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AGRO TOURISM: THE PATH TOWARDS RURAL DEVELOPMENT

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ABSTRACT
Agriculture play a crucial role in the Indian economy. About 65 percent of the rural population are dependent on agricultures as it contributes 13 percent of GDP and is biggest source of employment in rural areas. Due to low agriculture productivity and poor condition the Indian farmers have to face miserable life. Providing additional income generating activities to existing agriculture would certainly increase contribution of agriculture to national GDP. Agro - Tourism will serve this purpose. Agro tourism is the latest concept in the Indian tourism industry. It gives an opportunity to experience the real enchanting and authentic connection with real life. It has a direct impact on host culture and rural community creating needed employment and opportunities for development . Therefore this research paper attempt to understand the growth of agro tourism in India and its benefits to the farmers.

Keywords: Agro tourism, Rural development

INTRODUCTION
In today's world of liberalisation and globalisation travel and tourism is extensively recognised as an important civil industry worldwide which provides major potential for economic growth and development. For many developing countries it is one of the main sources of foreign exchange income and the number one export category creating much needed employment and opportunities for development. But the concept of traditional tourism has been changed. Some new areas of the tourism have emerged like Agro tourism. Agro tourism is an innovative agricultural activity related to tourism. it has a great capacity to create additional source of income and employment opportunities for farmers. Maharashtra is one of the major tourist centre in India. It gives an opportunity to the tourist to experience the real enchanting and authentic contact with the rural life, taste the local genuine food and get familiar with the various farming task during the visit. Tourist can relax and revitalise in pure natural environment. Due to the hectic and busy city life such form of tourism connect people with nature.

Agro tourism enables the tourist to experience rural life and see the agriculture activities. It includes opening up farms to tourist coming from urban areas and from abroad and letting them to take the experience of rural life. Apart from telling them about the crop and their varieties agro tourism exposes tourist to traditional village food, handicraft, culture, folk dance, bullock cart ride, milking cows and goat and picking farm fresh fruits and vegetables. This creates win win situation for the farmers who can earn better from such innovative resources and tourist can also enjoy village life at affordable prices.

OBJECTIVES OF THE STUDY
1. To understand the concept of agro tourism in India.
2. To understand various forms of agro tourism.
3. To indentify the benefit that agro tourism can provide to the farmers.
4. To recommend suitable course of action for creating awareness towards agro tourism.

RESEARCH METHODOLOGY.
The study is based on secondary data collection method by referring various reports on agro tourism, news articles and research articles available on web based resources

Concept of Agro Tourism
World Tourism Organisation (1998) defines agro tourism as " involves accommodation being offered in the farm house or in separate guest house, providing meals and organising guest activities in the observation and participation in the farming operation".

McGehee, Kim, Jennings(2007) explains agro-tourism as "rural enterprises which incorporate both a working farm environment and a commercial tourism component"

Essentials for developing agro tourism
In order to develop agro tourism the centre should have to arrange following activities:

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- Cultural festival where the tourist can enjoy religious places like temple, fort, stage play, rural games, bullock cart race, camel ride in which tourist can take part and enjoy
- Rural safari is an activity there tourist get to see the forest area, bird watching, fishing activity which can be though elephant ride.
- Rural exhibition can also be a part of agro-tourism package where there rural farms can organise farm equipment exhibition, craft exhibition, handloom exhibition fresh agriculture product market, processed food which the tourist can get attractive to and would be interest to purchase for their stores.
- Traditional food katta would be one of the initiatives where the rural farmer can serve traditional delicacies like traditional breakfast, lunch, traditional drink; traditional sweets and snacks can also be displays in this food zone.

Therefore through such innovative concepts related to agriculture and other non agricultural activities the agriculture tourism has a great capacity to create additional source of employment to the farmers. As the agriculture is completely depended on monsoon which is uncertain in India such agro tourism can prove to be the one of the solution to diversify the farm activity and earn money.

Benefits of Agro-Tourism

Generating employment and additional source of income: Agro tourism revolves around displaying the village life their hard ship and culture which world wide tourist are curious about. With the arrangement of various facets of farmers product these farmer get engaged in additional activities of earning which will keep them busy motivate them to excel in their field.

Revenue to the government: Agro tourism will be the great source of opportunities to the government as they can earn in dollars from foreign tourist who are keen to study India flora and fauna. Such money can be utilised in providing loan to these farmers for their extension activities like village festival, craft stores etc.

Recreation for stressed urban population: Due to busy work life in the urban areas most of the urbanites are living a stressful life where they look out new destination for holidays and weekends. Agro tourism can be one of destination with peace and tranquillity which is not possible in resorts of over crowded cities. Due to medical advices more of the urban population are leaning towards nature. Proximity to nature through birds, animals, mountains, crops, village etc. provides an atmosphere to urban people where they can forget their busy urban life.

Educative value: The agro tourism would create awareness about the life of the rural farmers. They will understand the ground reality which is never highlighted in media. Students who are in the field of agriculture science or those doing study on agriculture will get hands on experience about the agriculture activities that are carried on to produce crop which will make them aware about the importance of food and would avoid such wastage. Agro tourism enhances the social value of rural life and the challenges which they face every day.

Poverty alleviation and less suicides: Agro tourism help to reduce poverty as its creates additional sources of earning for the farmers who are jobless when there is no cultivation. This will reduce less suicides cases and such activities can be supported by the entire family and this will improve their standard of living which will lead to the community development.

Recommendation to improve agro- tourism in India

Wide Publicity. The government should initiate awareness campaign by promoting through various social media platforms like face book, Instagram etc which will provide global awareness toward agro tourism.

Organising workshops and seminars: The government agency should conduct workshop and seminars giving information to state nodal agency, or to farmers about the requirement to start the agro tourism in the respective states.

Effective Agro tourism Policies: To encourage the development of effective agro-tourism policies and regulations, as well a consistent interpretation of their intent.

Funding provision from various banks: The bank should provide necessary funding to these farmers as lack of funds has been one of the reason for less growth of agro tourism. With availability of loan at the concessional rate farmers will be motivated to diversified their activities.

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CONCLUSION

Agro tourism is considered as complimentary to traditional agricultural activities. It is an opportunity for farmers to use the available resources in a diversified and innovative ways. It creates win win situation for farmers and tourist. Farmers can earn better form such innovative use of available resources and the tourist can enjoy village life and nature in an affordable price. Some cases of agro tourism in Maharashtra in District Raigad, Pune, and Satara have proved that agro tourism not only bring development to farmers but to the village as a whole from socio and economic angle. To initiate growth the government should give priority to agro tourism business through appropriate policy measures.

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A BRIEF OVERVIEW OF GOVERNMENT MEASURES IN AUGMENTING AGRICULTURAL FINANCE

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ABSTRACT
Agricultural is considered as the backbone of the Indian economy. It is a source of employment for around 58 % of the total working population of the country though it contributes around 18% of the national income. The significance of the sector stems from the fact that a sizeable proportion of industries in India are agro based or agro-dependent. It is a vital clog in the supply demand chain for the manufacturing sector in India. The Economic Survey 2018 notes that the agriculture sector is in a period of continuous stress. Policy experts opine that urgent measures need to be undertaken by the government to relive the stress faced by the agricultural sector which apart from being labour intensive and capital deficient is also a sensitive political group which no political formation in democratic India can afford to ignore. Growth and modernization of Indian agriculture is vital to ensure food security in face of fast-growing population as well as to maintain the tempo of the development experienced by the Indian nation post the economic reforms of 1991. Modern farming and irrigation equipments, high yielding varieties, fertilizers, pesticides and other inputs require high capital investments. In spite of a substantial development of private sector in field of agricultural finance, the small and the marginal farmer has been excluded from the Indian agricultural growth story. The story of the growth and development of agricultural finance in India has been primarily government driven. The current study seek to undertake a brief review of government measures in post independent era in augmenting agricultural finance.

Keywords: Agricultural finance, capital inputs, measures

INTRODUCTION

Agricultural is considered as the backbone of the Indian economy. It is a source of employment for around 58 % of the total working population of the country though it contributes around 18% of the national income. The significance of the sector stems from the fact that a sizeable proportion of industries in India are agro based or agro-dependent. It is a vital clog in the supply demand chain for the manufacturing sector in India. The Economic Survey 2018 notes that the agriculture sector is in a period of continuous stress. Policy experts opine that urgent measures need to be undertaken by the government to relive the stress faced by the agricultural sector which apart from being labour intensive and capital deficient is also a sensitive political group which no political formation in democratic India can afford to ignore.

Growth and modernization of Indian agriculture is vital to ensure food security in face of fast growing population as well as to maintain the tempo of the development experienced by the Indian nation post the economic reforms of 1991.Given that a vast majority of Indian farmers are land poor, capital scarce and are divorced from the modern mechanized and high yielding agricultural techniques, a concerted effort on the part of the government is required to push the Indian farmers on the path of modernized farming. Modern farming and irrigation equipments, high yielding varieties, fertilizers, pesticides and other inputs require high capital investments.In spite of a substantial development of private sector in field of agricultural finance, the small and the marginal farmer has been excluded from the Indian agricultural growth story. The story of the growth and development of agricultural finance in India has been primarily government driven. The current study seek to undertake a brief review of government measures in post independent era in augmenting agricultural finance by adopting the descriptive analytical methodology.

OBJECTIVES OF THE STUDY

1. To review the measures undertaken by government in augmenting agriculture finance.
2. To study the pattern of government expenditure on agriculture in India.

RESEARCH METHODOLOGY

The study is based on descriptive analytical approach using secondary data from authentic and reliable sources such as government agencies reports, websites, newspapers, research journals etc.

Government Expenditure on Agriculture.

Agriculture has been the corner stone of all economic policy post independence.In his landmark budget speech unveiling the new economic reforms of 1991, the then Finance Minister Manmohan Singh stressed that government would continue to ensure that 50 per cent of the plan resources are invested in the agricultural and

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rural sector.Table I below offers a birds eye view of budget allocations and utilizations post 1991 by successive governments in India. As can be observed, though the budget allocations improved substantially over the period, the actual utilization ratio remained poor highlighting the inefficiencies of the government machineries in reaching out to the poorest and the most excluded of farming communities in the country.

Table-I: Year-wise Expenditure by Departments under Ministry of Agriculture & Farmers Welfare

Year	DAC&FW			DARE			DAHD &F		
	Budget Estimate	Revised Estimate	Actual Exp.	Budget Estimate	Revised Estimate	Actual Exp.	Budget Estimate	Revised Estimate	Actual Exp.
1	2	3	4	5	6	7	8	9	10
1991-92	1041.35	1016.93	957.86	190.00	180.51	173.07	-----	-----	-----
2001-02	1985.00	1985.00	1792.9	684.00	550.00	683.69	300.00	240.00	239.68
2004-05	2650.00	----	2657.4	1000.00	900.00	881.81	500.00	-----	566.22
2009-10	11307.0	10965.2	10870	1833.37	1821.32	1821.2	1100.00	930.00	873.38
2010-11	15042.0	17254.0	17052	2307.50	2307.50	2529.2	1300.00	1257.00	1104.6
2011-12	17122.8	16515.0	16355	2808.54	2858.54	2831.6	1600.00	1356.52	1243.1
2012-13	20208.0	17867.3	17731	3232.00	2520.00	2519	1910.00	1800.00	1736.7
2013-14	21609.0	19000.0	18722	3415.00	2600.00	2599.9	2025	1800.00	1748.6
2014-15	22309.0	19530.0	1919	3715.00	2500.00	2456.8	2174	1800.00	1738.1
2015-16	16646.3	15500.0	15028	3691.00	3000.00	2988.6	1491.14	1491.14	1410.3
2016-17	20400.0	29411.3	26639	3700.00	3166.58	2989.6	1600.00	1748.02	1743.1
2017-18	41855.0	41105.0	28908	6800.00	NA	3138	2371.00	2166.74	1511.2

Source: Ministry of Agriculture & Farmers Welfare

DAC&FW: D/o Agriculture, Cooperation & Farmers Welfare

DARE: D/o Agricultural Research and Education

DAHD&F: D/o Animal Husbandry, Dairying & Fisheries

Eleventh and Twelfth Plan Outlay on Agriculture;
Regional disparity has been the bane of Indian agriculture since time immemorial. Though regional disparity has decreased over the plan periods it still exists in an alarming proportion. A stark regional disparity regards planned agricultural outlay for the 11^{th} and 12^{th} plan can be observed from Table II below.Though the government has attempted to tackle the issue of regional disparity by allocating more percentage of funds to the hitherto agricultural backward states, the actual volume of capital input remains low.

Table-II: Comparison of States Outlay and Expenditure for 11^{th} & 12^{th} Plan

State	**Eleventh Plan Outlay**		**Eleventh Plan Expenditure**		**Twelfth Plan Outlay**		
	Agriculture & Allied Sector	% of Total Plan	Agriculture & Allied Sector	% of Total Plan	Agriculture & Allied Sector	% of Total Plan	Increase in Twelfth Plan over Eleventh Plan Expenditure (%)
1	2	3	4	5	6	7	8
Andhra Pradesh	3487.44	2.4	9510.46	6.0	17138	5	80
Arunachal Pradesh	752	9.5	617.71	5.7	1114	5.3	80
Assam	877.86	2.1	2335.56	7.8	3272	5.9	40
Bihar	3672.73	4.8	4805.33	6.3	15613	6	225

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Chhattisgarh	4613	8.6	5637	12.7	8284	6.9	47
Goa	211.76	2.5	325.39	3.6	1046	3.9	221
Gujarat	9092.94	0.7	8879.8	6.9	19712	7.8	122
Haryana	1638.82	4.7	2733.02	5.7	6288	5.4	130
Himachal Pradesh	1470.08	10.7	1642.82	12.1	2174	9.7	32
J&K	1818.21	7	892.98	3.5	2843	9.7	218
Jharkhand	3130.53	0.8	2319.85	5.9	4157	3.8	79
Karnataka	8426.85	8.3	10484.4	7.7	19824	8.9	89
Kerala	2649.11	7.8	2931.54	7.6	8831	11.5	201
Madhya Pradesh	3408.18	4.8	6057.09	7.3	17076	8.5	182
Maharashtra	9507.64	5.9	10636.4	7.3	19325	7.03	82
Manipur	386.55	4.7	234.04	3.2	643	3.1	175
Meghalaya	735.52	8	845.2	9.8	2114	10.7	150
Mizoram	536.31	9.6	387.86	7.1	346	2.8	---
Odisha	1230.29	3.8	3580.37	8.2	8387	7.4	134
Nagaland	434.31	8.3	725.08	11.3	1795	13.8	148
Punjab	1309.13	4.5	1410.77	4	1524	2.9	8
Rajasthan	2919.07	4.1	5990.67	6.2	7255	5.6	21
Sikkim	260.43	6.9	228.27	6.4	469	4.1	106
Tamil Nadu	7831.57	9.2	8170.01	8.8	20680	10	153
Tripura	798.51	9	858.79	11.3	980	6.8	14
Uttar Pradesh	19146.37	10.6	14164.8	7.8	24354	8.5	72
Uttarakhand	2478.5	8.4	2079.25	10	2673	5.9	29
West Bengal	1846.5	2.9	3339.26	5.1	8583	5.5	157
Total States	**94670.2**	**3.6**	**111823.72**	**7.2**	**226500**	**7.1**	**103**

Source: 12th Plan Document, Planning Commission

Proportion of Government Outlay(Plan) on Agriculture and allied activities:

As per the Economic survey 2018 around 58% of the total workforce is employed in agriculture and allied activities. An analysis of the share of agriculture and allied activities in total plan outlay will enable us to

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investigate the focus of the government in invigorating this vital sector of the Indian economy. Table III offers comparative analysis of the proportion of Agriculture and allied activities plan outlay from the Ninth Plan to the 12th Plan. While the Ninth Plan offered the maximum proportion of 4.9% of the total outlay, the 11th and 12th plan(2012-2014) came pretty close to the figure.Sadly, post 2014, the proportion has more than halved.The statistics available can explain the co-relation between reduced government outlay and increased levels of stress among the agricultural community in rural India in the present times.

Table-III: Plan-wise share of Public Sector Outlays and Expenditure under Agriculture and Allied Activities

Five Year Plan / Annual Plan	Agriculture and Allied Activities		Total Plan Outlay		% Share of Allied Activities	
	Plan Outlays	Actual Expenditure	Plan Outlays	Actual Expenditure	Plan Outlays	Actual Expenditure
1	2	3	4	5	6	7
Ninth Plan (1997-2002)	42462	37239	859200	941041	4.9	4.0
Tenth Plan (2002-07)	58933	60702	1525639	1618460	3.9	3.8
Eleventh Plan (2007-12)	136381	163105	3644718	3676936	3.7	4.4
Annual Plan (2007-08)	17971	20083	558765	475012	3.2	4.2
Annual Plan (2008-09)	27270	27117	684288	628161	4.0	4.3
Annual Plan (2009-10)	28772	29498	794616	717035	3.6	4.1
Annual Plan (2010-11)	36983	40370	929725	826268	4.0	4.9
Annual Plan (2011-12)	46255	46037	109720	1030461	4.2	4.5
Twelfth Plan (2012-17)	363273	NA	766980	NA	4.7	NA
Annual Plan (2012-13)	56669	52521	125171	971951	4.5	5.4
Annual Plan (2013-14)	64098	61356(RE)	137093	1281022	4.7	4.8
Annual Plan (2014-15)	11531	9795	484532	420882	2.4	2.4
Annual Plan (2015-16)	11657	10942(RE)	578382	582707(RE)	2.0	1.9
Annual Plan (2016-17)	19394	NA	706248	NA	NA	NA

Source: Economic Survey and Budget Documents, Ministry of Finance

Institutional credit to small farmers

Government has taken several measures to increase institutional credit flow and to bring more and more farmers including small and marginal farmers within the institutional credit fold. These measures, inter alia, include the following major steps to provide hassle free crop loans to farmers including small and marginal farmers:-

i) Under the Interest Subvention Scheme (ISS)Short Term Crop loans upto Rs.3 lakh are extended to farmers at a subvented interest rate of 7% per annum for a period up to one year. In case of prompt repayment, the farmers can avail a prompt repayment incentive of 3% per annum and thus the effective rate of interest on such loans is only 4%.

ii) The ISS also provides for post harvest loans for up to 6 months at the same rate of interest as Short Term Crop loans to Kisan Credit Card holding Small and Marginal Farmers, to encourage them not to resort to distress sale and instead store their produce in Warehouses accredited with Warehousing Development Regulatory Authority (WDRA) against Negotiable Warehouse Receipts (NWR).

iii) Reserve Bank of India (RBI) has issued Priority Sector Lending Guidelines (PSL), which mandate all Domestic Scheduled Commercial Banks to earmark 18% of their Adjusted Net Bank Credit (ANBC) or Credit Equivalent amount of Off-Balance Sheet Exposure (OBE), whichever is higher, as on the corresponding date of the previous year, for lending to Agriculture. Within the 18 percent target for agriculture, a sub-target of 8 % for small and marginal farmers has been fixed to help in increasing the flow of credit to small and marginal farmers.

iv) As per PSL guidelines loans to distressed farmers to repay non-institutional lenders are eligible under priority sector. Besides loans to stressed persons (other than farmers) not exceeding Rs. 1,00,000/- per borrower

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to repay their debt to non-institutional lender are also eligible for the purpose of priority sector lending by banks.

v) The Government implements the Kisan Credit Card (KCC) Scheme aimed at providing adequate and timely credit support from the banking system under a single window to the farmers for their cultivation and other needs. In terms of master circular dated July 03, 2017 of RBI, tenant farmers, oral lessees or share croppers are also covered under the KCC Scheme. The Scheme provides for sanction of the limit for 5 years with simplified renewal every year. All the banks have been advised to implement the scheme. The issue of smart–cum debit card, mandated under the revised guidelines, is enabling the farmers to access multiple delivery channels.

vi) To bring small, marginal, tenant farmers, oral lessees, etc. taking up farm activities, off-farm activities and non-farm activities, into the fold of institutional credit, Joint Liability Groups (JLGs) have been promoted by banks. The announcement of Union Budget for 2014-15 for financing of 5 lakh JLGs of 'Bhoomi Heen Kisan' (landless farmers) has given further credence to efforts of National Bank for Agriculture and Rural Development (NABARD) in innovating and reaching out to the landless farmers through JLG scheme of financing.

vii) Banks have been advised by RBI to waive margin/security requirements of agricultural loans upto Rs.1,00,000/-, vide RBI's circular dated 18th June, 2010.

viii) RBI has issued directions for Relief Measures to be provided by respective lending institutions in areas affected by natural calamities which, inter alia, include, restructuring/rescheduling of existing crop loans and term loans, extending fresh loans, relaxed security and margin norms, moratorium, etc. These directions have been so designed that the moment calamity is declared by the concerned District Authorities they are automatically set in motion without any intervention, thus saving precious time. The benchmark for initiating relief measures by banks has also been reduced to 33% crop loss in line with the National Disaster Management Framework.(RBI)

CONCLUSION

Successive governments over the years post independence have taken measures to develop Indian agricultural by augmenting finance availability to all farmers especially the small and the marginal land holders.From cash subsidies, priority lending, loan waivers , governments have tried to enhance the well being of the farming community and motivate them to transform into modernized farming. Nonetheless, given the scale of the farming community and the significance of the agricultural sector in the Indian socio-political ethos, a massive planned and concerted government led effort is required to enable this vital sector to attain world beating capabilities. Failure to rise up to the challenges to channelize quality finance input into the agricultural sector may prove to be disastrous for the nation as a whole.

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FEMINIZATION OF AGRICULTURE IN INDIA: IS THIS AN OPPORTUNITY FOR SUSTAINABLE AGRICULTURE?

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ABSTRACT
Post-liberalization era is witness to a phenomenon called 'Feminization of Agriculture' in many parts of the world and that has drawn attention of the policy makers. Women's access to agriculture is because of out-migration of rural men. Post-reform period has witnessed to the disproportionate access of women in agriculture across the globe including India.

In this regard, this paper aims to conceptualize the phenomenon called 'Feminization of Agriculture' and its process. This is depicted in Section-I. Section-II deals with investigating the trend of feminization of agriculture in India. Section-III analyzed the cost and benefit of feminization of agriculture in India and its policy imperative.

Keywords: Feminization of agriculture, gender inequality, productivity, women farmer, SAP, Social protection etc.

1.1: INTRODUCTION

Today, two and half decades after the structural adjustment program (SAP), most of the countries of the globe have recognized the negative impacts of financial globalization specifically on the marginalized sections of the society. If we combine the contribution of women in agriculture and allied sectors like- livestock conservation, water conservation, fisheries, forestry, work related to common property resources, the share of women is way ahead that of men.

The phenomenon called feminization of agriculture is not restricted to India, but in fact it has been observed in Asia, South-East Asia and many parts of west Asia. The main reason for feminization of agriculture is the out migration of men from low paid jobs in agriculture to high paid jobs in industry. Data shows that 33.7 per cent rural men and 44.6 per cent of urban men migrated for employment. But women's migration remains low i.e. 3.6 per cent in rural and 3.7 per cent urban areas. High wage rate encourages rural migration but women's are unable to take the advantage of it due to her household position and constrained. In fact, women's have no option other than accepting low paid work in agriculture.

The activities that are performed by women in Indian agriculture includes, sowing, weeding, protection of fields, winnowing and storing. Besides, women are involves-looking after cattle, collection of fodder and milking. By and large, women's presence in agriculture helps the development of agriculture, protecting bio-diversity and maintaining food security in the households.

1:2: OBJECTIVES

1. To conceptualize feminization of agriculture and its process.
2. To investigate the trend of feminization in Indian agriculture.
3. To analyzed the cost and benefit of feminization of agriculture in India and its policy imperative.

Section-I

1:3: Conceptualizing Feminization of Agriculture:

Guy Standing (1989)[1] argues that feminization of labour force is a process through which women are substituted for men and many works converted in to works traditionally done by women. Guy standing further explains the new dimensions of feminization.

First, feminization refers to a situation refers to a situation of any economy where unemployment rate of women is falling at a lower level than men. Second, feminization may occur if women occupy the jobs traditionally occupied by men. Third, feminization as a declined in sex segregation. Fourthly, feminization leads to increase in static jobs. Guy Standing is also of the view that feminization of labour force related to growing insecurity in labour force due to capital's desire for more disposal labour. Agriculture is the sector of an economy where

[1] Guy Standing 1999, 'Globalization through Flexible Labour: A Theme Revisited', World Development, Volume, 27, No. 03.

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women have been involved since its inception. But their involvement varies from place o place and time to time. UNDP has indicated that 67 per cent of words worked done by women.

According to de Bueuw, 'An increase in the percentage of women in agriculture lahour force relative to men'. This either happens in the form of more women working in agriculture, fewer men's are working in agriculture or declining in the percentage of both men and women in agriculture work force. But the declining rate of men workforce is greater than women workforce.

The term of 'feminization of agriculture' refers to increasing participation of women in agriculture activities. Katz (2003)[1] and Deere (2005)[2] had provided specific definitions for feminizations of agriculture. It says that an increase in women's participation rate in agriculture sector either as self-employed or as agriculture wages. An increase in percentages of women in agriculture labour force relative to men, either because of more women is working or because of fewer men is working in agriculture.

Feminization[3] of labour is the increased participation by and integration of women in the workforce. The term like feminization of labour exists itself is indicative of the fact that the society we live is sexist-that believes that the natural place for women is at home, doing unpaid house labour and tending to children.

Feminization of labour describes the changing nature of employment where irregular conditions once thought to be the hallmarks of women's 'secondary' employment have become widespread for both sexes. In general, increasing number of women has been incorporated into paid employment under condition inferior to men[4].

Section: II

1:4: Feminization of Indian Agriculture:

Economic survey (2018), Census 2001 and 2011 have highlighted the growing trend of feminization of agriculture. According to census 2001, the proportion of women marginal workers in rural areas has reached to 51 lakh as compared to 30 lakh men. Table-03 has already shown that the composition of main to marginal workers among women workers have changed from 70:30 in 1991 to 54.46 in 2001. The share of men worker in the 'main workers category' remains high. In the past decades, most of the women workers were marginal workers, but this trend has changed men workers are also started appearing as a marginal workers.

Besides, it has been observed that the participation of both men and women are decreasing but the rate of decrease is faster among men worker as compared to women. Agriculture census (2010-11) reveled that out of 11.87 crore cultivator, more than 30 percent are women. In case of agriculture labour, out of 14.43 crore, 42.6 per cent are women. Similarly, Census 2011 have shown that there the percentage of women workers (agricultural laborers) has increased by 24 per cent during 2001 to 2011. Census 2011 has also pointed out of total women employed in agriculture sector, 55 per cent are agriculture labour and 24 per cent are cultivator. Let's understand the trend of feminization of Indian agriculture with some data.

Increase share of women in the agriculture workforce:

The process of feminization of Indian agriculture is evident from the statistics given below. The workforce structure of rural main and marginal workers shows that 4 per cent shift of rural workforce in favor of women (Table-1). But in term of percentage of men workforce has actually declined by 4 per cent.

Structure of rural workforce in India (Figures in Crores)

[1] Katz Elizabeth 2003, 'The Changing role of women in the Rural Economies of Latin America', CUREMIS II: Volume-I, Latin America and the Caribbean's. Rome, FAO.

[2]Deere, Carmen Diana 2005, 'The Feminization of Agriculture? Economic Restructuring in Rural Latin America (Occasion Paper

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[4]Nazneen Kanji and Kalyani Menon-Sen 2001, 'What does the Feminization of Labour Mean for Sustainable Livelihoods?, World Summit on Sustainable Development Opinion, International Institute for Environmental and Development (IIED), May 2001.

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Table: 01

	1991	Percentages	2001	Percentages
Women	8.43	0.32	11.14	0.36
Men	16.80	0.68	19.92	0.64
Men + Women	24.90	1.00	31.06	1.0

Source: Census of India – 2001

Share of women workers among the main and marginal workers (in per cent)

Table: 02

All India	Women main workers to all main workers	Women main workers to all main workers	Women marginal workers to all marginal workers	Women marginal workers to all marginal workers
	1991	2001	1991	2001
Total	22.48	23.20	90.41	60.89
Rural	25.19	26.27	91.38	63.12
Urban	12.10	14.75	72.59	39.24

Source: Census of India – 2001.

Data depicted in table-2 shows that the share of rural women as a main worker to all main workers has increased marginally from 25.19 per cent to 26.27 during 1991 to 2001. Similarly, the percentage of urban women in the similarly category has also increased from 12.10 to 14.75 percentage during the same period of time.

Percentage increase in main and marginal workers in rural India from 1991-2001- Rural (Persons in Crore)

Table: 03

	Total (Main + Marginal)			**Main Workers**			**Marginal Workers**		
	Persons (M +W)	Men	Women	Persons (M +W)	Men	Women	Persons (M +W)	Men	Women
1991	24.93	16.86	8.04	22.22	16.62	5.6	2.67	0.23	2.44
2001	31.66	19.92	11.14	22.96	16.93	6.03	8.08	2.98	5.11
Difference	6.16	3.06	3.10	0.73	03.32	0.43	5.42	2.75	2.66
Percentage Increase	19.84	15.36	27.84	03.21	01.80	07.20	66.98	92.28	52.20

Source: Census of India – 2001

The total share of main and marginal worker in agriculture has increased from 24.93 to 31.66 during 1991 to 2001. The share of main and marginal workers in agriculture is 19.84 per cent. Main and marginal women workers have increased to 27.84 per cent from 15.36 per cent during 1991 to 2001. A woman as a main worker in agriculture sector shows an improvement from 5.06 per cent to 6.03 per cent during the same period. But a woman as marginal workers shows significant increase of 52.20 per cent during 1991 to 2001. It means women are absorbed in agriculture sector not as a main worker but marginal workers.

Increase women marginal workers

Table: 04

	Total workers Persons (M + W)	Main workers Persons (M + W)	Marginal workers Persons (M + W)	Main workers to total workers (%)	Marginal workers to total workers (%)
Census 1991 (Persons in Crore)					
Total	31.01	28.59	02.82	91.02	08.98
Rural	24.90	22.22	02.67	89.26	10.74
Urban	06.60	06.46	00.14	97.79	02.21
Census 2001 (Persons in Crore)					
Total	40.25	31.31	08.93	77.80	22.20
Rural	31.06	22.96	08.09	73.97	26.07
Urban	09.18	08.35	00.83	90.90	09.10

Source: Census of India 2001

Table-04 shows that among the rural workforce, the share of marginal workers increased from 02.67 crore to 08.09 crore during 1991 to 2001. Rural marginal workers have increased from 10.74 per cent to 26.07 per cent

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during the same time period. Among the marginal workers, the share of women remains high. But the share of main workers to total workers has declined from 89.26 to 73.97 per cent.

Section: III

1:5: Is feminization of agriculture is an opportunity for empowerment?

Growing presence of women in agriculture has benefited them, sited by many studies. It also helps to secure food security in the household. Women, being economic producer can influence decision making in household? In this regards, the empirical results are not consistent. But some evidences have revealed that women's larger participation in the wage employment in agriculture has increased decision making ability. Women's are successful in the management of property or land, wedding arrangement of children, investment etc. Wage employment provides economic independence, mobility and ability to make decisions. These changes have brought positive impact on social as well as production relations at the household level. Women working in non-traditional export led agro-business; they are likely to benefit more as compared to conventional agriculture.

Cost of feminization of agriculture

The disadvantage includes the labour intensive task that is time consuming; wages are lower as compared to men. Men and women invest equal time in agriculture, but the large differences in wages are disappointing. A woman plays multiple roles in the production of agriculture commodities, harvesting and post-harvesting processing. They act as a producers, agricultural wage laborers as well as supplier of temporary, seasonal and causal workers. Due to multitasking, sometime women's not able to cultivate their own land, unable to arrange inputs for their one land such as labour, seeds and fertilizer.

Women's access to agricultural puts additional pressure on them because they have to perform daily household work. In the absence of women, daughter continues the domestic work. Girl child is often pulled out from school to take the domestic responsibilities as well as taking care of old and siblings.

It means that women's wage employment either in agriculture or any other sector of economy has not reduced unpaid work in households. Declining social protection due to economic liberalization has shifted women from paid to unpaid economy. This has negatively affected women's health and wellbeing of the households. Women's increasing participation in the labour market has also affected her participation in public life. Most of the women's are still excluded from public life due to increasing workload as well as the biases that exist in the structure and process for participation.

1:6: CONCLUSION

It has been observed that feminization of agriculture has impacted women on both social and economic spheres. On social sphere, it creates social injustice to women because of the added burden of agriculture work. Institutional and technological hindrance highlighted their secondary status in the society. The access to agricultural wage employment indirectly restricts the access of women in other fields of the economy.

The matter of fact is feminization of agriculture accelerates the presence of women at low paid employments. It's not enough that liberalization has brought more opportunities for women. The larger agenda for sustainable agriculture needs rethinking of current agriculture policies - like- labour market reform, access to credit, adequate social protection policies etc.

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AGRI- TOURISM AND SAGUNA BAUG, NERAL

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1. INTRODUCTION

Services sector plays a dominant role in contributing to the India's GDP. it also attracts significant foreign investment flows, contributing significantly to exports as well as providing large-scale employment. It has contributed 57.12 per cent of India's Gross Value Added at current prices in H1 2018-19, visibly a significant value. Agriculture being the backbone of Indian Economy contributes good 18% of India's GDP and employs 50% of India's workforce. Tourism sector in India is today considered a dynamic instrument for employment generation, poverty alleviation and sustainable development. During 1999-2000, direct employment created by this sector was 15.5 million. In India today, the tourism sector is one of its fastest growing service sub-sectors, contributing around 10% if its GDP.

A relatively new and innovative tourism avenue today is Agri tourism that is rapidly gaining limelight in India and abroad. It is especially rapidly growing in **Maharashtra that now boasts of over 150 Agri Tourist Centres (ATCs).** It offers unique experiences ranging from picking our own fresh vegetables at an orchard, to trying your hand at calf roping or kayaking in the dam waters, to a hay ride in a bullock cart at a pumpkin farm or even simply sitting back and taking in the joys of being one with nature. Such unique experiences in a rural setting rejuvenate the affluent urban tourist who is continuously exploring new vistas of enjoyment.

2. ABOUT SAGUNA BAUG, NERAL

Saguna Baug, is an eco-friendly agricultural farm located at the foothills of Matheran in the Neral village. It was set up around the 1960s on Gandhian principles of self-sustenance. Its founder, Shri Harikaka Bhadsalve was a Gandhian freedom fighter who wanted to popularize a self-sustaining farm model in the country. The idea was to duplicate this model not only in the state of Maharashtra, but also across the country. The farm is located in a picturesque setting and surrounded by the perennial Ulhas River. Visitors to the farm experience farm life, and learn about their innovative farming methods that provides rural employment and opportunities for the youth of villages in the vicinity. They also engage in a number of rustic, fun-filled and adventurous activities on the farm.

3. REVIEW OF LITERATURE

Thanasis Kizos & Theodoros Iosifides (2007), in their research thesis titled, "The Contradictions of Agrotourism Development in Greece: Evidence from Three Case Studies" understood that, Agrotourism is considered to be and is promoted as an important 'tool' for rural development in Europe. Specifically, this paper highlights the divergence between official objectives and basic characteristics of the sector's development trajectory in Greece.

McGehee, N. G., & Kim, K. (2004) their research study titled, "Motivation for Agri-Tourism Entrepreneurship" studied the motivations for agri-tourism entrepreneurship among Virginia farm families. Respondents indicated that Virginia farm families owned small farms, utilized farming as a secondary income source, and indicated their most popular agritourism activities to be pick-your-own produce, Christmas tree sales, hayrides, children's educational programs, petting zoos, and on-farm festivals.

C. Contini, P. Scarpellini, R. Polidori, (2009) in their research paper titled, "Agri□tourism and rural development: the Low□Valdelsa case, Italy", analyzed the demand of tourists who stay in agri□tourist facilities and also assess the impact of agri□tourism on local development in terms of income and employment. The study was conducted in Tuscany, a region which is famous in terms of the Italian agri□tourist supply and has a strong attraction for tourists seeking natural resources, the countryside and the local culture.

Christine,T., Carla Barbieri (2012), research thesis titled, "The perceived benefits of agritourism: The provider's perspective" examines the perceived benefits of agritourism by examining the importance of the activity in attaining 16 goals of farmers receiving visitors for recreation on their farms. Results showed that agritourism mostly serves to capture new farm customers, educate the tourists about agriculture and enhance the quality of life for the farmer and his family, which represents both, economic and non-economic benefits.

Che, D., Veeck, A. & Veeck, (2005), study titled, "Sustaining production and strengthening the agritourism product: Linkages among Michigan agritourism destinations", analysed how entrepreneurial farmers have strengthened Michigan agritourism by fostering producer networks through brochures and web linkages,

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information sharing in refining the agritourism product, referrals to other agritourism businesses that serve different markets and/or offer different products, purchase linkages, and a regional approach to establishing agritourism destinations and increase visitation.

4. OBJECTIVES OF THIS RESEARCH STUDY

1. To check the level of awareness/popularity of 'Agri-Tourism' and its potential for growth in the country.
2. To explore the emergence of agri-tourism as a new vista for sustainable lifestyles
3. To understand and appreciate the functioning of agri-tourism centre at Saguna Baug.
4. To access the impact of agri-tourism centre on the lives of the people living in the vicinity.

5. RESEARCH METHODOLOGY

To collect the requisite information for our study, the following methods for data collection were adopted.

1. **Observation Method**: Through a field visit, the entire functioning of agro-tourism center, Saguna Baug was studied. The various activities available were seen and experienced first hand. Interactions with the villagers involved in the procedure also took place.
2. **Survey method:** A suitable questionnaire was made and circulated via social media groups to understand the level of awareness amongst the masses about the concept of 'Agi-Tourism'. A total of 151 responses were received from Mumbai. Representatives from different age groups (86% being between 16-40 years) and occupations (77% students and 23% working) were covered. Half or 50% of the respondents had family income below Rs. 2 lakhs per annum, 23% between Rs. 2-5 lakhs, 10% between 5-10 lakhs and remaining 17% above Rs. 10 lakhs, thus well representing the Indian masses.

6. HYPOTHESIS/ CONJECTURES

1. There is huge potential for Agri-tourism to grow in the country.
2. Saguna Baug ATC Model is a catalyst in the rural growth and development in Maharashtra.
3. Saguna Baug ATC has grown because of its huge educational appeal and innovative farming methods.

7. DISCUSSION AND ANALYSIS

While the surveyed groups had excellent awareness about agri-tourism and its benefits to the farmers, society and country, only one third had actually visited an ATC. Also a significant 26% had visited Sagunabaug. An overwhelming 62% of these came to know about Saguna baug from word of mouth (i.e. from friends/ family/ relatives/ colleagues) and/or 28% from online sources, 12% through advertisements and 7% through tour operators. Clearly sufficient scope and potential exists for agri-tourism to grow in the country.

During the **guided farm tour at Saguna baug**, the tourists are explained about all the various farm activities that help generate income and sustain the livelihoods of people living in the nearby village. The most impressive among the farm activities, ranging from growing various crops to Honey-bee culture and fishing, is the cultivation of rice that uses their own indigenous **Sagunabaug Rice Technology or SRT** (see picture below)**.** The guide proudly displays this simple and yet very innovative technology. The 'equipment' is just a light iron frame that is lifted and dropped onto the permanently raised beds (to be made only once) of soil. When kept aside, it reveals tiny holes, into which the seeds can be dropped. The top soil can then be just tapped on with the shoes to cover the seeds that were put in. This simple procedure does away with the requirement of the heavy wooden plough that needs the oxen or tractors to pull it. Research is underway to develop more sophisticated avatars of this crude yet innovative tool. Today the Saguna baug rice is a brand in itself!

Above: Staff and students from VES College of Arts, Science and Commerce understanding SRT in an educational trip.

Some features of SRT:

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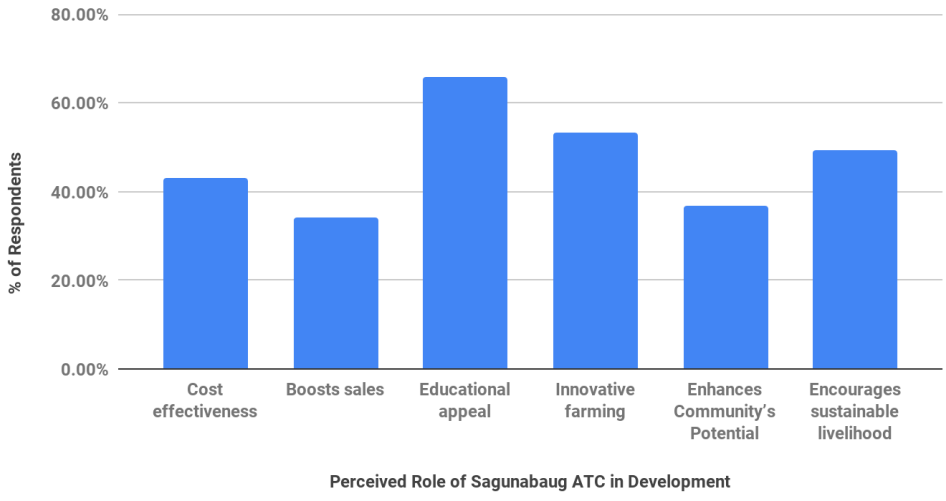
- It is a Conservation Agriculture (CA)/ eco-friendly type of method of cultivation that preserves life forms like earthworms and attracts birds
- Compatible with organic farming and crop rotation
- No ploughing, no hand hoeing for seed planting, no tilling, no puddling and no transplanting, no dependance on optimum monsoon
- Raised soil beds ensure optimum moisture and sufficient oxygen right upto the roots
- No laborious work by farmers
- Helps in maintaining soil fertility as there is no puddling leading to fertile topsoil loss and so lesser fertilizers used
- It plants the crop at precise and predetermined distances to ensure ideal growth space for the plants, uniformity of produce and greater yield in all soil types with higher returns
- Saves 30-40% cost and 50% labour when compared with conventional methods.

The SRT has proved to be a hit in especially all educational tours and never fails to impress students and teachers alike as also farm enthusiasts. Sagunabaug also provides fun activities for the conventional tourist like Kayaking, bird watching, cycle ride, fish farming, rope mallakhamb etc. along with stay facilities.

Also, during the field visit, the interaction with the group guide revealed that the entire village nearby was sustaining itself by working on the farm in various agricultural activities, as tourist guides and as staff for maintaining the infrastructure including the tourist residential quarters. The tourists brought additional earnings for the farm and its dependents that was instrumental in supplementing their farm incomes. The villagers could now afford to educate their children and there were many first generation learners upto the college level, some of whom had regular jobs in the cities.

The farm incomes were also boosted with development of the indigenous SRT, which itself became the high point of the farm tour in due course of time. Sagunabaug becoming a well known ATC, the SRT farm innovation here and growth in farm incomes, all have boosted this areas growth and development. According to the Government of Maharashtra, Department of Agriculture, **Success story under NSFM programme on SRT (2015-16)**, the implementation of SRT in Medha and Kudal Agriculture Circle of Jaoli Taluka as a pilot project, was a huge success and increased yields there on the experimental plots. Farmers in the pilot project reported around 22% increase in productivity, 27% reduction in cost, improvement in soil quality, reduction in labour efforts and implementation of multiple cropping. They expressed desire to use SRT for their total cultivated area for rice and other crops as well. Indeed duplicating the Saguna baug success story elsewhere would further boost growth and development of those regions.

Chart 1: Perceived role of Saguna baug ATC in Rural Development



The chart above giving the visitors responses based on their interactions at the farm also resonate the same i.e. they too feel that such an ATC is cost effective, boosts sales, enhances the community's potential and encourages sustainable livelihoods. Additionally a notable 66% are impressed by its educative powers and 54% by its innovative farming techniques.

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On account of the above, **all the aforementioned hypothesis stand corrected.**

8. CONCLUSION

In an agriculture-based country like India, Agri tourism has the capacity to create a win-win situation for all the stakeholders: the farmers, the tourists, the state as well as the country. The fact that 81.4% respondents wish to visit an ATC shows that the urban population is tilted/ inclined towards the idea of exploring the rural side of our nation. Ideas can be explored to attract these willing population and convert them into customers. Also the profile of Indian tourists seems to be changing, from just seeking entertainment/ relaxation to "edutainment" i.e. adding the flavour of education and adventure to rejuvenation.

According to the results obtained from the conducted survey , it can be concluded that the respondents to a great extent had an idea about the concept of 'agri-tourism'. For them, agri tourism provides opportunities to be engaged in various activities. When given an opportunity to tick multiple options that describes agri-tourism to them, 46.6% believed it comprise of outdoor recreation, 65.8% selected educational experience, 47.9% believed hospitality services to be it's highlight, whereas, 30.1% ticked entertainment. Only 0.7% believed it to be responsible for environmental protection.

It was is understood that agri-tourism is seen as a new vista for sustainable lifestyles. 49.3% respondents believed it encourages sustainable livelihoods, which is the need of the hour. Agri-tourism is also seen as a way of enhancing community's potential by 36.8% respondents.

The field visit to the agri-tourism center helped us understand and appreciate the functioning of agri-tourism centre at Saguna Baug. The entire group of farmers at Saguna Baug, with the help of the SRT Technology are progressing well and contributing to the growth and development of the area. The ATC is also responsible for providing employment opportunities to nearly all willing workers from the villages in its vicinity, thus having a big impact on the lives of the people living around.

9. SUGGESTIONS

1. The entire urban population of nearby metropolitan zones can be attracted as to agri-tourism centres through various promotional efforts like advertising, exhibitions, fairs etc.
2. Maharashtra government has launched Maharashtra State Agriculture and Rural Tourism Federation in 2008 for the development of rural tourism in the state. Help from such schemes can be taken for further development of ATCs in the state.
3. With proper planning and government incubation, the ATC Centres can gain flight and help in the betterment of the rural farmers and aid in development of their regions.

10. LIMITATIONS OF THE STUDY

1. Unequal participation of both the genders in the survey collection.
2. Only observation and survey methods were used and no tests of significance conducted.
3. An interview with the managers of the farm would have revealed more insights into the profitable running of the farm and issues faced by the authorities.

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A STUDY OF AGRO-BASED INDUSTRIES IN INDIA

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1. INTRODUCTION

Agribusiness denotes the collective business activities that are performed from farm to fork. It covers the supply of agricultural inputs, the production and transformation of agricultural products and their distribution to final consumers. Agribusiness is one of the main generators of employment and income worldwide. Agribusiness is characterized by raw materials that are mostly perishable, variable in quality and not regularly available. The sector is subject to stringent regulatory controls on consumer safety, product quality and environmental protection. Traditional production and distribution methods are being replaced by more closely coordinated and better planned linkages between agribusiness firms, farmers, retailers and others in the supply chains.

2. OBJECTIVE OF THE STUDY

1. To study Importance of Agro-based industries.
2. To Study need for agro-based industries.
3. Review the Institutional arrangements for promotion of agro based industries.
4. Highlights the Case study of Chheda's Namkeen.

2. Importance of Agro-based industries

- Agro-based industries have to set up at rural areas where raw material may be available in plenty – helps in the up-liftment of the rural economy.
- Provide rural population an opportunity for employment.
- Generate income and thereby improve economic condition of people – which in turn creates potential for demand based industries.
- Provide an opportunity for the dispersal of industries instead of concentrating at a particular place.
- Solve the problem of exploitation of farming community by traders and middlemen.
- Farmers could be assured of better price for their produce.
- Encourage to bring more and more areas under various crops – increase agricultural production and improve nation's economy.
- Transportation cost of agricultural products can be minimized – thereby help to minimize cost of finished goods.
- Avoid wastage of perishable agricultural products.
- Help to develop backward areas based on their suitability for setting up agro-industries.
- Prevent migration of people from rural to urban areas.

3. AGRO-BASED INDUSTRIES ARE DIVIDED INTO FOUR GROUPS.

1. Resource based
2. Demand based
3. Skill based
4. Ancillary

Again the resource based industries are divided into agro-based, forest based, animal husbandry and poultry based, mineral based, marine based, etc. Agro-based industries are those industries which have either direct / indirect link with agriculture. Industries which are based on agricultural produce and industries which support agriculture come under agro-based industries.

4. TYPES OF AGRO-BASED INDUSTRIES

There are four types of agro-based industries.

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1. Agro-produce processing units
They merely process the raw material so that it can be preserved and transported at cheaper cost. No new product is manufactured. Ex: Rice mills, Dal mills, etc.

2. Agro-produce manufacturing units
Manufacture entirely new products. Finished goods will be entirely different from its original raw material. Ex: Sugar factories, bakery, solvent extraction units, textile mills, etc.

3. Agro-inputs manufacturing units
Industrial units which produce goods either for mechanization of agriculture or for increasing productivity come under this type. Ex: Agricultural implements, seed industries, pumpset, fertilizer and pesticide units, etc.

4. Agro service centres
Agro service centres are workshops and service centres which are engaged in repairing and servicing of pumpsets, diesel engines, tractors and all types of farm equipment.

5. NEED FOR AGRO-BASED INDUSTRIES

- Suitable to rural areas as they are raw material oriented.
- For upliftment of rural economy.
- To solve the problem of unemployment.
- To generate income and increase standard of living.
- For decentralization and dispersal of industries.
- To reduce disparity between rural and urban areas.
- To encourage balanced growth between agriculture and industry.
- To solve the problem of exploitation of farming community.
- To reduce transportation costs.
- To give big push to agriculture and act as a source of demand and supply.
- To avoid wastage of perishable agricultural products.
- To prevent migration of rural people.
- To develop suitable backward areas.
- To improve infrastructural facilities.

6. INSTITUTIONAL ARRANGEMENTS FOR PROMOTION OF AGRO BASED INDUSTRIES
Following Ministries & Departments at the Centre and State level are at present looking after development of agro based industries.

- **Ministry of Agriculture:** Deals with rice mills, oil mills, sugar mills, bakeries, cold storage, etc.
- **Khadi and village industries board:** Covers traditional agro based industries like "gur", handicrafts, khandasari, etc.
- **Director General of Trade and Development:** Looks after the industries engaged in the manufacture of tractors, power tillers, diesel engines, pump sets, etc.
- **Agro-industries Development Corporation:** In each state mainly supply agricultural machinery, inputs and agricultural advisory services to farmers. Some corporations have also undertaken certain manufacturing activities in agro-industries sector.
- **Small Industry Development Organization:** Deals with small agro-industries like hosiery, processing of food products, beverages, food and fruit preservation, agricultural implements, pesticide formulations, etc.

7. CONSTRAINTS IN ESTABLISHING AGRO BASED INDUSTRIES
1. Proper guidance is not available to entrepreneurs.

2. It involves some element of risk taking

3. Change in crops / cropping pattern

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4. Change in variety of crop due to technological improvement

5. Failure of monsoon may hit the raw material supply.

6. Proper guidance, training for modern and sophisticated agro-industries are not available.

7. As modern small industries are capital intensive, supply of finance will be a considerable problem.

8. Promotional activities such as conducting, intensive campaigns, identifying candidate industries and explaining to entrepreneurs about prospects are inadequate.

9. Uncertainty about future market demands.

10. Absence of information about quantity and quality of market.

11. Multiplicity of agricultural produce and absence of suitable methodology to select best suited industries to a given region.

12. Seasonal supply of agricultural produce may result in underutilization of capacity of the units as the unit will not be working throughout the year. Ex: Sugarcane

13. Industries based on fruits and vegetables may not get the same variety throughout the year, but they may get some other variety.

14. Absence of proper integration among the various agencies of development in the district.

8. CASE STUDY OF CHHEDA'S NAMKEEN

With humble business backgrounds, Mr. Ashok Chheda and Mr. Kishore Chheda are sailing a big group of young, talented and dynamic work force. "Employees are the biggest asset to our organization and it is the prosperity and growth of individuals that ultimately leads the company in many folds" believes Mr. Ashok Chheda. The team at Chheda is constantly been motivated, nurtured and trained to deliver the best results. The proprietors lead their team is a very personal and professional way making the team responsible and self-reliant. With just one product - Banana Chips starts Chheda's journey. They had started factory in 1993 under the family name "Chheda Wafers" at Mumbai and they are pioneers to introduce traditional banana wafers in standardized packaging under the brand name 'Chheda'. With a clear vision in mind, they succeeded in providing the best, consistent products with ultimate taste and relishing freshness. The overwhelming response of most valued customers helped in transforming us from 'Chheda Wafers' to 'Chheda Specialities Foods Pvt. Ltd.' in 2005. Their factory at Manor has a giant capacity and is well equipped with machineries to meet the international standard requirements. With all this, they gradually then started expanding Product Range with leaps and bounds. Potato Chips, Banana Chips, Ethnic Snacks, Namkeens, Pop up snacks range have always been Hero since then. They at Chheda constantly strive for innovation and quality snacks.

9. CONCLUSION

Thus, Agro-industry, i.e. the processing, preservation and preparation of agricultural production for intermediate and final consumption, performs a number of crucial functions that support development and poverty alleviation. Agriculture in connection with industry needs to be recognized by senior-level policy makers and industry leaders as a competitive, value-adding business sector that has a positive development impact and contributes to economic growth.

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AGRITOURISM – THE NEED OF THE HOUR

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ABSTRACT

The Ministry in 2002-03 went ahead with the proposal of Rural Tourism with the intention of showcasing, art, culture and heritage through rural life in villages and at rural locations. Maetzold (2002), defined agritourism as an alternative enterprise, "it is a set of activities that occur when people link travel with products, services and experiences of agriculture". Agri-Tourism as it is pronounced, identify many agriculturally based operation or activity that brings visitors to a farm or close to nature beauty. Considering the topography of India, in the last few years have seen the concept of rural tourism gaining momentum as an allied area of revenue generation thus diverting attention towards the rural belt in which resides a large portion of Indian population. The study is based on the following objectives: a) To study the impact of Agritourism on farmers life. b) To examine the impact of growth of Agritourism on agriculture industry in India. This study is based on primary data. A Google form was used to collect data from Chartered Accountants, Advocates and Professor in different colleges of Mumbai city. The sample size was Chartered Accountants, Advocates and Professors in different colleges of Mumbai city. Simple random sampling techniques were used for data collection. "Agritourism is the need of the hour" as it is innovative concept in India, which will benefit farmers of the country by increasing productivity, earnings, standard of livings, high rate for vegetables and fruits and getting low rate of interest loan from banks. It increases agriculture productivity, GDP, National Income and per capita income of India. Role of government is immense in developing Agritourism in India. Banks and Financial Institutions also plays vital role by providing low interest loan and expert knowledge to farmers.

Keywords: Agirtourism, Agriculture, Tourism, GDP and National Income.

1. INTRODUCTION

Agritourism or farm tourism is a type of rural tourism and is highly recognized as a mean of farm diversification and an alternative source of farm income (Colton and Bissix, 2005; Byrd and Gibson, 2004; Sharpley, 2002). Brumfield and Mafoua (2002) have described agritourism as a ''direct marketing activity, that may provide special opportunities to growers to reduce risks via diversification in a competing and urbanizing economic environment, which may share quasi-fixed inputs (e.g. information, machinery, labour, etc.) with other enterprises and enhance business efficiency and profitability.'' According to Bernardo et al. (2007), the list of agritourism

activities continues to grow, and might include a variety of participants and educational and spectator experiences such as outdoor recreation (farm visits, fee fishing, photography, etc.), educational experiences (demonstration programs, training sessions, guided farm tours, cooking classes), entertainment activities (harvest festivals, barn dances, hay tunnels), hospitality services (farm stay, home stay, bed and breakfasts), and on-farm direct sales (U-pick operations, sales centres, roadside stands).

The crisis of mass tourism has led to the necessity for seeking out alternative forms of tourism in worldwide. At the same time, the crisis in intensive agriculture has led to the necessity for seeking out alternative forms of agriculture (Hélène, 2003).

Today the Indian Agriculture has to face tremendous competition because of the driven global trends. To add to this the agriculture crop growth is also weakened due to the uncertain climatic conditions. There is no minimum support price guarantee also. These changes have altered the form and practices of farming operation. Farmers are looking beyond traditional farming to generate income via various forms of direct on farm marketing and farm based non-agriculture business.

Many farmers, in addition to normal farming activity, have already turned to agritourism as a source of additional farm income and opportunities. There are numerous benefits from the development of agritourism: it may strengthen local economy, create job opportunities and new businesses; develop and promote training and certification programs to introduce young people to agriculture and environment (Privitera, 2010).

The individual farmer can start Agri-tourism who have minimum two hector land, farm house, and water resource and is interested to entertain the tourists. Apart from the individual farmer, agricultural cooperatives institute, Non-Government organizations Agricultural Universities, and agricultural colleges may start centers in their operational areas with the help of villagers and farmers.

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In 2014, the National Crime Records Bureau of India reported 5,650 farmer suicides. The highest numbers of farmer suicides were recorded in 2004 when 18,241 farmers committed suicide. The farmers' suicide rate in India has ranged between 1.4 and 1.8 per 100,000 total populations, over a 10-year period through 2005. There are accusations of states manipulating the data on farmer suicides.

India is an agrarian country with around 70% of its people depending directly or indirectly upon agriculture. Farmer suicides account for 11.2% of all suicides in India. Activists and scholars have offered a number of conflicting reasons for farmer suicides, such as monsoon failure, high debt burdens, government policies, public mental health, personal issues and family problems.

2. REVIEW OF LITERATURE

PlaceFirst (2011) As per the Scottish Natural Heritage Commissioned Report No. 463 on "Agri-tourism in Southern Scotland" agri-tourism is defined for the purposes of the research as: "Tourism on a working farm in which visitors can experience a direct connection with the host farm, rural life and/or the local environment".
According to Maetzold (2002), the organic agritourism is one of the important types of agritourism in Italy. In the organic agritourism entrepreneurs are using organic techniques like organic farming, following principles of ecotourism, water saving and recycling solutions.

3. OBJECTIVES OF THE STUDY

The study is based on the following objectives:
a) To study the impact of Agritourism on farmers life.

b) To examine the impact of growth of Agritourism on agriculture industry in India.

4. METHODOLOGY

This study is based on primary data. A Google form was used to collect data from Chartered Accountants, Advocates and Professor in different colleges of Mumbai city.

Sample and Sample size

The sample size was 42 Chartered Accountants, Advocates and Professors in different colleges of Mumbai city.

Sampling technique

Simple random sampling techniques were used for data collection.

Tools used

This is a likert type scale with 5 options ranging from strongly agree, agree, neutral, disagree and strongly disagree.

Statistical techniques used:

Mean, Standard Deviation Likert Scale, Pie Chart and Percentage were used for data analysis.

For each question, mean, standard deviation and Z score was calculated [Z score was calculate by following formula, Z = (Mean -0)/S.D. Expected mean is 0 because scale has been created on 2 agree, 4 strongly agree, -1 disagree and -2 strongly disagree].

With 95% confidence level Z=1.96. If score is positively more than 1.96, then total result is general agreement. If score is negative and less than -1.96, there is general disagreement.
If score is between +1.96 and -1.96, respondents are neutral.

5. DATA ANALYSIS AND INTERPRETATION

Questionnaire

<table>
<tr><th>Sr. No.</th><th>Questions (Alternative Hypotheses) and Analysis</th><th>Strongly Agree</th><th>Agree</th><th>Neutral</th><th>Disagree</th><th>Strongly Disagree</th></tr>
<tr><td>1</td><td>Agritourism is beneficial to farmers. [Enhances standard of living]
Analysis:
<table><tr><td>Mean</td><td>2.48</td></tr><tr><td>SD</td><td>1.29</td></tr><tr><td>Z</td><td>2.48</td></tr></table>Z score is more than +1.96. Hence, respondents accepted alternative</td><td>14</td><td>25</td><td>01</td><td>02</td><td>00</td></tr>
</table>

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	hypothesis.					
2	Agritourism is beneficial to farmers. [Increases Productivity] Analysis: Mean 1.93 SD 1.6 Z 1.93 Z score is between +1.96 and -1.96. Hence, respondents are neutral.	11	20	09	01	01
3	Agritourism is beneficial to farmers. [Improves earnings] Analysis: Mean 2.64 SD 1.28 Z 2.64 Z score is above +1.96. Hence, alternative hypothesis is accepted.	17	22	02	01	00
4	Agritourism is beneficial to farmers. [Provides high rate for vegetables and fruits] Analysis: Mean 2.3 SD 1.5 Z 2.3 Z score is above +1.96. Hence, alternative hypothesis is accepted.	15	19	07	01	00
5	Agritourism is beneficial to farmers. [Helps in repayment of loan] Analysis: Mean 2.1 SD 1.5 Z 2.1 Z score is above +1.96. Hence, alternative hypothesis is accepted.	12	22	05	03	00
6	Agritourism is beneficial to farmers. [Eliminates middlemen in distribution chain] Analysis: Mean 2 SD 1.7 Z 2 Z score is above +1.96. Hence, alternative hypothesis is accepted.	13	19	07	02	01
7	Agritourism is an instrument for employment generation, poverty alleviation and sustainable human development. Analysis: Mean 2.19048 SD 1.62658	14	20	05	02	01

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	Z 2.19048 Z score is above +1.96. Hence, alternative hypothesis is accepted.					
8	Agritourism increases agricultural productivity in India. Analysis: Mean 1.69 SD 1.388 Z 1.69 Z score is between +1.96 and -1.96. Hence, respondents are neutral.	06	25	08	03	00
9	Agritourism will raise per capita income and national income of the country. Analysis: Mean 2.0476 SD 1.3426 Z 2.0476 Z score is above +1.96. Hence, alternative hypothesis is accepted.	09	25	05	01	00
10	Agritourism will increase national GDP of India. Analysis: Mean 2.2143 SD 1.3166 Z 2.2143 Z score is above +1.96. Hence, alternative hypothesis is accepted.	11	25	05	01	00

6. FINDING AND SUGGESTIONS:

Objectives	Findings and suggestions
To study the impact of Agritourism on farmers life.	The study shows that it will impact positively on the farmers' life as agritourism will enhance standard of living, increases productivity, improves earnings, provides high rate for vegetables & fruits, helps in repayment of loan and eliminates middlemen in distribution of channel. Therefore, first objective of research paper is achieved. It is the responsibility of all stakeholders such as government, public, banks, financial institutions, farmers and industrialist to take effective measures to develop Agirtourism in India.
To examine the impact of growth of Agritourism on agriculture industry in India.	Agritourism is an instrument of employment generation, poverty eradication and sustainable human development. It increases agricultural productivity, per capita income, national income and national GDP of the country. Hence, government must provide tax concessions to Agritourism and banks must provide low rate of interest loans to farmers.

7. CONCLUSION

"Agritourism is the need of the hour" as it is innovative concept in India, which will benefit farmers of the country by increasing productivity, earnings, standard of livings, high rate for vegetables and fruits and getting low rate of interest loan from banks. It increases agriculture productivity, GDP, National Income and per capita income of India. Role of government is immense in developing Agritourism in India. Banks and Financial Institutions also plays vital role by providing low interest loan and expert knowledge to farmers.

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INNOVATIVE SOLUTIONS FOR SUSTAINABLE AGRICULTURE IN INDIAN CONTEXT

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Sustainable agriculture development integrates three main goals; Environmental, health, economic prosperity and livelihood sustainability. In other words, sustainability rests on the principle that we must meet the needs of the present without compromising the ability of future generations to meet their own needs. Therefore, stewardship of both natural and human resources is of prime importance. Stewardship of human resources includes consideration of social responsibilities such as working and living conditions of farm families, the needs of rural communities, and consumer health and safety both in the present and the future. Stewardship of land and natural resources involves maintaining and enhancing this vital resource base for the long term.
The productivity can be increased by two ways. First, increasing output by efficient utilization of available resources. Second, increasing output by variation of input. The first method is better with respect to productivity and sustainability. But due to increasing population, this method cannot provide a permanent solution. Thus, we can go for the second method, which may potentially cause environmental degradation in the economy and affect its sustainability. Therefore there is need to tackle the issues related to sustainable agriculture development.

INDIAN AGRICULTURE SECTOR

The agriculture sector in India has always played a crucial role in driving the wheels of socio-economic development of the country. India was primarily an agrarian economy with almost 60% of the country's population depending on agriculture for their livelihood. This dependence on agriculture in terms of employment has not undergone much of a change, since majority of the population are still engaged in agricultural and allied industries. In most of the countries of the world, agriculture still remains the biggest division responsible for the employing and feeding a large percentage of the population. Since there is no strict concentration on the requirement of superior skills for labour employed in this sector, the absorption ratio of this sector is very high. Also, around 43% of India's territory remains employed in agricultural activities.

Indian Agriculture production in most part of the country is close related to the optimum use of available natural and human resources of the country. Therefore, riding on the back of agro climatic condition and rich natural resource base, India today has become the world's largest producer of numerous commodities. The country is a leading producer of coconuts, mangoes, milk, bananas, dairy products, ginger, turmeric, cashew nut, pulses and black pepper. It is also the second largest producer of rice, wheat, sugar, cotton, fruit and vegetables. Indian agriculture production is closely related to sufficient and wise water management practices. Most of the agriculture practices in India confined to a few monsoon months.

During the monsoon season, India is usually endowed with generous rainfall; although not infrequently, this bountiful monsoon turns into terror, causing uncontrollable floods in different parts of the country and ultimately affecting agriculture production.

Agriculture is also important from the viewpoint of assessing the standard of development in a country, based on the capability of its farmers and the scale of productivity. In this context, the role of education, health & nutrition and awareness programmes for imparting the necessary knowledge to the labour force is of vital importance. As we know, that poorly trained farmers are not well-quipped in applying higher methods and new technologies required to achieve better productivity.

We must also bear in mind, that majority of the Indian population live in villages and hence, the contribution of agriculture to the Indian economy becomes an indicative measure for determining the performance of the country.

- **Agriculture and GDP:** In recent times, the contribution of agriculture to the country's Gross Domestic Product (GDP) has seen a declining trend. According to the Economic Survey 2013-14, the share of agriculture and allied sectors to Gross Domestic Production (GDP) reduced further to 13.9 per cent in 2013-14 from 15.2 per cent in the Eleventh Plan. In spite of this steep fall, agriculture still forms the backbone of development. In fact, this is seen as a common trend that is anticipated in the development process of any economy. Even if agriculture frequently plays a contributory role in the GDP - of most countries, it nevertheless requires a substantial increase from both the local and the international community.

- **Food Security:** One of the most significant features that highlight the importance of the agriculture sector is the idea of 'food security'. Every developing nation seeks to attain the goal of self-sufficiency in food-grains to

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cater to the nourishment needs of its growing population. As such, agriculture is measured to be the very basis of political and social steadiness of a nation. The sharp rise in foodgrain production during India's Green Revolution of the 1970s enabled the country to achieve self-sufficiency in foodgrains and stave off the threat of famine. Agricultural intensification in the 1970s to 1980s saw an increased demand for rural labor that raised rural wages and led to the decline in food prices and rural poverty. Since then, however, the slowdown in agricultural growth has become a major cause of concern. India's rice yields are one-third of China's and about half of those in Vietnam and Indonesia. With the exception of sugarcane, potato and tea, the same is true for most other agricultural commodities.

- Sustainable agriculture: The era of Globalization had strongly impacted the agriculture sector in terms of productivity, new techniques of production, credit facilities and others. This has had a positive after effect on export and import of agricultural commodities - a major source of income in India.

In this regard, the concept of sustainable agriculture has gathered great importance over the years. Sustainable agriculture implies the presence of eco-friendly agricultural practices which originates from paying special attention to conservation of the environment as much as to crop yield. Hence equipment, fertilizers, pesticides, etc used are monitored.

- Investments & risk in Agricultural commodities: Agriculture is now looked at as an investment option for investors with a focus on a number of key agricultural commodities such as forestry and horticulture. Agri-business is an alternative asset class that offers returns generated from a traditional income source. Agri-business offers investors another level of diversification because it is not correlated with interest rates, share markets, bonds or property markets. However, the instability of commodity prices has always been a major concern of the producers, processors, traders as well as the consumers in agriculture -dominated country like India. Farmers' direct exposure to price fluctuations, for instance, makes it too risky for many farmers to invest in otherwise profitable activities. In this context, Agricultural commodity exchanges step in as a facilitator to enable better management of activities in this sector. Apart from the risk-shifting function, these exchanges can be used to lock -in futures prices instead of relying on uncertain price developments.

Agricultural products, unlike others, have an added risk. Since many of them are typically seasonal, they end up attracting lower prices. The forward and futures contracts are efficient risk management tools which insulate buyers and sellers from unexpected changes in future price movements. The cash market or ready delivery market on the other hand, is a time-tested market system which is used in all forms of business to transfer title of goods.

SUSTAINABLE AGRICULTURE DEVELOPMENT

The issues of sustainable development can be discussed under three broad types of farming systems viz. traditional production system, modern agriculture system and sustainable agriculture system. Further, we can compare them across three dimensions, ecological, economic, and social sustainability.

Ecological Sustainability: Most of the traditional and conventional farm practices are not ecologically sustainable. They misuse natural resources, reducing soil fertility causing soil erosion and contributing to global climatic change. But sustainable agriculture has some major advantages over traditional practices.

Soil Fertility: Continuous fall in soil fertility is one of the major problems in many parts of India. Sustainable agriculture improves fertility and soil structure.

Water: Irrigation is the biggest consumer of fresh water, and fertilizer and pesticides contaminate both surface and ground water. Sustainable agriculture increase the organic matter content of the top soil, thus raising its ability to retain and store water that falls as rain.

Biodiversity: Sustainable agriculture practices involve mixed cropping, thus increasing the diversity of crops produced and raising the diversity of insects and other animals and plants in and around the fields.

Health & Pollution: Chemicals, pesticides, and fertilizers badly affect the local ecology as well as the population. Indiscriminate use of pesticides, improper storage etc. may lead to health problems. Sustainable agriculture reduces the use of hazardous chemical and control pests.

Land use Pattern: Over-exploitation of land causes erosion, landslides, and flooding clogs irrigation channels and reduces the arability of the land. Sustainable agriculture avoids these problems by improving productivity, conserving the soil etc.

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Climate: Conventional agriculture contributes to the production of greenhouse gases in various ways like reducing the amount of carbon stored in the soil and in vegetation, through the production of Methane in irrigated field and production of artificial fertilizers etc. By adopting sustainable agriculture system, one can easily overcome this problem.

Economic Sustainability: For agriculture to be sustainable, it should be economically viable over the long term. Conventional agriculture involves more economic risk than sustainable agriculture in the long term. Sometimes governments are inclined to view export-oriented production systems as more important than supply domestic demands. This is not right. Focusing on exports alone involves hidden costs: in transport, in assuring local food security, etc. Policies should treat domestic demand and in particular food security as equally important to the visible trade balance.

Social Sustainability: Social sustainability in farming techniques is related to the ideas of social acceptability and justice. Development cannot be sustainable unless it reduces poverty. The government must find ways to enable the rural poor to benefit from agriculture development. Social injustice is where some section of the society is neglected from development opportunities. But having robust system of social sustainability can bridge the gap between "haves" and „have-nots". Many new technologies fail to become applicable in agriculture sector due to lack of acceptability by the local society. Sustainable agriculture practices are useful because it is based on local social customs, traditions, etc. Because of being familiar, the local people are more likely to accept and adopt them .Moreover, sustainable agriculture practices are based on traditional know-how and local innovation. Local people have the knowledge about their environment crops and livestock.

The planning commission has identified "Twelve Strategy Challenges" owing to some core areas that require new approaches to produce the desired results. These are as follows:

1**. Enhancing the Capacity for Growth:** Today, India can sustain a GDP growth of 8 percent a year. Increasing this to 9 or 10 percent will need more mobilization of investment resources; better allocation of these resources through more efficient capital markets; higher investment in infrastructure through both public and PPP routes; and more efficient use of public resources.

2. Enhancing Skills and Faster Generation of Employment: It is believed that India's economic growth is not generating enough jobs or livelihood opportunities. At the same time, many sectors face manpower shortages. To address both, we need to improve our education and training systems; create efficient and accessible labor markets for all skill categories; and encourage the faster growth of small and micro enterprises.

3. Managing the Environment: Environmental and ecological degradation has serious global and local implications, especially for the most vulnerable citizens of our country. How can we encourage responsible behavior, without compromising on our developmental needs?

4. Markets for Efficiency and Inclusion: Open, integrated, and well-regulated markets for land, labor, and capital and for goods and services are essential for growth, inclusion, and sustainability. We have many sectors were markets are non-existent or incomplete, especially those which are dominated by public provisioning. How do we create or improve markets in all sectors?

5. Decentralization, Empowerment and Information: Greater and more informed participation of all citizens in decision-making, enforcing accountability, exercising their rights and entitlements; and determining the course of their lives is central to faster growth, inclusion, and sustainability. How can we best promote the capabilities of all Indians, especially the most disadvantaged, to achieve this end?

6. Technology and Innovation: Technological and organizational innovation is the key to higher productivity and competitiveness. How can we encourage and incentivize innovation and their diffusion in academia and government as well as in enterprises of all sizes.

7. Securing the Energy Future for India: Faster and more inclusive growth will require a rapid increase in energy consumption. Since we have limited domestic resources, how can we meet this need equitably and affordably without compromising on our environment?

8. Accelerated Development of Transport Infrastructure: Our inadequate transport infrastructure results in lower efficiency and productivity; higher transaction costs; and insufficient access to our large national market. How can we create an efficient and widespread multi-modal transport network.

9. Rural Transformation and Sustained Growth of Agriculture: Rural India suffers from poor infrastructure and inadequate amenities. Low agricultural growth perpetuates food and nutritional insecurities, which also

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reduces rural incomes. How can we encourage and support our villages in improving their living and livelihood conditions in innovative ways?

10. Managing Urbanization: Most of our metros and cities are under severe stress with inadequate social and physical infrastructure coupled with worsening pollution. Migration pressures are likely to increase. How do we make our cities more liveable? What can we do today to ensure that smaller cities and towns are not similarly overwhelmed tomorrow?

11. Improved Access to Quality Education: Educational and training facilities have been increasing rapidly. However, access, affordability, and quality remain serious concerns. Employability is also an issue. How can we improve the quality and the utility of our education, while ensuring equity and affordability?

12. Better Preventive and Curative Health Care: India's health indicators are not improving as fast as other socio-economic indicators. Good healthcare is perceived to be either unavailable or unaffordable. How can we improve healthcare conditions, both curative and preventive, especially relating to women and children?

To attain the targeted 4% p.a agriculture growth target, the twelve strategy challenges incorporated in the approach paper of the 12th five year plan are of crucial importance. But the first question that comes to mind is - "How realistic is this 4% growth target?"

In order to secure the objective of 4 % growth rate in agriculture, several initiatives should be taken up such that it leads to the transformation of the sector. In this paper, we shall look at some key issues related to the agriculture sector and thereby, make some recommendations to create a road map for the sector in the 12th five year plan.

CONCLUSION

Consequences of farmer's crisis in India are likely to affect national economy and may impose adverse effects on food supply, food grain prices, cost of living, health and utrition, poverty, employment, and labor land loss from agriculture. The only remedy to solve the crisis is to make agriculture a profitable enterprise by initiating efforts for Second Green Revolution (SGR) which should pave way to the remunerative agriculture through technological innovations, customized farm mechanization, rural markets and infrastructure.

Yet the centre has raised the minimum support price (MSP) of paddy by Rs.180-200 per quintal for the current year. This increase, by 11.3- 12.9 per cent over 2017-18 is the most significant of the MSP related decisions announced. Although the hikes in other crops such as bajira, jowar, nigerseed and ragi are even steeper – between 36.8 per cent and 52.5 per cent- these have no more than symbolic importance as the MSPs are not backed by any meaningful government procurement.

Henceforth, MSPs will be set at 1.5 times the productions cost. The higher the cost, the more is the MSP So farmers growing crops consuming more water and energy, with their production costs naturally higher, get rewarded through increased MSPs.

Such perverse cost-plus pricing cannot sustain for long. It can even backfire politically. The new MSPs in cotton. Groundnut and maize, for instance, are way above open market prices. It it leads to the private trade cutting down purchases and the likes of Nafud and Cotton Corporation of India not being able to fill the void, farmer anger may only grow. The time has come to consider extending the Telangana government formula .

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IMPACT OF APMC ON AGRICULTURAL MARKETING

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ABSTRACT

The Agriculture sector plays a vital role in the Indian Economy. Agriculture contributes about 18.4% of Total GDP. The significant of agriculture in India's economy can be understood from the fact it supports about 58 percent our population.

According to CSO data, contributed 18.4% of GDP in 2014-15 at 2011-12, prices. The number of cultivators have declined from 127.3 million (2001 to 118.7 million (2011)

In last few decades agriculture has transformed to a certain extent and succeeded in solving our food problem.

Transformation of agriculture is possible with appropriate Government policies effective implementation transport agricultural marketing system. Financial institutions to provide sufficient loans, research and development institutes to develop appropriate technology, irrigational network to reduce negative effects of the vagaries of monsoon and host of other related and supporting facilities. All these will enable the agricultural sector to function in a modern commercial basis.

Now marketing to provide organized marketing of agricultural commodities, model agricultural produce marketing (Development and Regulation) (APMC) Act was prepared. Many state Govt. have enacted this law with some amendments. The Act through regulated market, aims at ensuring reasonable gains to farmers and consumers through a fair play of supply and demand. Further changes and reforms are envisaged in agricultural marketing by bringing in major changes in APMC to create a single national market. Recently passed GST bill should help improve marketing system.

This paper analyses positive & negative impact of APMC on agricultural marketing and find out search different methods of agricultural marketing.

Keywords: APMC Agriculture, Market, Marketing System, Impact.

INTRODUCTION

The agriculture sector the Agriculture sector plays a vital role in the Indian Economy. Agriculture contributes about 18.4% of Total GDP. The significant of agriculture in India's economy can be understood from the fact it supports about 58 percent our population.

According to CSO data, contributed 18.4% of GDP in 2014-15 at 2011-12, prices. The number of cultivators have declined from 127.3 million (2001 to 118.7 million (2011). In last few decades agriculture has transformed to a certain extent and succeeded in solving our food problem.

In India agriculture product marketing is not properly support to farmers. In Village and small town marketing facilities for agricultural products are poor. Besides, the supporting services like transport warehousing gradation etc. are also poor and inadequate. Poverty also compels the farmers, to sell the products immediately after harvest at a low price depriving the farmers of the advantage of a fair market price.

1. OBJECTIVES

- To understand the factions of APMC.
- To study of impact of APMC on agricultural marketing.
- To study the reforms of APMC Laws for Agricultural selling products.

2. DATA COLLECTION AND METHODOLOGY

Data has been collected by referring different statistical abstract, Government reports. The secondary data was also collected from various RBI reports. The collected data was processed, edited and analyzed by applying different statistical methods and its presented though tables and grafts and diagrams.

3. AGRICULTURAL PRODUCE MARKET COMMITTEE (APMC)

APMC is a statutory market committee constituted by a state Government in respect of trade in certain notified agricultural or horticultural or live stock product, under the Agricultural produce market committee Act issued by that State Government.

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4. APMC'S RESPONSIBILITIES

1. Ensuring transparency in pricing system are transactions taking place in market area.
2. Providing market-led extension services to farmers.
3. Ensuring payment for agricultural produce sold by farmers on the same day.
4. Promoting agricultural processing including activists for value addition in agricultural produce.
5. Publishing data on arrivals and rates of agricultural produce brought into the market area for sale.
6. Setup and promote public and private partnership in the management of agricultural markets.

APMCS are about 2477 principle regulated markets based on Geography and 4843 sub market yards regulated by the respective APMCS in India.

6. AMENITIES UNDER APMCS:-

Auction halls, Weigh Bridge, go downs, shop for retailers, canteens, roads, lights, drinking water, police station, post office warehouse, farmers amenity center, water treatment plant, soil testing laboratory, toilets.

7. AGRICULTURAL PRODUCE MARKET COMMITTEE (APMC) ACT :-

Agricultural is a state subject and almost all State Government enacted APMC Act in 1950s SD, to bring transparently and end discretion of traders. This is extension of overall Government Policy which directed towards food security, remunerative prices to farmers and fair prices to consumers.

It should be noted that though current system controlled by APMC is quite inefficient, yet it is far important from pre APMC 50s era. At that time there was no control at all. Money lender, trader's banker etc. were often person. This all in one role of middleman resulted in perpetual ineptness of farmer.

Under the APMC Acts, states are geographically divided into markets which are headed by market committees and any production in that area shall be brought to a market committee for sale.

APMC, there are commission agents who hold license and are allotted a shop in the market. Farmer and buyer have discretion to go to any agent in this market, based on personal relations. Normally farmers choose agent from their own village and are influenced by age old relations of money lending. There are huge numbers of commission agent in a particular APMC dealing in same crop.

8. APMC ACT 2003:- SALIENT FEATURES -

1. Farmer doesn't need to bring his produce to APMC mandi. He can directly sell it to whomsoever he wants.
2. Farmer processors, exporters, ganders, packers etc. can by agricultural produce directly from farmers.
3. Permits private market yards direct purchase centers, farmers market for doing trade in agriculture produce.
4. Public private partnership in the management and development of agricultural markets in the country for post harvest handling, cold storage pre cooling facilities, pack houses etc.
5. Prohibits commission agents in any transaction.
6. Establish state agricultural produce marketing standards bureau for grading, standardization and quality certification of agricultural produce.
7. Increased the responsibilities of APMC –

- Ensure complete transparency in pricing system and transaction taking place in market area.
- Ensure payment for agricultural produce sold by farmers on the same day.
- Promote agricultural processing and value addition.
- Publish data arrivals and rates of agricultural produce brought into the market area for sale.

8. Details of five big APMC in the country in Terms of Revenue

Realization.

Sr.No	Name of APMC	Income Rs. In corers for 2013-14	Rate of market Fee	Rate of commission charges
1	APMC Vashi	126.00	0.8Perishable	Onion-6.5%,

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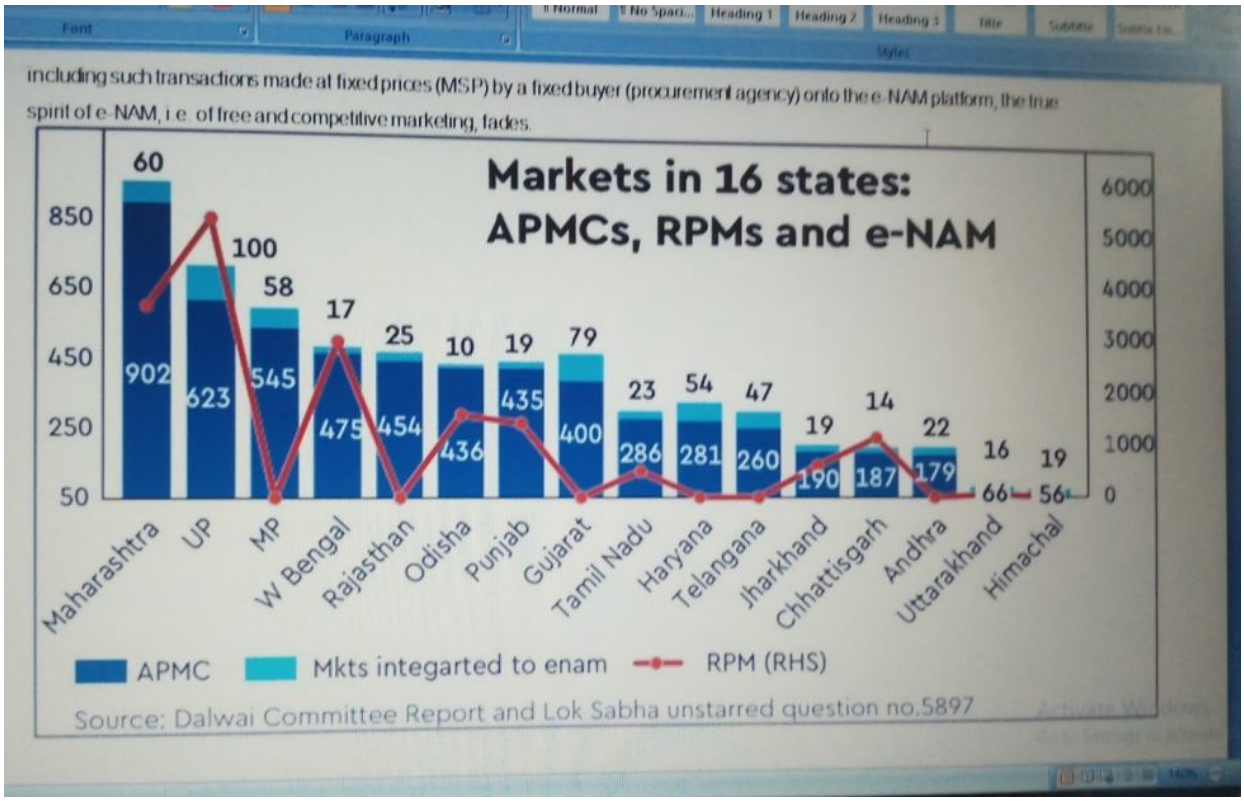
				Vegetable-8%, Fruits-10%
			Nonperishable	Up to 2.75% of the value produces.
2	APMC Azadpur (Delhi)	90.09	1%	6% of value.
3	Gallamandi APMC Indore	59.70	2%	No commission agent of
4	APMC Gultekari	47.00	1%	Perishable – 6.00 Nonperishable – 3.00%
5	APMC Yashwantpur	44.00	1% + 0.5% (Khismish)	Fruits & Veg – 5% Others – 2.00%

Source – Economic serve 2014-15



10. SHORTCOMING IN CURRENT APMC SYSTEM

- Monopoly of APMC – Monopoly of any trade is bad whether it is by some MNC Corporation by Government or any APMC. If deprives farmers from better customers and consumer's from original suppliers.
- Cartelization – It is quite often seen that agents deliberately restraint from higher bidding. Produce is procured at manipulatively discovered price and sold at higher price. Spoils are then shared by participants leaving farmers in lunch.
- Entry Barriers – License fee in these markets are highly prohibitive. In many markets farmers were not allowed to operate further over and above license fee, rent value for shops in quite high which keep away competition. At most places only a group of village unborn elite operates in APMC.
- Conflict of Interest – APMC play dual role or regulator and market. Consequently its role as regulator is undermined by vested interest in lucrative trade. They despite of inefficiently won't let go any control, generally member and chairman are nominated elected out of the agents operating in that market.
- High commission, taxes and levies – Farmers have to pay commission, marketing fee, APMC cuss which pushes up cost.

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- Other manipulations – Agent have tendency to block a part of payment for unexplained or fictitious reasons farmers is sometimes refused payment slip which is essential for him to get loan.

SUGGESTIONS

The economic survey 2014-15 suggest three increment steps for possible solutions.

- It may be possible to get all states to drop fruits and vegetables from APMC schedule of regulated commodities are followed be other commodities.
- State Government may be specifically persuaded to provided policy support for alternative or special markets in private sector
- In attracting domestic capital for the setting up marketing infrastructure, liberalization in FDI in retail could create possibilities for filling in the massive investment and
- Permit sale and purchase of all perishable commodities such as fruits and vegetables, and fish in any market this could later be extended to all agricultural produce.
- Exempt market fee on fruits and vegetable and reduce the high incidence of commission charges on Agricultural / Horticultural produce.
- Under the permitted list of corporate social responsibility (CSR) activities under companies Act 2013, to encourage companies engaged in Agri allied activities, food processing etc.
- Some measures that would facilitate the creation of a barrier free national markets.
- Direct marketing – APMC model act promotes direct marketing. As farmer is allowed to sell his goods outside APMC, directly sell to consumer.
- Contract Farming – Under contract farming inputs material may be provided by purchasing party of for particular crop and there is a crop buy back agreement in advance quality is specified in advance. This is mainly entered into by big corporate who are in business of food processing

CONCLUSION

In APMC committees these are institutions were designed in 1950s and 1960s in response to the challenge of food security and farmer protection. This was followed by green revolution, then by liberalization of economy. In all changes, reformation redefinition of role is important. They gradually moved in opposite directions. To hold them together, Government needs to make a smooth policy to underlying mechanisms.

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AGRITECH STARTUP IN INDIA: AN INNOVATIVE SOLUTION TO SUSTAINABLE AGRICULTURE

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ABSTRACT
Start-ups play a crucial role for the world as they cultivate the innovation of new ideas by the younger generations. One such idea is to accomplish the mission of sustainable agriculture, which has been introduced by the agritech start-ups in India.

This paper focuses upon the idea of applying modern technologies to the agriculture sector with a view to enhance produce, efficiency and revenue.

The paper starts off with the introduction of agritech start-ups and their sectoral presence in India. The existing status and some projections for the Indian agriculture and allied sectors are specified in order to examine future possibilities for agritech start-ups in India.

In the later section of the paper a list of agritech start-ups is mentioned which has done surprisingly well in the past few years. In the last segment, the writer has pointed out various challenges and issues being faced by the agritech start-ups in India and has also suggested some of the best possible solutions to them.

Keywords: Agritech start-ups, Sustainable agriculture, Farm mechanisation

INTRODUCTION
The goal of Sustainable Agriculture is to sustain the economic viability of farm operations and to enhance the quality of life of farmers and society as a whole.

"To attain sustainability, economic incentives for the development and adoption of precision technologies (with minimal residues that cause environmental damage) have to be developed" [(1)]. Agritech is the idea of applying modern technologies to the agricultural sector with a view to enhance produce, efficiency and revenue. The introduction of agritech as not only a concept but initiatives by different administrations and institutions spells new possibilities for the farming industry, making it a viable sector for future generations to explore.

Even after achieving self-sufficiency, the profession that continues to represent an important part of our economy and provides livelihood to 60% of country's population, cannot ensure prosperity to our farmers. Agriculture in India is moving beyond the production of basic food grains therefore the past strategies would no longer work. However, the key question that arises is whether our existing strategies adequately prioritise the key elements that have the potential to bring prosperity to farmers. By the year 2050, annual food grain production would need to grow to 333 million tonnes. Despite the fact that the contribution of key food grains in acreage terms is 15%, the production contribution is mere 8.7 % [(2)].

This indicates that the use of innovative technology is necessary to meet the forecasted demand in a sustainable manner and move Indian agriculture along the growth path.

OBJECTIVES OF THE STUDY
- To understand the need for agriculture technology for sustainable agriculture.
- To study various agritech start-ups recently introduced in India and to analyse their future potentials.
- To assess the challenges and issues being faced by the Indian agritech start-ups.
- To suggest a future path.

RESEARCH METHODOLOGY
The study uses secondary data available in books, journals, research reports and websites.

Source: (1)AARES Inc.-1467-8489 (2) Agri start-ups.indd

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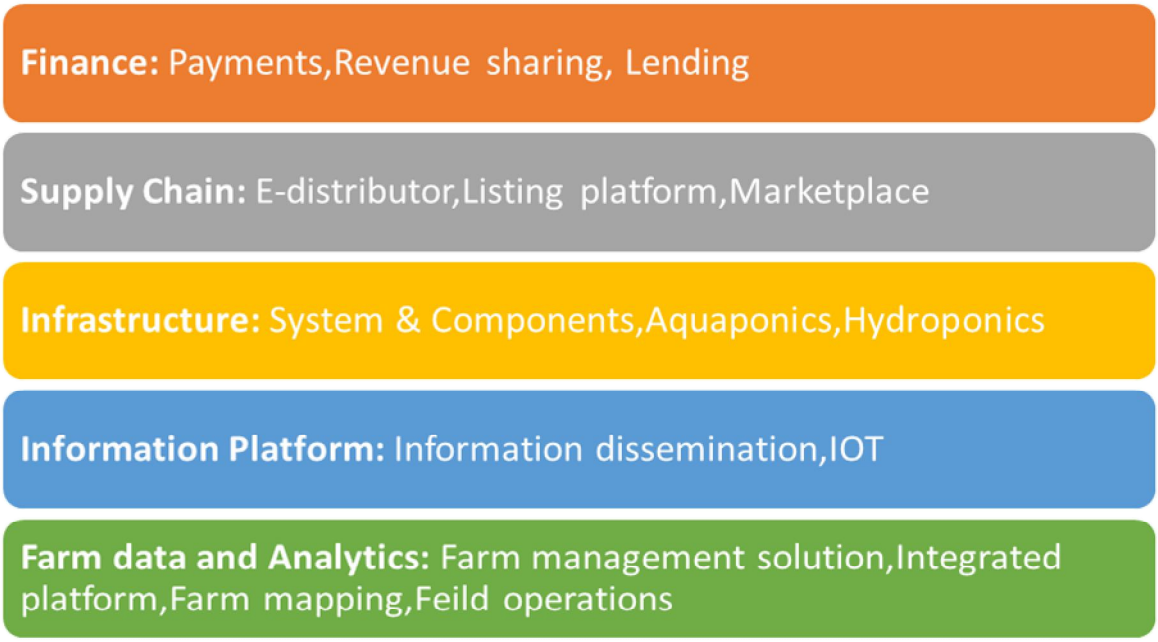
Sectoral presence of Agritech start-ups in India



Source: Agri start-ups.indd

It is quite clear from the above list that Agritech start-ups have touched almost all the problems that have been faced by the farmers. May it be related to inefficient supply chain and infrastructure or mounting loan burdens and complex finance structure.

Let's start with The Sharing Economy Model, these start-ups are combining efficient re-inventions with tech-driven innovations to make agriculture a profitable profession for Indian farmers. Many agritech start-ups have come with a sharing economy model called FaaS (Farming as a Service), where farmers can rent machinery as per demand.

While other interesting field is Farm Data and Analytics where a lot of innovative technologies are being used like Satellite Imaging, Big Data, Machine Learning, IOT enabled technology, etc. which provides Farm management solution, Risk mitigation and forecasting solution, Agri inputs market platform, Quality, availability and price check.

Now, the most crucial one the Finance Sector. As various studies have shown that farm productivity of small and marginal farmers can be increased by 35-50% if farmer's right quality of input is applied at the right time. For which they require a constant line of credit. YES Bank has piloted a fintech solution that uses geotagging of farmlands for remote monitoring and evaluation of loans. Agrostar & Adani Capital ltd partnered to offer a unique data-driven loan product. Unlike the traditional credit checks, it works on the primary data captured by Agrostar to offer loans to farmers.

Indian Agriculture: Existing status and key trends

(As des. In Agri start-ups.indd)

Agriculture plays a vital role in India's economy. Over 58% of the rural households depend on agriculture as their principal means of livelihood. Gross Value Added (GVA) added by agriculture, forestry and fishing is estimated at 17.67 trillion INR (274.23 billion USD) in FY-18. The GVA of the agriculture and allied sector at constant 2011-12 prices grew at a CAGR of 2.75% between FY12-18. Union Budget 2018-19 allocated 57,600 crore INR (8.9 billion USD) for the Ministry of Agriculture & Farmers' welfare, signifying its immense importance in the national socioeconomic context.

Some projections for the Indian agriculture and allied sector.

Conducive atmosphere

- India has the 10th largest arable land resources in the world with 20 agri-climatic regions, all 15 major climates in the world exist in India. The country also possesses 46 of the 60 soil types in the world. Growth in GVA (Gross Value Added) by agriculture and allied sectors is estimated at 3% in 2017-18.
- Strategic geographic location and proximity to food-importing nations favour India in terms of exporting processed foods.

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Farm mechanisation

- India is one of the largest manufactures of farm equipment such as tractors, harvesters and tillers. India accounts for nearly one-third of the overall tractor production globally.
- Tractor sales in the country are expected to increase by 11-13% in FY-19, while the tractor industry is expected to grow at 8-10% between FY17-22.

Increasing consumption

- Consumer spending in India is likely to reach 3.6 trillion USD by 2020.
- Private final consumption expenditure (at constant prices) increased by 6.1% in 2017-18 and 8.6% in the April-June quarter of 2018-19.

Source: Ministry of Agriculture & Farmers' welfare, GOI, MOSPI, GOI and PWC analysis

A list of Indian agritech start-ups moving towards a sustainable future. (As des. in Startup Watchlist Inc42.com)

1. Crofarm

Founded in 2016 by Prashant Jain and Varun Khanna, Crofarm is an F2B (Farm to Business)
Venture. According to the website, it has over 10,000 farmers in its network and has partnered with Reliance Retail, Grofers, Big Basket, Jubiliant Foodworks, Big Bazar and Metro Foods. The Farm to Business, Crofarm attacks one of the biggest inefficiency in agriculture wastage during distribution and selling of farm produce. By building a digitised agri-supply chain for fruits and vegetables that is efficient and has zero wastage, it increases the incomes of both farmers and neighbourhood retailers.

2. CropIn

CropIn integrates the agricultural sector with ICT (Information and Communication Technology) by putting a network of ERP and BI (Business Intelligence) across rural India.

By doing so, the agritech start-up collaborates with the different value chain participants along the supply chain to monitor farm produce status closely.

The agritech start-ups provide farm business a farm management software and mobile app, which enables them to do connected and data-driven farming. In September 2018, the start-up raised an undisclosed amount of pre series A funding from Singapore based Beenext, Ankur Capital and Invested Development.

3. Ninjacart

Due to marginal farming, poor logistics and zero market information, a number of middlemen get involved in sourcing the produce from farmers to markets. As a result, the farmer gets only one-fourth of what the consumer pays and also there is much wastage in the supply chain. It is this problem which Ninjacart addresses cutting out the middlemen from the supply chain. In the last one year, it focussed on building a cost-efficient, reliable and scalable supply chain that can handle 300+ tonnes a day. Initially, it worked as an on-demand grocery delivery company and later pivoted to an end-to-end B2B agri-marketing platform.
Source: Startup Watchlist Inc42.com

4. Waycool

India is the second largest producer of fruits and vegetables in the world and presents a significant opportunity for private players to profitably organise perishable produce value chain. Waycool aims to fix the disorganised perishable supply chain. It is an Omni channel fresh produce distribution company that distributes fruits and vegetables to multiple end-use segments spanning small local shops, modern retail outlets. The agritech start-up claims to have over 20,000 farmers on board and says that by tying up with waycool, farmers have been able to increase their earnings by 25%. It has also made it a point to network with small farmers rather than larger establishments; about 45% of its produce comes from farmers having less than two acres of land. Given that majority of farmers in India fall under this category, waycool has a big opportunity to unlock the potential of these farmers and in the process reduce wastage in the supply chain.

5. Tessol

Owned and operated by Thermal Energy Service Solutions Pvt. Ltd, Tessol was founded by Rajat Gupta, in 2013 with a vision of creating a farm to fork cold supply chain.Tessol's breakthrough, as per him, is the design of a heat exchange unit that can be charged at any power outlet in about six hours. Once charged, the unit will keep the refrigerator on the reefer truck within the optimal temperature for a full-day's operation. Using its

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energy storage technology, Tessol's cold storage and transportation solutions eliminate the use of fossil fuel for cold chain transport systems.

6. Aarav Unmanned Systems

An unmanned aerial vehicle start-up incubated at IIT Kanpur aims to build the future of drones and their applications in the enterprise space. The start-up's drones provide high-value engineering solutions to enterprises across GIS (Geographic Information System) surveying/mapping, industrial inspection and precision agriculture. In February 2016, the start-up raised an undisclosed amount in seed funding from startupXseed ventures, The phoenix Fund and other investors.

Source: Startup Watchlist Inc42.com

Challenges before Agritech Start-ups in India

It's one thing to make farm-friendly technologies, it's another thing to get it implemented.

Agri start-ups are facing a great deal of challenges due to the prevailing knowledge gap between farmers and entrepreneurs other challenges they facing are the lack of support from investors and policy makers in the country.

KEY CHALLENGES

- **Low landholding size**

Due to fragmented and scattered piece of land it is difficult to achieve economies of scale.

- **Return for investors**

Return on Investment seems quite hazy for agritechs in comparison to other technologies.

- **Talent retention**

Agri startups are finding it hard to retain technical talents.

- **Long gestation period**

It takes time to adopt a whole new technology and that too in agriculture sector where one has to wait for at least 5 months to check the outcomes.

Issues/Problems

- **Skill adaptability**

Making farmers adaptive to work on advanced technologies requires significant effort.

- **Regulatory and policy issues**

Regulations in India are favourable but are also complex in nature.

- **Urban centric startups**

The vast majority of Indian startups, particularly the big venture capital funded ones, are urban centric.

- **Apathy of investors**

The Indian agritech industry is still at a very nascent stage, considering the amount invested in one deal in the consumer internet industry is the cumulative amount of funds invested in all the deals in this industry.

Source: economictimes.com, Agri start-ups.indd

RECOMMENDATIONS

Globally, agritech startups have done exceedingly well in implementing technologies to farm and attracting investments. In India there are great technologies, we just have to figure out the way to its proper implementation. For which a timely support to early stage start-ups should be provided. Funding in the Indian Agritech sector is 10% of the global funding but startups struggle to scale up, there is need for large companies to effectively collaborate with startups.

Today, more than $1/4^{th}$ of the farmers in India have access to mobile phones which they are using for shopping and entertainment purposes. There is need to develop mobile training programmes to educate farmers and help them adapt and adopt to new technological advancements. There is need for the government to help set up agritech focussed incubators and grants. Also, academia should encourage more entrepreneurs to focus on this growing sector.

The young entrepreneurs have to work hard to come with outbreaking solutions to indigenous problems and surviving by being resolutely real, selling above cost and often relying on the only marketing that works- word of mouth.

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ROLE OF CO-OPERATIVE INSTITUTIONS IN AGRICULTURAL FINANCE IN INDIA

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ABSTRACT
India is agricultural based country and its majority of population stay in rural area. Agriculture is a dominant sector of our economy and credit plays an important role in increasing agriculture production. Availability and access to adequate, timely and low cost credit from institutional sources is of great importance especially to small and marginal farmers. Along with other inputs, credit is essential for establishing sustainable and profitable farming systems. Most of the farmers are small producers engaged in agricultural activities in areas of widely varying potential. Experience has shown that easy access to financial services at affordable cost positively affect the productivity, asset formation, and income and food security of the rural poor. The major concern of the Government is therefore; to bring all the farmer households within the banking fold and promote complete financial inclusion.

The cooperative banking sector is one of the main partners of Indian banking structure, the cooperative banks have more reach to the rural India, through their huge network of credit societies in the institutional credit structure. The cooperative sector has played a key role in the economy of the country and always recognized as an integral part of our national economy. Cooperatives have ideological base, economic objects with social outlook and approach. The cooperative covers almost all cent percent villages in India. The cooperative form of organization is the Ideal Organization for economically weaker sections in the country. According to recent study by World Bank and National Council for Applied Economic Research, the Primary Agriculture Credit Societies (PACS) amount for about 30 percent of micro credit in India. This proper attempts to analyze the role of co-operative bank in agricultural credit.

Keywords: Cooperative Bank, Agricultural Credit, Rural Development, PACS

INTRODUCTION

Agriculture, historically speaking, was the base for further development of every economy. It was the agricultural sector which enabled people settledown and have a more organised life. It took centuries for the world to move from agriculture to industry and further to the service sector. Even today, in the modern age of science and technology, the agricultural sector is the foundation on which one thinks of further progress.

Agriculture is backbone of Indian economy. It is an important source of GDP and main stay of Indian population. About two third of total population directly earns its livelihood from agriculture. Agriculture sector is most important sector of the Indian economy from the perspective of poverty alleviation and employment generation. But at present agriculture sector is facing lots of problems such as credit, irrigation, HYVs, marketing of crops and other capital equipments etc. Agriculture credit plays a significant role in ushering of this fertilizer - irrigation - mechanisation based breakthrough in India.

India is agricultural based country and its 70% population stay in rural area. The cooperative which are the life blood of the Indian economy and the mechanism for any developmental programs. Especially in an agriculture dominated rural sector, cooperative banks play a pivotal role in bolstering the common individual and financing his business and personal needs. The cooperative credit structure is serving the Indian society since 1904 and since then it has seen several ups and downs. Despite of several limitations such as restriction of area of operations, limited clients, small volume of business, political interference, this movement is standing since last 108 years and serving the societies.

OBJECTIVES OF THE STUDY

1. To study the growth and performance of Cooperative Banks in respect to agriculture credit in India.
2. To study the role of cooperative bank in agricultural credit.
3. To study the agricultural credit structure of the cooperative bank.

RESEARCH METHODOLOGY

The present study is based on secondary data. The necessary data has been collected from annual reports of NAFSCOB, Research Papers, Journals and various other websites.

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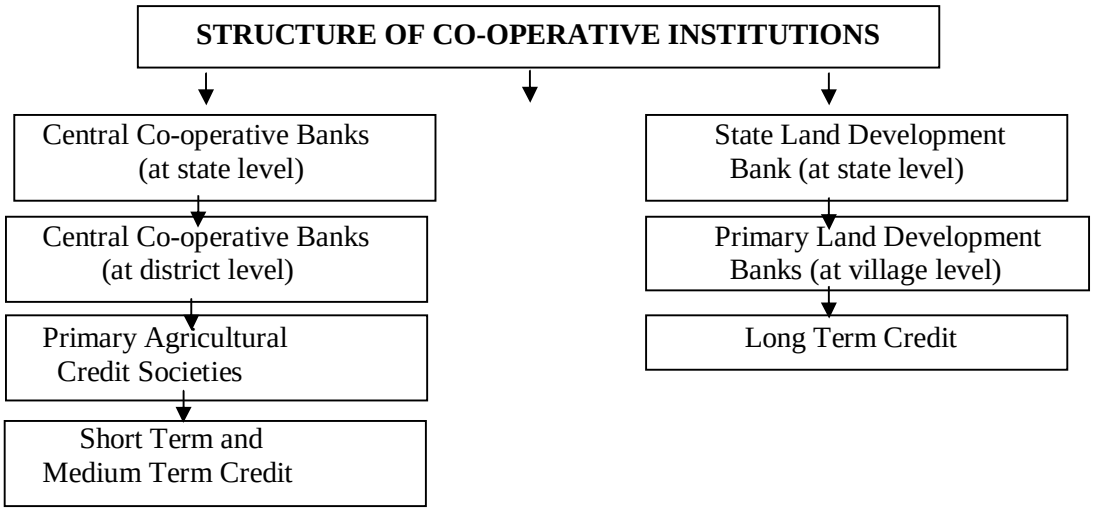
SCOPE AND LIMITATIONS OF STUDY

Study is limited to concept of Cooperative and agricultural credit.

In this research paper we will emphasize on the cooperatives institutions role in the development of agriculture and rural area. Ever since the cooperative was introduced for over a hundred years the rural outlook has progressed in its own pace. India adopted the three tier cooperative system. Thus the State Cooperative Banks (SCBs), the District Central Cooperative Banks (DCCBs) and the Primary Agricultural Credit Societies (PACs) were formed for the short term credit requirements of the rural population. The long term credit is provided by the State Cooperative Agricultural and Rural Development Banks (SCARDBs) and the Primary Cooperative Agriculture and Rural Development Banks (PCARDBs). The RBI as the apex bank for agriculture established NABARD and entrusted the financing and regulatory functions of the PACS. At the grass roots level the PACS is formed by 10 or more people coming together at the village or taluka level. The RBI encouraged the formation of PACS by keeping the contribution of each member minimum so as to enable the poorest also to be the beneficiary. The cooperative banks have remarkably increased its primary functions, but still lacks in volume as compared to the commercial banks in the country. The total credit mobilized by cooperative banks is less than 10 percent of the commercial banks. The various issues it dealt with can improve the scope for the development of the cooperative banks. In these regard a number of committees have been formed to give their recommendations. The Capoor Committee (1999), the Vikhe Patil Committee 2001, the National Policy on Cooperatives 2002, the Vaidyanathan Committee 2004, recommended the revival of the cooperative banks by analyzing the short term and long credit.



The system is well connected from village upwards to state level banks and further to NBARD and RBI. The money required by the primary agricultural credit societies is provided the NABARD through proper channel subject to certain conditions.

RESULTS OF COOPERATIVE INSTITUTION IN INDIA

Primary Cooperative Agricultural Credit Societies (PACs)

A Cooperative agricultural credit society can be started with 10 or more persons normally belonging to a village or a group of villages. The members have unlimited liability, so each member is fully responsible for the entire loss of the society in the event of failure. Loans are given for short period, normally for the harvest season, for carrying on agricultural operation, and the rate of interest is fixed. The primary agricultural credit society was expected to attract deposits from among the members and non members of the village and thus promote saving and self-help. It provides loans and advances to needy members mainly out of these deposits. At the end of year 2013, there are 91833 primary agricultural credit societies in the country with a membership of over 139376 thousand.

The loan issued to agriculture sector by PACs in India has grown from Rs.3247754.72 lakhs in 2007-08 to Rs.10419168.41 lakhs in 2012-13.

CENTRAL COOPERATIVE BANKS (CCBS)

The Central Cooperative Banks located at the district headquarters or some prominent town of the district. Their main function is to lend to primary credit society apart from that, Central Cooperative Banks have been undertaking normal commercial banking business also, such as attracting deposits from the general public and lending to the needy against proper securities.

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The short term loan issued to agriculture sector by District Central Cooperative Banks in India. Increased from Rs.3974546 lakhs to Rs.10141581 in 2008-09 to 2012-13 and medium term loans also increased from Rs.255891 to Rs.366994 during the same period.

The State Cooperative Banks : they finance, coordinate and control the working of the Central Cooperative Banks in each state. They serve as the link between the Reserve Bank and the general money market on the one side and the Central Cooperative and Primary Societies on the other. They obtain their funds mainly from the general public by way of deposits, loans and advances from the Reserve Bank and they are own share capital and reserves.

The short term loan issued to agricultural sector from State Cooperative Bank increased from Rs.2255415 Lakhs to Rs.5407632 Lakhs and Medium term Rs.91014 to Rs.152639 Lakhs in 2007-08 to 2012-13 in India.

BENEFITS FROM COOPERTIVE INSTITUTIONS

1. **Cheap Rate**

Cooperative Societies have provided credit to the farmers at a cheap rate. Since 1954, the cooperative credit societies are meeting increasingly the requirements of farmers. More than 60 percent of the credit needs of farmers are met by the cooperative societies. The monopoly of the money lenders, landlords etc. is being broken in the villages. While at one time the money lenders provided more than 70 per cent of the farmer's credit needs, they are now providing less than 35 per cent. in course of time, therefore, co-operative credit would become so significant that the village money-lenders will have no role to play in rural finance.

2. **Use of better farming methods**

The cooperative societies had led to the use of better farming methods, such as the use of improved seeds, manures, etc. The marketing and processing societies have helped members to buy their requirements cheaply and sell their agricultural produce at good prices. It has also provided good storage facilities to the farmers.

3. **Helped in improving life in rural areas**

Cooperative Societies have also helped in improving life in rural areas. They have educated the farmers so that the latter could give up many of their bad habits like gambling, drinking etc. They have attempted to remove undesirable social customs like reckless spending during marriages, religious ceremonies, etc. They have discouraged farmers from going to the courts and indulging in costly litigation; they have attempted to solve disputes at the village level itself. In other words, they have been attempting to improve the farmers socially and morally.

4. **Have helped their members to raise their economic condition**

The non credit societies, like the housing cooperative societies, the consumers' cooperative societies etc. have helped their members to raise their economic condition and have saved them from the exploitation of powerful groups. For instance, in many urban areas, housing cooperatives have enabled middle income groups to secure plots of land and also construct their own houses. Consumer cooperatives have done great service to the community by helping to distribute goods in short supply equitably and in selling goods at reasonable prices. In many places they have been instrumental in preventing the private shopkeepers from taking advantage of supply shortages and charging exorbitant prices. Likewise, societies meant to help artisans like handloom weavers may have helped their members with finance and marketing facilities.

5. **Role in areas of credit**

The rural cooperatives have played a significant role in areas of credit, agricultural production, agricultural processing and marketing. The guiding principles of co-operatives are voluntary and open membership, democratic control and equitable distribution of profit and utilisation of resources. The present thrust of the movement has been to build democratically vibrant, economically viable and self, reliant cooperative movement in India.

Except for the year 1990-91, when there was a dip in credit from the cooperative sector, there has been steady increase in cooperative credit over the year Rs.3,440 crores in 1984-85 to Rs.20,660 crores in 1999-2000 and Rs.42,480 crores in 2006-07.

WEAKNESSES OF THE MOVEMENT

(i) Lack of Spontaneity : The cooperative movement in India did not spring from the people themselves. The movement was not voluntary, and the people did not come forward to organise societies to satisfy their needs. On the other hand, the movement took the form of a government department. The villagers among whom the credit societies were started generally thought of the societies as government lending agencies. The government

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officials who can the movement were ignorant of the ideals of the cooperation. They were neither properly trained, nor were they aware of the needs of the farmers.

(ii) Lack of Funds : A basic weakness of the cooperative movements was the lack of funds. It was felt that the members themselves should save and deposit their savings and thus contribute a large share to the working capital of the societies. The central and the state cooperative credit societies could not attract as much deposits from the general public as was anticipated. This is the position even now. The Reserve Bank was willing to lend to the cooperative banks, and the concessional rates, but even this facility could not be taken advantage of by the State Co-operative Banks. Lack of funds was one of the basic weakness of the movement.

(iii) Loans for Productive Purposes Only : The cooperative credit societies did not help the farmers in meeting all their credit requirements. They gave loans only for agricultural operations. But the farmers required loans to meet many of their other requirements also. For these purposes, the farmers had to depend upon the money-lenders. In other words, the cooperative societies should have met all the requirements of the farmers, otherwise they would not receive full royalty of the farmers.

(iv) Lack of Cooperation on the Part of the People. In India, people have been largely illiterate, ignorant and extremely conservative. For one thing, most of them did not understand the real meaning and objective of cooperation. For another, be principle of unlimited liability which was the basis of the village credit societies prevented the letter farmers to join the movement. Cooperation cannot succeed unless there is willing and complete cooperation from the people.

(v) Defective Management and Leadership : The failure and liquidation of many societies in rural was directly due to the defective management and leadership. As mentioned earlier, the village economy is dominated by the landlords. The small farmers owe blind allegiance to the landlords. But the landlords did not care much about the success of the cooperative movement. Nor did they take genuine interest is promoting the welfare of the farmers. Besides, the work of the societies suffered from favoritism and partiality. For instance, loans and other assistance flowed easily to rich farmers and to the relatives and friends of the office bearers. The needy and the poor failed to get any assistance. Moreover, the office bearers were not strict in getting repayments from those in whom they were interested. In general, the management was weak and inefficient.

CONCLUSION

Cooperative banks belong to the oldest forms of the collective action in India playing essential role in the realization of the agricultural and in local development. They serve both rural and urban population, and are main banks in India supporting development of agriculture and rural areas. Their key role is to give credits financing various rural based entrepreneurships. Agricultural credits play a number of significant functions of which the primary include the intensification and growth of the agricultural production in India. There is urgent need to open new cooperative bank branches in rural area and provide all financial facilities at low cost. So Government should have the primary responsibility to open new cooperative banks branches and to ensure that its citizens have easy access to cooperative credit.

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ORGANIC BANKING A WAY TOWARDS SUSTAINABLE AGRICULTURE

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The Sustainable Development Goal to "End hunger, achieve food security and improved nutrition and promote sustainable agriculture" recognized inter linkages among supporting sustainable agriculture and empowering small farmers. The goal of Sustainable Agriculture can be achieved through promotion of organic farming, as there are many forward and backward linkages of organic farming to the economy in general and sustainable agriculture in particular. The experiences of many developed countries suggest that organic farming is the absolute need of the hour.

Organic farming is key to sustainable agriculture as it relies on natural methods of cultivation, use of organic manure such as compost manure, green manure, bone meal and prohibiting use synthetic fertilizers and pesticides, genetically modified organism and growth of hormones. Many studies have also confirmed that organic farming practices have improved the quality of soil fertility, reduced soil and water pollution, increased in nutritional value of food and also increased in farmers earnings. Organic farming ensures soil fertility, promotion of environment and ecology, healthy living and decrease the risk of health ailments, enhances agroecosystem health, biodiversity, biological cycles and biological activity.

Indian economy is agriculture-based economy. Agriculture sector provides employment to more than 50% of workforce and contributes approximately 18 % to the GDP. India is world's largest producer of milk, wheat, rice, spices and dairy products. Recently, Sikkim state has been confirmed as the first organic state in the world by FAO. According to the World Organic Agriculture report, India is home to 30% of the total organic producers in the world 8,35,000 organic farmers and is the 9th largest in terms of area of organic agriculture land. However, as a percentage of the total area under cultivation, it accounts for just 2.59 percent (1.5 million hectors) of the total organic cultivation area of 57.8 million hectares. (FIBL & IFOAM Year Book 2018) It means there is a strong need to increase area under cultivation of organic agriculture land so as to ensure sustainable agriculture.

The Global market for organic foods has increased tremendously in recent past. According to the report, global food and beverages valued at approximately USD 124.76 billion in 2017. Market has opened many opportunities to small and marginal farmers to earn better than before. The current Indian organic market is estimated of INR 40,000 million and likely to increase to 1 to 1.2 lakhs Million rupees by 2020. Indian organic market has been growing steadily with CAGR of 25% as compared to 16 % global growth rates. India's export of organic food was 515.44 million dollars in 2017-18. India is largest exporter of organic cotton in the world.

India is blessed with lot of potential to produce all varieties of organic product due to its diversified agro climatic region. But its potentiality is not fully utilized due to many reasons and now it is time to move towards organic farming so as to achieve the goal of sustainable agriculture. The present is an attempt to study the challenges faced by organic farming in India and give innovative solutions to promote organic farming by making structural changes in the policies and establishing Organic Banking as a grass root institution to promote and protect organic farming.

CHALLENGES FACED BY ORGANIC FARMING IN INDIA

1. **Lack of accommodative policy to promote organic farming**

   India lacks accommodative policy for holistic development of organic farming. Though government has taken number of efforts for promotion of organic farming but these are not sufficient to achieve the prescribed goal.

   There is no uniformity in the policies of state and central government. Farmers find difficult to get assistant from the government due to lack of clarity in the policy.

2. **Low productivity of crops during transition period:**

   One of the biggest challenges faced by Indian farmers to adopt organic farming is loss of crop production or low productivity of crop if they switch over organic farming from conventional farming.

   Farmers earning fall around 30 to 40% due to low productivity of organic crop as agriculture land is used to chemical fertilisers. Low income earning during transition period makes farmers not to move towards organic farming.

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3. **Lack of consumers awareness about organic products and willingness to purchase them**
   Organic products market in India is underdeveloped due to many reasons. Only one percent of Indian consumers purchase organic product. This is due to higher prices of organic product and lack of awareness about the product.

4. **Lack of strong supply chain:**
   Lack of storage facilities for organic product and proper organic supply chain incurred losses to farmers. Farmers find difficult to sell their produces due lack adequate of marketing facilities.

5. **Lack of good quality of inputs and Higher price of inputs;**
   Higher prices of organic inputs such as organic manure, biofertilizers, pesticides increase the cost of production around 25-30%. The quality of these inputs are many times are not up to the mark due to adulteration.

6. **Tedious procedure to get certification**

7. **Lack of training to farming to move towards organic farming**

By understanding challenges faced by farmers to move towards organic agriculture. The present paper proposes Organic Banking as an innovative solution to promote organic farming and sustainable agriculture by making structural changes in the Indian agriculture policy.

If this new system of organic banking is introduced in India, the day is not too far to say that India is one of the largest organic agriculture economies in the world.

What is an Organic Bank?
Organic bank is a cooperative institution which promote and protect organic farming by extending numerous facilities to the farmers.

These facilities include providing adequate organic inputs at reasonable prices, marketing of organic inputs to fetch good prices to the farmers, financial assistant to marginal farmers and expanding linkages to get updated information.

Who can be member of organic bank?
Any farmer who is practicing organic agriculture or ready to switch towards organic farming in the village can become member.

How will it function?
Organic bank is formed on the basis of cooperative principle so it will function as other cooperative institution. It will extend various facilities to member farmers for promotion of organic farming.

What will be the sources of funding?
Being a cooperative institution, membership fees is the primary sources of funding of Organic Bank. But marginal farmers are unable to pay high membership fees to cover the operational cost of the organic bank.

Therefore, Government should finance these banks initially by giving seed funds and later based on their performance to promote organic farming in their jurisdictions.

How will be the Structure of Organic Banking System?
The organic banking system will operate as a three-tier system.

At the village level, Primary organic bank will operate.

At Taluka or District level, District Organic Bank will function as intermediator between primary and central organic bank

At State or Central level, Central Organic Bank will function as a policy making body and funding agency for promotion of organic banks in the state.

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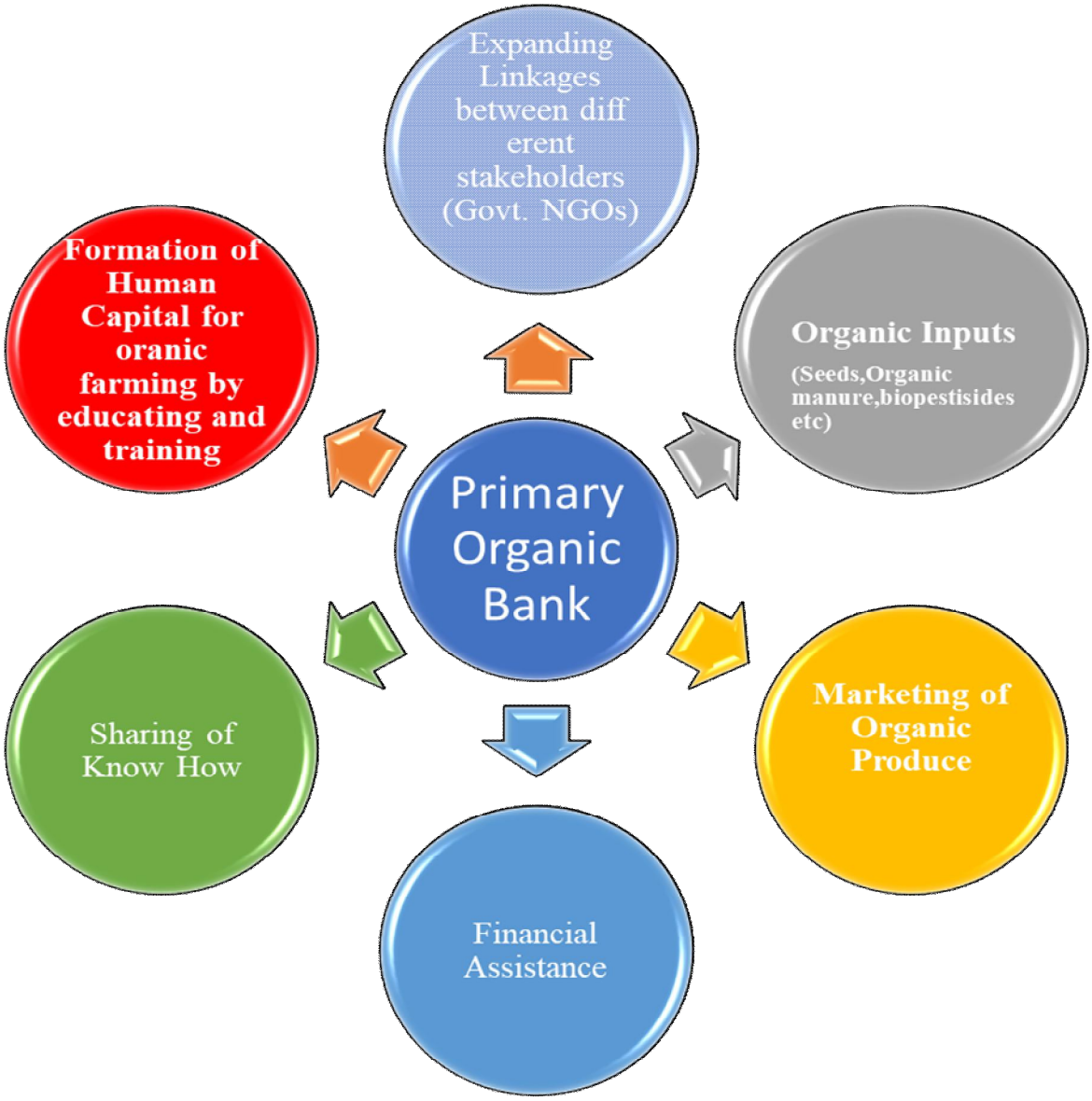

Proposed Model of Organic Bank

Functions of Primary Organic Bank

Supply of good quality of Organic inputs:
Organic farming is essentially based on uses of organic inputs such as organic manure, biofertilizers, organic pesticides, seeds and nature friendly equipment. If these inputs are made available to the farmers in sufficient amount, farmers can able to reduce the cost of production by near about 30 %, which they spent on synthetic fertilizers and pesticides. The organic bank will ensure the availability of organic inputs and their quality either by producing them or purchasing them at reasonable prices form market. The bank can also produce these inputs with help of its members and can distribute amongst the member farmers on the basis of cooperative principle. Lack of adequate organic inputs and their higher price is major challenge for farmers who are willing to move towards organic farming. If farmers are provided adequate organic inputs at reasonable prices, this challenge is solved by the bank then every farmer will go for organic farming.

Marketing of organic produces
Marketing of organic produces includes all those facilities required to transfer the agriculture produce from land to final consumers. The growing demand for organic products, lack of adequate supply of these products, high in nutritional value and safe food are some positive points which gives more prices to these products than traditional product. But due to lack of knowledge about market information, lack of storage facilities, grading and sorting and exitance of intermediaries fetches lower prices to these produces. Sometimes farmers are not even able to cover the cost of production also which males them discourage to move towards organic agriculture.

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The Organic Bank will provide all kinds of marketing facilities to the farmers to provide attractive prices for their produce. As they are in better position to find good market for produces, eliminating intermediaries by direct selling to final consumers, building storage and transport facilities which can reduce the wastages of agriculture products since they are perishable in nature, grading of product for exports and getting certification for produce. If these facilities are extended to the farmers at the right time their earning can be increased by around 50 % - 60%.

Organic bank work as an institution and not as an individual. Being institution, it is stronger to overcome from any problem related to marketing of organic produce Construction infrastructure facilities in the initial stage of OB is major challenge as it required huge investments. These facilities can be constructed by collaborative efforts of government, NGOs and farmer members.

Financial Assistance

Financial assistant to the organic producers is quite essential in the initial stage of farming as income earnings fall due to low productivity of crops and high cost of cultivation, cost of handling during transition period. Organic Bank can help the farmers by providing financial assistance to overcome the losses during transition period. There is also need of credit when farmer switches from traditional to organic farming for purchase of inputs, transportation certifications of produce. Farmers are hesitate to switch towards organic farming due to lack of financial security, low productivity during transition period, high prices of organic inputs etc.

Organic Bank can provide short term credit to the marginal farmers to overcome financial problem associated during transition period. Government can also give subsidies to the organic farmers to cover the losses of crop production during transition period through organic banks. If farmers are assured that they will get financial assistant in the initial stage, it will encourage them to switch towards organic farming.

Formation of human capital

Organic farming required specialised knowledge, innovations and know how to make it commercial and profitable. Human capital play very important role in achieving above requirement. If farmers are trained for how to use modern techniques of farming, marketing skills, use of ICT for dissemination of information and getting market updates, improving standards of agriculture produce etc, farmers earnings can increase to around 40%. Organic bank being primary institution for promoting organic farming will engage numerous activities for educating and training the farmers. Government can also provide extensive services to the farmers through organic bank so as to enable farmers to make best decisions and follow best practices. Lack of skill manpower and commercial approach is biggest hurdle in adopting organic farming in India. This gap can be met through organic bank.

Expanding Linkages

Organic bank can play an important role in connecting different stakeholders with the organic producers since it functions at various level. Government can make effective policy for promotion of organic farming if they are connected to farmers. Organic bank can provide platform to farmers interact with different stakeholders to share their experiences, problems faced by them and give suggestions to make better policy. If farmers are able to connect with domestic and global supply chain, their earning will increase by manifold as they get better prices for the produces. Expanding linkages with different stakeholders can give various economies to the farmers as well as government.

CONCLUSION

India has potential to achieve the goal of sustainable agriculture but it needs to work on various front inorder to achieve the goal at the earliest. Organic farming is a key to achieve this goal as it is based on nature friendly farming techniques, free from chemical input and use of organic inputs. But there are many challenges faced by organic farming such as high prices of organic inputs, lack of supply chain, lack of accommodative policy to promote organic farming, lack of consumers awareness about organic product etc. The development of organic farming can boost by introducing organic banking in India. Organic banking is an innovative solution to make organic farming economical and scalable. If this system of banking is introduced, India will be first county to achieve sustainable agriculture goal in the world.

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SWOT ANALYSIS OF TEA TOURISM: A CASE STUDY OF ASSAM

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ABSTRACT
The lush greenery and the picturesque beauty of Assam provides a huge opportunity for the tourism business to prosper. It is also one of the major tea producing state of the country. Tea tourism is a recent origin in the state. The researcher in the study has attempted to give a brief overview of the Tea tourism industry in Assam. A SWOT analysis is also done based on the secondary and the primary data collected by the researcher. The paper is a qualitative one based on primary and secondary data.

Keywords: Tea tourism, heritage, nature, wildlife

1. INTRODUCTION
Tea tourism is trending worldwide as the new form of sustainable tourism. Its growing popularity has contributed generously in the sustainable development of the tea industry. Practicing tea tourism helps in extra revenue generation for the tea cultivators alongside its main revenue generation from various types of teas. Many tea producing countries are now promoting tea tourism as it has become an important channel of revenue generation in the tourism industry. In the United States, a tea garden was reopened in 2003 that provides tea factory tours and trolley rides through tea fields in South Carolina[1].Similarly, tea tourism in China has developed even more widely, including such attractions as the National Tea Museum in Hangzhou[2] and tea arts and ceremonies in the Fujian province [3]. Tea tourism encompasses a large potential market, as a result of its green and sustainable tourism characteristics, as well as the global transmission of tea culture.[4] In India too there is a upward trend in tea tourism. There are a couple of tea tourism destinations in India like in Coorg, Darjeeling, Dibrugarh, Tocklai, etc. Assam is one of the eight North Eastern states in India. It is known for the natural beauty which can awe any nature lover. The lush greenery and the picturesque beauty of the State provides a huge opportunity for the tourism business to prosper. It is also one of the major tea producing state of the country. Tea tourism is a recent origin in the state. The Tea estate Bunglows of the British time situated right amidst beautiful tea gardens have the old world charm which attracts many tourists. Those are the relic of the colonial era with large courtyards and swimming pools which are now being converted into heritage properties. Such heritage properties are the base of tea and luxury tourism. In many European countries, the vineyards are a major tourist destination. It attracts a lot of tourists from all over the world as it not only helps one to have an unique experience to be close to nature but also learn a lot about the culture and the history of the place. Similarly the Tea gardens of Assam have a lot of Potentials and opportunities to turn into a lucrative tourism business.

2.1 LITERATURE REVIEW:
Tea tourism is defined by Jolliffe as "tourism that is motivated by an interest in the history, traditions and consumption of tea."[5] Tea tourism has developed to showcase tea planting areas with beautiful natural environment or special historical heritage. Tea culture (local tea customs) is conveyed through a variety of activities promoting sightseeing, learning, shopping and other forms of entertainment and tourism experiences.[6] Tea tourism in China was developed in the forms of tea museums, tea gardens, tea related activities, tea shops,

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tea events, tea folk performance, and tea related products.[1] According to Jolliffe and Aslam's (2009) research in Sri Lanka, tea tourists had expectations concerning the relaxation, homely environments, and tea plantations when visiting a tea destination. Goowalla & Neog (2011) in their study mentioned that Tea tourism though relatively new in concept has tremendous potentiality. A proper cheeked out design and plan to entire tourist is the need of the hour. Chutia (2015) pointed out the problems of tourism in Assam. Absence of a strong tourism policy, Insurgency, lack of infrastructure and lack of coordinated efforts were his main findings. The study mentioned that the tourism industry in Assam has still miles to go to exploit the proper potentialities. The whole tourism potentialities of the state can be grouped together under the following categories: (a) Wildlife, (b) Nature Tourism, (c) Tea tourism (d) Eco Tourism, (e) Cultural Tourism (f) Pilgrim Tourism (g) Golf Tourism and (h) Adventure Tourism (i) Others. He also mentioned that Assam is richly endowed by nature to become a spotlight of tourism, but mere having a good number of attractive tourist spots is not enough unless all the minimum requirements stated above are not readily available. Kalita & Gogoi (2015) in their study pointed out the basic requisites for development of tourism in Assam like congenial social and political climate, good transport and communication network, easy accessibility, comfortable lodging and secured social environment. Borthakur (2017) chalked out the benefits of community from tourism. The study explained how tourism strengthened the socio economic conditions of the community. The main problem found from his study was that local people lacked the expertise and skills required for tourism sector.

2.2 Research Gap: From the review of literature it can be easily understood that there are numerous studies have been conducted on Tea tourism in China, Sri Lanka and other Foreign countries. There are also lots of studies done on various aspects of Tourism in Assam but there are very limited literatures available on Tea Tourism in Assam. Hence, the researcher has made an attempt to examine the present status of Tea Tourism in the study area.

3. OBJECTIVES OF THE STUDY

i) To have a brief overview of Tea Tourism in the state of Assam.

ii) To list out few popular Tea Tourism destinations in Assam.

ii) To do a SWOT analysis of Tea Tourism in Assam.

iii) To provide few suggestions for the improvement of the Tea Tourism destinations.

4. RESEARCH METHODOLOGY

This paper is descriptive and qualitative in nature. It is based on both Primary and Secondary data. The primary data is collected through various interviews and observations. The secondary data is collected from different sources like books, journals, articles, and periodicals.

5. LIMITATIONS AND SCOPE FOR FURTHER STUDIES

The Researcher has restricted the study to the state of Assam only because of the constraints of time and resources. Similar study can be carried out for other tea producing States as well. Also the researcher has studied only the opportunities and the prospects of Tea Tourism. Studies on other aspects of Tea tourism such as various problems faced, marketing strategies, branding, etc. can be studies.

6. DISCUSSIONS

6.1 Tea Tourism in Assam- an overview

Tea Tourism is a contemporary concept researched and talked about since the beginning of the 21st century. It is a wonderful tourism concept associated with tea gardens. The tea gardens, the process of tea plucking, tea producing, cultural festivals of the tea tribes and staying at the tea bungalows are part this kind of tourism. This is a kind of unique tour experience connected to nature. Tea tourism is already popular in countries like China, Sri Lanka and Kenya. It is now catching up in India.[2] It offers adventurers the opportunity to discover how Tea is made and lets them taste various different types of teas. Assam is considered as one of the largest Tea producing places in the world. It is brimmed with a number of colonial era bungalows, mostly located in the eastern part of the state. Tourists from across the world frequent these places to get a taste of British architecture amid the lush green gardens.[3] Assam is host to the World's oldest and largest Tea Research Centres at Toklai in

[1] Ji, S. J. (2006). 茶文化旅游开发研究. (Master's), Shandong University. Retrieved from Wang fang Database. (Y982958)

[2] Sharma, K Sanjeev. (2016) Tea Tourism in Darjeeling: IJARIIE Vol 2 Issue 4, ISSN(O)-2395-4396

[3] https://blog.mygov.in/tea-tourism-an-emerging-trend/

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Jorhat. It also is the home to the world's largest Tea Auction centre in Guwahati. Assam tea is derived from the plant species called Camellia sinensis. Its uniqueness lies in its distinct malty flavour. The favourable tea tourism season in Assam is from June to September which is the Monsoon time. Most of the Tea Tourism destinations are situated in the Dibrugarh district in Assam. Apart from the heritage Bungalows being converted to resorts, one can get the option of staying in homestays too. The Locals and the workers of the tea estates play warm and wonderful hosts.

Activities in and around the Tea Estates:

1) A relaxing walk through the lush green tea gardens

2) Engage oneself in the Tea plucking process with the workers

3) Visit to the Tea processing Industry

4) Tea tasting

5) Learn about the different types of Tea

6) Guided tours to the nearby places

7) Visit to the homes of the locals to learn about the culture and the community

8) Enjoy the local cuisine of Assam

9) Cultural programme in the evening with special Bihu performances

10) Most of those destinations have Badminton/Tennis/ Golf courts.

Off late Tea tourism has become the buzz word in promoting the tourism for Assam. Tea estates as well as the government are planning to develop additional facilities inside the tea garden to attract tourists which can help in generating additional revenue. The state governments of Assam are working towards creating the necessary infrastructure for tea tourism.

6.2 Tea Tourism Destinations in Assam

1) Mancotta Heritage Chang Bungalow, Dibrugarh
It is located at a distance of around 15 km from Dibrugarh airport. Mancotta Heritage Chang Bungalow at Mancotta Tea Estate was built by the British tea planters. Thus the bungalow is a relic of the bygone colonial times. The beautiful tea gardens and the colonial décor of the Bungalows is a must for the heritage tourists.

2) Kaziranga Golf Resort, Jorhat
Kaziranga Golf Resort was called the Burra Sahib Bungalow. It is a heritage plantation bungalow built more than 120 years ago by renowned planter Hemendra Prasad Barooah. It is Located at Sangsua Tea Estate near Jorhat. The idea behind setting up this property was to make tea tourism popular in the region. The resort also has a golf course in the middle of the tea garden, making it a unique experience for people wanting to have a slice of tea tourism in Assam.

3) Banyan Grove, Jorhat
Nestled amidst Gatoonga Tea Estate in Jorhat, Banyan Grove is a century old colonial plantation bungalow. The bungalow offers a rich colonial experience with British-era décor in a serene natural environment.

4) Thengal Manor, Jorhat
Situated around 15 km from Jorhat, Thengal Manor is a heritage tea estate bungalow constructed in 1929. The bungalow is very popular among tourists owing to its large collection of various materials from British era. 'Dainik Batori', the first Assamese daily, was also launched here. This region is also home to the Indian Greater One-Horned Rhino. Visitors can stay in the tea planter bungalows in the heart of the Gatoonga Tea Estate and witness the production of tea from start to finish. Guests can walk with the on-site tea estate manager as he begins his day at 5:30am.

5) Wathai heritage Bungalow (Tinsukia)
Wathai Heritage Bungalow at Limbuguri Tea Estate in Tinsukia is a plantation bungalow situated around 5 km from Dibru Saikhowa National Park, making it the perfect destination to spend the night after an engaging day of birding inside the Park.

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6) Wild Mahseer, Sonitpur

Located in Balipara division of Addabarie Tea Estate, Wild Mahseer is a heritage bungalow established by the British Assam Tea Company in 1864. The bungalow has been named after one of the toughest game fish in the world 'Wild Mahseer'. Known for its impressive colonial architecture, lush greenery and wide range of activities, Wild Mahseer is the go-to place for tea enthusiasts.[1] Tours at Addabarie introduce visitors to the magic of tea during a half day adventure. Visitors will drive through lush tea gardens where garden workers in vivid saris pluck leaves. The tour continues through the onsite factory where the leaves are processed using both the Orthodox and CTC methods. The tour concludes with a visit to the tasting room where you can discover the flavors of different tea grades. The best time to visit is between May and October when the factory is in full swing during harvest season.

These are few of the popular tea tourism destinations in Assam. There are a lot of other destinations too which are upcoming in different parts of Assam.

6.3 SWOT Analysis:

On the basis of the various available literatures, secondary data and the primary data collected by the researcher, a SWOT Analysis of the Tea Tourism in Assam have been done.

Strengths

- Picturesque beauty of the place attracts many nature lovers.
- Offers wildlife tourism as well. The vicinity of the tea gardens are often home to many wild animals. One can easily spot Elephants and Rhinos in many of those destinations.
- The Victorian styled Bungalows of the colonial era attracts many heritage lovers.
- An unique cultural experience with a opportunity to interact with the local.
- Ethnic Culinary experience to entice the taste buds with dishes like Maasor tenga, aloo pitika, khorisa, etc.
- An opportunity to learn about various teas and how they are produced. It also allows one to taste various types of teas available.

Weaknesses

- A little pricey as the starting range of the accommodations are from Rs.3000 – Rs.7000. It loses out on many of the customers because of its prices. There is lack of budget accommodations.
- Digital media used for promotions is very less and so the reach to masses is less.
- Lack of good roads and transportation.
- No Banks and commercial set ups nearby.
- Communication bottlenecks as knowledge of Hindi and English is limited by the locals and the staffs.
- Lack of good infrastructure facilities.

Opportunities

- Formulation of need based tea tourism policies by the state government.
- Promotional activities for reaching out to the masses.
- Creation of Destination image and branding.
- Using the availability of polo and golf fields for promotion.
- Training programme for the locals in the tourism and hospitality sectors.

Threats

- The negative publicity of Assam because of the insurgency issues.
- Bandhs due to various conflicts.
- Less inclination towards the tourism business from the community and the locals.
- Lack of proper training and guidance.

[1] https://blog.mygov.in/tea-tourism-an-emerging-trend/

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7. SUGGESTIONS

i) Training programmes to be held at regular intervals by institutions like IIE, ATDC or various NGOs to train the locals on how to go about tea tourism.

ii) Communication is a real problem. Efforts must be taken through various initiatives so that the locals and the staffs are able to communicate with the tourists at least at the basic level Hindi or English.

iii) There is lack of digital knowledge amongst the hoteliers and the resort owners. As such the properties are absent from many digital platforms and hence they fail to attract as many tourists comparatively.

iv) The commutation to those places from the major airports, train stations and bus stops should be improved.

v) Tea tourism ventures should collaborate with the adventure tourism, wild life tourism, religious tourism, and other possible tourism ventures so that the tourists can be provided with an exciting package. It would be a win-win situation for all.

8. CONCLUSION

The study carried out in the tea tourism sector in Assam portrays a clear picture about tremendous potentiality it has. Tea tourism can be a strong revenue generation stream for the State. It can unlock a new dimension of tourism in Assam. But it still has a long way to go. Proper collaborative efforts from the entrepreneurs, Government, NGOs, various Institutions like IIE, ATDC which give training on tourism entrepreneurship and the community people is required to reach the new heights of success.

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A STUDY OF SPICE PROCESSING SECTOR AND ENTREPRENEURIAL OPPORTUNITIES

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ABSTRACT
Indians like flavour and tasty foods, so spices play an essential role in enhancing the flavour and test of the processed foods. Spices are required in preparing instant curries, canned meat, appetising and digested beverages and confectionary, soup powders, sauces, and poultry products etc. Spices have been used to impart flavour and aroma in the preparation of a wide variety of processed foods. Food processing helps to diversify and commercialise farming, enhance income of farmers, create markets for export of agro foods as well as generate greater employment opportunities. This study is analytical in nature and based on secondary sources of information that are collected from various research papers, reports submitted by various agencies, government data sources.

Keywords: Spice Processing, Origin of spices in India, Spices Production.

INTRODUCTION

India is the second largest producer of food, and has the potential of being the biggest with developing food and agricultural sector. It is the reaction of the father of green revolution professor M. S. Swamynathan's contribution. It transformed our country from a land of foodstuff shortage to land of surplus foods. Changing lifestyle and surplus food has shifted the consumption pattern in modern India. Agriculture and industry are the two pillars of our economy, so food processing industry is the bridge between this two pillars of economy. Food processing helps to diversify and commercialise farming, enhance income of farmers, create markets for export of agro foods as well as generate greater employment opportunities.

Indians like flavour and tasty foods, so spices play an essential role in enhancing the flavour and test of the processed foods. Spices are required in preparing instant curries, canned meat, appetising and digested beverages and confectionary, soup powders, sauces, and poultry products etc. Spices have been used to impart flavour and aroma in the preparation of a wide variety of processed foods. Spices have carminative stimulation and digestive properties so spices used in the medicines. All types of curried dishes in India and abroad the spices are extensively used. Chiefly spices are traded in an unprocessed form, a small yet significant quantity enters international trade as spice powders.

India is the largest producer, consumer, and exporter of spices in the world. India produces more than 65 spices in different varieties out of the 109 spices listed by ISO. Almost all known spices produce in India and the largest exporter of this commodity. The approximately world trade in spices is 1.05 million tones valued at 2750mln US$ out of which India has effective share of 48% in quantity. Curry powder is the foremost of those blends or mixes and sometimes consists of 20 or more spices designed to add the characteristic flavour of an Indian curry, which is appreciated all over the world. Apart from world market processed curry power becomes popular in domestic market. Spices are used all over the country and the unit can go on adding new products once achieve stability in the market.

World's biggest exporter of spices is India. In the domestic market have good scope for the processed spices. In the international market export of spices is encouraged in processed form as it will bring more value addition to the unit price of whole spices. Processed spice power demand is increasing day by day with changing attitude as well as improvement in purchasing power of the people. An urban area of the country is the good market for the processed spice products.

ORIGIN OF SPICES IN INDIA:

Spices once hailed as 'gray gold' have played an important role in the history of civilization, exploration and commerce. Spices were the first object of commerce between the East and the West. The cultivation and use the spices go back to the beginning of history. Spices export from India is the oldest known trade to man. Spices were the traditional items of international trade. Spices have had a greater impact on world trade than any other foodstuff. Many spices have medicinal properties and have profound effect on human health, since they affect many functional processes. Spices are being used every day in the family at all occasions of sorrow, happiness and festivals in one or other forms.

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LITERATURE REVIEW

Indian Spices: The Legacy, Production and Processing of India's Treasured Export: this book comprehensively covers the production, processing and post harvest technology of Indian spices with an added focus on the history and uniqueness of the legendary regional product. This book describe the unique aspects of these spices and their production, post harvest technology and value addition, molecular breeding, organic farming aspects, climate change effects and bioactive compounds. Seasonal, preparatory, and storage conditions resulting composition variations are explored.

Handbook on Manufacture of Indian Kitchen Spices (Masala Powder) with Formulations, Processes and Machinery Details (2nd Revised Edition): This book covers the formulation of spices mixture, ingredients and formulation of spices, pre-processed spice mix formulation, how to start spice business, Indian raw spices, spices manufacture, spices production in India, spices powder manufactures, production of Indian kitchen spices, Indian spices, manufactures, spice business, production of spices, Indian spices masala, masala manufacture, Indian cooking spices, Indian food spices, food cooking spices, spices or masala manufacture.

Vasudevan Namboodiri: Study on Production & Prospects of Exports of Spices From India, this study has been undertaken to examine the production and prospects of spices export from kerala mainly black pepper and cardamom. This study is mainly confined to the three leading spices growing districts of Kerala viz. Wynad, Idukki and Kollam the main items of spices under study are black pepper and cardamom which are the leading spices in Kerala, and in the cultivation of which kerala leads all other states. This study also cover trace the origin and growth of spices export from India, assess the performance of spices export from India, and study the production and prospects of spices export in India.

OBJECTIVES

- To an overview of Spice processing industry
- To study entrepreneurial opportunities in spice processing industry

RESEARCH METHODOLOGY

This study is analytical in nature and based on secondary sources of information that are collected from various research papers, reports submitted by various agencies, government data sources.

Spices Production:

Maharashtra	2015-16		2016-17		2017-18(est)	
	Area	Production	Area	Production	Area	Production
CHILLI	17323	35875	2100	3430	2060	5840
TURMERIC	10710	177850	14050	224680	14050	224680
GARLIC	2450	14310	2560	14260	2560	14260
TAMARIND	720	7150	750	7150	600	7040

Source: Cardamoms: Estimate by Spices Board (Area in Hectare, production in Tons)

Above table show the production of spices in Maharashtra. Maharashtra produces Chilli, Turmeric, Garlic and Tamarind. Table shows the data of the 2015-16, 2016-17 and 2017-18 (est). Production of chilli is increasing in the year 2017-18. Turmeric production is increased in 2016-17 and 2017-18 as compared to year 2015-16. Same in the Garlic and Tamarind production also increasing as per the data.

Spice Processing Units:

	Total Number of Units	**Percentage**
India	5649	100%
Maharashtra	979	17.33 %

(Source: Ministry of Food Processing Industry Food Processing Resource Map)

Above table shows the total number of spice processing units in India and Maharashtra. Maharashtra have a 17.33% contribution in the India's total spice processing. As per the spice production data, Maharashtra's production of spice production also high so Maharashtra can increase the spice processing unites.

Major Spices Processing Units in Maharashtra 5 major districts:

Districts	**Number of Units**
Thane	223
Pune	124
Mumbai	89

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Sangli	81
Jalgaon	72

(Source: Ministry of Food Processing Industry Food Processing Resource Map)

Above table shows that the 5 major districts in Maharashtra Pune district have 124 units of spice processing it ranks second in Maharashtra. Thane district hold first rank in Maharashtra with having 223 food processing units. Then the Mumbai, Sangli, Jalgaon respectively third, fourth and fifth.

CONCLUSION

As per the data we can understand that the production of spices is huge. So in this sector lots of entrepreneurial opportunities are available. Government also taking initiative and starts schemes for the food processing. In the Maharashtra 979 spice processing units are available so we can analyse that the production of the spices is huge but processing units are less so there is scope to start the spice processing units as a new business. In the packaging, marketing and exporting the spices also have tremendous opportunities. India ranks second largest in the processing sector and first in the spice processing. The main spice produce in Maharashtra are Chilli, Turmeric, Garlic and Tamarind. Start up India, Stand up India such schemes also help to start new spice processing unit. Government also providing the training under the skill India scheme there are some private and government collaborations institutions, they also provide training to the interested people. Mostly training centres works under district udyog centre. They provide training as well as help to start a business.

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MICROFINANCE: INNOVATIVE WAYS OF FINANCIAL SOLUTIONS IN RURAL AREAS

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ABSTRACT
Microfinance has come to play a major role in many gender and development strategies because of its direct relationship to both poverty alleviation and to the empowerment of women. Microfinance scene is dominated by Self Help Group (SHGs) as an effective mechanism for providing financial services to the "Unreached Poor", and also in strengthening their collective self-help capacities leading to their empowerment. Micro finance is necessary to overcome exploitation, create confidence for economic self-reliance of the rural poor, particularly among rural women. The survey was conducted on around 50 respondents from various SHGs of Central Mumbai district, and the analysis was done to study the empowerment of women through microfinance. The results strongly demonstrate that on an average, there is a significant increase in women empowerment of the Self Help Groups members. However, social backwardness, indebtedness and presence of other microcredit programs in the same or nearby urban areas have a significant positive influence on women's participation in this program.

Keywords: Microfinance, Self Help Groups; Non-Governmental Organization;

INTRODUCTION
The concept of Self Help Groups is not ultimately a micro credit projects, but an empowerment process. The Self Help Group and Microfinance are aimed at empowering poor women, which help the family to come out of poverty. Microfinance program in India is an instrument that can transform lives of the poor. Microfinance gives quick and tangible results to the poor people, especially women. Microfinance, when extended to people, especially women, in urban & rural areas coupled with supporting activities like training, raw material supply, marketing of products leads to investment in micro enterprises, women may become entrepreneurs, generate main or additional income to the family, poverty is reduced, and development takes place and the women get the self-confidence to go for enterprising activities with social, economic, and political empowerment and with her increased knowledge and awareness, development takes place. Govt. efforts are focused to raise their social, economic and political status at par with men. The field or microfinance made significant progress as a movement in our country, with the active support of RBI, NABARD, SIDBI, and NGOs microfinance emerged as a giant.

STATEMENT OF THE PROBLEM
In olden days women were restricted to take part in any social activities and not given roles in decision making in her family. In today's scenario more women are engaged in income generating activities. This is because of NGO and other financial institution came forward to provide microfinance to poor women. They believe that a woman is the small credit risk and often benefits the whole family. The main aim of microfinance is to empower women. This induced the researcher to focus more on the empowerment of urban women who participates in the microfinance.

RESEARCH OBJECTIVES
The major objectives of the study are:
1. To study the role of micro finance in women empowerment.
2. To study the problems women members face in SHG.
3. To study the performance of SHGs in Central Mumbai district urban area.
4. To analyse the empowerment which women members get in SHGs.
5. To offer suggestion for betterment of women's empowerment through microfinance.

RESEARCH METHODOLOGY
Sources of Data: The study is exploratory in nature and is based on both primary and secondary data. Secondary data was collected from various journals, articles, working papers, NGO reports etc. Primary data was enumerated from a field survey in the study region. (Central Mumbai).

Area of Sampling: The study was conducted in the Central Mumbai urban area through a field survey to get an insight of the benefits and challenges faced by women in SHGs.

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Sample Size: 60 Respondents (samples) from 4 SHGs from the area of study have been considered to conduct the present study.

Method for data collection: A structured interview schedule was prepared and used for collecting data from the women SHG member. Both open ended and close ended questions were included in the schedule.

Statistical tools: Cross tabulation and percentage analysis are used for the analysis and interpret of the data.

LIMITATIONS OF THE STUDY

The study is confined with the urban areas of Central Mumbai. Hence the results may not be applicable to rural area SHG members. The data was collected only from those who engaged in income generating activities.

PROBLEMS AND CHALLENGES

Surveys have shown that many elements contribute to make it more difficult for women empowerment through micro businesses. These elements are:

- Lack of knowledge of the market and potential profitability, thus making the choice of business difficult.
- Inadequate book-keeping.
- Employment of too many relatives which increases social pressure to share benefits.
- Setting prices arbitrarily.
- Lack of capital.
- High interest rates.
- Inventory and inflation accounting is never undertaken.
- Credit policies that can gradually ruin their business (many customers cannot pay cash; on the other hand, suppliers are very harsh towards women).

OBSERVATIONS:

Educational Qualifications of the Respondents			
S. I. No.	Particulars	No. of Respondents	Percentage
1	Primary	07	12
2	Secondary	18	30
3	Higher Secondary	20	33
4	Under-Graduate	03	05
5	Nil	12	20
	Total	60	100

20% of the women are illiterate and the next majority of the women have done up to secondary education

Reduction in Poverty			
S. I. No.	Particulars	No. of Respondents	Percentage
1	Very much	49	82
2	To an extent	08	13
3	Not Much	03	05
	Total	60	100

82%of the women stated that microfinance has reduced their poverty level to a greater extent.

Percentage of Respondents Empowered Socially			
S. I. No.	Options	Frequency	Percentage
1	Yes	54	90
2	No	06	10
	Total	60	100

54 out of 60 respondents agreed they can able to express their opinions freely both in group and in family.

Moving independently			
SI No.	**Options**	**Frequency**	**Percentage**
1	**Yes**	**47**	**78**
2	**No**	**13**	**22**
	Total	**60**	**100**

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47 respondents are moving independently without the help of family members to banks, government offices and other places which indicate the social mobility.

Role in Decision making in family			
SI No.	**Options**	**Frequency**	**Percent**
1	**Yes**	**50**	**83**
2	**No**	**10**	**17**
	Total	**60**	**100**

Most of the respondents (83 %) agreed they play a vital role in decision making in their houses.

Purpose of getting microfinance by respondents			
Sl. No	Options	Frequency	Percentage
1	Household purpose	**09**	**15**
2	To start business	**33**	**55**
3	To promote existing business	**12**	**20**
4	Education purpose	**03**	**05**
5	Low rate of interest	**03**	**05**
	Total	**60**	**100**

55 % respondents got microfinance to start new income generating business followed by to promote their existing business.

Maintenance level of the family by women			
S. I. No.	**Particulars**	**No. of Respondents**	**Percentage**
1	**To Greater extent**	**15**	**25**
2	**To Some extent**	**40**	**67**
3	**To Lower extent**	**05**	**08**
	Total	**60**	**100**

40 Respondents out of 60 said that they can able to maintain their family to some extent followed by the 15 respondents who accepted to greater extent they can able to maintain their family after joining in SHG.

FINDINGS

- Majority of the respondents expressed that their awareness about environment improved after taking part in micro finance programs actively. Maximum number of respondents accepted that microfinance has brought economic development directly and indirectly happiness and peace in the family.
- It is noticed that all the respondents agreed that micro finance brought courage and self-confidence and improved their skill and self-worthiness.
- Women are economically and socially empowered after joining SHG and getting micro finance as 82 percent reported that poverty level reduced by participating micro finance program.
- It is found that microfinance improved the literacy level of rural women improved awareness on children education to high level of respondents.
- As far as the self-help group is concerned they don't face any type of problems or compulsions from leaders or from other members in the group. Women are given full freedom to express their opinions.
- There is a definite improvement in psychological well-being and social empowerment among urban women as a result of participating in micro finance through SHG program.
- It is also noticed that most of the women are not aware of the trainings organized by the NGO. The NGO shall actively take part in various trainings sessions provided to all women members wherein they can gain more knowledge about the various income generating activities.
- There is appreciable development in coordination between groups and within group leaders and decision making among respondents. There is a significance improvement in the income of the respondents after joining SHG.

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CONCLUSION

The study inferred that group association and access to financial services certainly brings positive changes among group members leading to their socio-economic empowerment. However, there is need of employing long term policy measures to empower women in its true sense. Some key issues such as training, awareness and viability of the group activities need to be addressed in order to strengthen women empowerment process through micro financing. The study concludes that microfinance brought psychological and social empowerment than economic empowerment. Impact of micro finance is appreciable in bringing confidence, courage, skill development and empowerment. The SHG members feel free to move with their groups and leaders. It leads them to participate on various social welfare activities with good cooperation. The study concluded that poor, discriminated and underprivileged women if join the groups, can come out of poverty. So, conducive environment is needed to be created in the urban areas to give boost to women self-help groups.

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SUSTAINABLE DIGITAL TRANSFORMATION –RISE OF SMART APPS

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INTRODUCTION

Agricultural sector has seen major transformation using technology in farm management. Agtech means to make use of internet of things, AI, machine learning and satellite imaging in agriculture to increase production and enhance profitability. According to a report by Cisco, there is an estimated $14.4 trillion in value at stake with the emergence of IoT. The IoT has simplified and streamlined the collection, inspection and overall distributing of agricultural resources using sensors on equipment and materials.[1] India being second biggest agricultural land mass (140.1 million hectares of net sown area and 198.4 million hectares of gross cropped area, according to the 2017-18 annual report of Department of Agriculture) in the world, provides ample opportunities to Agtech startups. Tech-driven solutions can help in areas such as pre-sowing plans, enhancing yield, improving nutritional value of land, reducing the input price, farm mechanization, and improving supply chain and connectivity with customers. Above all Agtech will help to manage cost of farming and climate change. Agtech has been successful in shifting farming from conventional farming to precision farming.

According to a NASSCOM report, the Indian Government specifically supports AgriTech startups In India, 53 start-ups had raised about $313 million in 2016. In 2017, the investment was $10.1 billion for agri food-tech start-ups, consisting of 994 deals from 1,487 unique investors which is 29 per cent year-over-year growth. Out of $10.1 billion, $2.6 billion was invested into farm-tech[2]. Indian Government's determination to double farmers' average income by 2022 can be achieved by effective use of technology along with various centrally sponsored schemes like National Food Security Mission (NFSM); Mission for Integrated Development of Horticulture (MIDH); National Mission on Oilseeds & Oil palm (NMOOP); National Mission for Sustainable Agriculture (NMSA), National Mission on Agricultural Extension & Technology (NMAET); National Crop Insurance Programme (NCIP); Unified National Agriculture Markets; and Rashtriya Krishi Vikas Yojana (RKVY). Parampragat Krishi Vikas Yojana (PKVY), Pradhan Mantri Krishi Sinchai Yojana and above all National Crop Insurance Scheme.

STATEMENT OF THE PROBLEM

There will be increasing demand in the consumption of vegetables, fruits, sugar, dairy, pulses, meat, fish and eggs. It will always be a challenge for farmers to increase production with low cost and better quality making it sustainable. time minimization and value maximization approach. Digital transformation helps produce traceability, weather analysis, inventory management with value maximization. Digitalization and financial inclusion by Government has also contributed to Farm Production.

The study examines contribution of Developmental and Support Services by AgriTech Startups and centrally sponsored Government schemes for the betterment of farmer's thereby increasing production through digital transformation. The role of Bengaluru's based CropIn is analyzed with reference to total funding received and contribution to sustainable digital transformation in increasing farm production.

OBJECTIVES OF THE STUDY

1. To understand contribution of Developmental and Support Services by AgriTech Startups and centrally sponsored Government schemes for the betterment of farmer's
2. To evaluate role of Bengaluru's based CropIn is analyzed with reference to total funding received and contribution to sustainable digital transformation in increasing farm production.

RESEARCH METHODOLOGY

The study was based on Secondary data. The Secondary data has been collected from various articles and research reports on digitalization, artificial intelligence and Farmer enrichment. The data has been collected from the website of CropIn (www.cropin.com) and Craft for Business. (https://craft.co/cropin)

Sample Size

The Sample taken in this study is CropIn that delivers future ready farming solutions to the entire Agricultural Sector through farm digitization and data managing the eco-system.

[1] https://www.forbes.com/sites/danielnewman/2018/05/14/top-six-digital-transformation-trends-in-agriculture/

[2]//economictimes.indiatimes.com/article show/64714325.cms

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Tools used for the Study
Trend Analysis is used for data interpretation and analysis.

REVIEW OF LITERATURE

Stern et al. (2013) adopted a mixed methods approach. This evaluation methods found evidence of a range of direct effects like development of new products and knowledge networks resulting in increased revenues for companies, and indirect effects such as access to a greater pool of labour for companies and spill over effects like knowledge being used for different industries.

Coad et al. (2014) They find that growth starts with employment, leading to increases in R&D spending, resulting in innovation behaviours such as new products to market, which in turn lead to sales and value maximisation

AgriTech Industrial Strategy: Evaluation Scoping Study and Baseline (2015)
The Agri-Tech sub-sectors are modelled using a common structure, the key macroeconomic variables, output, employment, value-added etc. are calculated from assumptions relating to, for example export markets, domestic demand, export demand, domestic demand, investment intensity, wages and productivity.[1]

Smart Farming: The Future of Agriculture Technology (2018)
According to the report, in 2017, the hardware systems solution segment held more than 72% of the total global smart farming market. The precision crop farming application currently holds the largest market share of over 31%. Companies in the market offer a variety of solutions for several types of precision crop farming applications such as precision irrigation, yield monitoring and forecasting, variable rate application, crop scouting, and recording keeping. Precision irrigation products and autonomous milking robots into milk harvesting is expected to augment the growth of smart agriculture in the livestock sector. In addition, growing demand for fresh agricultural produce all year round shall propagate the growth of indoor farming. A change in the global aging demographic has triggered the adoption of automation in farming practices. Automation and control systems manufacturers have witnessed a definite surge in their sales due to this profound change in the farming industry. Over the past five years, agricultural robots have also been incorporated into farming operations as they treat soil and crops selectively as per their requirements and reduce the need for manual labour. UAV/drones generated the highest revenue amongst all agricultural robots utilized in smart farming. The majority of robot deployment was done for crop management.

CHALLENGES TO AGRARIAN INDIAN ECONOMY

- 54.6% of the population dependent on agriculture and allied sectors for their livelihoods contributing only 15.4% to the nation's GVA.
- Marginal and small land holdings comprise 85% of the total operational land holdings both in terms of number and area. Of 193.7 million ha, around 45% (87.7 million ha) is irrigated while the rest is rainfed.
- Groundwater and surface water sources irrigate about 31% and 68% of the irrigated area respectively (GoI 2017a).
- In addition to water scarcity and increasing land degradation, Indian farmers are vulnerable to impacts of climate change as their livelihood largely depends on monsoon, markets and intermediaries who are integral part of their lives but are unpredictable and play havoc on rural livelihoods.
- Increasing fragmentation of holdings, extreme weather events, rising input costs and post-harvest losses
- With the agricultural growth rate hovering around 3% annually, farmers have felt severe economic distress.

The government has already placed a clear focus on farmers' welfare with policies to enhance water availability(Har Khetko Pani), increased water use efficiency (more crop per drop), better farm practices, improving soil heath, increasing investment in agriculture research, extension and support prices, creating rural infrastructure, ensuring timely delivery of credit and technology, encouraging market reform (e-NAM) and reducing risk in agriculture through the introduction of a new insurance scheme (Pradhan Mantri Fasal Bima Yojana).A draft strategy paper released by the Ministry of Agriculture and Farmer Welfare targeted to raise the average annual income of a farmer household in India toRs.2,19,724 by 2022-23, from Rs. 96,703 in 2015-16, with the help of additional public and private investment of Rs. 6.4 lakh crore (GoI, 2017b). Research and technology with the support of pragmatic policies, targeted budget allocations and convergence of schemes

[1] http://www.sqw.co.uk/files/2414/6913/4001/Agri-Tech_Industrial_Strategy_-_Evaluation_and_Baseline.pdf

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based on agroecologically focused growth engines will be key to realizing this vision of Prime Minister to Double Farmers' Incomes by 2022.[1]

DATA ANALYSIS AND INTERPRETATION

CropIn provides SaaS-based service to agribusinesses in India and abroad, enabling partners to analyse, interpret and gain real-time insight on crops and farms so as enable to take corrective measures on time. Cropin is an intuitive, intelligent, self-evolving system that delivers decisive decision-making tools that bring consistency, dependability and sustainability to agri-businesses. CropIn is digitizing every farm, while data-managing the entire ecosystem. CropIn has digitized more than 3.1 million acres of farmland through its various software-as-a-service offerings. CropIn provides farm businesses a farm management software and mobile app, which enables them to do connected and data-driven farming. It allows farm businesses to take advantage of real-time data and insight from farms (an accurate view of their operation throughout the growing season) and to improve financial, operational, and agronomy aspects.
The Company's products include:

SmartFarm: Incorporates end to end operations, guidance system and alerts.

SmartRisk: Agri alternate data for accurate decision making

SmartSales: Retailer management for order, stock and payments.

mWarehouse: Comprehensive solution for pack-house and processing providing traceability to the last mile.

The data has been collected from website of CropIn mentioned as case studies. It was found there was effective collaboration of innovation and technology to provide efficient solutions. The two case studies have been mentioned in detail, It provides digital-based agriculture services to companies such as McCain and BigBasket.

1. : Complete Farm Management Solution

It is one of the world's largest producers of potato specialties company based in India. The company leases plots for farming and has 2500+ plots spread across an area of 5200 +acres.

Challenges faced

- record farm data manually
- multiple inconsistent entries.
- dehaulming & rouging,
- adoption of right package of practices &
- the right inputs and visibility of field activities.

Solution

- Remote Sensing and Weather Advisory helped in detection of dew point, rainfall, frost, blight and other challenges related to dehaulming
- 2500+ Plots audited, and geo tagged to find the actual plot area
- Gathering Complete information from farmer registration till harvest end
- Scheduling and monitoring farm activities for complete traceability
- Educating farmers on adoption of right package of practices and inputs
- Monitoring Crop health and harvest estimation
- Alert (pest, diseases etc.) resolution & quick advisory

Impact

- Timely Dehaulming in 91.2 % of the plots
- All the plots were audited and geo-tagged;73 % of the plots were within the range of -15% to +15% area deviation
- Comprehensive set of Package of Practices defined and scheduled

[1] http://nmoop.gov.in/conference/docs/Background_Paper_Group_4.pdf

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- Complete traceability across farm operations achieved
- Alerts (pest, diseases etc.) were resolved within a quick turnaround time
- The management today has an overview of all field activities on the interactive dashboard, is able to manage & monitor farming operations and get early estimation of the yield farmer & Plot wise.
- Weekly weather forecast helps take early and timely decision and strip tests help make harvest prediction.

2. : Digitizing Farm for Traceability, Compliance and Output Predictability

It is largest online food and grocery store determined to create an organic revolution in India. The company wanted to monitor its farms and ensure that the crops are grown organically.

Challenges faced

- lower output yield
- looking for a farm management solution
- for ensuring traceability and
- strengthening sustainability

Solution

- Digitisation of farm to enable data-driven decision making
- Ensuring complete Traceability of organic produce
- Harvest estimation and daily monitoring of harvest
- Better visibility of supply chain data to ensure consistent supply of goods
- Standard package of practices and adherence to compliance and certification

Impact

- Enabled the company to ensure traceability of its produce,
- make well-informed decisions and
- balance its demand and supply numbers,
- ensuring consistent supply of goods and increasing customer satisfaction.

Total Funding Received by CropIn

CropIn was found in 2009. CropIn's latest funding round in November 2018 was reported to be $8 m. In total, CropIn has raised $11.6 m. CropIn Investors as given by craft for business are

- Seeders,
- BEENEXT,
- Ankur Capital,
- Sophia ApS,
- Invested Development,
- Chiratae Ventures,
- Bill & Melinda Gates Foundation Strategic Investment Fund

CONCLUSIONS

Rapid adoption of technology by farmers will help them to meet their challenges and have increased production to meet the rising demand for agricultural products. The challenging climatic conditions, weather and soil fertility can also be managed through digital solutions using drones. It is necessary to integrate the agricultural sector with Information and Communication Technology (ICT) by putting a network of ERP and BI (Business Intelligence) to achieve vision of Prime Minister to Double Farmers' Incomes by 2022

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A REVIEW OF THE ROLE OF RURAL CO-OPERATIVE CREDIT INSTITUTIONS

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INTRODUCTION

A well thought three pronged approach to develop rural India was envisioned by establishing
1. The Panchayat system for governance,

2. Schools to spread education and

3. Cooperatives to provide credits.

In this paper we will emphasize on the cooperatives role in the development of the rural areas. Ever since the cooperative was introduced for over a hundred years the rural outlook has progressed in its own pace. India adopted the three tier cooperative system. Thus the State Cooperative Banks (SCBs), the District Central Cooperative Banks (DCCBs) and the Primary Agricultural Credit Societies (PACS) were formed for the short term credit requirements of the rural population. The long term credit is provided by the State Cooperative Agricultural and Rural Development Banks (SCARDBs) and the Primary Cooperative Agriculture and Rural Development Banks (PCARDBs). The RBI as the apex bank for agriculture established NABARD and entrusted the financing and regulatory functions of the PACS. At the grass roots level the PACS is formed by 10 or more people coming together at the village or taluka level. The RBI encouraged the formation of PACS by keeping the contribution of each member minimum so as to enable the poorest also to be the beneficiary. The cooperative banks have remarkably increased its primary functions, but still lacks in volume as compared to the commercial banks in the country. The total credit mobilized by cooperative banks is less than 10 percent of the commercial banks. The various issues it dealt with can improve the scope for the development of the cooperative banks. In these regard a number of committees have been formed to give their recommendations. The Capoor Committee (1999), the Vikhe Patil Committee 2001, the National Policy on Cooperatives 2002, the Vaidyanathan Committee 2004, recommended the revival of the cooperative banks by analyzing the short term and long credit. He emphasized on the interest rate structure for various long term schemes, which fails to revive as per the table given below. The reforms in institutional structure and manpower requirement were considered from the short term credit. The most essential technological up-gradation was also a part of their suggestions and as a result significant changes have been observed. The long term credit of rural cooperatives has not been exclusively dealt by various committees. Few recent ones (K.M Das Committee 1973) found that there was absence between the short terms and long term credit coordination and suggested revival measures. The word bank was straight forward in pin pointing the lack of uniformity between the two as they found a borrower unable to approach the same institution for short term and long term credit needs. The agricultural credit and review committee 1985 opposed the merger of short term and long term rural cooperative credit, and others went ahead for the closure or merger of the land development banks. The Government of India established Long Term Rural Credit Fund with NABARD to boost agricultural productivity in the long run is an initiative undertaken recently for which research is too early to commence. The cooperative credit also comprises of the Urban Cooperative Banks which requires a separate research, thus this research paper conveniently excludes the study of the same.

OBJECTIVES OF THE RESEARCH:

In the light of the above given back ground the researcher intents to find the possibility of revival of the long term cooperatives credit. A review of the role of rural co-operative credit institutions in the present banking scenario becomes important to know its functioning.

THE OBJECTIVES OF THE COOPERATIVE BANKS:

To provide credit to the rural population on a cooperative basis at a lower rate of interest.

To save the rural poor from the exploitation of the money lenders

To contribute positively in the growth and development of the rural areas.

To mobilise funds from the rural population for investment purpose

To encourage entrepreneurship activities in rural areas.

To provide short term and long term credit to the members.

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RESEARCH METHODOLOGY

The research paper is based on the secondary data mainly from the RBI Bulletin. The information on the subject was obtained from reference books and from websites. Research studies from the past and the recommendations and suggestions of various committees and task force constituted by RBI on Cooperative Rural Credit were perused to get an in-depth insight. The data considered is analyzed using percentage and simple arithmetic.

A Profile of Rural Cooperatives as on March, 2016. (Amount in Rupees Crores)

Particulars	Short Term			Long Term	
	SCBs	DCCBs	PACS	SCARDBs	PCARDBs
1. Number of Cooperatives	33	370	93367	13	601
2. Balance Sheet Indicators					
a. Deposits	109300	298200	101100	2400	1400
b. Borrowings	68800	83600	112700	14600	14300
c. Loans and Advances	122900	242700	180800	20400	12700
3. Financial Performance					
a. Institutions in Profit	28	319	45241	9	306
b. Institutions in Loss	5	51	36695	4	295
4. Non Performing Assets	5600	22700	29900	3400	4700
5. Recovery of Loans (%)*	92	80	82	64	52

Source; Report on Trend and Progress of Banking in India 2016-17, page no. 114 (The figures are rounded up for convenience). * Recovery of loans to demand ratio.

ANALYSIS

- The number of cooperatives has significantly reduced in case of PACS. The data reveals that the number of PACS has reduced to 93,367 in 2016 from 1, 61,000 in 1970-71. The other cooperatives have marginally increased.
- The deposits of all cooperatives have increased over a period of time and so the borrowings and the loans and advances.
- The share of credit flow to agricultural sector has stagnated at 17 percent since 2013-14 till 2015-16 as per the data available from NABARD.
- The deposits and credit of SCBs have shown a slow and steady growth from 2014 till 2017.
- The Non Performing Assets of State Cooperative Banks are less than the nationalized banks but still it is higher than the desired NPAs of 3 percent and less. The NPAs of District Central Cooperative Banks and that of PCAS is around 10 percent and for the later it is more than ten percent.
- Large number of PACS, 36695 is making losses out of the total 93367.
- The membership of PACS has increased in the year 2015-16 .
- The non agricultural loans have increased in the recent years whereas the agricultural loans have stagnated for almost a decade now.
- The loans and advances for the short term purpose have increased by many folds as compared to the loans and advances for the long term purpose. The long term loans forwarded by SCARDBs and PCARDBs not only less but it also making losses. Out of Nine SCARDBs four of them are making losses and 295 PCARDBs is making losses from a total of 601 throughout the country.

REASONS FOR LOWER RECOVERY RATIO OF LONG TERM CREDITS OF RURAL COOPERATIVES

The loans and advances for long term credit is less than the short term credit as reflected in the table given above. The reasons attributed for the lesser amount of lending and its low recovery of the long term lending can be as follows:

1. The overall investment in agricultural sector has declined from almost three percent of our GDP to less than one percent. Thus the Gross capital formation in agriculture is declining rapidly. The investment on large dams, irrigation cannals, community irrigation projects has declined over a period of time. The investment in cooperative warehouses, multipurpose projects at various levels is losing momentum.

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2. The agriculture and allied activities being a state subject, the investment in smaller irrigation projects, storage of rain water and efficient management of rain water harvesting needs a strong support from the state governments.

3. NABARD as the apex bank for agriculture with refinancing facilities to cooperatives banks sponsors various short term and long term requirements of the rural population. NABARD has had successful implementation of the long term development schemes since its inception. It also faces problems in land acquisition, over run of the cost, continuous maintenance and financing of the projects undertaken.

4. The shortage of efficient manpower in SCARDBs and PCARDBs to handle long term rural credit has significantly retired or reduced. New generation with knowledge and efficiency refuses to work in the rural or semi urban areas.

5. The farmers who are capable of investing on their own are slow and reluctant to invest in long term capital formation especially in specialized techniques because of displacement of self or of shortages of manpower in future. The long term credit is confined to digging wells, bore-wells, tube-wells for irrigation purpose and purchase of machines for few years. The development and research required are left for the third party (companies) to explore and provide appropriate technology. A large number of marginal farmers (57%) do not invest in long term assets creation in agriculture.

SUGGESTIONS

- The short term rural cooperative institutions need to be monitored so as to push the NPAs below three percent level for strengthening the cooperatives sector.
- The NPAs of long term rural cooperative institutions should be reduced, and as suggested by the World Bank mission, the short term and long term cooperatives should operate together for the benefit of the borrowers. The cooperatives need to be open for merger.
- The coordination between the short term and long term cooperatives will lead to merger and avail the advantages of larger manpower and economies of scale in the rural cooperatives.
- The creation of independent cooperatives such as Diary Cooperatives, Sugar Cooperatives, etc, has generated capital for themselves. Thus cooperatives for other infrastructural needs in agriculture can also be formed and increased. The ware-hosing, cold storage, community research centre, library in cooperatives, etc will create assets in the rural areas for enhancing the developmental goals.
- The process of diversifying the use of land for cultivating pulses, horticultural products, etc, will not only generate capital but also reduce India's dependence on other countries for the required crops.
- The government initiation of Skill India, Make in India and Start up India needs to absorb large number of rural youths so as to increase the size of land holding for long term investment to increase.
- A well planned development of agri-business in rural India with the participation of agro-based industries and the corporatizing the agriculture sector will create long term capital in the rural areas.

CONCLUSION

The declining investment in agricultural sector reduces the capital formation and the farm productivity which will further reduce the income of the rural and farming communities. Thus the rural cooperatives needs all round support from the government, apex institutions, and the rural population to revive and protect their future. This will ensure a harmonious relation between rural and urban population. The establishment of the Long Term Rural Credit Fund with NABARD by the government to boost asset formation and productivity in rural economic activities will go a long way to foster a healthy growth of income for the farming sector.

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DOES MINIMUM SUPPORT PRICE REALLY BENEFIT FARMERS? (A CASE STUDY OF SOYABEAN PRODUCT IN LONAR TALUKA)

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There has been a huge discussion recently over 'Minimum Support Price' (MSP) for agricultural products. Currently discussions have begun over the government's move of hiking the MSP to 50% over production cost. The present research paper focuses on, whether hiking the MSP to 50% over production cost, will benefit to the soyabean producer's at the Vidharbh Region in Lonar taluka.

What is Minimum Support Price (MSP)?
Minimum support price on agricultural products is set by the government of India to purchase directly from the farmers. It is a foolproof solution to agricultural producers against a sharp fall in farm prices. The minimum guaranteed prices are fixed to set a floor below which market prices cannot fall. If no one else buys it, the government will buy the stock at these minimum guaranteed prices. This is what came to be known as the Minimum Support Price.

The MSP depends upon cost of production, which is determined by the CACP (Commission for Agricultural Costs and Prices) such as: A2, A2+FL, and C2.

i) A2 is the actual paid-out expenses incurred by farmers in cash and kind on seeds, fertilizers, pesticides, hired labour, fuel, irrigation and other inputs from outside.

ii) A2+FL includes A2 cost plus an imputed value of unpaid family labour.

iii) C2 is the most comprehensive definition of production cost of crops as it also accounts for the rentals or interest loans, on owned land and fixed capital assets over and above A2+FL. Presently MSP is based on A2+FL. These considerations are controversial because Swaminathan Commission recommended MSP 50 per cent above C2.

Minimum Support Price for Soyabean
The government of India announced the minimum support price Rs. 3399 per quintal in the year 2018-19 for soyabean products.

Status of Soyabean in Lonar Taluka
The primary crops of Lonar Taluka are Soyabean, Cotton, Moong, Urad and maize. Around 25 villages are dependent on Lonar Taluka's APMC to sell around 5, 94,437 quintal soyabean annually.

THE OBJECTIVES OF THE STUDY ARE i) To examine the price for soyabean in the Lonar market ii) To study the difference between Lonar market price and MSP. iii) To know whether MSP will benefit the farmers.
HYPOTHESIS OF THE STUDY: Null hypothesis is used to investigate the associations
H1: There is no association between MSP and farmer income.

HO: There is no association between MSP and Market price.

RESEARCH METHOD & METHODOLOGY
The study is an exploratory study to investigate MSP benefit to the farmers in lonar taluka. It is based on field survey. Primary data is collected from conducting personal interview of farmers. Non-probability method as convenience sample method is used for collecting data. A total sample of 75 farmers from 3 villages of lonar taluka (25 from each) was selected. The SPSS was used for analysing data. Different statistical method and tools are used.

The results are present in the scheme of descriptive statistics and quantitative analysis through Chi-square test.

Descriptive Statistics

Table No-1: Status of Farmer Income & Minimum Support Price of Soya bean at Lonar Taluka:

SN	Perception	Gender	Cross Table		Pearson Chi-Square Test		
			Yes	No	Value	df	Asymp. Sig
1	Soyabean Producers	Male	47	11	1.674[a]	1	.196
		Female	16	1			

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		Total	63	12			
2	Awareness about MSP declared by the government	Male	33	25	.513[a]	1	.474
		Female	8	9			
		Total	41	34			
3	Soyabean Sell as per MSP	Male	7	51	.354[a]	1	.552
		Female	3	14			
		Total	10	65			
4	Benefit From MSP	Male	5	53	4.918[a]	1	.027
		Female	5	12			
		Total	10	65			
5	MSP cover the cost of production of soybean	Male	11	47	.171[a]	1	.679
		Female	4	13			
		Total	15	60			
6	MSP should rise	Male	45	13	.009[a]	1	.923
		Female	13	4			
		Total	58	17			
7	Difference between MSP & market price	Male	55	3	.916[a]	1	.339
		Female	17	0			
		Total	72	3			

Sources: Field Survey

- Lonar Taluka is Soyabean product dominated area, which is reflected in this study. In the total sample of 75 farmer respondents, 63 (84 Percent) are soyabean producers and only 12 (16 Percent) are other than soyabean producers.
- 'Minimum Support Price' is one of the important factors for agriculture products, to determine farmers' income in the economy. 41 farmers ((54.66 Percent) are aware about MSP declared by the government.
- There are only 10 sellers (13.33 percent) to sell their soyabean products as per MSP declared by government. Because there are so many obstacles to sell soyabean as per Minimum Supports Price. The obstacles mentioned by the farmers are i) First of all farmers should register their names with the government and take the number, only when they are called, farmers are able to sell their products as per MSP. ii) At the time of selling soyabean there are some formalities to be followed by the farmers, such as submit 7/12 of land holding, Adhar Card, & Bank pass book. iii) Du to single buyer, farmers are not getting money on time, when they require. iv) There is a waiting period to sell soyabean as per MSP because there is only one consumer. v) During season farmers' require quick money to pay liabilities such as labour charges, and other charges, MSP is not providing money on demand of farmer when they require. Farmers will have to wait an average of one or two month to get money from government
- Only 10 farmers (13.33percent) feel that their income has been rising from MSP declared by government. 65 farmers (86.67 percent) have not experienced any rise in their income. There is a reverse impact of MSP on farmers' income, because traders are not exceeding MSP in open market. The traders are keeping open market prices less than MSP, thus farmers are not benefited from the MSP. It shows that farmers cost are rising and market prices are lowering.
- Table No. 1 indicate that only 15 soyabean producers (20 percent) experienced that MSP covered the cost of soyabean and 65 soyabean producers (80 percent) feel that MSP declared by government is not recovering the cost of soyabean. They feel the cost is much more than MSP.
- 58 farmers (77.33 percent) feel it should be rise as per table No.1
- Table No. 1 shows that only 3 farmers (4 percent) were of the opinion that there is no difference between MSP and market price, and 72 farmers felt that there is difference between MSP and Market price.

H0: There is no association between MSP and increase in farmer income.

As per Table No.1 the Chi-Square test for all perception shows that Asymp.Sig.by Linear by Linear Association is > 0.05, hence there is significant association between increase in farmers income & MSP. The null hypothesis is rejected and alternative hypothesis is accepted. It means farmers income is related to MSP. Due to MSP farmers are not getting more than price in the market. There is reverse impact of MSP on farmers income.

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Table No.2: How much difference between MSP and minimum support Price:

SN	Perception	Gender	Cross Table		Pearson Chi-Square Test		
			More Than MSP	Less Than MSP	Value	df	Asymp. Sig
1	How Much difference between MSP & Market Price?	Male	2	56	.602[a]	1	.438
		Female	0	17			
		Total	2	73			

(Sources: Field Survey)

Table No.1 indicates that how much difference between MSP and market price. 73 farmers (97.33 Percent) experienced that the market prices was lower than MSP and only 2 farmers (2.67 percent) experienced that market prices are more than MSP. Because traders deliberately lower the market price from the MSP during season and earn profit

Table No.3: Range of soybean price in open market:

SN	Perception	Price in Rs.	Gender			Pearson Chi-Square Test		
			M	F	T	Value	df	Asymp. Sig
2	Range of Soyabean Price in open Market	2500-3000	44	8	52	5.291[a]	3	.152
		3000-3500	7	5	12			
		3500-4000	4	2	6			
		4000 & above	3	2	5			

Sources: Field Survey

Table No.3 indicates that 52 farmers (69.33 percent) experienced that the price range of soyabean in open market were Rs.2500-3000 per quintal and 12 farmers (16 percent) got price range over 3000-3500 per quintal, and only 6 farmers (8 percent) got per quintal price range between Rs. 3500-4000, remaining 5 farmers were able to get per quintal price Rs. 4000 and above.

HO: There is no association between MSP and Market price.

As per Table No.2 & 3 the Chi-Square test for all perception shows that Asymp.Sig.by Linear by Linear Association is > 0.05, hence there is significant association between Market Price & MSP. The null hypothesis is rejected and alternative hypothesis is accepted. It shows that market price and MSP are associated to each others. Table No. indicates that traders are maintaining marker below the MSP.

OUTCOME OF THE STUDY

The results of the study are discussed below.

On the basis of collected, stabilized and analyzed data from the respondents, the researcher has reached to the following conclusion. Findings are categorized on the basis of Structural analysis and Chi-square statistical test.

1. In Lonar Taluka 84 percent of farmers are soyabean producers, and 54.66 percent farmers were aware about MSP for Soyabean.
2. Only 13.33 percent farmers sold their soyabean as per MSP and remaining sold it as per market price. It shows 86.67 percent farmers sold their soyabean at market price.
3. 86.67 percent farmers do not get benefit from MSP declared by government because market price is deliberately maintained lower than MSP.
4. 80 percent farmers felt that, MSP is does not cover the cost of production of soyabean in Lonar Area.
5. 96 percent farmers realize that there is difference between Market price and MSP. And 77.33 percent feels MSP should rise.
6. 69.33 percent farmers experienced that the price range of soyabean in open market was Rs.2500-3000 per quintal. This was lower than MSP (Rs.3399).

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RECOMMENDATIONS

In the light of findings of the study and conclusion drawn thereby, the researcher has the following suggestions to the policy maker to resolve farmers' problems and improve overall performance of MSP.

1. In Lonar Taluka there are 84 percent of farmers are soyabean producers. Government should start more shop to purchase soyabean. This will lead to better utilization of resources.
2. 86.67 percent farmers sold their soyabean at market price. Because farmers need money on the spot, government delays the payment, this mechanism should be improved. To introduce on the spot payment delivery. And also purchase farmers soyabean when they need.
3. 86.67 percent farmers do not get benefit from MSP declared by government because market price is deliberately kept lower than MSP. To address this issue government should make law to purchase soyabean as per MSP and not lower than that.
4. There is need to implement Swaminathan Commission recommendation of MSP being 50 per cent above C2.

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CORPORATE FARMING: A CASE STUDY ON GODREJ AGROVET

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INTRODUCTION

Corporate farming is the business based on agriculture with mega-corporations involved in it. It is a modern food industry which includes the use of products for the company itself, and entire chain of agriculture-related business. The concept also includes the influence of these corporate companies on education, research and public policy, through their educational funding and government lobbying efforts. "Corporate farming" and "agribusiness" are synonymous in the world economy. Corporate farming in India can be traced back to the times of forced commercialization of our agriculture under the aegis of East India company where farmers were forced in 18th and 19th century to cultivate opium and Indigo for the benefit of the Company, ultimately leading to loss of the fertile quality of the land leaving it unsuitable for any other crop cultivation.Post independence the recovery of agriculture sector was slow and largely stagnant. For fresh revival of the sector, National Agriculture Policy (2000) saw many initiatives by the government which also focused on leasing land to private enterprises for agricultural activities. The Agriculture Tourism Development Corporation (2005) also works towards development of our agriculture-tourism sector.

For our research study, we will be focusing on the Godrej Industries and its contribution to the corporate farming sector in the Indian Agricultural growth and development.

ABOUT GODREJ AGROVET

Godrej Agrovet Limited, a part of Godrej Industries, is a diversified, Research & Development focused agri-business company. It is dedicated to improving the productivity of Indian farmers by innovating products and services directed towards sustainably increasing the crop and livestock yields. The firm hold leading market positions in the different businesses in which they operate - Animal Feed, Crop Protection, Oil Palm, Dairy and Poultry and Processed Foods. They have tied up with various small as well as large scale farmers for the same. As per the NSSO data, an average agricultural household in rural sector earns Rs. 6,426 per month, adding up to Rs. 77,112 per annum, sustaining minimum a family of 05 members. In such a situation, corporate tie-ups comes as a big relief, due to promised regular income.

REVIEW OF LITERATURE

P. K. Swain, C. Kumar, C. V. Raj Kumar (2012), in their research paper titled, " Corporate Farming vis-a-vis Contract Farming in India: A Critical Perspective", explained that, Cooperative farming is advantageous since it helps in achieving economies of scale, but the access to market remains a problem. Though it can be solved with the help of contract farming, the contracts, most of the time, are too one sided. Corporate farming thus can be very suitable for utilizing the unutilized and waste cultivable lands of India.

Balakrishnan, R. (2010), in the research study titled, "Corporate Entry into Agricultural Input and Output Markets and Its Impact on Small Producers and Consumers", concluded that, corporate involvement in the agriculture sector is necessary in making innovative machinery and inputs and also in creating national and international markets for them. However, farmers will have to adopt the corporate culture of organization and professional management to earn the well-deserved equality with other sectors.

Gandhi, V. P. (2014, in research paper titled, "Presidential Address: Growth and Transformation of the Agribusiness Sector: Drivers, Models and Challenges" explained that Agro-processing and marketing agribusinesses have been given substantial priority in India due to their significant potential to contribute to economic development. The study finds that the sector still contributes substantially to employment in agriculture and industry, and is crucial for value addition and income generation in the rural areas.

OBJECTIVES OF THIS RESEARCH STUDY

1. To understand the concept of corporate farming in general.
2. To understand the context and nature of corporate farming in Indian Economy.
3. To study the impact of corporate farming on sustainable agricultural development.
4. To investigate about the contribution of Godrej - Agrovet in corporate farming sector in Indian Economy.

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RESEARCH METHODOLOGY

1. The research depends on secondary data and information which is used for further analysis and inferences.
2. Bar diagram & Pie diagram are used for analysis purpose.

Context & Nature of Corporate Farming in India

Agriculture is coming under a state subject. Many State Governments in India have attempted liberalization of land laws especially land ceiling laws. The states of Gujarat, Madhya Pradesh, Karnataka and Maharashtra have allowed agribusiness firms to buy and operate large land holding for R & D and export-oriented production purpose. Punjab is also planning to raise the ceiling on holdings in order to encourage large scale farming. The farmers organizations and political parties representing larger farmers in Punjab are also lobbying for the removal or relaxation of the ceiling on land holding in Punjab (Dhaliwal, 2005).

Some of the corporate agencies in the state are asking for longer term lease (20-30 years) of farmer's land for corporate farming. The states of Maharashtra & Gujarat have also enacted laws to allow corporate farming on Government wastelands by providing large tracts of these lands (upto 2000 acres each) to agribusiness companies on a long term (20 years) lease (Bharwada & Mahajan 2006). The Chhatisgarh state government is also making availables about 20 lakhs hectares of land for biofuel cultivation. Under the scheme, an individual can lease up to 200 hectares of land at Price of Rs. 100 per hectare, per year for the first five years. For subsequent years, these rates could be increased. The state government has already formulated an action plan including the setting up of the Chhattisgarh Biofuel Development Authority identifying Government owned waste or fallow land (The Hindu Business line, Sept 2, 2005). The government of Andhra Pradesh had started corporate farming under a project in Kuppam in Chittoor district during 1997-2002 where the purpose was to test the feasibility of large farming through contract farming on lands leased by agribusiness company(BHC Agro India Private Limited-an Israeli Consultancy firm).The focus was on precision farming, drip irrigation & quality standards.

About 80% of the agricultural sector is driven by private companies.Over the past few years the companies like Cargill, Hindustan Unilever, PepsiCo, McCain, Tata Group, Mahindras, Ruchi Soya, DCM Shriram are involved in corporate farming. These groups have been consistently working with farmers, in collaboration with agrochemical and farm machinery companies to bring best practices and raise yields or lower costs.The association between farmers & the corporate sector started a long back. In 1987, PepsiCo started work with tomato farmers in Punjab. It provided with them the required technology and farm prices. This was followed by Bhati's Field Fresh,and projects by seed companies like Mahyco and Syngenta .New crops like gherkins were sown by farmers ,with Ballarpur industries working with them. Also AVT Natural and Katra group exporting opened up the market for marigold extraction. In recent period PepsiCo India started working with more than 24,000 potato & rice farmers across nine states., providing new varieties, technologies and sustainable farming practices. Chairman D Shivakumar claimed that " PepsiCo has been at the forefront of empowering Indian farmers with cutting- edge technologies, derived from global technological expertise pool. The collaborative farming of process grade potatoes has not only raised the incomes of small and marginal farmers but also their social standing in the community.

Godrej Agrovet is working with 2 million farmers at 54 production units, in 20 states, in the areas of animal feed ,dairy, poultry and oil palm plantation. In the words of Balram Singh Yadav, MD of Godrej Agrovet, "It is the private sector which is bringing new technology to the rural landscape-from seed to farm equipment." DCM Shriram company's sugar business DSCL Sugar has been working with 50,000 farmers in Hardoi and Lakhimpur districts of Uttar Pradesh. This company is working with the International Finance Corp,Solidaridad and Coca-Cola. Mondelez India company through its Cocoa Life (sustainability) programme is associated with more than 100,000 farmers . It is supporting farmers by providing seedlings, technical know-how and during post-harvesting processing in the farms. This company is working for over 50 years. This company has also a tie-up with Kerala and Tamil Nadu Agriculture Universities to develop superior varieties of cocoa seeds. The research focus is also on ares like plant breeding, agronomic practices and environmental impact. Mahindra Agri Solution Ltd,(MASL),the agri-business initiative of Mahindra group is working with the grape farmers. The President, Ashok Sharma claimed that the yields increased from 3-4 tonnes per acre to 9-10 tonnes per acres in seven years. Micro-Irrigation & providing digital agri service is their focus. ITC has been continuously working with farmers in making interventions at all the nodes of the agricultural value chain aligning the same with consumer demand. This is helping the farmers to get a greater share of the consumer price. Hindustan Unilever is working with more than 15,000 smallholder farmers in Maharashtra, HUL spokesperson said, "Apart from providing farmers with a buyback guarantee for their produce, they also offer global and local knowledge and expertise like latest agricultural techniques, irrigation practices and recommendation of right

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seed varieties."The Adani Group is working with 15,000 farmers in Himachal Pradesh. It buys 30;000 tonnes of Apple. The quality & price of apple have been improved a lot over the years.

Case Study: Godrej Agrovet

The various sectors of investment by Godrej Agrovet are:

1.Animal Feed: "Providing solutions to India's protein crisis"

Godrej Agrovets 'Animal Feed business' is India's one of the largest organized players in the Compound Feed market. Their diverse portfolio in this sector includes products in Cattle, Poultry, Aqua and Specialty Feed. They have over 32 state-of-the-art manufacturing plants, equipped with quality assurance labs, help farmers improve their farm productivity and profitability are installed. They also work closely with farmers to provide on-farm technical support and engage them in skill building activities. The company is investing significantly in cutting-edge Research & Development to support the innovation pipeline.

2. Oil Palm: "Collaborating to meet India's demand for edible oil"

Godrej Agrovet is amongst the largest oil palm developers in India and work directly with the farmers for the entire lifecycle of their crop. Also, over the years, they have developed more than 61,700 hectares of plantations across Andhra Pradesh, Telangana, Tamil Nadu, Goa, Maharashtra and Mizoram. They produce a range of products, including Crude Palm Oil, Crude Palm Kernel Oil and Palm Kernel Cake. They have five oil palm mills across the country.

3. Crop Protection: "Improving farm productivity"

The company's Crop Protection business has a wide range of products that cater to the entire crop lifecycle. They are constantly evolving product portfolio including Plant Growth Regulators, Organic Manures, Generic Agrochemicals and Specialised Herbicides. Today, they are the world's largest producers and marketers of Homobrassinolide. The company is also the leader in selective postemergence cotton herbicides in India.

4. Godrej Tyson Foods: "Serving the growing demand for quality poultry"

In 2008, Godrej Agrovet entered into a joint venture with Tyson Foods, U.S.A to manufacture and market processed poultry and vegetarian products. Godrej Tyson Foods offers great tasting, safe and affordable protein products through household favourites like Real Good Chicken and Yummiez. They cater to India's expanding food service industry, quick service restaurants and the universe of modern retailers, with innovative food solutions, at world-class standards, customised to local tastes.

5. ACI Godrej Agrovet: "Providing innovative and sustainable solutions to farmers in the livestock and fishery sub-sector"

In 2005, Godrej Agrovet entered into a joint venture with Advanced Chemical Industries Limited (ACI), Bangladesh to manufacture and market quality products in Animal Feed and Poultry Hatchery. They have a presence across all critical elements of the poultry value chain and are significant players in the fish, shrimp and cattle feed segments.

6. Creamline Dairy Products: "Making our mark in dairy"

In December 2015, Godrej Agrovet, entered the dairy business, acquiring a majority stake in Creamline Dairy Products Limited. They focus on selling milk and milk-based products under the brand name "Jersey". With an aggregate processing capacity of about approximately 1.36 million litres per day and 119 chilling centres, they have a formidable presence in the southern states of Telangana, Andhra Pradesh, Tamil Nadu, Karnataka and parts of Maharashtra.

7. Astec Life Sciences: "Empowering agri inputs"

In August 2015, Godrej Agrovet acquired stake in Astec LifeSciences Limited. They produce agrochemical active ingredients, intermediates and pharmaceutical intermediates. Established in 1994, they have considerable experience in development and production of intermediates and active ingredients.

They have forged enduring relationships with large and small companies all over the world and have an unshakeable reputation for providing quality products in manufacturing plants that meet global standards.

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GAVL has delivered strong performance over the years

Source: Godrej Agrovet Annual Report 2017-18

From the above Bar diagram,we came to know that GAVL's performance has considerably improved over the years (2015 to 2018). The company's performance can be measured through these indicators.The sales of this company is amounted to 5, 20,591 lakhs during 2018, increased by 57%.The company recorded a profit before tax of 35,969 lakhs as compared to profit before tax of 23,425 lakhs in the FY 2016-17.Almost more than 50% increase in profit the company got. Likewise the earnings before all deductions increased by 48%.Total Equity has been increased to 1,68,065 lakhs during FY 2018.

GAVL has diversified the product portfolio

Source: Godrej Agrovet Annual Report 2017-18

It is visible from the above pie diagram that Godrej Agrovet Limited is a diversified agri-business company.The company is getting revenue from different sources.Over the years Oil Protection business has expanded.The percentage has been increased from 10.1% to 16.9%.The company has added dairy business.From this it is getting 22.2% of revenue.The company has a strong footing in Oil Palm business over the years.

CONCLUSION

Post thorough study of the functioning of the Godrej Agrovet, following working model of the company is understood; leading to better growth and development opportunities for our economy.

a) Lending a helping hand towards the needy:

Godrej Agrovet launched some key initiatives such as the **"Farmer Knowledge Series"** which actively focus on increasing awareness among farmers, and improving farm productivity, thereby driving sustainable income. As a part of these programs, veterinarians and animal-husbandry experts hold educational training among farmers to create awareness on best livestock management practices. Further, experts also visit farmers to conduct periodic checks on the health of the livestock and recommend quality feed and best practices to improve livestock health and milk production.

b) The 04 W's: "Every day is women's day at Godrej" with this motto, Godrej Agrovet focuses on providing employment opportunities to women. Also, as part of the Godrej Group's social responsibility program, **Good and Green**, Godrej Agrovet has introduced an integrated livelihood program for farmers where the woman is the main focus of the plan. Further, the program has a four-fold approach: **Women, Water, Work and Well-Being.** While keeping the women-centric approach in mind, they have designed and implemented plans with the

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ultimate aim of doubling farmer income, in line with the national agenda.
c) Training and Employment Generation: Godrej Agrovet, till date, has **trained over 22,000 farmers** in dairy farming and **10,000 in sustainable agriculture practices.** Also, **83%** of the farmers have reportedly shown an increase in milk production post-training, and 75% reported that their cattle were free from illness. The company's sustainable agriculture program has led to an **improved yield of 20-40%**, depending upon the crop.

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AGRICULTURAL TOURISM- A NEW DIMENSION IN TOURISM INDUSTRY TO ENHANCE PROFITABILITY IN AGRICULTURE SECTOR

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INTRODUCTION

"Tourism has emerged as a major economic sector and source of social and environmental change since the 1950s. It has also become a field of serious research and scholarship in many academic disciplines since 1970s. The patterns of tourism development in different parts of the world reflect the histories and cultures of those regions and nations, but tourism is a nearly universal phenomenon. Agro-tourism is an innovative agricultural activity related to tourism and agriculture both. It has a great capacity to create additional source of income and employment opportunities to the farmers. Maharashtra is one of the major tourist centres in the India and there is large scope and great potential to develop agro-tourism.

Tourism is now well recognized as an engine of growth in the various economies in the world. Several countries have transformed their economies by developing their tourism potential. Tourism has great capacity to generate large-scale employment and additional income sources to the skilled and unskilled Agricultural tourism is a subset of tourism that consists of ranging aspect such as farm/agricultural tourism, cultural tourism, nature tourism, adventure tourism, and eco-tourism. Agricultural tourism is one such form of tourism which has recently emerged in Maharashtra to enhance profitability in agriculture. Any form of tourism that displays the rural life, art, culture and heritage at rural locations, thereby benefiting the local community economically and socially as well as enabling interaction between the tourists and the locals for a more enriching tourism experience can be termed as Agricultural tourism. Rural / Agricultural tourism creates experiences for tourist who enjoys locations that are sparsely populated, it is predominantly in natural environment, and it meshes with seasonality and local events and is based on preservation of culture, heritage and traditions. It also includes educational tours, tasting events, agricultural museums, commodity festivals, wildlife, etc. All of these examples can be considered opportunities for consumers and farms to generate a meaningful exchange of values. Agricultural tourism is an integral part and a kind of drive wheel of the economy in rural areas. The immediate cause of this process is a change in tastes of urban population concerning spending free time and a continuous increase in the cost of holidays in resorts. Nowadays, a modern tourist is looking for places free from contamination, active leisure activities or offers that allow for trying a taste of life that is different than the city and experience a new lifestyle. Besides, it is a chance to taste another cuisine. It should also be pointed out that a potential tourists to appreciate peace quiet and direct contact with nature. In this case Agricultural tourism meets those expectations.

Agricultural Tourism is the latest concept in the Indian Tourism industry. It gives an opportunity to experience the real enchanting and authentic contact with real life. Agricultural tourism is a new concept tied up with agriculture, ecosystem and tourism.

Agriculture is the main sector of Indian Economy. Agriculture is not only an important occupation of the people, but also a way of life, culture and custom. Agro tourism is one such form of tourism which has recently emerged in Maharashtra. It is a field with potential to develop. In general agricultural -tourism is defined as any form of tourism that showcases the rural life, art, culture and heritage at rural locations thereby benefitting the local community economically and socially and enabling interaction between the tourists and the locals for a more enriching tourism experience. Agricultural- tourism refers to travel which combines rural settings with products of agricultural operations – all within a tourism experience that is paid for by visitors. Tourism is termed as instrument for employment generation, poverty alleviation and sustainable human development. Agricultural tourism is the latest concept in the Indian tourism industry, which normally occurs on farms. It gives an opportunity to the tourists to experience the real enchanting and authentic contact with the rural life, taste the local genuine food and get familiar with the various farming tasks during the visit. It is multi faceted and other terms such as "agrotourism", "farm tourism", "farm-based tourism", "farm stays", "vacation farms" and "agricultural tourism" have been used, in varying degrees as equivalent terms or subsets terms of "agri-tourism". it provides additional outlets for the sale of local crafts and food items (typical products). Agritourism also offers the opportunity to provide "sustainable" or "green" tourism or "farm tourism".

Tourism is widely recognized as a vital industry with immense potential for employment generation and economic development. Hence, it is an effective means for faster development of nations, particularly the developing nations like India. Globally, tourism is ranked second highest in terms of income generation, next to

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the oil industry. World over, tourism has transformed considerably from its earlier motivation i.e. religion and business to being a part of one's life style, even within research of classes other than aristocracy. Tourism is one of the world largest and most rapidly growing industries. Increased leisure and higher purchasing power have combined to enable more people take into tourism. Thus it has become an accepted part of life style of a number of people. Hence every country has a decisive role to play in tourism, and tourism industry projected as very valuable particularly for the development of international transport and communication.

Tourism is now well recognized as an engine of growth in the various economies in the world. Several countries have transformed their economies by developing their tourism potential. Tourism has great capacity to generate large-scale employment and additional income sources to the skilled and unskilled Agricultural tourism is a subset of tourism that consists of ranging aspect such as farm/agricultural tourism, cultural tourism, nature tourism, adventure tourism, and eco-tourism. Agricultural tourism is one such form of tourism which has recently emerged in Maharashtra to enhance profitability in agriculture. Any form of tourism that displays the rural life, art, culture and heritage at rural locations, thereby benefiting the local community economically and socially as well as enabling interaction between the tourists and the locals for a more enriching tourism experience can be termed as Agricultural tourism. Rural tourism creates experiences for tourist who enjoys locations that are sparsely populated, it is predominantly in natural environment, and it meshes with seasonality and local events and is based on preservation of culture, heritage and traditions. It also includes educational tours, tasting events, agricultural museums, commodity festivals, wildlife, etc. All of these examples can be considered opportunities for consumers and farms to generate a meaningful exchange of values. Agricultural tourism is an integral part and a kind of drive wheel of the economy in rural areas. The immediate cause of this process is a change in tastes of urban population concerning spending free time and a continuous increase in the cost of holidays in resorts. Nowadays, a modern tourist is looking for places free from contamination, active leisure activities or offers that allow for trying a taste of life that is different than the city and experience a new lifestyle. Besides, it is a chance to taste another cuisine. It should also be pointed out that a potential tourists to appreciate peace quiet and direct contact with nature. In this case agricultural tourism meets those expectations.

Agricultural tourism benefits are

1. Agricultural tourism helps in generating additional revenue for local businesses and services from tourists;
2. Agricultural tourism helps in promoting the use of local agricultural products and services;
3. It provides a more energetic business environment for attracting other businesses and small industries;
4. Agricultural tourism always helps to develops community facilities for rural people as well as tourist;
5. It includes increasing protection of rural landscapes and natural environments for tourists and local people;
6. Agricultural tourism helping to preserve and revitalize local traditions, ritual, custom, art and craft;
7. It helps to promotes inter-regional, inter-cultural communication and understanding for the rural people towards tourist.
8. It creates an awareness and consciousness of agricultural issues and inculcate values among the tourist;
9. Agricultural tourism helping to diversify & strengthen rural economy through creating job & income creation skill and unskilled job opportunities;
10. An inexpensive gateway: for the cost of food, accommodation, recreation and travel is minimum in Agricultural-Tourism.
11. Agricultural Tourism helps to the reduce burden on the other traditional tourist destination as well.

OBJECTIVES

The objectives of the present study are

1. To find out 'Agricultural Tourism' helps in enhancing profitability in agricultural sector
2. To understand the role of tourism in agricultural tourism.
3. To examine the importance of agro-tourism development in Maharashtra.

HYPOTHESIS

1. Agricultural Tourism boosting to Tourism Industry.

2. Agricultural Tourism helps to enhance profitability in agricultural sector.

3. Agricultural tourism day by day helping to mobilize Indian agricultural economy by creating new livelihood.

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METHODOLOGY

The scope of the study is limited to examine the role of agricultural tourism. This study is based on primary and secondary data. Survey method with structured questionnaire used in conducting this research study.

The survey instrument included structured questionnaire on socio-economic aspects like age, sex, and occupation. Sources of secondary data collected were books, Journals articles, reports, publications and other documents, reports of self-government bodies and websites.

The data will be analyzed with the help of commonly statistical techniques and findings are drawn.

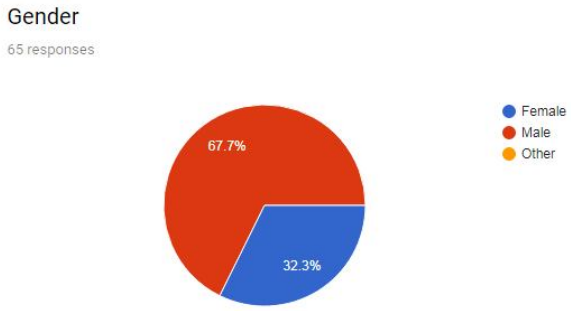
The Sample size was restricted to 64 respondents.

LIMITATION OF THE STUDY: The study is confined to the jurisdiction of Mumbai suburb and Thane District. The present study is based on the opinion of 65 sample peoples who residing in Mumbai region and who visited different tourist centres and experienced for agricultural tourism.

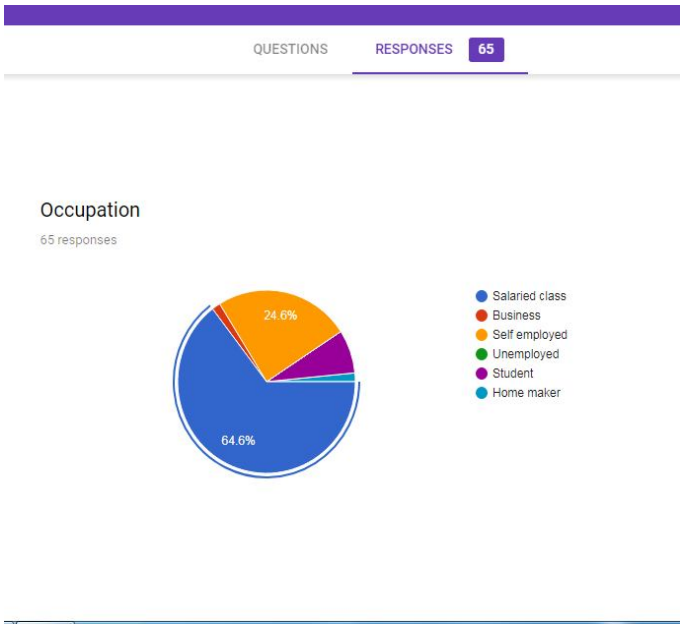
SAMPLING METHOD AND DATA INTERPRETATIONS: Data Collected from different peoples who visited different tourist centers from Mumbai and Thane District with Convenience Random Sampling method. The Information collected from the respondents within the study area was tabulated and analyses by using percentage as statistical tools and conclusion were drawn with the help independent variables like age and gender for agricultural tourism a new dimension in agricultural sector to enhance profitability in agricultural sector.

DATA ANALAYSIS

Forms response chart
Question title: Gender. Number of responses: 65 responses.



In this research, 62. 7 % Male members are the respondents and 32.3 % are the female are the Respondents.



2. This Figures shows that 64.6 % are the salaried people , 24.6% people are self – employed 7.7% are the students and 1% are business persons and home makers are the respondents.

3.Age : Different Age groups of respondents involved : 44.6% are of the age group of 35 to 45 years.

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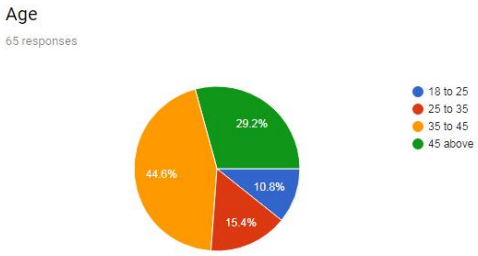
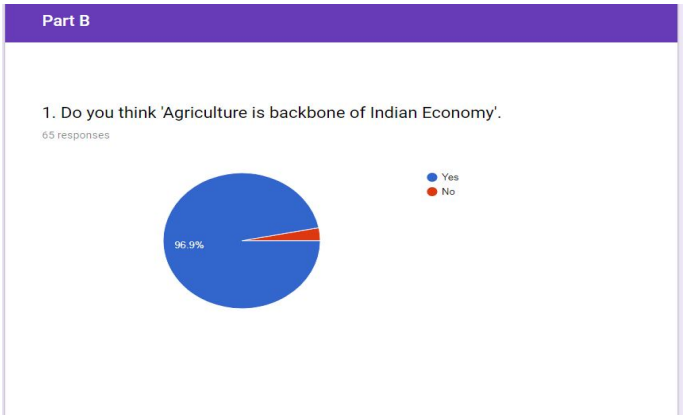
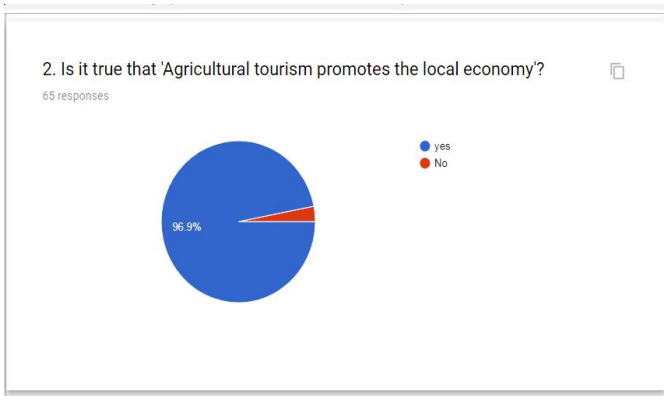


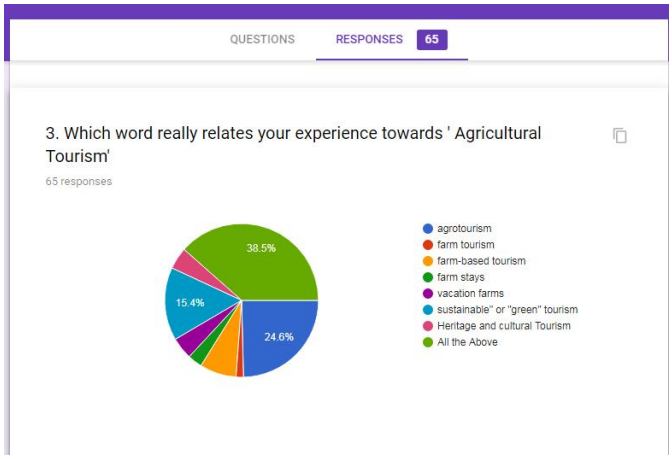
Part B : 96.9% respondents answered that reaally agriculture is the backbobe of Indian economy. And only 2% respondents answered NO.



2. 96.9% respondents answer : it is true that agriculture really promotes the local economy. Only 3.1% answer is No means it is not true.



3.Respondents answered that 38.5 different terms deonote to the agricultural tourism.



55.4% respondents are agreed that Agricutlural Tourism creates an experience in natural environment , heritage and traditions, preservation of culture, wild – life habitat improvement and learning about flora and fauna.

24.6% respondents answer it creates an experience in natural enviornoment.

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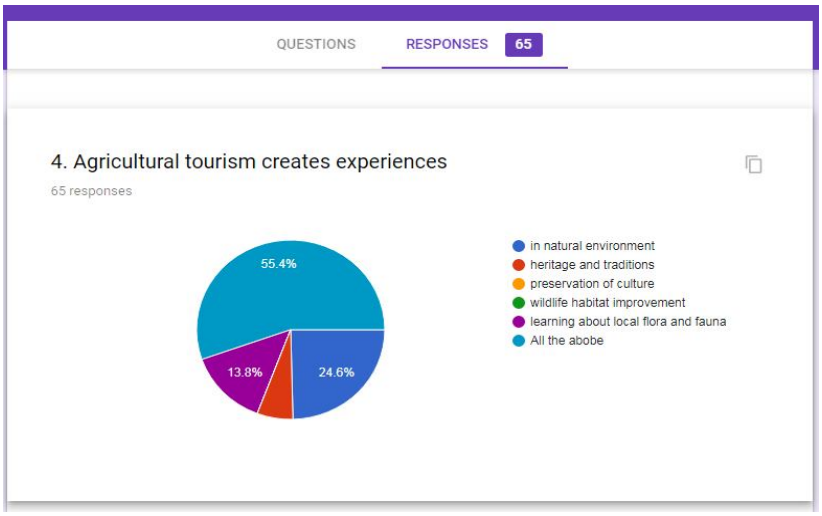
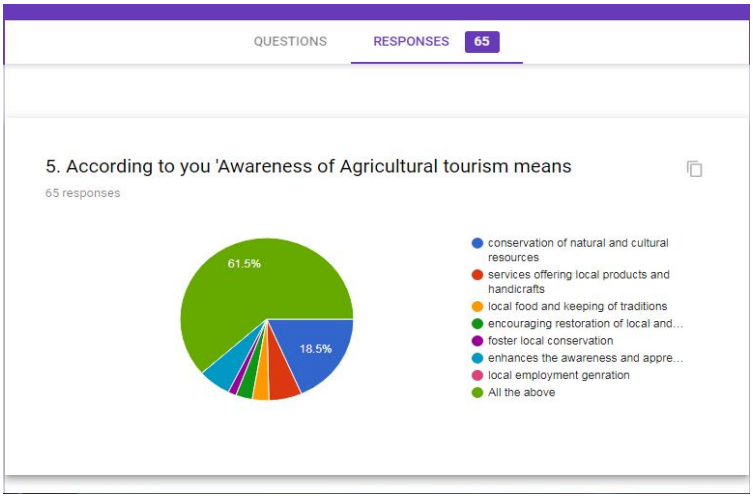
6.2 % respondents are with it creates an experience with heritage and traditions.

13.8 % are respondents answer is an experence with flora and fauna.



For awareness of agricutlrual tourism means 61.5% respondents answer is all the above.

- 18.5 respndents answer is conservation of natural and cultural resources .
- 6.2% respondetns – services offering local products and handicraft
- 3.1% - local food and keeping traditions
- 3.1% encouraging restoration of local and regional historical sites.
- 1.5 % foster local conservation



Agricultural tourism helps to increase

Respondents 66.2% answer all the above means

- the life standard of a local community
- stimulates the opening of new jobs in local community
- promotes inter-regional, inter-cultural communication
- the opportunity to reconnect with the source of food and agrarian culture
- 12.3 % stimulates the opening of new jobs in local community
- 9.2% the life standard of a local community.
- 7.7% the opportunity to reconnect with the source of food and agrarian culture
- 4.6% promotes inter-regional, inter-cultural communication.

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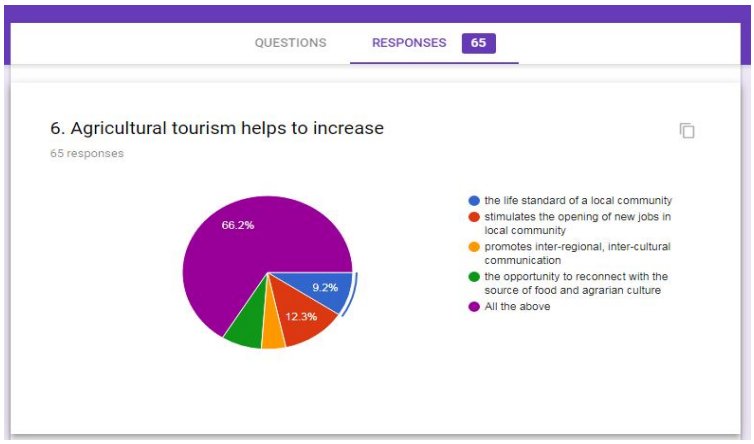
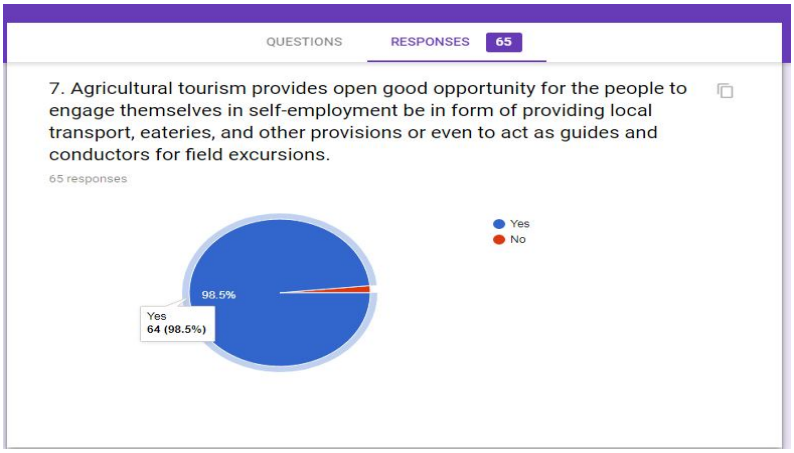


Agricultural tourism provides open good opportunity for the people to engage themselves in self-employment be in form of providing local transport, eateries, and other provisions or even to act as guides and conductors for field excursions.

Respondents answer is 98.5 % answer Yes,

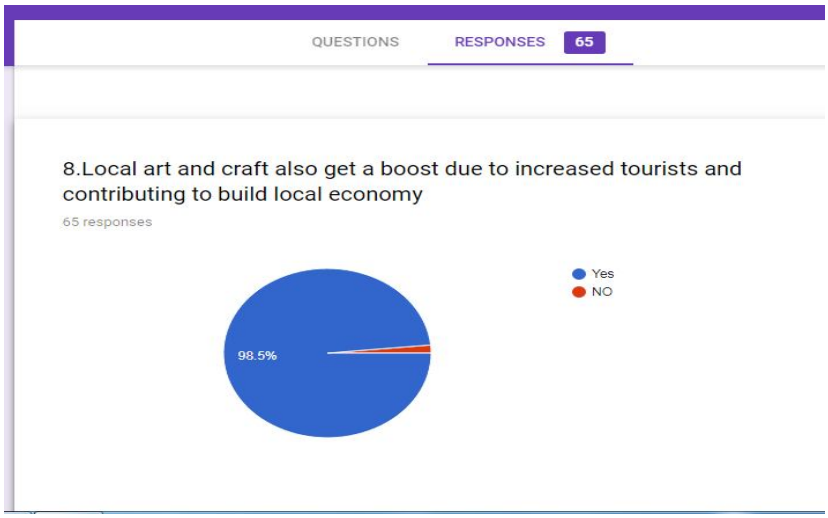
1.5 % Respondents answer is No



Local art and craft also get a boost due to increased tourists and contributing to build local economy

Respondents answer is 98.5% is Yes,

1.5% is No



Do you think 'Agricultural tourism really a Social Fabric of rural people as a part of touristic experience':

Respondent’s answer 95.4% is Yes

4.6% respondent’s answer is No

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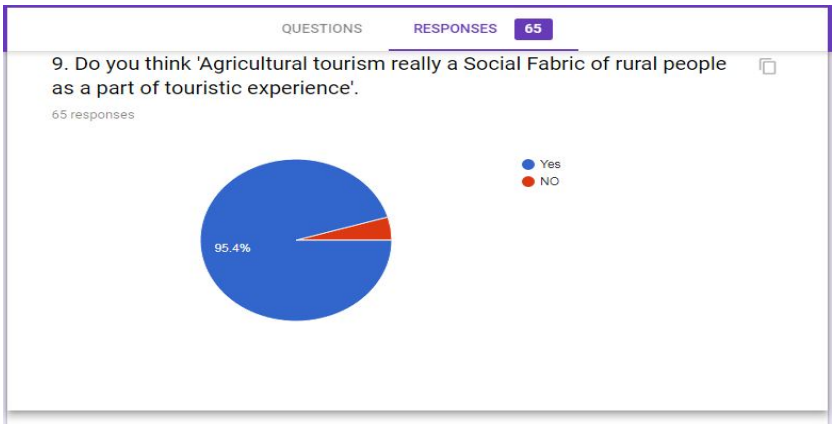

Would you like to relate any adventure activity you experienced as a tourist:

23.8% respondents answer is All the above

18.5% Bullock Cart Riding

13.8% Mountain climbing andTrekking

7.7% Bird and animal watching

3.1% Horse riding

3.1% Valley and River Crossing

CONCLUSION AND SUGGESTIONS

In my research it is found that agriculture in backbone of Indian economy. Tourism industry is making drastic changes in agricultural sector by providing livelihood in terms of employment for different skill and unskilled population, opportunities for on-farm employment so they do not have to migrate to urban areas, increasing awareness of local agricultural products, enhancing understanding of the importance of maintaining agricultural lands there by strengthening the long term sustainability of small farms.

Beside tourism is an activity includes the urban tourists go the farmers home; stay like a farmer, engage in farming activities, experience the bullock cart, tractor ride, fly kites, eat authentic food, wear traditional clothes, understand the local culture, enjoy the folk songs and dance, buy fresh farm produce and in turn the farmer maintains home and farm hygiene, greets new tourists, sells his farm produce at a better price, earns a livelihood all year round.

There are various challenges for agriculture sector while boosting its economy through tourism such as noise pollution, traffic jams , unavailability of transportation, changing rural culture through adaptation of urban norms and values ,rituals from the tourist. Many times due to policy changes from the government it may harm to the originality, and essence of that rural place.

In spite of these challenges, government of Maharashtra is promoting agricultural tourism through ATDC (Agri Tourism development Corporation).

Definitely, there is need to certain suggestions:

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1. Create awareness about tourism among the tourist is need of an hour.

2. Encouraging involvement of local community without which agricultural tourism is not possible

3. Government and tourism industry has to care of local entrepreneurship products and youth though encouragement, by providing proper infrastructure, incentives and special provisions should be given to the local entrepreneurs.

4. Also there is a need to get involvement of semiskilled locals into different jobs such as a tourist guides, security guards, and so on.

5. Development of self -help groups is necessary in terms tourism industry so that women also can involve in handicrafts, and hotel industry.

6. Use of technology, website, online feedback from the tourist are the participatory measures to agricultural tourism to improve profitability in the economy and will help to maintain sustainability in agricultural sector.

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NEED FOR DROUGHT-PROOFING APPROACH WITH CONCERTED AND COLLABORATIVE EFFORTS

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INTRODUCTION

Over the years with the advancement in scientific and technological knowledge the use of natural resources by mankind has increased enormously. However its rate of replenishment or supply is not keeping pace with human demand as it is beyond the capacity of the natural system. As a result, day by day these natural resources are becoming scarce or are getting depleted. This is reflected through the changes and disturbances in the Bio-Geo-Chemical cycles. Drought situation is one such example that needs to be discussed.

It is a well known fact the climate of any region is more or less stable with a period of normal rain years followed by a year of dry spell. So what is required is the scientific understanding of this meteorological aspect and a determined mind to accept with implementation the necessary mitigation measures during dry spell. But unfortunately this aspect is missing or is lacking serious and concerted effort in meeting the goal. The drought situation in the last few decades is more of anthropogenic in nature that natural.

FOLLOWING FACTORS ARE LARGELY RESPONSIBLE FOR DROUGHT SITUATION

1. **Decrease in green cover due to increasing human population and his activities**: Scientific and advancement increased life span contributing to huge population growth. Further modernization and increased production to meet demands of increasing population in primary, secondary and tertiary activities with urbanizing trends resulted in diminishing natural vegetal cover from the earth surface. As a consequence areas with diminished natural vegetal cover have started experiencing more climatic disturbances. This is reflected through large fluctuations in seasonal local temperatures affecting the normal distribution of rainfall and decreased availability of fresh water to create drought situation.

2. **Construction of large dams**: Necessity to meet increased and assured water supply as demanded by agricultural and industrial sector forced the Government of Maharashtra to construct many large dams in the catchment area of the drainage basin for creating huge water reservoirs. This regulated channelized flow of water from dam reservoirs through canals has obstructed the natural course of stream / river water. As a result the subsurface infiltration of water in the upper-middle areas and discharge through distributaries in the plain areas has reduced. Few areas in the supply zone of canal network are benefited at the cost of livelihood of areas located away from this zone. Non-availability of surface water in the neighboring areas forced people to dig wells.

3. **Increased number of wells and its depth**: As surface water is regulated settlements away from dam area now face surface water depletion. Therefore they have started digging wells and its number and depth is decreasing water table levels. The resultant impact is many wells are now going dry in the continental areas and saline in the coastal areas making situation worst.

4. **Changing agricultural pattern**: If we observe carefully the amount of rainfall received by any region has not varied much except for a few situations. What has changed is the agricultural pattern: from rain-fed food crops and pulses to irrigated commercial/industrial crops over large area; from seasonal crops to all year crops; from fallow land gestation period to intensive cropping; from crops requiring less water to crops requiring more water etc.

5. **Increased Livestock and diminishing common property resources**: Farmers are supplementing livestock produce due to uncertainty of agricultural production by increasing the number of livestock resources. But common water sources such as ponds are reclaimed and gurcharan occupied by the villages. This deprives the livestock of common people from drinking water and grazing and makes the situation worst during drought situations.

6. **Disturbances in the ecologically sensitive zones**: Hill /mountain slopes covered by natural vegetation and the wetlands near river/creek/coast covered by mangroves act as natural protective cover from soil erosion on the slopes besides increasing infiltration of water and regulating the surface flow. Wetland vegetation act as sponges by absorbing excess rain water and mitigating the flood situation. However these ecologically sensitive fragile zones are altered by man for cultivation / tourism / industrial /commercial/ residential etc. purposes. This has resulted in flooding in lower areas and drought in upper areas of the region.

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7. **Lack of initiatives for drought proof approach**: Further lack of initiatives from the administrators, planners, people representatives, industrialists /entrepreneurs and local communities in terms of desilting of dam reservoirs, lakes, ponds and wells; safeguarding and retaining the natural cover in the ecologically sensitive zones are largely responsible for drought situation in any region.

The factors largely responsible for drought situation are thus anthropogenic in nature. Jath and Atpati talukas of Sangli district in Maharashtra state are apt example of this situation. These talukas are located in the rain-shadow region of the Western Ghats. The traditional crop such as sorghum, pearl millet and wheat grown by farmers required less water. However over the last two decades farmers in western Maharashtra, Sangli is provided by irrigation facilities from Krishna River by government and so they became rich by growing commercial crops of pomegranate. This lured the farmers of Jath and Atpati talukas who started pomegranate cultivation on commercial scale by over extracting ground water for irrigation. No doubt the quality of pomegranate and its production, increased its fame by appearing as pomegranate producing region on world map, but since 2005 the region has been experiencing a drastic change in rainfall pattern. Year 2011 is one of the worst drought situation where farmers from Atpadi earning up to Rs 30 lakh annually from pomegranate plantation on one hectare land, has suffered losses to the tune of Rs 40 lakh in 2011. Unofficial estimates put the losses faced by farmers in the blocks to the tune of Rs 110 crore.

It should be noted that provision of supply of drinking water and fodder to the people and livestock by government through water tankers and trucks possess an additional burden on the administrative authorities. This may be minimized if strategic planning based on geographical and socio-economic aspects is given due consideration.

FOLLOWING ARE SOME OF THE MEASURES SUGGESTED AS DROUGHT PROOF APPROACH

1. **Desilting:** Desilting of the existing natural ponds, lakes and man-made tanks and dam reservoirs would increase supply of fresh water sources and aquatic life.
2. **Streams and rivers:** Widening and deepening of the streams and rivers to increase fresh water by tapping rain water.
3. **Rejuvenation of the aquifers:** Cleaning of wells to remove silt from choked aquifers. Rejuvenation of aquifers would increase water table levels and so the supply of ground water.
4. **Rain Water Harvesting structures**: Provision of rain water harvesting structures to recharge of tube wells and wells during monsoon, tanks to increase fresh water.
5. **Adoption of Wise and scientific water-use**: Adopting scientific water –shed management practices, optimum use of water, curbing water wastages etc. are some of the possible solutions for the drought areas of the district.
6. **Expertise Guidance**: Geographers with the help of their expertise in the field of geomorphology, climatology, and Human geography, Remote Sensing and Geographical Information System and Techniques of spatial analysis can provide the best sustainable practices for the region based on ecological principles with socio-economic justice.
7. **Drought proof approach**: Besides drought being a natural cycle, reappears after certain years in the region. This cannot be changed but definitely the situation can be handled by adopting wise water and resource management and the nature of cropping pattern. Hence principles of water management and water use for drought region need to be studied carefully and scientifically. The meteorologists predict the drought situations that need to be acknowledged by the administrators, planners, entrepreneurs and the local community to handle the situation more wisely to minimize the distress. This calls for **'drought proofing'** approach where both the animals and the people of the region during drought period are able to meet / or are provided with basic needs with least hardships.
8. **Need of Small dam structures**: The need is felt on focusing on small dam structure plans. This should facilitate fifty percent of river water to flow in its natural course. It would thus help in recharging the ground water in the middle and lower river course areas.
9. **Controlled and Regulated Agriculture land use**: Mixed land use agriculture pattern, crop-rotation system; preventing / avoiding irrigated crop production and reducing industrial goods production using water in large quantities in the regions with deficit rain water years; etc. Would go a long way in minimizing the stress in the drought region. Another major step that needs to be incorporated is the

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delimiting/zoning of the agricultural land-use of farmers; that is of the total cultivable land he possess how much should be under cash crop/ industrial crop/ food crop and grassland.

10. **Increasing green cover**: Increasing green cover on a war-foot scale by all the sections of the society would help in moderating the effects of climatic disturbances and restoring the ecological equilibrium in the long run.

11. **Strategic planning for drought and normal rain period:** It is advisable to bring land under grass or be kept fallow during dry spells in the region. Normal years of rain should be strategically used to optimize agricultural land uses. Dry spells should be utilized to provide employment and survival means by undertaking water- enhancement projects and infra-structure developments. In addition to this well designed strategies should be prepared in advance by identifying the areas supplying the basic materials for the drought affected region. Institutionalizing long term sustainability and drought-proofing measures by the municipalities in the urban areas and the grampanchayats in the rural areas would play a major role in mitigating the drought situation in any area. Proactive disaster mitigation measures would go a long way in minimizing the losses and distress to the people, its economy and the nation.

It therefore calls for an initiative for collaborative and concerted efforts at all levels. The administrators and local representatives; academicians and researchers; planners and entrepreneurs; non-governmental organizations and local communities need to initiate all the suggested measures religiously in the interest of the society, nation and planet to make it sustainable and keep it habitable.

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A STUDY OF INDIAN URBAN PEOPLE'S PERCEPTION TOWARDS AGRICULTURE AND FARMERS

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ABSTRACT
From ancient age humans have relied on farming for their survival. Post independence agriculture was the backbone of Indian economy and same remained as fact in globalised arena. Though the methods of farming have drastically changed , farmers are doing innovations in various aspects of farming that has resulted in increase in agriculture products, but on the other hand there are several reasons for Indian agriculture crisis.

After independence more than 70 percent of population of India was depend on agriculture but recently that percentage has reduced due to urbanization and migration of villagers to urban cities due to industrial revolution. The main sources of income of these urban people are trade, business, service and self employment. They have made themselves very busy in earning bread and butter for their family. They live in nuclear family, where 'me' and 'my' family has importance over other issues.

This research is an attempt to study the perception of this urban people towards agriculture and farming. Survey was conducted with structured questionnaire and it raveled that urban people's level of agricultural awareness is satisfactory. They are fully aware of farmer's issues and the reasons behind crisis in Indian agriculture. They are well-versed with farmer's difficulties and ready to accept their responsibility towards their development.

Keywords: Agricultural, Farmer, Urban People, Perception, Farmers Issues, Farmers Difficulties, and Awareness

INTRODUCTION

From ancient age humans have relied on farming for their survival. Post independence agriculture was the backbone of Indian economy and same remained as fact in globalised arena. Though the methods of farming have drastically changed , farmers are doing innovations in various aspects of farming that has resulted in increase in agriculture products, but on the other hand there are several reasons for Indian agriculture crisis.

After independence more than 70 percent of population of India was depend on agriculture but recently that percentage has reduced due to urbanization and migration of villagers to urban cities due to industrial revolution. The main sources of income of these urban people are trade, business, service and self employment. They have made themselves very busy in earning bread and butter for their family. They live in nuclear family, where 'me' and 'my' family has importance over other issues.

OBJECTIVES OF STUDY

There were five primary objectives of this study:

1. To know the status of agricultural awareness amongst urban people.
2. To study urban people's perception regarding issues of farmers.
3. To understand urban people's perception regarding crisis in Indian agriculture.
4. To learn what extent the urban people are concern with farmer's difficulties.
5. To find out whether the urban people are ready to take their responsibility towards development of farmers.

RATIONAL OF STUDY

Indian agricultural industry has improved as compared to pre-independence era but hasn't developed as per the expectations of economists. It has several issues and difficulties so that some are saying it as crisis. Government is doing its part for betterment of this industries but the size of this problem is huge hence government's efforts are not enough to overcome this issues. Unless all stakeholders of Indian economy join their hands together, development of this industry is impossible. After independence more than 70 percent Indian population was dependant on agriculture but recently that percentage has reduced due to urbanization and migration of villagers to urban cities due to industrial revolution. The main sources of income of these urban people are trade, business, service and self employment. They have made themselves very busy in earning bread and butter for their family. They lived in nuclear family, where 'me' and 'my' family has importance over other issues.

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Therefore it is necessary to understand the feelings of urban peoples towards this industry for involving them in the task of development of this industry.

SIGNIFICANCE OF THE STUDY

The study attempts to provide recommendations/ suggestions which can be used to improve the urban people's awareness of Indian agricultural issues and farmers' difficulties, which will sensitize them regarding farmers suicide and make them to accept their responsibility towards betterment of farmers.

Government can take appropriate steps to sensitize urban people with farmers difficulties as they should come forward voluntary to help poor farmers.

Farmers can have insight of situation in regards to perceptions of urban peoples towards their issues and difficulties, from which they can decide to continue or wipe-off the stereotype that "Urban people don't bother about farmers"

RESEARCH METHODOLOGY

For the purpose of this study, the survey method is adopted for collection of data. This method has been selected keeping in mind the larger number of people residing in Mumbai region. The survey includes primary and secondary data.

Primary Data: Primary data was collected directly from urban people with the use of structured questionnaire.

Secondary Data: Secondary data was collected from theses, reports, seminars and conference papers, articles, websites, unpublished data, published books, journals, magazines and newspapers etc.

Research Design: The research aims to quantify the perceptions of the urban people towards agriculture and farmers. It is descriptive in nature because it measures urban people's level of awareness of farmer's difficulties and their perceptions on various issues regarding Indian agriculture. Thus the research design adopted for the study is Quantitative Descriptive Cross-sectional design to cover the various facets of the study.

Sample Size: The Sample Size is 164 urban people residing in Mumbai region

Research Area: Research is carried out within Mumbai Region across Mumbai, Mumbai suburb and Thane district

Sampling Method and Data Interpretation: The data collected from the peoples of Mumbai region with Convenience Random Sampling method and interpreted so as to get the information based on the objectives and hypotheses of the study. The information collected from the respondents within the study area was tabulated, analyzed by using Percentage and Chi-Square Tests as statistical tools and conclusions were drawn with the help of independent variables like age and gender, for perceptions, awareness, concern's and responsibility of urban people towards farmers issues.

HYPOTHESIS

1. H0: "Urban people's awareness regarding agriculture is satisfactory."

   H1: "Urban people's awareness regarding agriculture is not satisfactory."

2. H0: "Urban people are more concern with farmer's difficulties."

   H1: "Urban people are not concern with farmer's difficulties."

3. H0: "Urban people are ready to accept their responsibility towards development of farmers"

   H1: "Urban people are not ready to accept their responsibility towards development of farmers"

LIMITATIONS OF STUDY

The area of the study is restricted to Mumbai Region across Mumbai, Mumbai suburb and Thane district only. The study is restricted to urban people only. Though there are many variables available for analyzing and interpretation of perception of urban people towards agriculture and farmers, only gender and age variables are used.

DATA ANALYSIS

1. **Respondents Profile:** for this research data was collected from peoples residing in Mumbai City whose profile is as follow:

2.

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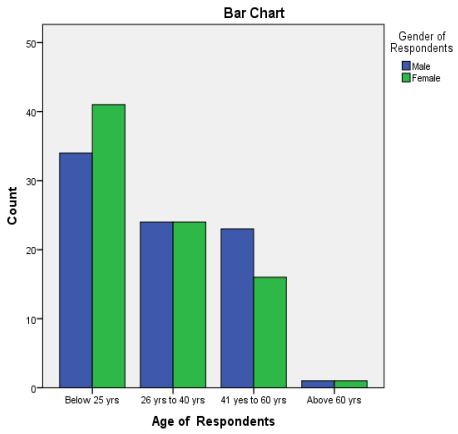
a) Age

Table no 1				
Particulars		Gender		Total
		Male	Female	
Below 25 yrs	Count	34	41	75
	% of Total	20.7%	25.0%	45.7%
26 yrs to 40 yrs	Count	24	24	48
	% of Total	14.6%	14.6%	29.3%
41 yrs to 60 yrs	Count	23	16	39
	% of Total	14.0%	9.8%	23.8%
Above 60 yrs	Count	1	1	2
	% of Total	0.6%	0.6%	1.2%
Total	Count	82	82	164
	% of Total	50.0%	50.0%	100.0%

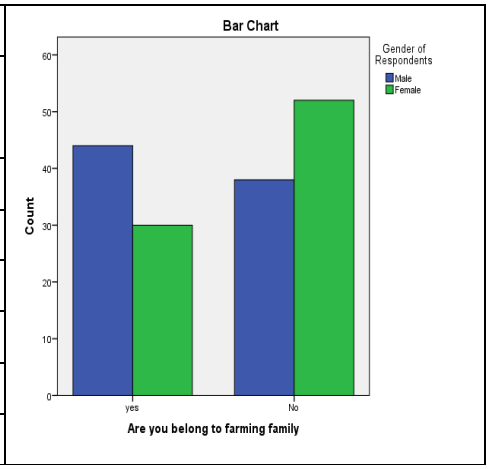
(Source: Field survey)



b) Belong to farming family :

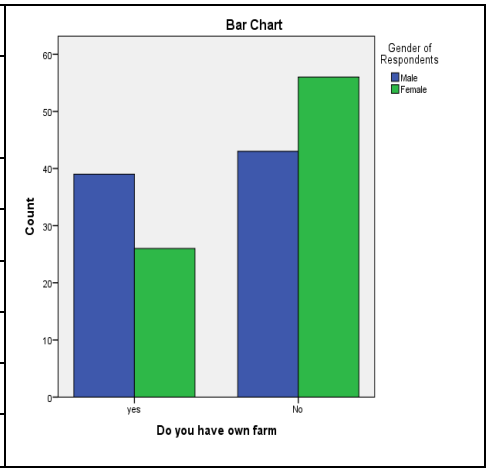
Table no 2				
		Gender		Total
		Male	Female	
yes	Count	44	30	74
	% of Total	26.8%	18.3%	45.1%
No	Count	38	52	90
	% of Total	23.2%	31.7%	54.9%
Total	Count	82	82	164
	% of Total	50.0%	50.0%	100.0%

(Source: Field survey)



c) Respondents owned farm:

Table no 3				
		Gender		Total
		Male	Female	
yes	Count	39	26	65
	% of Total	23.8%	15.9%	39.6%
No	Count	43	56	99
	% of Total	26.2%	34.1%	60.4%
Total	Count	82	82	164
	% of Total	50.0%	50.0%	100.0%



3. Status of agricultural awareness amongst urban people:

Urban peoples are involved themselves in non agricultural activities for their bread and butter such as trade, business, manufacturing and providing various services. They are born and brought up in cities hence unaware of farm and farming activities. The agricultural awareness of urban people in study area is as follow:

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Table No. 4: Status of agricultural awareness amongst urban people

SN	perception	G	Cross Table					Pearson Chi-Square Tests		
			SD	D	N	A	SA	Value	df	Asymp. Sig.
1	There is no future in agriculture	M	36	26	9	10	1	4.779[a]	4	.311
		F	28	38	9	7	0			
		T	**64**	**64**	**18**	**17**	**1**			
2	Agriculture is India's large employer	M	1	14	12	36	19	2.762[a]	4	.598
		F	4	13	14	37	14			
		T	**5**	**27**	**26**	**73**	**33**			
3	Agriculture is highly technological and science based industry	M	4	24	17	25	12	7.402[a]	4	.116
		F	1	17	18	39	7			
		T	**5**	**41**	**35**	**64**	**19**			
4	Agriculture has skilled and educated workers	M	6	29	20	23	4	2.886[a]	4	.577
		F	7	28	26	20	1			
		T	**13**	**57**	**46**	**43**	**5**			
5	Agriculture has carrier opportunities	M	1	6	14	47	14	2.496[a]	4	.645
		F	0	7	9	49	17			
		T	**1**	**13**	**23**	**96**	**31**			

(Source: Field survey) (M=Male, F=Female, T=Total, SD= Strongly Disagree, D= Disagree, N= Neutral, A=Agree and SA = Strongly Agree)

As per above table no 4 the Chi-Square Test for all perceptions indicates that Asymp. Sig. by Linear-by-Liner Association is > 0.05, hence there is no significant difference in agricultural awareness of urban people. As they are accepting i) There is future in agriculture ii) Agriculture is India's large employer iii) Agriculture is highly technological and science based industry iv) Agriculture has skilled and educated workers and v) Agriculture has carrier opportunities.

Hence the **H0 : "Urban people's awareness regarding agriculture is satisfactory." is accepted**

4. Urban people's perception regarding issues of farmers

Farmers are facing various issues such as frequent drought, rapid urbanization; small and fragmented land and many more but urban peoples are unaware of such issues as they are busy with other activities. They might be learnt about these issues through their education and news and social media but it is an attempt of understand the perception of urban people of study area in regards to issues faced by farmers and agricultural industry in India which is as follows:

Table No-5: Urban people's perception regarding issues of farmers

SN	perception	G	Cross Table					Pearson Chi-Square Tests		
			SD	D	N	A	SA	Value	df	Asymp. Sig.
1	Agriculture has positive future for people and business	M	0	5	10	41	26	10.752[a]	4	.029
		F	3	3	9	55	12			
		T	**3**	**8**	**19**	**96**	**38**			
2	Frequent drought is main difficulty of farmers	M	2	18	24	33	5	2.458[a]	4	.652
		F	3	13	22	41	3			
		T	**5**	**31**	**46**	**74**	**8**			
3	Rapid urbanization is reason for less farm workers	M	5	20	11	38	8	5.909[a]	4	.206
		F	3	10	11	44	14			
		T	**8**	**30**	**22**	**82**	**22**			
4	Small and fragmented land holding is the main reason of	M	0	10	13	46	13	4.916[a]	4	.296
		F	1	8	21	45	7			

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	low agriculture income	**T**	**1**	**18**	**34**	**91**	**20**			
5	Government should impose tax on an agricultural income	M	20	18	19	16	9	7.330[a]	4	.119
		F	11	29	22	16	4			
		T	**31**	**47**	**41**	**32**	**13**			

(Source: Field survey) (M=Male, F=Female, T=Total, SD= Strongly Disagree, D= Disagree, N= Neutral, A=Agree and SA = Strongly Agree)

As per above table no 5 the Chi-Square Test for all perceptions except one indicates that Asymp. Sig. by Linear-by-Liner Association is > 0.05, hence there is no significant difference in perception of urban people regarding farmers issue like i) Frequent drought is main difficulty of farmers ii) Rapid urbanization is reason for less farm workers iii) Small and fragmented land holding is the main reason of low agriculture income and iv) Government should not impose tax on an agricultural income.

Hence the **H0: "Urban people's awareness regarding agriculture is satisfactory." is accepted**

5. Urban people's perception regarding crisis in Indian agriculture

'Indian agricultural crisis: fact or myth' is debatable but there are hand full big and rich farmers who are untouched by agriculture crisis because of several reason, on the other hand majority of small and poor farmers never came out of crisis because of various reasons. Urban people are fortunate as they never came across of such crisis. The perception of urban people of study area regarding crisis in Indian agriculture is in following manner:

Table No-6: Urban people's perception regarding crisis in Indian agriculture:

SN	perception	G	Cross Table					Pearson Chi-Square Tests		
			SD	D	N	A	SA	Value	df	Asymp. Sig.
1	Government should be blamed for crisis in Indian agriculture	M	4	20	18	24	16	4.088[a]	4	.394
		F	5	17	22	30	8			
		T	**9**	**37**	**40**	**54**	**24**			
2	No proper irrigation facility is the main cause of crisis in Indian agriculture	M	2	6	10	44	20	13.916[a]	4	.008
		F	0	10	20	46	6			
		T	**2**	**16**	**30**	**90**	**26**			
3	Changing environment should be blamed for crisis in Indian agriculture	M	1	17	12	41	11	1.568[a]	4	.815
		F	3	20	12	36	11			
		T	**4**	**37**	**24**	**77**	**22**			
4	Farming method should be blamed for crisis in Indian agriculture.	M	4	13	20	36	9	6.270[a]	4	.180
		F	1	22	25	28	6			
		T	**5**	**35**	**45**	**64**	**15**			
5	Lack of agriculture market should be blamed for crisis in Indian agriculture	M	4	14	13	38	13	1.829[a]	4	.767
		F	2	19	12	34	15			
		T	**6**	**33**	**25**	**72**	**28**			

(Source: Field survey) (M=Male, F=Female, T=Total, SD= Strongly Disagree, D= Disagree, N= Neutral, A=Agree and SA = Strongly Agree)

As per above table no 6 the Chi-Square Test for all perceptions except one indicates that Asymp. Sig. by Linear-by-Liner Association is > 0.05, hence there is no significant difference in perception of urban people. As per their opinion i) Government should be blamed for crisis in Indian agriculture. ii) Changing environment should be blamed for crisis in Indian agriculture iii) Farming method should be blamed for crisis in Indian agriculture. and iv) Lack of agriculture market should be blamed for crisis in Indian agriculture.

Hence the **H0: "Urban people's awareness regarding agriculture is satisfactory." is accepted**

6. Urban people are concern towards farmer's difficulties

Farming is not a walk through park; it requires hard work, perseverance, sustenance and patience in spite of that returns on investment in farming is very low. The several researches have reveled; various difficulties faced by the farmers such as low productivity**,** farming loan, low price, middle men and improper pricing of agricultural products and so on. The urban peoples concern in regards to said farmers difficulties is shown below:

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Table No-7: Urban people are concern towards farmer's difficulties

SN	perception	G	Cross Table					Pearson Chi-Square Tests		
			SD	D	N	A	SA	Value	df	Asymp. Sig.
1	Low productivity of land is the main reason behind farmer's suicide	M	8	19	16	20	19	4.432[a]	4	.351
		F	5	21	9	29	18			
		T	**13**	**40**	**25**	**49**	**37**			
2	Loan is the main reason behind farmer's suicide	M	3	22	14	29	14	15.026[a]	4	.005
		F	1	8	7	41	25			
		T	**4**	**30**	**21**	**70**	**39**			
3	Low price for agricultural product is the main reason behind farmer's suicide	M	2	11	9	33	27	8.878[a]	4	.064
		F	0	4	5	47	26			
		T	**2**	**15**	**14**	**80**	**53**			
4	Middle man is eating the income of farmers	M	3	3	2	30	44	8.209[a]	4	.084
		F	0	7	1	41	33			
		T	**3**	**10**	**3**	**71**	**77**			
5	Farmer's products are not given proper price	M	2	0	3	34	43	1.269[a]	3	.737
		F	3	0	1	36	42			
		T	**5**	**0**	**4**	**70**	**85**			

(Source: Field survey) (M=Male, F=Female, T=Total, SD= Strongly Disagree, D= Disagree, N= Neutral, A=Agree and SA = Strongly Agree)

As per above table no 7 the Chi-Square Test for all perceptions except one indicates that Asymp. Sig. by Linear-by-Liner Association is > 0.05, hence there is no significant difference in perception of urban people regarding farmers difficulties. According to them i) Accepting low productivity of land is the main reason behind farmer's suicide ii) Agreeing to low price for agricultural product is the main reason behind farmer's suicide iii) Accepting that middle man is eating the income of farmers and iv) saying that farmer's products are not given proper price.

Hence the **H0: "Urban people are more concern with farmer's difficulties." Is accepted**

7. Urban people's responsibility towards development of farmers:

Without agricultural development Indian economy cannot progress, in other words to become developed county all stake holders of economy has strive hard. Every citizen should become aware of this fact and take various responsibilities. The perception of urban citizen's of study areas in regards to their responsibility towards development of farmer is as follows:

Table No-8: Urban people's acceptance of responsibility towards development of farmers

SN	perception		Cross Table					Pearson Chi-Square Tests		
			SD	D	N	A	SA	Value	df	Asymp. Sig.
1	Agricultural education should be taught in to schools	M	1	4	5	34	38	2.064[a]	4	.724
		F	1	5	6	41	29			
		T	**2**	**9**	**11**	**75**	**67**			
2	Your child should take farming as profession	M	3	7	35	26	11	4.577[a]	4	.333
		F	0	9	35	31	7			
		T	**3**	**16**	**70**	**57**	**18**			
3	After retirement I will involved myself in farming	M	3	6	25	28	20	14.147[a]	4	.007
		F	1	13	18	43	7			
		T	**4**	**19**	**43**	**71**	**27**			
4	I will purchase farmers product directly from him	M	1	3	15	39	24	2.548[a]	4	.636
		F	1	4	8	43	26			

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		T	**2**	**7**	**23**	**82**	**50**			
5	I will not mind additional tax imposed by government for betterment of farmers in India	M	8	15	15	30	14	6.213[a]	4	.184
		F	3	16	22	34	7			
		T	**11**	**31**	**37**	**64**	**21**			

(Source: Field survey) (M=Male, F=Female, T=Total, SD= Strongly Disagree, D= Disagree, N= Neutral, A=Agree and SA = Strongly Agree)

As per above table no 8 the Chi-Square Test for all perceptions except one indicates that Asymp. Sig. by Linear-by-Liner Association is > 0.05, hence there is no significant difference in Urban people's acceptance of responsibility towards development of farmers by i) Accepting agricultural education should be taught in to schools ii) Accepting their child should take farming as profession iii) showing readiness for purchase farmers product directly from him and iv) showing willingness for accepting additional tax imposed by government for betterment of farmers in India.

Hence the **H0: "Urban people are ready to accept their responsibility towards development of farmers" is accepted**

FINDINGS AND CONCLUSIONS:

After analyzing data collected from 164 respondents of urban city i.e. Mumbai region with structured questionnaires the following are the findings of this study:

1. Out of total sample 54.9% respondents are not from farming family background and 60.4% are not owner of farm.
2. Farming has a future is perception of majority urban people i.e. 78% of total samples.
3. 64.6% respondent's accepted that agriculture is India's large employer.
4. Agriculture is highly technological and science based industry is perception of 50.6% respondents.
5. Majority of respondents i.e. 77.4% are saying that Agriculture has carrier opportunities.
6. Agriculture has positive future for people and business is opinion of 81.7% urban people who stays in study area.
7. Of the total respondents 47.5% has a view that, Government should be blamed for crisis in Indian agriculture.
8. No proper irrigation facility is the main cause of crisis in Indian agriculture is opinion of 70% of respondents.
9. 60.4% respondents are saying that, changing environment should be blamed for crisis in Indian agriculture.
10. Within the sample 48.1% urban people think that, Farming method should be blamed for crisis in Indian agriculture.
11. Lack of agriculture market should be blamed for crisis in Indian agriculture is a perception of 61% urban people who were part of sample.
12. Half of the respondents are in view that, frequent drought should be blamed for crisis in Indian agriculture.
13. Rapid urbanization should be blamed for crisis in Indian agriculture is a belief of 63.4% respondents.
14. Small and fragmented land holding is the main reason of low agriculture income is a perception of 67.7% respondents.
15. 52.5% respondents are of the view that low productivity of land is the main reason behind farmer's suicide.
16. Loan is the main reason behind farmer's suicide is observation recorded by 66.5% peoples of total samples.
17. Majority of respondents i.e. 81.1% said that, Low price for agricultural product is the main reason behind farmer's suicide.
18. Middle man is eating the income of farmers is belief of 93.3% urban peoples.
19. Almost all i.e. 94.5% urban people accepted that farmer's products are not given proper price.

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20. Government should impose tax on an agricultural income is opinion of only 27.4% respondents but on other had 47.6 % are opposing to this proposal.
21. Out of total 164 respondents 86.6% are in opinion that Agricultural education should be taught in to schools.
22. 45.8% urban peoples of sample size will not mind if their children take up agriculture as a carrier.
23. After retirement I will involved myself in farming is opinion of 59.8% respondents.
24. Majority of respondents i.e. 80.5% are ready to purchase farmer's product directly from him.
25. More than half i.e. 51.8% urban people are ready to bare additional tax imposed by government for betterment of farmers in India.

On the basis of above findings the researcher concludes that

1. There is no significant difference in agricultural awareness amongst urban people.
2. There is no significant difference in perception of urban people towards reasons of crisis in Indian agriculture.
3. There is no significant difference in perception of urban people regarding farmer's difficulties.
4. There is no significant difference in urban people's in accepting the responsibility towards development of farmers.

Urban people's level of agricultural awareness is satisfactory. They are fully aware of farmer's issues and reasons behind crisis in Indian agriculture. They are well-versed with farmer's difficulties and ready to accept their responsibility towards their development.

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AN ANALYSIS OF THE MINIMUM SUPPORT PRICE SYSTEM OF INDIA

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ABSTRACT

The emergence of agricultural Price Policy in India was in the backdrop of food scarcity and price fluctuations provoked by drought, floods and international prices for exports and imports. This policy in general was directed towards ensuring reasonable food prices for consumers by providing food grains through Public Distribution System (PDS) and inducing adoption of the new technology for increasing yield by providing a price support mechanism through Minimum Support Price (MSP) system.

In recognition of the importance of assuring reasonable produce prices to the farmers, motivating them to adopt improved technology and to promote investment by them in farm enterprises, the Agricultural Prices Commission (renamed as the Commission for Agricultural Costs and Prices in 1985) was established in 1965 for advising the Government on agricultural prices policy on a continuing basis. The thrust of the policy in 1965 was to evolve a balanced and integrated structure to meet the overall needs of the economy and with due regard to the interests of the producers and the consumers. The first Commission was headed by Prof M L Dantwala and in its final report the Commission suggested the Minimum Support Prices for Paddy.

Based on the recommendations of the Commission for Agricultural Costs and Prices, the Department of Agriculture and Co-operation, Government of India, declares Minimum Support Prices (MSP) for 22 crops before their sowing seasons. The idea behind MSP is to give guaranteed price and assured market to the farmers and protect them from the price fluctuations and market imperfections. The guaranteed price and assured market are expected to encourage higher investment and in adoption of modern farming practices. Further, with the globalization resulting in freer trade in agricultural commodities, it is very important to protect the farmers and their interest.

There have been many concerns off late regarding operation and effectiveness of MSP. Many studies have pointed out that MSP is leading to regional imparity in incomes as it is effective only in few states where it is backed by procurement (Ali et al. 2012; Tripathi 2013; Schiff et al. 1992). MSP is also said to have favoured crop specialization in with rice and wheat at the cost of pulses and oil seeds (Chand 2003; Jha & Srinivasan 2006; Jha 2009; Mittal & Hariharan 2016).

Farming is a risky business with the farmer's income dependent on the vagaries of weather and pests, as well as local and international price trends. The MSP mechanism shields farmers to an extent, from such risks, by guaranteeing a floor price for their produce.

This paper tries to analyze the origin, method and implications of the Minimum Support Price in India.

INTRODUCTION

The Minimum Support Price Scheme is a scheme of the government of indiato safeguard the interests of the farmers. Under this schemethe government of india declares a basic price which assures the farmer that their agriculture produce will be purchased, thereby preventing distress sale

Rationale behind the Minimum Support Price

It acts like a buffer to protect the farmer in case the price of the commodity produced by the farmer falls below the market price due to bumper crop which causes a glut in the market, the Government agencies (usually the Food Corporation of India) procures the grains from the farmers at the prices announced by the Government.

OBJECTIVES OF THE MINIMUM SUPPORT PRICE SYSTEM

- To prevent distress sale by the farmer in case of a bumper crop and market demand is low to recover the cost of production.
- To procure the grains for public distribution by fair price shops.

Usually, Minimum support prices are announced by the Government at the start of the sowing season. The rates are announced by the Government which is decided by the cabinet committee on economic affairs (CCEA) on the basis of recommendations of Commission for Agricultural Costs and Prices (CACP). The recommendations are not binding and can be modified by the Cabinet committee.

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METHOD OF CALCULATION

The commission for agricultural costs and prices (CACP) in formulating the minimum support prices takes into account, a comprehensive view of the entire structure of the economy along with the following factors

- Cost of production
- Changes in input prices
- Input-output price difference
- Trends in market prices over a period of time (3-6 months)
- Demand and supply of commodities
- Inter-crop price rates
- Effect on the industrial cost structure
- Effect on cost of living of the population
- Effect on general price level in the market
- International prices of the commodities
- Parity between prices paid and prices received by the farmers.
- Effect on issue prices for subsidy

The Commission makes use of both micro-level data and aggregate price levels at district, state, and the country. The data used by the Commission also includes

- Cost of cultivation per hectare in various regions of the country.
- Cost of production per quintal in various regions
- Prices of various inputs
- Market prices of products
- Prices of commodities sold by the farmers
- Supply-related information like area, yield, imports, exports and domestic availability with procurement corporations
- Demand related information like total and per capita consumption
- Prices in the international market
- Prices of farm derivatives like sugar, jaggery, jute goods, oils and cotton yarn
- Cost of processing of agricultural products
- Cost of marketing - storage, transportation, processing, marketing services etc.
- Macroeconomic factors like general level of prices, consumer price indices etc.

Price Support Policy of the Government is directed at providing insurance to agricultural producers against any sharp fall in farm prices. The minimum guaranteed prices are fixed to set a floor below which market prices cannot fall.

MSP were announced by the Government of India for the first time in 1966-67 for Wheat in the wake of the Green Revolution and extended harvest, to save the farmers from depleting profits.

Till the mid-1970s, Government announced two types of administered prices:

Minimum Support Prices (MSP)

Procurement Prices

This policy of two official prices being announced continued with some variation upto 1973-74, in the case of paddy. In the case of wheat it was discontinued in 1969 and then revived in 1974-75 for one year only. Since there were too many demands for stepping up the MSP, in 1975-76, the present system was evolved in which

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only one set of prices was announced for paddy (and other kharif crops) and wheat being procured for buffer stock operations.

MSP is announced by the Government of India for 25 crops currently at the beginning of each season viz. Rabi and Kharif.

- Following are the 25 crops covered by MSP

Kharif Crops: Paddy, Jowar, Bajra, Maize, Ragi, Arhar(Tur), Moong, Urad, Cotton, Groundnut, Sunflower Seed, Soyabeen Black, Sesamum, Nigerseed

Rabi Crops: Wheat, Barley,Gram, Masur (Lentil), Rapeseed/Mustard, Safflower, Toria

Other Crops: Copra, De-Husked Coconut, Jute, Sugarcane

CACP's Methodology for Cost Calculation

- Minimum Support Price for major agricultural products are announced each year after taking into account the recommendations for the commission for agricultural costs and prices (CACP).
- The CACP while recommending prices takes into account all important factors including cost of production, changes in input prices, input/output parity, trends in market prices, inter crop price parity, Demand and supply situation, parity between prices paid and prices received by farmers etc.
- In fixing the support prices, CACP relies on the cost concept which covers all items of expenses of cultivation including that the imputed value of the inputs owned by farmers such as rental value of owned land and interest on fixed capital. some of the important cost concepts used by CACP are the C2 and C3 Costs.
- **C2 Cost**: C2 cost includes all actual expenses in cash and kind incurred in production by actual owner + rent paid for leased land + imputed value of family labour + interest on the value of owned capital assets (excluding land) + rental value of owned land (net of land revenue)
- **C3 Cost**: Cost C2 + 10% of cost C2 to account for managerial remuneration to the farmer.
- Costs of production are calculated both on a per quintal and per hectare basis. Since cost variation are large over states. **CACP recommends that MSP should be considered on the basis of C2 Cost**. However increases in MSP have been so substantial in case of paddy and what that in most of the states MSPs are way above not only the C2 cost but the C3 cost as well.

FORMULA FOR CALCULATING MSP

For calculating MSP, the CACP considers factors such as cost of production, change in input prices, market price trends, demand and supply, and a reasonable margin for farmers.

The CACP projects three kinds of production cost for every crop both at the state and all—India average level. These three production costs includes:

Pricing for sugarcane:

- The pricing of sugarcane is governed by the statutory provisions of the Sugarcane (Control) Order, 1966 issued under the Essential Commodities Act (ECA), 1955.
- Prior to 2009-10 sugar season, the Central Government was fixing the Statutory Minimum Price (SMP) of sugarcane and farmers were entitled to share profits of a sugar mill on 50:50 basis.

- **A2:** It covers all paid-out costs directly incurred by the farmer in cash and king on seeds, fertilizers, pesticides, hired labour, leased-in land, fuel, irrigation etc.
- **A2+FL:** It includes A2 plus an imputed value of unpaid family labour.
- **C2:** It is a more comprehensive cost that factors in rental and interest forgone on owned land and fixed capital assets, on top of A2+FL.

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Recent updates:

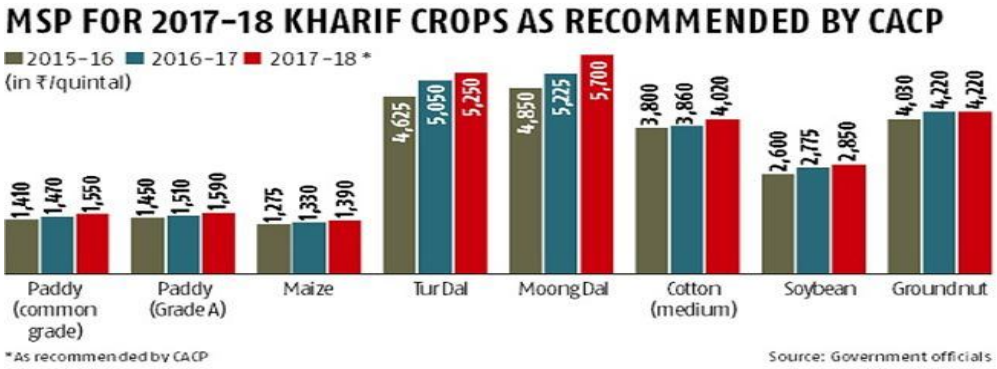
- Recently, the government has increased minimum support prices this year to at least 50% above A2+FL.
- MSP was increased for 14 crops grown in the kharif (summer) season, including paddy, cotton, soyabean, pulses and millets.
- According to the agriculture ministry, this increase in prices would be a step towards helping farmers double their incomes by 2022.

MSP for different crops:

- The minimum support price for bajra is close to 50% more than C2.
- The others are mostly around 14% above C2. Sesamum is just 3% more than C2.
- The minimum support price for paddy, an important crop in North India, is just 12% above C2.
- The demand itself originates in 2006 report of the National Commission on Farmers led by MS Swaminathan.
- The committee recommended, among others, that the minimum support price be at least 1.5 times C2. And for much of the last 10 years, the minimum support price for most crops has in fact been 50% more than A2+FL.

Procurement under MSP

- The Food Corporation of India is the nodal agency for procurement along with State agencies.
- FCI establishes purchase centres for procuring food grains under the price support scheme.
- While, the State government decides on the locations of these centres with the aim of maximizing purchases.



MSP is declared on the following commodities

- Cereals (7) – paddy, wheat, barley, jowar, bajra, maize and ragi
- Pulses (5) – gram, arhar/tur, moong, urad and lentil
- Oilseeds (8) – groundnut, rapeseed/mustard, toria, soyabean, sunflower seed, sesamum, safflower seed and nigerseed
- Copra
- De-husked coconut
- Raw cotton
- Raw jute
- Sugarcane (Fair and remunerative price)
- Virginia flu cured (VFC) tobacco

Procurement under MSP

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- FCI establishes purchase centres for procuring food grains under the price support scheme.
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Crops Covered

The MSP is announced by the Government of India for 25 crops currently at the beginning of each season viz. Rabi and Kharif. Following are the 25 crops covered by MSP:

Kharif Crops		Rabi Crops	
1	Paddy	15	Wheat
2	Jowar	16	Barley
3	Bajra	17	Gram
4	Maize	18	Masur (Lentil)
5	Ragi	19	Rapeseed/Mustard
6	Arhar(Tur)	20	Safflower
7	Moong	21	Toria
8	Urad	**Other Crops**	
9	Cotton	22	Copra
10	Groundnut	23	De-Husked Coconut
11	Sunflower Seed	24	Jute
12	Soyabeen Black	25	Sugarcane
13	Sesamum		
14	Nigerseed		

Need for MSP

1. The share of agriculture in India's GDP has fallen and almost half of India's population is still dependent on agriculture for livelihood.
2. It protects farmers from any sharp fall in the market prices of a commodity.
3. MSP are announced at the beginning of the sowing season, this helps farmers make informed decision on the crops they must plant.
4. MSP is a tool to achieve food security.
5. It provides security to farmers from the risk of crop failure and less production.
6. MSP is used as a tool to incentivize production of specific food crops which is short in supply.
7. Slow farm growth and increasing farmer's distress demand for more MSP for farmers.It will enhance purchasing capacity of farmers.
8. MSP motivates farmers to grow targeted crops and increased production.
9. Minimum prices ensured for the crops thereby hedging them from market fluctuations.
10. It helps famers from price fluctuations and market imperfection.

Various problems related to MSP

1. Crop production:

- The crop production is still unviable.
- The support prices that are being provided do not increase at par with increase in cost of production.
- A rating agency, CRISIL pointed out that the increase in MSP has indeed fallen in the year between2014-

2. MSPs have unequal access:

- The benefits of this scheme do not reach all farmers and for all crops.
- There are many regions of the country like the north-eastern region where the implementation is too weak.

3. Procurement related problems:

- Almost 2/3rdof the total cereal production is taken through the route of MSP, leaving only 1/3rdfor open market.
- As a result, a farmer who chooses the MSP route cannot take advantage of beneficial market prices and has to depend solely on the MSP.

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- It prevents earning of profit by producers.
- This has created shortage of crops in the open market also which has a serious impact on consumption pattern.
- It has shifted consumption towards non-cereal foods (that are available more in open market relatively), but production has not risen simultaneously, causing a *production-demand*
- Many famers due to lack of awareness about MSP are far away from FCI procurement areas.

4. Excess storage:
- This kind of procurement without sufficient storage has resulted in huge piling of stocks in the warehouses.
- The stock has now become double the requirements under the schemes of PDS, Buffer stock etc.

5. Issues in WTO:
- India's MSP scheme for many crops has been challenged by many countries in the WTO.
- For example, Australia has complained of the MSP on wheat, US and EU complained of sugarcane and pulses MSP.
- They have been claimed to be highly trade-distorting by its method of calculation.
- If the current process continues, the country will face international criticism for breaching the 10 per cent norm for subsidy on farm production set by the WTO.

6. Market distortion:
- It distorts the free market.
- It favours some particular crops over other crops.
- Not all farmers have been able to get the benefits of MSP because of lack of awareness.
- Higher MSP over-incentivise production leading to supply glut.
- Hikes in MSP also adversely affect the exports by making Indian farm goods on competitive especially when international market prices are lower.
- It does not cover perishables.

7. Ecological problem
- MSP lead to non-scientific agricultural practices whereby the soil, water are stressed to an extent of degrading ground water table and salinisation of soil.

8. Killing of competition
- Any interference by the government kills the competition. This affects the agents who procure the crops at lower prices and sell them at higher prices and earn profits. This mainly disturbs the working of people who sell these outputs from farmers into the open market.

Various committees on MSP:

1. National Commission on Farmers :

- The National Commission on Farmers (NCF) was constituted on November 18, 2004 under the chairmanship of Professor M.S. Swaminathan.
- The reports contain suggestions to achieve the goal of "faster and more inclusive growth" as envisaged in the Approach to 11thFive Year Plan.
- The Swaminathan Committee widely disseminated recommendations, to fix minimum support prices(MSP) for crops at levels" atleast 50 per cent more than the weigted average cost of production.

Ramesh Chandra Committee:

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Some of the other recommendations of swaminathan committee:

- Distribute ceiling-surplus and waste lands;
- Prevent diversion of prime agricultural land and forest to corporate sector for non-agricultural purposes.
- Ensure grazing rights and seasonal access to forests to tribal's and pastoralists, and access to common property resources.
- Establish a National Land Use Advisory Service, which would have the capacity to link land use decisions with ecological meteorological and marketing factors on a location and season specific basis.
- Set up a mechanism to regulate the sale of agricultural land, based on quantum of land, nature of proposed use and category of buyer.

- It was constituted to examine the methodological issues in fixing MSP.
- The Commission suggested that for calculating production cost, family labour head should be considered as skilled worker.
- The interest on working capital should be given for the whole season.
- Post harvest costs, including cleaning, grading, drying , marketing and transportation should be included.
- The committee recommended that the cost 2 should be raised to 10% account for risk premium and managerial charges.

SUGGESTIONS

In order to improve the MSP procurement system and make it more effective, the following recommendations are offered: i. First and foremost the awareness among the farmers needs to be increased and the information disseminated at the lowest level so that the knowledge would increase the bargaining power of the farmers. In the process the farmers will become empowered which would give them the legitimate dues. ii. The basic source of livelihood for the farmers is farming and the delay in payment has negative effect. Our micro-level analysis finds, inter-alia, that although fair grading and weighment in MSP procurement induces farmers to opt for MSP, unavailability of on-spot payments deters farmers to sell at MSP. The delay in payment needs to be corrected and immediate payment should be ensured. For sustainability of farming prompt payment at remunerative rates should be made. Thus, intervention may be specifically directed towards reducing payment time for farmers in case they are accessing the MSP route to protect them from unfair market practices and guaranteeing them an effective minimum support price. iii. It has been found that MSP rates are announced after the sowing season begins or at the time when the farmers have already initiated the necessary preparation for sowing a particular crop.

Rather, as intended by the policy makers, MSP should be announced well in advance of the sowing season so as to enable the farmers to plan their cropping. iv. Improved facilities at procurement centres, such as drying yards, weighing bridges, toilets, etc. should be provided to the farmers. More godowns should be set up and maintained properly for better storage and reduction of wastage. Transport facility (say, in the form of providing two wheelers) for Purchase Officers may be considered to help them effectively discharge their work, as they have to cover all the DPCs located within their jurisdiction. v. These should be meaningful consultation with the State Government, both on the methodology of computation of MSP as well as on the implementation mechanism. The criteria for fixing should be current data and based on more meaningful criteria rather than C3. 86 Evaluation Report on Minimum Support Price vi. The small and marginal farmers can be provided with some exemption in FAQ norms to provide them with a source of income. The Procurement Centres should be in the village itself to avoid transportation costs. vii. The farmers should receive their MSP rate in case on the spot and in the same day, so that they will be encouraged to improve their production and create more marketable surplus.

CONCLUSION

The Minimum Support Price is an important policy of the Union Government to determine floor price of major agricultural produces every year for protecting the farmers from the middlemen and fluctuating market conditions as it provides them an assured market in addition to a minimum assured return. On the whole, it was found that the MSP has succeeded in providing floor rate for major food grains like paddy and wheat and other

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produces such as Gram (black & green), spices and oilseeds (groundnut, mustard, til), sugarcane, jute and cotton, and it did not allow market prices to fall below the MSP fixed for them. The data collected from the respondents revealed that the MSP has been playing a critical role in stabilizing market prices in addition to helping the beneficiaries in adoption of modern technologies in farming.

However, many farmers continue to sell their produce in the open market to get better returns. Certain problems noticed in the implementation of MSP were: the procurement centres being far away resulting into heavy transportation cost, non-opening of Procurement centres timely, the authorities insisting for revenue records, lack of covered storage/godowns facility for temporary storage of produces, lack of electronic weighing equipment in some places, delays in payments, etc. Further, the instances of farmers coming to know about the MSP after they have sown their farms, and thus depriving them of any planning for their crops keeping in view the MSP, was quite common. It was also found that sometimes, the small and marginal farmers resorted to distress sales due to urgent need for money or to repay the loan taken before the sowing season. Some also pointed out that the MSP fixed was too low as it did not cover the rising farming costs. The Government needs to look into these issues for their appropriate redressal. Finally, almost all the beneficiaries were unanimous with the view that the MSP should continue as it insulated them from an unfavorable market conditions by assuring them a minimum return for their produces.

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A STUDY ON AGRO – TOURISM WITH SPECIAL REFERENCE TO MAPRO GARDENS, MAHABLESHWAR

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ABSTRACT
Agro tourism offers a unique opportunity to combine aspects of the tourism and agricultural industries in order to provide tourists, producers and communities with a number of financial, educational and social benefits. Agro tourism provides producers with the opportunity to generate additional income and avenue for consumers to market directly. This paper describes the significance of agro tourism for the farmers, towards improvement of standard of living of people involved in agro tourism and overall development of our Indian economy. This research paper also analyzes the reasons for the growth of agro tourism in India. The research objectives are to investigate the contribution of Mapro gardens as a place to visit in promotion of agro tourism at Panchgini, Mahableshwar.

Keywords: tourism, agriculture, agro tourism.

INTRODUCTION

Agriculture is the Indian economy's main sector. About 65 – 70 percent of the population is dependent on agriculture directly or indirectly and generates their livelihood. About 16 – 17 percent of total GDP comes from agriculture. It would certainly increase the contribution of agriculture to national GDP by providing additional income generating activities for existing agriculture. This is what Agro Tourism will serve.

Agro tourism is the latest concept in the Indian tourism industry that usually takes place on farms. It offers the opportunity to experience the real enchanting and authentic contact with rural life, taste genuine local food and learn about the various agricultural tasks during the visit. It offers a welcome escape from everyday hectic life in a peaceful rural setting. It gives the chance to relax and revitalize in the pure natural environment, surrounded by magnificent setting.

Simply put, agro - tourism can be seen as a crossroads between tourism and agriculture. More technically specified, agro - tourism can be defined as a form of commercial enterprise that links agricultural production and / or processing with tourism to attract visitors to a farm, ranch or other agricultural business for the purpose of entertaining and / or educating visitors and generating income for the owner of the farm, ranch or business. Whatever the exact definition or terminology, the following four factors should be included in any definition of agro - tourism:

- combines the essential elements of the tourism and agricultural industries ;
- attracts members of the public to visit agricultural operations ;
- is designed to increase farm income ; and
- Provides visitors with recreation, entertainment and/or education.

The present paper is an attempt to understand significance of agro tourism in India in terms of its contribution towards raising the standard of living of people associated with agriculture, generating employment and overall development of our economy. The paper tries to analyze significance of Mapro garden as a destination for agro tourism as well.

1. STATEMENT OF THE PROBLEM

The research paper aims to probe into, the significance of agro tourism towards raising standard of living or contribution towards economic growth. The researcher has tried to analyze the opinions of the tourists visiting the agro tourism places towards their experiences and purpose of their visits at such places. To understand in an elaborative way about the agro tourism a case study of Mapro gardens at Panchgini, Mahableshwar is also highlighted.

3. OBJECTIVE OF THE STUDY

The present study aims to examine the significance and reasons for the growth of agro-tourism development. In this broader framework, an attempt is made to achieve the following specific objectives:

- To examine the importance of agro-tourism in the development of farmer's livelihood

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- To describe the significance of agro-tourism development
- To understand the reasons for the growth of agro tourism in India
- To identify the problems of the agro-tourism and make suggestions to establishment and operations of agro-tourism
- To discuss the case study of Mapro gardens at Panchgini, Mahableshwar.

SCOPE OF THE STUDY

It enhances the tourism industry by increasing the volume of visitors to an area and the length of their stay. Agro tourism also provides communities with the potential to increase their local tax bases and new employment opportunities. Additionally, agro tourism provides educational opportunities to the public, helps to preserve agricultural lands, and allows states to develop business enterprises.

LIMITATIONS OF THE STUDY

1. From among the total number of tourists visited agro tourism places 100 sample respondents are interviewed.
2. Case study of only Mapro gardens has been considered for the study as a place of agro tourism. Rest all places all over Maharashtra or India have not been discussed.

REVIEW OF LITERATURE

Examine the importance of agro-tourism development in Maharashtra.

- To define a suitable framework for the of agro- tourism centers in the view of marginal and small
- Kumbhar (2010)[1] describes scope and opportunities for the farmers in Maharashtra. The paper examines the importance of agro-tourism development in Maharashtra. The research papers defines a suitable framework for the of agro- tourism centres in the view of marginal and smallfarmers and also tries to identify the problems of the agro-tourism and make suggestions to establishment andoperations of agro-tourism
- define a suitable framework for the of agro- tourism centers in the view of marginal and small
- identify the problems of the agro-tourism and make suggestions to establishment and
- Naidu (2016)[2] The paper aims to study the ongoing Agro-tourism initiatives & existing schemes to promote agro tourism in the country. It also highlights Documentation of existing business models in Agro-tourism – suggesting viable model. Further research aims to find out the strategic role of extension and advisory services in sustenance of Agro-tourism.
- Privitera (2015)[3] the research paper aims to differentiate agro tourism and organic agro tourism definitions specifying the principal characteristics. It tries to investigate the role of organic-agro tourism, as a tool for development of the landscape and attraction for sustainable tourism.
- The purpose of this paper was to identify and examine those factors that have helped rural communities successfully develop agro tourism, in particular organic agro tourism and its entrepreneurship opportunities.

Upadhye (2015)[4] examines the importance of agro-tourism development in Western Maharashtra. The research paper focuses on various factors instrumental enhancing agro tourism in Maharashtra. The paper analyzes the various products provided by Agro Tourism in Maharashtra and also discusses the problems of agro tourism industry in Maharashtra.

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METHODOLOGY & DATA

SOURCES OF DATA COLLECTION

1. **Primary data**
   The study is based on primary and secondary data. In order to achieve objectives of the study and to test the hypothesis, moreover, 100 sample respondents are contacted and interviewed.

2. **The secondary data**
   The data is gathered from relevant research journals, websites, published and unpublished sources etc. Some data has furnished from the websites of the government of India and Maharashtra, as well as Ministry of agriculture. Some ideas have been taken from the Tourism Development Corporation of Maharashtra.

RESULTS & ANALYSIS:

The opinions of tourists respondents have been analyzed in terms of:

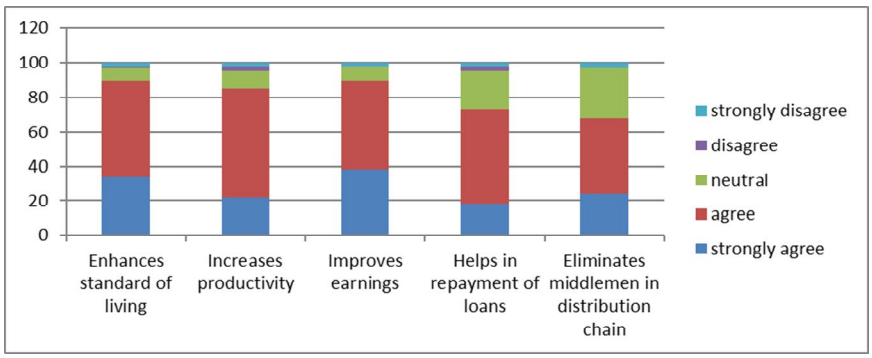
- Significance of agro tourism for the farmers
- Benefits of agro tourism
- Reasons for the growth of agro tourism in India
- Opinions towards visit to Mapro gardens in terms of purpose to visit, the most preferable liking at Mapro
- Mapro gardens a contributor towards growth of agro tourism

ANALYSIS & INTERPRETATION

Table-8.1: Beneficial to the farmers

Particulars	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
Enhances standard of living	34	56	7	1	2
Increases productivity	22	63	10	3	2
Improves earnings	38	52	8	0	2
Helps in repayment of loans	18	55	22	3	2
Eliminates middlemen in distribution chain	24	44	29	0	3

Chart 8.1 Beneficial to the farmers



INTERPRETATION

It can be noted from the chart that there are mainly five ways in which agro tourism benefits the farmers. Majority of the people agree to these ways being beneficial to the farmers. Agro tourism helps the farmers to generate more income and attain a better standard of living. Around 85-90% respondents believe that it enhances standard of living, increases productivity and improves earning. 65 - 75 % respondents are in opinion that it helps in repayment of loans and eliminates the middle men.

Particulars	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
Development of rural areas takes place	34	57	6	1	2
Nature is taken care of	25	49	16	6	4
Acts as a stress buster for urban people	30	48	16	4	2
Generates employment	37	48	12	0	2

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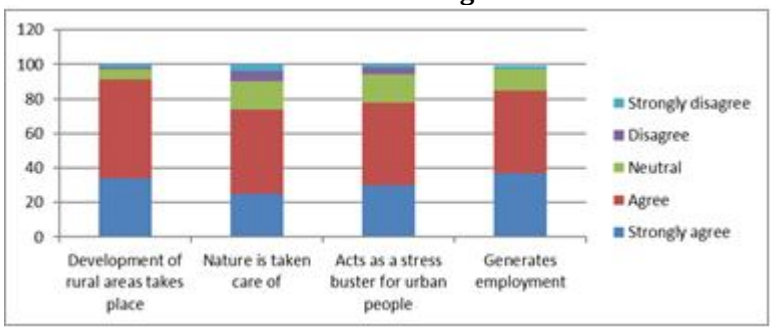
Chart-8.2: Benefits of agro tourism



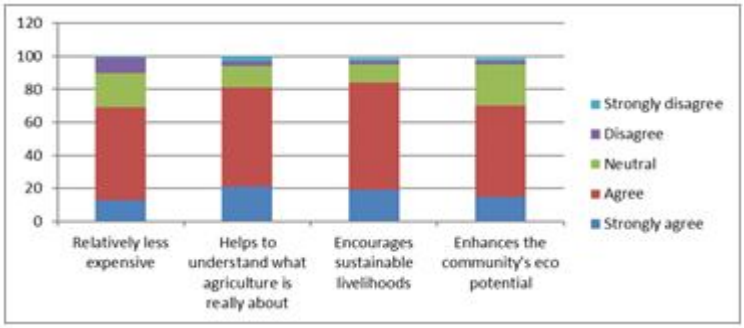
INTERPRETATION:

The main benefits of agro tourism are given above. When asked about them, majority of the respondents agreed to the fact that all these were the benefits of agro tourism. 85 - 95% are in the opinion that growth in agro tourism contributes significantly for the development of rural areas and also generates employment which leads to the capital formation in our country. For other variables also there is positive response from the respondents only few are neutral. Negligible amount of respondents strongly disagreed with these benefits.

Table 8.3 Reasons for the growth of agro tourism in India

Particulars	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
Relatively less expensive	13	56	21	9	1
Helps to understand what agriculture is really about	21	60	13	3	3
Encourages sustainable livelihoods	19	65	11	2	2
Enhances the community's eco potential	15	55	25	2	2

Chart-8.3: Reasons for the growth of agro tourism in India



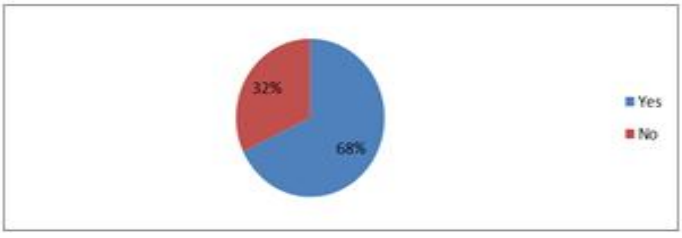
INTERPRETATION

69 - 85% respondents agreed to the fact that agro tourism is growing because it is relatively less expensive, helps to understand what agriculture is really about encourages sustainable livelihoods and enhances the community's eco potential. Some people disagreed with these reasons as they thought there are other reasons for agro tourism's growth.

Table-8.4: Visit to Mapro Garden

Particulars	Nos.
Yes	**68**
No	**32**

Chart-8.4: Visit to Mapro Garden



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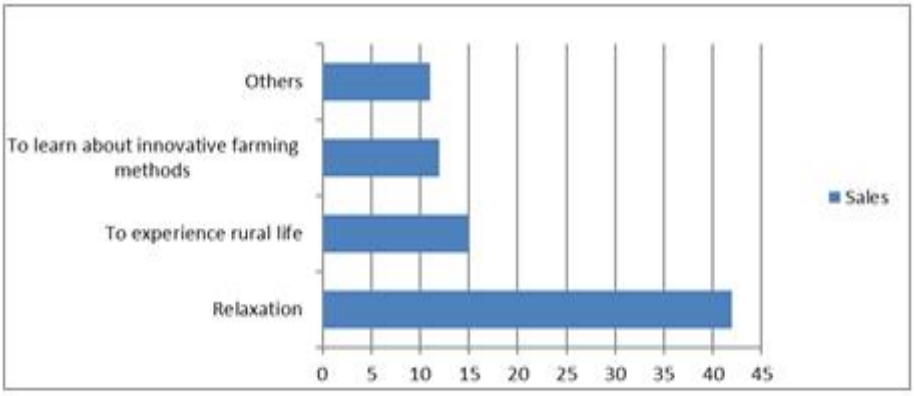
INTERPRETATION

Since this research paper was made with reference to the Mapro Garden, Mahabaleshwar, the respondents were asked whether they had visited the same. 68% of the total respondents had been to the Mapro Garden. This significant proportion of population visited Mapro gardens only shows the popularity of the agro tourism places whereby visitors love to enjoy at strawberry gardens and love to spend time in appreciating the scenic view at Panchgini.

Table 8.5 The Purpose of visit at Mapro Gardens

Reasons	Percentage
Relaxation	52.5% (42)
To experience rural life	18.75% (15)
To learn about innovative farming methods	15% (12)
Others	13.75% (11)

Chart 8.5: The Purpose of visit at Mapro Gardens



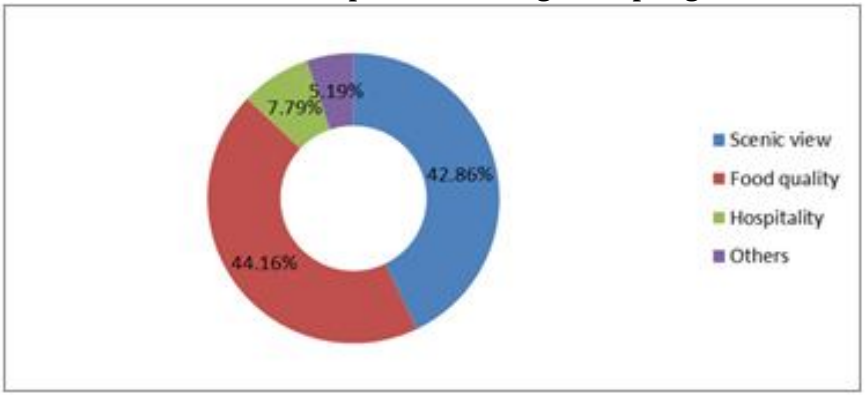
INTERPRETATION

More than 50% of the people visit the Mapro Garden for relaxation. They find an escape in this garden away from their busy lives. 15% people visit the garden to learn about new innovative farming methods and experience rural life. Among the population size of 100 around 15 are interested to visit such place to be the first hand learners by experiencing the innovative methods at such places.

Table-8.6: The most preferable thing at Mapro garden

Aspect	Percentage
Scenic view	42.86% (33)
Food quality	44.16% (34)
Hospitality	7.79% (6)
Other	5.19% (4)

Chart-8.6: The most preferable thing at Mapro garden



INTERPRETATION

There are many likeable things at the AmiPro garden, Mahabaleshwar. 44.16% of the people like the quality of food available there. The scenic view offered by the garden is also liked by 42.86% of them.

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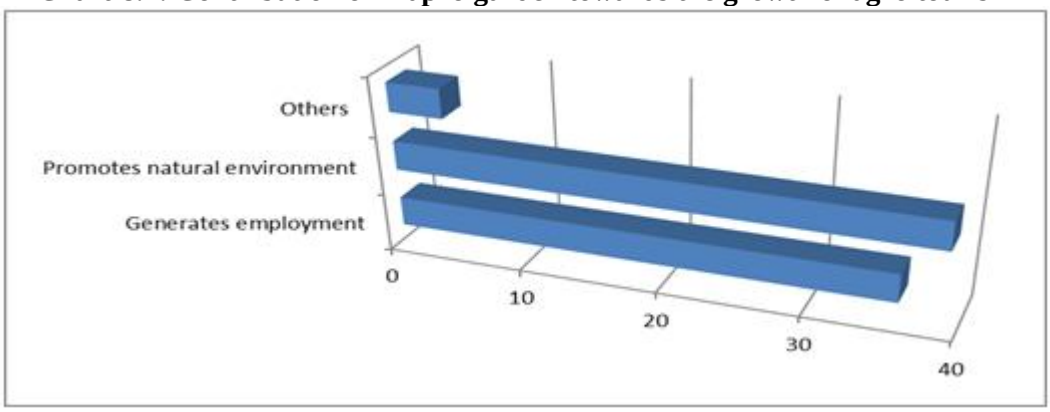
Table-8.7: Contribution of Mapro garden towards the growth of agro tourism

Various ways	Percentage
Generates employment	45.57% (36)
Promotion natural environment	49.37%(39)
Others	5.06% (4)

Chart-8.7: Contribution of Mapro garden towards the growth of agro tourism



INTERPRETATION

Half of the people (50%) believe that Mapro garden; Mahabaleshwar is promoting and protecting the natural environment. A significant proportion of respondents that is 45.57% of the people say the garden is also generating employment which ultimately leads to capital formation of our country

9. FINDINGS & CONCLUSION

9.1 FINDINGS

The Maharashtra has a greater potential of the development of the agro-tourism centres due to the good natural and climatic conditions. But there are some problems in the process of agro-tourism development in the state. Few problems researcher could come across while doing the survey. Major challenges and problems are as follows;

- Lack of perfect knowledge about the agro tourism
- Weak communication skill and lack of commercial approach of the small farmers
- Lack of capital to develop basic infrastructure for the agro-tourism
- Ignorance of the farmers towards the hospitality for the urban tourists
- Presence of unorganized sector in the agro-tourism industry
- Ensuring hygiene and basic requirements considering urban visitors.

9.2 SUGGESTIONS

Agro-Tourism is a one of the business activities. So, farmers must have commercial mindset and some marketing techniques for the success. For the better success in the agro-tourism farmers should follow the following things;

- Train your staff or family members for reception and hospitality
- Understand the expectations of tourists and try to reduce the gap between their expectation and perception
- Charge optimum rent and charges for the facilities/services on the commercial base
- Do the artificially use local resources for the entertain / serve to tourist
- Develop a good relationship with the tourist for future business and chain
- Develop different agro-tour packages for different type of tourist and their expectations.
- Preserve an address book and comments of the visited tourists for future tourism
- Small farmers can develop their agro-tourism centers on the basis of cooperative society
- Participation in training and skills development programs with Maharashtra State Development corporation

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9.3 CONCLUSION

Agro tourism is still a developing sector in India. There is a lot of scope for growth in this sector but necessary steps should be taken by the government for the same. With appropriate policies, agro tourism can generate tremendous revenue for the government and can be one of the sought after vacation options.

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INNOVATIVE SOLUTIONS FOR ISSUES & CHALLENGES FOR SUSTAINABLE AGRICULTURE

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The role of agricultural sector in Indian economy can be seen through its contribution to GDP (Gross domestic Product) and employment. This sector also contributes significantly to sustainable economic development of the country. The sustainable agriculture development of any country depends upon the judicious mix of their available natural resources. In fact agriculture determine the fate of a country like India where about two-thirds of the population still lives in rural India with agriculture as its livelihood, in spite of the increasing urbanization that has been taking place since many decades. Therefore if agriculture goes wrong, it will be really bad for the economy as the falling of agricultural growth not only affects employment but GDP too (thus increasing poverty). The larger objective for the improvement of agriculture sector can be realized through rapid growth of agriculture, which depends upon increasing the area of cultivation, cropping intensity, and productivity. But for a country like India, increasing productivity is more important than the rest of the two. This is simply because of increasing urbanization, industrialization and the limited land size of the country.

Issues & Challenges

The agriculture sector is crippled with a number of hurdles that hampers the growth and productivity of this sector. Besides the ever-dominant influence of the monsoons, certain irregularities in the core structure if this sector has made agriculture a backward sector. Moreover, in recent times, a slow down in Agricultural and Rural Non-Farm Growth has been the cause of major concern. Both the poorest as well as the more prosperous 'Green Revolution' states of Punjab, Haryana and Uttar Pradesh have recently witnessed a slow-down in agricultural growth.

Some of the factors hampering the revival of growth are:

i. Poor composition of public expenditures: Public spending on agricultural subsidies is crowding out productivity-enhancing investments such as agricultural research and extension, as well as investments in rural infrastructure, and the health and education of the rural people. In 1999/2000, agricultural subsidies amounted to 3 percent of GDP and were over 7 times the public investments in the sector.

ii. Over-regulation of domestic agricultural trade: While economic and trade reforms in the 1990s helped to improve the incentive framework, over-regulation of domestic trade has increased costs, price risks and uncertainty, undermining the sector's competitiveness.

iii. Government interventions in labor, land, and credit markets: More rapid growth of the rural non-farm sector is constrained by government interventions in factor markets -- labor, land, and credit -- and in output markets, such as the small-scale reservation of enterprises.

iv. Inequitable allocation of water: Inadequate infrastructure and services in rural areas has always held down the growth of the agriculture sector in India. Many states lack the incentives, policy, regulatory, and institutional framework for the efficient, sustainable, and equitable allocation of water.

v. Deteriorating irrigation infrastructure: Public spending in irrigation is spread over many uncompleted projects. In addition, existing infrastructure has rapidly deteriorated as operations and maintenance is given lower priority.

vi. Inadequate Access to Land and Finance: Stringent land regulations discourage rural investments: While land distribution has become less skewed, land policy and regulations to increase security of tenure (including restrictions or bans on renting land or converting it to other uses) have had the unintended effect of reducing access by the landless and discouraging rural investments.

vii. Computerization of land records has brought to light institutional weaknesses: State government initiatives to computerize land records have reduced transaction costs and increased transparency, but also brought to light institutional weaknesses.

viii. Rural poor have little access to credit: While India has a wide network of rural finance institutions, many of the rural poor remain excluded, due to inefficiencies in the formal finance institutions, the weak regulatory framework, high transaction costs, and risks associated with lending to agriculture.

ix. Weak Natural Resources Management: One quarter of India's population depends on forests for at least part of their livelihoods.

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x. A purely conservation approach to forests is ineffective: Experience in India shows that a purely conservation approach to natural resources management does not work effectively and does little to reduce poverty.

xi. Weak resource rights for forest communities: The forest sector is also faced with weak resource rights and economic incentives for communities, an inefficient legal framework and participatory management, and poor access to markets.

xii. Weak delivery of basic services in rural areas: Low bureaucratic accountability and inefficient use of public funds: Despite large expenditures in rural development, a highly centralized bureaucracy with low accountability and inefficient use of public funds limit their impact on poverty. Delays in the transfer of authority, funds, and functionaries to the local government bodies is hampers the implementation of progressive legislation and practices. The part played by vested political interests worsens the scenario. The poor are not empowered to contribute to shaping public programs or to hold local governments accountable.

There was a significant revolutionary development in small farm management in respect of all the sub-sectors, i.e., crops, animal husbandry and fisheries. This process needed to be encouraged to provide 'the power of mass production to production done by the mass of small farmers'. Institutional mechanisms enabling this process should encompass (i) a decentralized production for increasing the availability of quality seed with the required insurance coverage, (ii) delivery of improved technology and associated services to farmers, and (iii) aggregation of produce to improve market access, which essentially should target 'end-to-end' or 'farm-to-plate' approach covering production, processing, marketing, etc. In addition, agriculture should be made a professionally rewarding and intellectually satisfying occupation to attract the youth to farming.

Orientation of agricultural development should shift from increasing production to raising farm income. This was important to check the widening rural-urban disparity and to diversify rural livelihood options, covering crop, livestock, fisheries and horticultural activities. Hence, linking farmers to market must receive high priority.

Researchable issues

- **Strengthening of research capability for achieving**

1. Research excellence
2. Basic research
3. Application of modern techniques and tool
4. Promote international linkages and collaborations
5. Establishment of centers for capacity building in HRD
6. Agricultural laws awareness and enforcement centers
7. Provision for international scientific exchange programme

- **Reorientation of research to increase research productivity**

1. Location specific, demand driven and scientists accountable research
2. Promotion of inter-departmental multi-disciplinary research
3. Creation of modern and updated laboratory facilities for basic and creative research
4. Existence of sufficient and qualified HRDs
5. Development of good learning centers & social environments
6. Counseling and capacity building for quality research and publications
7. Strengthen of institutional/ international collaboration and scientific exchange programmes

- **Reorientation of research to increase soil productivity**

1. Maintaining soil biodiversity for higher production
2. Integration of soil management and soil biodiversity
3. Soil resource characterization including agro-ecology, modeling and GIS mapping
4. Enhancing soil biological activities and soil fertility

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5. Genetic manipulations for increasing soil beneficial micro-flora and plant relationship
6. Soil health improvement by reducing the use of soil pollutants
7. Presentation of soil erosion and management of degraded soils

- **Reorientation of research to increase water productivity**

1. Management of crop and crop geometries
2. Genetic amelioration for better WUE.
3. Standardization of crop specific micro-irrigation technique
4. Recycling of water for crop uses
5. Standardization crop-water requirement models
6. Rainwater harvesting for ground water recharging and crop use
7. Promotion of less water demanding crops for efficient water use

- **Genetic manipulation for higher yield and durable resistance**

1. Collection, evaluation, characterization, documentation and registration of genetic resources
2. DNA finger printing of desirable germplasm
3. Molecular tagging of economic genes
4. Application of biotechnological tools in crop improvement programmes
5. Development of crop varieties having tolerance/avoidance against climatic vagarious
6. Protection of genetic resources and IPR rights

- **Eco-friendly management of diseases and pests**

1. Identification of resistance sources, molecular tagging of resistance genes
2. Development of crop varieties having high yield and durable resistance
3. Efforts to reduce the pest complex
4. Development of weather based forecasting models
5. IPM techniques

- **Technologies for mitigating the effect of climatic change**

1. Identification of climatic vagaries, their vulnerability and extent of losses
2. Identification of crops and varieties to fit well in seasonal changes
3. Identification and promotion of micro-climate benefits
4. Promotion of conservation agriculture
5. Promotion of IFS modules
6. Development of forecasting, monitoring and early warning system
7. Strengthening of agriculture extension and communication system
8. Capacity building and increasing awareness

- **Conservation of genetic resources and agricultural biodiversity**

1. Germplasm conservation, molecular characterization and gene tagging
2. Identification and molecular characterization of beneficial soil micro flora/ microbs/insect pest
3. Conservation of genetic resources and agriculture biodiversity
4. Increasing awareness on IPR and harvesting the benefits
5. Creation of gene banks facilities at state level

- **Integrated farming and farmers participatory approach**

1. Promotion of demand driven diversify agriculture

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2. Technological assessment and validation
3. PRA based identification of research projects
4. Farmer participatory approach in technological development and standardization
5. Integration of agro-horti-pastoral system
6. Complementary combination of farm enterprises
7. Protection of PPV&FR

- **Integrated approach for agro-meteorology and ICTs in standardization of forecasting models**

1. Strengthening of weather based agro-advisory services
2. Development of agricultural informatics and communications
3. Implementation of e-governing system
4. Capacity building for integration of Agriculture and ICT

CONCLUSION

The current farm crisis is purely because of policy failure. Fiscal space must be found for providing income support this year to the most vulnerable farmers at least.

India needs large reforms in its agri-markets, from reforming APMC markets to abolishing the Essential Commodities Act and rolling back all export restrictions. Encouraging contract farming, allowing private agri-markets in competition with APMC markets, capping commissions and fees to not more than 2 per cent for ay commodity at any place in India. Opening and expanding futures trading negotiable warehouse receipt system, e-NAM with due system of assaying, grading, delivery and dispute settlement mechanism, are some of the necessary steps needed urgently. Form research must give equal importance to economics issues in agriculture similar to technical aspects. Integrated refers in agriculture policies can improvise the economic scenario of farmer than providing relief measures. Hence, there is strong need to formulate Farmers Minimum Income Security Act.

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ENVIRONMENT AND HUMAN ADVANCE - A HISTORICAL STUDY OF ANCIENT INDIAN CIVILIZATION

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ABSTRACT
The Environment has a direct bearing on human efforts. Environment means surroundings, comprising soil, air and water on which animals, plants and people live. Humans need to interact with the Environment to obtain food, water,fuel,medicines, building materialsand many other things. Biological, intellectual and technological advances over the period of time helped us to exploit the environment for our benefit. This paper intends to analyze the environmental impact on humans, affecting all human activities including socio-economic and political development with special reference to Indian Civilization.

OBJECTIVE
The focus of the paper is to elucidate, the environmental dynamics that led to the rise of Indian Civilization, from the growth of Indus Valley Civilization, acknowledged as the first Urbanization in India to the Age of Kingdoms with discovery of iron leadingto the rise of second urbanization in India.

INTRODUCTION
Civilizations of the world owe their existence to the environmental resources. The meaning of the term civilization has changed several times during its history, and even today it is used in several ways. It is commonly used to describe human societies "with a high level of cultural and technological development", as opposed to what many consider to be less "advanced" societies.

Version of Charles Redman, an American archaeologist:

Civilization consists of following *Primary characteristics:*

- Urban settlements
- Full-time specialists not involved in agricultural activities
- Concentration of surplus production
- Class structure
- State-level organization (government)

It is difficult to comprehend the human advance in ancient times without taking into consideration exploitation of natural resources by man. The earliest settlements in India were generally founded near lakes or rivers in hilly, plateau, or wooded areas where people could make stone and bone tools to earn a livelihood. These tools were used for hunting birds and animals, tilling the soil to grow plants and cereals, and also to prepare the sites for setting up dwellings

Stone Age people relied on natural resources for their existence, they hunted animals and gathered wild plants to eat. Rivers were good places to look for food. The first farmers also liked to live near rivers. A river keeps the land green and fertile for growing crops. Farmers lived together in villages. However stone age societies started to give way to sophisticated cultures once the knowledge to tap environmental resources for human advance became known, which further led to the growth of civilizations viz,Harappan Civilisation, Vedic Civilisation and second Urbanisation leading to the age of Kingdoms in India.

RIVERS AND GROWTH OF CIVILISATION
The heart of historical India is formed by its important rivers. They mainly consisted of the plains of the Indus system, the Indo – Gangetic divide and the Gangetic basin. The HarappanCivilisation originated and flourished in the Indus Valley, the Vedic Civilisation originated in the North-West Frontier and the Punjab, and flourished in the western Gangetic basin; the post- Vedic culture, mainly based on the use of iron, throve in the mid-Gangetic basin. The lower Gangetic valley and the north Bengal really came into focus in the age of Guptas[1].

Indus Valley cities like Harappa and Mohenjo-Daro began as riverside farming villages about 5,000 years ago. The fertile plains enables cultivation, once **brought under cultivation**, the Indus-Gangetic plains produced rich

[1]R.S. Sharma, India's Ancient Past (Oxford University Press, 2005), 34

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crops and supported successive cultures. The Indus and the westernGangetic plains produced wheat and barley inlarge quatities, while the middle and lower Gangetic plains produced largely rice, which also became staple diet in Gujarat and south of Vindhyas.

The river junctions served as **sites for the early settlements**. The junctions effectively cleared forests and helped human habitation. This can be said of Pataliputra, the first great city of India. This place lay on the junction of the Ganges and Son. Not far from the town, the Gandak and the Ghagra too joined the Ganges on the north and the Punpun joined it on the south. The presence of the rivers on the three sides made Pataliputra virtually a water port and helped it to become the first great state capital[1].

The rivers served as **arteries of commerce and communications**. In ancient times it was difficult to build roads, and so men and material were moved by boat. People were mainly dependent on river routes. These river routes, therefore, facilitated military and commercial transit of men and goods. Evidently the stone pillars built by Asoka were transported to different parts of the country by boat. The importance of rivers for communications continued till the days of East India Company. banks of riversserved as Important towns and capitals such as Hastinapur, Prayag, Varanasi, and Pataliputraetc

Above all, it was the rivers that **demarcated political and cultural boundaries**. Thus in the eastern part of the Indian peninsula, the area known as Kalinga, covering the coastal belt of Orissa, was situated between the Mahanadi to the north and the Godavari to the south.

MINERALS AND OTHER RESOURCES

The exploitation of natural resources of India has an important bearing on its history.Availability of minerals and other resources enabled the growth of Indian Civilisation. The Indus basin was rich in **timber** for building and fuel. As there were no local building stone, burnt bricks or the kiln – fired brick made out of fine silt was the standard building material. Further timber became a vital building material post-harrapan period.

Copper is widely distributed in India. Availability of Copper led to the rise of BronzeCivilisation in India 3rd millennium BC onwards. Rich copper deposits found in Khetri mines in Rajasthan were tapped by both pre-Vedic and Vedic people. As copper was the first metal to be used, it is invested by Hindus with great purity, and utensils made of it are used in religious rituals.India has been rich in **iron ores**, which are found particularly in south Bihar, eastern MP, and Karnataka. The formation of the first empire in Magadha in the sixth to fourth centuries BC owed much to the availability of iron just south of this region. The large scale use of iron made Avanti, with its capital at Ujjain, an important kingdom in the sixth and fifth centuries BC.

Andhra possesses large **lead resources**, which explains the large numbers of lead coins in the kingdom of the Satvahanas, who ruled over Andhra and Maharashtra in the first two centuries of the Christian era. Lead may have also been obtained from the towns in Rajasthan.The earliest coins, called the punch-marked coins, were largely of **silver**, although this metal is rarely found in India. However, silver mines existed in early times in the Kharagpur hills in Monghyr district, and they are mentioned as late as the reign of Akbar[2].

Gold coins issued by the Gupta kings led to high degree of cultural advancement in the field of art, architecture, science and technology and literature.

LAND AS MEANS OF POLITICAL CONQUESTS AND TERRITORIAL EXPANSION

There is a deep relation between land and political formation of states, which we find manifested in Ancient Indian History in the process of change in polity from tribal oligarchy to **state formation**, i.e. from Rigvedic period to the Age of Mahajanapadas.State arises where the availability of agricultural land was restricted and to acquire circumscribed agricultural land caused the war among the autonomous villages. Aggregation of villages by a chief had transformed the villages into a greater political identity and formed the chiefdom. Conquest of chiefdom by another had increased the size of the political units while the number of chiefdom was decreased and eventually unified under the banner of a strong chief who centralized the political power and led to the formation of a state. Chieftainship came to be associated with territory, incorporating the families settled in the villages, the wider clans and the still larger unit of the tribe. These constituted the **Janapadas**– literally a place where a tribe places its foot – significantly named after the ruling clan[3]. Janapadas further led to formation of Mahajanapadas, i.e. big kingdoms.

[1]R.S. Sharma, India's Ancient Past (Oxford University Press, 2005), 42

[2]R.S. Sharma, India's Ancient Past (Oxford University Press, 2005), 37-39

[3]RomilaThapar, The Penguin History of Early India from the Origins to AD 1300 (The Penguin Press, 2003), 121

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Heads (rulers) of such states formed political offices to decree and enforce laws, collect taxes, organize labour and draft men for war. Second step was the concentration of resource where availability of food was restricted and exploitable area became occupied and competition over cultivable land was increased and warfare became the means of resource concentration. It further accelerated the **political integration** beyond the village level and establishment of kindoms and Empires.

Territoriality is primarily an expression of social power in the country. Its changing function facilitates us to understand the historical relationship between society and land. "Perhaps, throughout history, one of the strongest drivers for territoriality and associated expansionist claims is the desire for commercial growth.[1]"

First historical empire-state was originated in India in the 4th century B.C. with larger territory and elaborate state machinery under the Mauryan rulers. Asoka was one of the most powerful kings of the Indian subcontinent. A ruler of the Mauryan Empire, Ashoka reigned over the country from 273 BC to 232 BC. The reign of Emperor Asoka covered most of India, South Asia and beyond, stretching from present day Afghanistan and parts of Persia in the west, to Bengal and Assam in the east, and Mysore in the south.

Decline of the Mauryan Empire led to the rise of small states in India throughout the country. Cholas, Pandyas, Cheras in South India, Kalinga in Eastern India and a number of powers in Northern India had been emerged as states particularly when the 'Central Asian tribes' entered into India in the early centuries of A.D. However, empire state was revived in India with the rise of the Gupta Empire in the 4th century A.D. But its decline once again stimulated the formation of smaller states throughout the country.

CONCLUSION

It is evident that there has been a tremendous impact of Environment or geographical factors on the growth of Indian Civilization. Civilization flourishes once there are ample of resources available that if tapped or harnessed lead to high level of political, economy and cultural development and the advances in Ancient Indian Civilization bears testimony to it.

Rivers in India viz, Indus river Valley, Gangetic plains enabled settlements, agricultural processes, and also means of trade and commerce in an effective manner. Mineral resources facilitated technological and economic advancement. Means of exchange was revolutionised due to availability of Metal resources which in turn encouraged financial activities leading to economic prosperity and further political development. Land as a notion of spacelead to greater political achievements in the form of state formations, territorial expansion and the rise of Kingdoms and Empires.

However, it is to be understood that if environmental factors impacted the growth of Civilization, in the same context the exploitation of such resources have led to destruction of cultures. Deforestation, clearance land for agriculture and settlements, over grazing of land due to large scale domestication of animals to sustain increasing population, intensive agriculture for procuring more surplus for economic and material gains, misuse of mineral resources like copper, iron for making tools, implements and war weapons have led to environmental hazards and disturbed ecology. Ancient Indian History is replete with references of floods, drought, and desertification due to human activities resulting in decline of number of cultures, towns and cities, one of the prominent examples being Decline of Indus Valley Civilisation majorly due to climatic change.

To conclude this paper, it can be stated that Human Advance is negated in absence of Environmental aspects; the absolute dependence of man on environment should be understood in the light of environment's capacity to sustain human activities so as to maintain ecological balance, which is the sole factor for man's existence.

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AN ANALYSIS OF AWARENESS AND IMPLEMENTATION OF ECO-FRIENDLY LIFESTYLE AMONG THE YOUTH

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ABSTRACT
Today the world is facing different environmental problems. People are slowly becoming aware and environmentally conscious about the degradation of natural resources around the globe. There are scientists, researchers, government agencies are working for conservation of environment. It becomes necessary that the common citizen put his interest to save our planet in his own way that could contribute to the well- being of society.

Awareness and implementation of eco friendly life style is a key factor for the sustainable development. Present paper analyses the level of awareness and implementation of different methods of eco- friendly life style related to various aspects like food, energy resources utilization ,water resources conservation, transportation, health , forest and attitude towards environmental conservation. The sample size of my study will be100 and based on random sampling method .The respondents will be 18-25 year age group, including both males and females, from Chembur and Govandi area. The average value of every aspect will be calculated for comparison purpose and for understanding the level of awareness and implementation of eco-friendly life style in daily life.

Keywords: natural resources , random sampling ,well being ,awareness, implementation, aspects , eco-friendly life style , average value, environmental conservation.

INTRODUCTION
Today the world is facing different environmental problems. People are slowly becoming aware and environmentally conscious about the degradation of natural resources around the globe. A number of scientists, researchers, government agencies are working for conservation of environment. It becomes necessary that the common citizen put his interest to save our planet in his own way that could contribute to the well- being of society.

Many programmes such as clean up, tree plantation, sanitation, waste segregation etc. have been conducted to generate awareness. Hence the responsibility is gradually developing among the users with respect to consumption of resources. Every individual should initiate and integrate a sustainable life, which will help to serve the future generation. As compared to the past the demands and luxury of the younger generation have increased. As a result of this there is over exploitation of the natural resources and rising social issues and misery. It is necessary that requirement of the people should be met without degradation of environment. Many companies are addressing the environmental needs incorporating sustainable policies to the working culture of the employees.

Everyone has their own lifestyle that mainly thrives on social and financial needs. The irresponsible way of living leads to an unhealthy life which over a long period of time hampers the physical and mental health of the person and will have greater risk to the quality of environment as well.

The main concern is the over- utilization of natural resources to meet the needs of people which further leads to over exploitation and impacts the regeneration of the natural environment. This imbalance creates pressure on the resources to fulfill the requirement at every stage of human life. Hence it is necessary to adopt lifestyle that gives priority to both the needs of the people on one side and enhancing the environment on the other. There are many ways that people can bring a change and start setting the trend for a sustainable life style.

The present paper is about the analysis of awareness and implementation of eco- friendly lifestyle among youth especially in Chembur and Govandi area. The selected study area is located near Deonar dumping ground and facing different environmental problems especially on the health of the residents.

OBJECTIVES
To understand the level of awareness about eco-friendly life style among the age groups between 18year to 25years .

To analyse the variation between level of awareness and level of implementation of eco-friendly lifestyle among youth of Chembur and Govandi area.

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To find out the causes for variation between the awareness and implementation of eco-friendly lifestyle among youth of Chembur and Govandi area.

METHODOLOGY:

100 samples between the age group of 18 to 25 are selected from Chembur and Govandi area based on random sampling method . Questionnaire method is used for acquiring the primary data from the study areas. The questions are formulated based on different types of daily activities of people. It include the aspects of food, energy resources utilization, water conservation ,forest conservation, health, transportation and attitude towards environmental conservation of eco-friendly life style.

Data is collected from respondents through questionnaire method and average mean value of each aspect for awareness and implementation is calculated for comparison purpose. The difference between average values has also been calculated for understanding the gap between awareness and implementation of eco-friendly lifestyle.

Secondary data is collected from internet and books in order to understand its importance in today's world .

OBSERVATION AND FINDINGS

In this survey 78 respondents are females and 22 are males. It is observed that the average income dependency is quite high, that is , a very high majority(99%) of the respondent's families earn only less than 2 lakh income per year.

84 respondents are living in nucleated family system and 16 respondents are living joint family. In 78 families, father is head of family who takes all decisions related to home. Only 18 families headed by mother and 4 families by grandmother .

The data is collected from the respondents on main aspects such as food, energy utilization ,water conservation ,transportation, health, forest conservation, attitude towards environmental conservation along with different sub aspects related to eco –friendly life style .

For each main aspect average value is calculated with the help of sub aspects related to awareness and implementation eco friendly life style.

Following data shows the average awareness and average implementation of main aspects of eco-friendly life style and variation between awareness and implementation of eco-friendly life style.

Sr.No	Main Aspects of eco-friendly life style	Average Awareness	Average Implementation	Variation between awareness and implementation
1.	Food	76.40	61.20	15.2
2	Energy utilization	95.33	78.33	17.00
3	Water conservation	71.00	60.33	10.67
4	Transportation	95.33	90.00	5.33
5	Health	91.33	66.00	25.33
6	Forest conservation	78.14	63.42	14.72
7	Attitude towards the environmental conservation	85.40	48.60	36.8
8	Total	592.93	467.88	125.05
9	**Average value of eco-friendly lifestyle**	**84.70**	**66.84**	**17.86**

Table 1. Average awareness and implementation of eco-friendly lifestyle among youth of Chembur and Govandi area.

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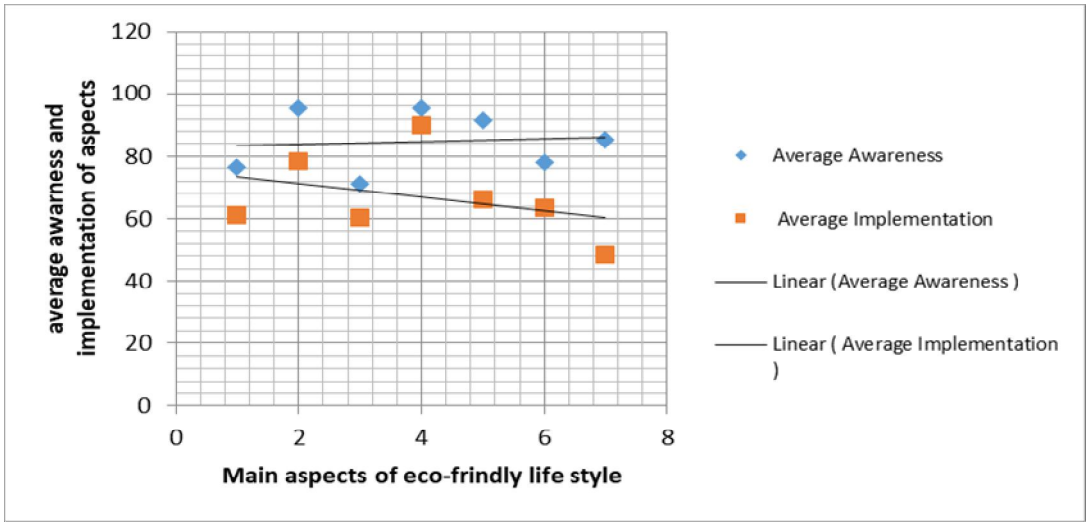

Diagram-1: Comparison between average awareness and average implementation of aspects of eco-friendly lifestyle among the youth of Chembur and Govandi area.

The above diagram shows the relationship between awareness and implementation of eco-friendly lifestyle. Of all, the main aspects awareness factor is more as compare to implementation factor among the youth of Chembur and Govandi area. Average awareness value of eco-friendly life style is (84.70%), implementation (66.84%) and variation between them (17.86%).

The study indicated that regarding transportation aspect , minimum variation between awareness and implementation (5.33%) is observed. Maximum variation is observed in case of attitude towards environmental conservation (36.8%).

1	Sub aspects related to food	Awareness	Implementation
A	Grow own food	76	50
B	Cut down processed food	90	76
C	Freeze food before it goes bad	76	76
D	keep separate food waste in house	48	22
E	Reducing food waste as per requirements	92	82
	Total	382	306
	Average value related to food	**76.40**	**61.20**

Table 2 : Awareness and implementation of eco-friendly life style related to food

Above table shows food aspect which covers the growing of food items, reducing consumption of processed food, keeping the food in refrigerator before it goes bad, keeping food waste separately for composting, reduce the food waste as per the requirement. It is observed the average value awareness about aspect of food is 76.4% and implementation is 61.2%.In food aspect awareness about separating food waste is 48% and implementation is only 22%. According to respondents this is because of factors like lack of awareness, ignorance about segregation, a lack of initiatives from Municipal Corporation of Greater Mumbai and free distribution of two separate dustbins for wastes. 76% respondents are aware of growing food items by them self's but only 50% of them actually implement it. It was found that lack of space is a reason behind this.

2	Sub aspects of Energy utilization	Awareness	Implementation
A	Keeping open widows during day	100	100
B	Switch off electricity after use	100	100
C	Purchase and use of energy efficient products	86	35
	Total	286	235
	Average value related to energy utilization	**95.33**	**78.33**

Table-3: Awareness and implementation of eco-friendly life style related to energy utilization

As far as energy conservation aspect is concerned, the awareness among the respondents is nearly 95.33% and practice is 78.33%. Regarding energy conservation sub aspects opening of windows during day time ,switching off electricity after use is almost all are aware and implement it in their daily life. Due to poor financial conditions and lack of awareness 65% respondents do not use energy efficient products like LED bulbs ,tubes etc.

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3	Sub aspects related to conservation of water	Awareness	Implementation
A	Use of bucket water for bathing and washing	98	96
B	Taking shorter shower	36	20
C	Use left over water to plant the trees	72	62
D	Turn off water while brushing	82	66
E	Avoid leakage	98	88
F	Run washing machine when there is full load	40	30
	Total	426	362
	Average value related to water conservation	**71**	**60.33**

Table 4: Awareness and implementation of eco-friendly life style related to energy utilization

About water conservation, the awareness among the respondents is 71% where as implementation is only 60.33% The water conservation include aspects of using bucket water for bathing and washing ,using left over water to plant the trees, avoid leakage, turn of taps after use, use of less shower, and do operate machine when there is full load. Though the respondents are aware of the use of left over water from kitchen for watering the plants, its implementation is very less. Due to lower annual family income of 98% of respondents don't own washing machine and shower at home. 98% of respondents are aware of using bucket water for bathing and washing and 96% actually implement it. No significant variation (10.67%) is observed between awareness and implementation of water conservation aspect.

4	Sub aspects related to transportation	Awareness	Implementation
A	Use of public transport	100	100
B	Prefer to walk for short distance travel	96	92
C	Do more than one work in one trip	90	78
	Total	286	270
	Average value related to transportation	**95.33**	**90**

Table 5:Awareness and implementation of eco-friendly life style related to transportation

Above data shows regarding transportation aspect, the variation between awareness and implementation is very meager (5.33%). Use of public transport, physical walking to short distances, covering various work in one trip are the practices followed by almost all respondents in order to reduce their expenses as they are from lower income family.

5	Sub aspects related to Health	Awareness	implementation
A	Use of natural beauty products	86	64
B	Getting out every day for fresh air	98	76
C	Unplug every day to enjoy nature	**90**	**58**
	Total	274	198
	Average value related to health	**91.33**	**66**

Table 6 : Awareness and implementation of eco-friendly life style related to health

Health aspect include use of natural beauty products , going outside every day for fresh air and sunlight and unplug at least once in a day so that you can enjoy nature and environment. The awareness about these aspect is 91.33% and implementation is about 66.00%. Here maximum variation (25.33 %) is observed between awareness and implementation. This is due to Islam culture which prevents all the Muslim female (24%) respondents from going out every day.

6	Sub aspect related to forest conservation	awareness	implementation
A	Plant the trees	76	70
B	Use of cloth bags	98	90
C	Contribute to community garden	37	28
D	Opt for paper less billing	78	56
E	Pay bills by electronic media	78	58
F	Print less as possible	94	76
G	Read publication online	86	66
	Total	547	451
	Average value related to forest conservation	**78.14**	**63.42**

Table 7 : Awareness and implementation of eco-friendly life style related to forest conservation

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Above data shows regarding forest conservation , the awareness and implementation among the respondents include planting trees, use of cloth bags , start community garden, preferring paper -less billing, less printing of documents, paying bills by electronic media and reading online publication. The study showed that average awareness about these methods is 74.14% while its implementation is 63.42% and so variation is 14.72%. The minimum use of electronic media for bill payments is attributed to lack of awareness and low level education level of the respondent's parents.

7	Sub aspect attitude towards environmental conservation	Awareness	Implementation
A	Use of long lasting products	92	82
B	Donate the items you no longer need	90	78
C	'Do not use' use and throw products	84	56
D	Prefer to waste products for recycling	92	82
E	Cancel all junk mails	94	90
F	Prefer to purchase eco-friendly products	90	78
G	Rain water harvesting method	80	2
H	In your area rainwater harvesting	78	8
I	Use of solar energy	86	2
J	Use of solar energy as substitute for conventional energy resources in your area	68	8
	Total	854	486
	Average	**85.4**	**48.6**

Table8 : Awareness and implementation of eco-friendly life style related to attitude towards environmental conservation

Attitude towards environmental conservation covers using of long lasting products, donate items after use, 'do not use' use and throw products, recycle the products, cancel junk mail ,purchase of eco-friendly products ,rainwater harvesting and development of solar project as substitute for conventional energy resources. Here maximum variation (36.80%) is observed in awareness (85.40%) and implementation (48.60%) . Even though, on an average 85% respondents are aware of the rainwater harvesting method and solar power project the implementation level (2%) this shows gap between awareness and implementation and was mainly due to lack of fund and improper planning by local administrator. With regards to use and throw products like thermocol ,plastic glasses and plates in daily life 92% of the respondents are aware of the restrictions on use of such non-biodegradable material but in reality only 58% of respondents implement it.

CONCLUSION

There is great need for creation of awareness among youth about eco-friendly lifestyle through media ,street plays ,books, publication, seminars, group discussions and movies. Local administrators can also play a vital role by earmarking adequate funds for conservation of environment by providing separate dustbins for dry and wet waste, maintenance of cleanliness of area, distributing cloth bags, and plantation programs, etc. Such efforts can lower the burden on our ecosystem, enrich our biodiversity and nurture a healthy environment for our future generation.

"Catch them young" it means the younger generation should be guided about the eco-friendly values and ethics for ensuring a healthy future environment.

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GREATER MUMBAI'S BURIAL GROUNDS AND CREMATORIUMS SUSTAINING URBAN NUANCES

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INTRODUCTION

Burial grounds, cemeteries and crematoriums as places of memory for individuals and communities are extremely significant to the society at large. These memorials comparatively have little direct economic value hence they are often neglected or overlooked. They are usually important locally or to specific communities and sometimes have national significance. They contain a variety of individual, ethnic values and can have widely diverse appeals. They are often green open spaces, attractive places with important architecture, monuments or layout. Massive urban redevelopment can affect the survival of these hidden burial grounds which are a major edifice in helping us increase our knowledge of the city's past. However public response towards conserving such relics can lead to a rise in need to protect this fragile and often highly personal aspect of one's past.

Greater Mumbai's culture is a blend of traditional festivals, food, music and theatres. Mumbai's history as a major trading center has led to a diverse range of cultures, religions and cuisines coexisting in the city. This unique blend of cultures is due to the migration of people from all over India since ages.

The religious groups represented in Mumbai as of 2011 include Hindus (65.99%), Muslims (20.65%), Buddhists (4.85%), Jains (4.10%), Christians (3.27%),Sikhs (0.58%), with Parsis and Jews making up the rest of the population. The linguistic/ethnic demographics are Maharashtrians (42%), Gujaratis (19%), with the rest hailing from other parts of India.

Mumbai city is home to a rich heritage legacy, hence a deeper insight into the spatial distribution and analysis of burial grounds is significant in order to unearth such a rich cultural history. Crematoriums and Burial Grounds in Greater Mumbai are in a state of dilapidation and require urgent renovation and conservation strategies.

Burial places have substantial significance, and are often the only evidence for cultures that would otherwise have been forgotten. In Greater Mumbai, burial evidence dates back to the colonial period. Over time, changing funerary practices have left a rich heritage of burial sites as a distinguishable heritage asset. The management of historic monuments should be seen as an integral part of the overall management of burial sites, which often have diverse historic, cultural, aesthetic, wildlife and amenity values. These interests need to be balanced with the function of the site as an operating burial ground. A Conservation Management Plan with a structured approach is vitally important in order to assess and manage historic burial sites and is a useful tool for assessing what matters and why, and then deciding what needs doing and how to go about it. This asset is not always well understood, and this lack of understanding has led to difficulties in articulating the significance of burial grounds and crematoriums in Greater Mumbai. Global consciousness is a prime requirement for the sustenance of such heritage structures.

The present paper is a novel approach towards creating an awareness and adding a heritage value status to such historic sites. Greater Mumbai is home to varied religious groups each adhering to their own rituals of last rites. The Bombay Municipal Corporation presently consists of 51 cemeteries, 11 electric crematoriums under their jurisdiction and 121 private cemeteries.

MUMBAI'S LESSER KNOWN CREMATORIUMS AND BURIAL GROUNDS

The city has witnessed a rich past with a diverse nature of migrants contribute to it,s economy.The paper highlights on certain rare burials grounds which are relics of Mumbai's past. The cemeteries chronicle the many enterprising migrants Armenians, Japanese, Baghdadi Jews who settled in Mumbai for trade. Epitaphs are a witness of not just the people buried but of the places they resided.

THE CHINESE CEMETERY

The cemetery is located in eastern Mumbai at Antop hill , which was purchased at six annas per yard by five Chinese merchants of Bombay back in 1889.A similar cemetery is also situated in Mazgaon. The cemetery is managed for by the Maharashtra Chinese Association. The earliest migrants came around 1850 and were employed in a factory in Powai, making silk and tea .

Sewri Christian Cemetery- is a 35 acre cemetery situated in eastern Mumbai which is an expression of the Colonial past and those who converted to Christianity. A raised, enclosed part of the burial ground houses

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Italian prisoners captured and brought to India during World War II. The deceased have been buried as per the church they followed chronicling, which included population from various sects namely Protestants, Anglicans and Presbyterians.

Bagdadi Jews Cemetery- Located at Chinchpokli built in the late 1700s Arabic speaking Jews, chiefly from Baghdad and also from Basra, Allepo and Damascus were encouraged by the British to visit India and reap the benefits of the burgeoning East-West trade in cotton and jute.

Japanese Cemetery -
Japanese memorials mark the spot where the ashes of Japanese traders and their geisha were entombed. One of Mumbai's least known cultural histories situated at Worli is that of its Japanese population.

Armenians and Ba'hai
The Armenians arrived in the city in the late 1670s they share their graveyard with the Ba'hai community located at Antop hill. They were encouraged by the British to settle in India, Armenians were involved in trade and commerce who settled in cities like Mumbai and Kolkata.

CHALLENGES ENCOUNTERED

- The BMC run crematoriums are unappealing, due to the filth, overgrown vegetation and unrestricted access for locals.
- The private trusts charge exorbitant rates.
- Maintaining all burial grounds and crematoria lies with the civic health department.
- Even privately-managed cemeteries and crematoria are supposed to be free-of-charge, but there is no check on the trusts that handle them.
- Cemeteries have suffered from years of under-investment. The result is often an appearance of neglect and decay overgrown sites where the legibility of the designed landscape has been eroded
- Alternate burial practices to respond to changing times.

CONSERVATION MANAGEMENT PLANS FOR BURIAL GROUNDS AND CREMATORIUMS

- Archive research of historic layout plans, maps, architects , drawings and other documentation
- A survey of landscape design.
- Biographical research of the people buried in the cemetery
- A review of the burial and cremation business needs including new burials and constraints like regulations
- Reawakening of interest in these special places. We need to raise awareness of our historic cemeteries, champion them and ensure they are valued as vital green spaces for the well-being of our communities.
- By researching cemeteries that are under-represented or under threat we can capture their historic and communal values and so make a powerful case for their protection.
- Address the backlog of repairs and management issues, while thinking about ways to achieve long-term sustainability.
- Voluntary groups also have a key role to play in their efforts to rescue cemeteries from neglect.

CONCLUSION
The discovery of human remains and associated artefacts should always be treated with dignity and respect. Repair and conservation work of Burial Grounds would not normally involve the disturbance of burials although this may occur inadvertently. Guidelines on the legal, ethical and practical treatment of archaeological human remains and associated artefacts, with emphasis on human remains should be a priority.Landscaping and Beautification of such sites requires urgent awareness and action. Strategic planning and Crematorium management programmes should be initiated as Greater Mumbai will stand to lose it's rich heritage glory.The heritage value and use of burial grounds needs to be considered as a major challenge in Greater Mumbai. Burial Grounds and Cemeteries have exceptional architectural and landscape interest, most of them have often been

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trapped in a time-warp and haven of been modified, adapted, overlaid or even destroyed, as has so much else in the historic environment.

Our city's historic cemeteries should be valued, not only as places of commemoration but as oases in built-up areas . As resources continue to diminish and repair bills rise, the key will be to reawaken interest in these sites and to ensure that they are both sustainable in the long-term and valued as vital green spaces .

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STATUS OF WOMEN FROM TRIBAL AREAS OF VASAI AND BHIWANDI-AN OVERVIEW

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INTRODUCTION

Tribals constitute a small proportion of the population in the country but ethnically they are a diverse group and they possess a distinct cultural heritage. In 2011, the total Scheduled Tribes (ST) population of the country was 104,281,034 of which the total male ST population was 5,24,09,823 while the total female ST population was 5,18,71,211. The proportion of total Scheduled Tribes population in Maharashtra state to the total population of the state according to the 2011 census was 9.35%. The total number of tribal communities in Maharashtra is 45.

Many of these tribes have been assimilated into the larger political economy for centuries and some of them have gained from State policies to a relatively greater extent as compared to smaller tribal groups (GoI, 2014). Over the years with the advent of industrialisation, urbanisation and globalisation many of these indigenous communities have been vulnerable and marginalised and have to struggle for getting access to basic facilities like housing, education, health facilities, etc. Tribes in transition stand somewhere in between. Some peculiar problems faced by these marginalised tribal groups are small size of the tribal population, displacement of tribes dependent on forest products as a source of livelihood due to declaration of the forest/s as reserved or protected forests; diversion of forest land for mining purposes and/or dam construction and numerous armed conflicts.

It is interesting to note that the tribal women are a further marginalised group who suffer not only because they belong to the tribal community but also because of the role of patriarchy in creating unequal opportunities for men and women in some of the tribal groups. In many tribal communities patriarchy does have a control on placing women in a differential position with reference to descent, inheritance and succession, marriage, divorce, sources of livelihood and political structures. The present paper aims to understand these dynamics related to the status of women from Vasai and Bhiwandi which are located in the periphery of Mumbai.

DEFINITION OF TRIBE AND SCHEDULED TRIBE:

The concept 'tribe' has had experienced a very interesting transition with reference to its meaning. One of the early meanings of tribe was that of a group claiming common ancestry. Later on, the idea of the tribe as people living in 'primitive' conditions became dominant. Another definition describes the tribe as a social group with a definite area, dialect, cultural homogeneity and unifying social organisation. It is interesting to note that each definition of tribes emphasises on a particular aspect of tribal life – their relationship with the state, civilisation and processes of development as well as specific features of their culture, livelihood, and economy (GoI, 2014).

Article 366 (25) of the Constitution of India refers to Scheduled Tribes as those communities, who are scheduled in accordance with Article 342 of the Constitution. This Article says that only those communities who have been declared as such by the President through an initial public notification or through a subsequent amending Act of Parliament will be considered to be Scheduled Tribes (GoI, 2013). It is also important to understand the word 'Scheduled Tribes' does not refer to or indicate to a group of people practicing a homogeneous culture (Mitra, A, 2006).

Article 342 provides for specification of tribes or tribal communities or parts of or groups within tribes or tribal communities which are deemed to be for the purposes of the Constitution the Scheduled Tribes in relation to that State or Union Territory. In pursuance of these provisions, the list of Scheduled Tribes are notified for each State or Union Territory and are valid only within the jurisdiction of that State or Union Territory and not outside (GoI, 2013).

The list of Scheduled Tribes is State/UT specific and a community declared as a Scheduled Tribe in a State need not be so in another State. The inclusion of a community as a Scheduled Tribe is an on-going process. The essential characteristics, first laid down by the Lokur Committee, for a community to be identified as Scheduled Tribes are – a) indications of primitive traits; b) distinctive culture; c) shyness of contact with the community at large; d) geographical isolation; and e) backwardness. The term'tribe' entails a social and cultural dimension but the Scheduled Tribe category has politico-administrative implications (GoI, 2014).

DEFINITION OF SCHEDULED AREAS: The term 'Scheduled Areas' has been defined in the Indian Constitution as "such areas as the President may by order declare to be Scheduled Areas". A detailed procedure for scheduling, rescheduling and alteration of 'Scheduled Areas' is mentioned in paragraph six of the Fifth Schedule of the Indian Constitution (GoI, 2014).

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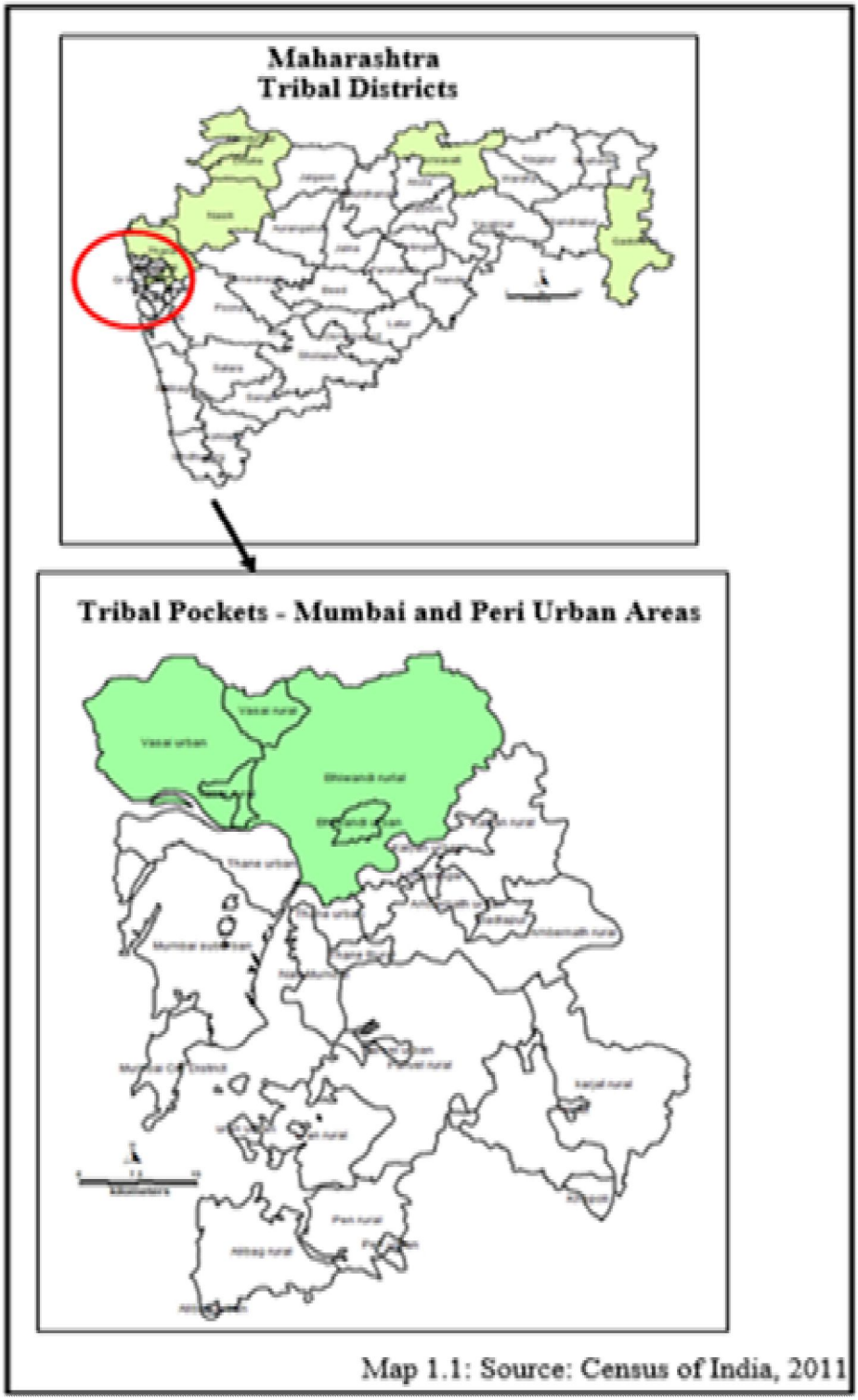

Map 1.1: Source: Census of India, 2011

THE STUDY AREA AND METHODOLOGY: For the current study, only two areas, that is Vasai and Bhiwandi Tehsils which fall under the purview of the definition of 'Scheduled Areas' have been taken into consideration. Map 1.1 is showing the location of Vasai and Bhiwandi with reference to Mumbai and also the tribal districts located in Maharashtra state. This is a working paper where the data has been collected from secondary sources like Census of India and various reports about the tribal communities in India and also from interviews of people working for various NGOs associated with the upliftment of tribal groups in Vasai and Bhiwandi.

PROBLEMS FACED BY TRIBAL WOMEN:

Article 46 of the Constitution of India lays down that the state shall promote with special care the educational and economic interests of the weaker sections of the people and in particular of the scheduled tribes and shall protect them from social injustice and all forms of exploitation. In spite of these constitutional provisions and various schemes formulated and implemented by the governments at central, state and local levels, the life of a

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tribal woman continues to be drudgery. The problems faced by tribal women in general are discussed in the following paragraphs.

Literacy rate of the tribals is low as compared to the other population. During the period, 1961 to 2011, the gap in literacy rate between Scheduled Tribes and the whole population increased from 19.8 % in 1961 to 27.2 % in 1981 and has declined to 14.6 % in 2011.

Low levels of education among the tribal women are associated with their lower literacy rate, lower enrollment rate and higher dropouts in the school (Ravichandran, N., 2014). The young tribal girls start working for the household at a very early age. Hence they lack in access to education (Chatterjee, P., 2014). The causes that can be identified for low levels of literacy among tribal women are: i) poverty, ii) inadequate educational institutions and support services in tribal areas, iii) medium of instruction, iv) relevance of curriculum in getting employment, v) the policy of education (Awais, M. et al 2009), vi) lack of quality teachers, vii) language barrier and viii) lack of protection in residential schools especially for girl children (GoI, 2014).

Low levels of education automatically results in low levels of income. Although the work participation rate of tribal women is high they do not have a fixed source of income throughout the year and hence at times they suffer from abject poverty. Whatever money the tribal women earn they have to give it to their husband. They do not enjoy the freedom of spending this money (Chatterjee, P., 2014). Tribal women do adapt themselves to live a traditional life style in the local environment and their occupations are depended on use and availability of natural resources (Awais, M. et al 2009). Access to micro credit and having a bank account are also lacking among the tribal women (GoI, 2013).

Some of the common health problems identified in tribal women consist of malnutrition leading to low birth weight and under-nutrition of children, lower body size of adults, anemia, iron and vitamin A and B deficiency, maternal and child health problems – higher infant mortality rate, neonatal mortality, acute respiratory infections, diarrhea, sickle cell disease, animal bites, accidents, and high consumption of tobacco and alcohol. According to NFHS-3 (2005-2006) findings, the percentage of ST women between the age group 15-49, who use any kind of tobacco, is highest when compared to any other social group (26.3 percent for women) and 14.1 % of ST women consume liquor. Access to ante-natal and post-natal health care facilities is also a major issue for tribal women (GoI, 2013).

Under nutrition is a major health problem among tribal women and children. Considerable number of tribal households does not have a proper sanitation facility. Hence people are forced to make use of public toilets, or, are forced to open defecation in the absence of public toilets. In such situations, the condition of women becomes further deplorable. In Maharashtra state as per the 2011 census, 59.7% of the ST population was forced to open defecation.

Reservation for tribal women in the Autonomous District Councils (ADCs) under Sixth Schedule of the Constitution of India (GoI, 2014) is absent.

Prevalence of bonded labour and the trafficking of women from tribal areas also need immediate attention of the state (GoI, 2014).

STATUS OF WELL-BEING OF TRIBAL WOMEN FROM VASAI:

Vasai is a part of Thane district. It is located between Bhiwandi on the eastern side and Wada taluka on the western side. The dominant tribe residing in Vasai area are the '*Warlis*'. The *Warlis* were compelled to migrate from the neighbouring Dahanu, Mokhada, Jawahar, Talasari talukas and the Dang region of Gujarat in 1980s. The reason behind this migration was the forceful land acquisition that was done in Palghar and the neighbouring talukas. The areas in Vasai where these *Warlis* have settled belong to the local land owners in Vasai so there is also a possibility that these tribals may be forced to displace in future.

Literacy:

The overall level of literacy among the tribals is poor due to non-affordability and inaccessibility to education facilities. Compared to boys, girls, have a better level of literacy. Majority of the boys complete their education maximum upto SSC whereas, girls study further till graduation. Most of the girls prefer taking training in skill-oriented courses like nursing, D. Ed. or a B.Ed. Degree in and around Vasai area which will help them to get a better employment opportunities.

Employment Opportunities:

The tribals settled in Vasai area do not own any land hence the older generation is employed as farm labourers and as marginal workers. The new generation does not prefer to work on agricultural farms rather they prefer

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paid employment as factory workers, domestic workers, etc. Women from the older generation are mostly employed as domestic workers or work as daily wage workers. The girls from younger generation (age group 18-25 years) prefer employment in beauty parlours or as a computer operator and so on. Vasai-Virar region has been experiencing an increasing rate of urbanisation from the last two decades and therefore many double income families hire young tribal girls to look after their children and for doing the household chores. On an average the income of a tribal woman is between ` 3,500 to ` 5,000.

Marriage:
Girls and boys are married of at a very young age between 18 to 22 years. Inter-caste and inter-religious marriages are observed. As the literacy level among girls is better than that of boys, demand of dowry during the fixing of marriages is avoided. Due to improved literacy levels, women are more aware about improving their own status and that of the family. Hence even though marriages take place at an early age, they are aware about use of family planning techniques and hence prefer to have a small family.

Health:
Awareness about health is poor because of affordability especially among tribal families where they are employed as daily wage workers. The average daily income of a daily wage worker is ` 200 out of which ` 100 is spent on food for the family and remaining ` 100 they cannot afford to spend on the services of a doctor if required. These tribals stay in hutments which are temporary settlements; availability of water on a regular basis is also an issue. Their houses also do not have a proper toilet facility.

Violence and Sexual Harassment:
The level of addiction (drinking liquor) especially among the men in the higher age group (45 to 60 years) is distinctively seen. Women do experience violence in the domestic front but also at the community level. This is because of the orthodox nature of the community where the people have a blind faith and believe and refer to some women as 'witches', etc. Such women experience extreme forms of violence. Women are also sexually exploited by their employers and contractors. The police do not register a complaint due to lack of awareness among the women and lack of evidence too.

Decision Making:
Due to improvement in the levels of literacy among women, they have gained self-confidence and therefore are equipped to take rational decisions for their own selves and for the family. Women do prefer and insist on use of family planning techniques and also are assertive about educating their children.

Status of Well-Being of Tribal Women from Bhiwandi:
Bhiwandi is a town located in Thane district between Vasai-Virar in the west and Kalyan in the east. The main tribal communities residing in Bhiwandi area are *Warlis*, *Katkaris*, *Malhar Kolis* and *Mahadev Kolis*. *Warlis*, *Malhar* and *Mahadev Kolis* comparatively seem to have progressed with reference to levels of literacy, employment opportunities, and a better standard of living than the *Katkaris*. The *Katkaris* still have to struggle a lot for bringing in change in their lives.

Literacy:
The literacy level among the *Katkari* women is very poor. Due to extreme levels of poverty, the question of affordability restricts the parents from sending their children especially daughters to schools. Hence majority of them are illiterate or have completed schooling upto fourth standard.

Employment Opportunities:
Due to illiteracy, both men and women are employed as daily wage workers in brick kilns earning very meagre wages. Because of illiteracy and ignorance they also get exploited at the hands of the supervisors and have to satisfy themselves with very meagre wages.

Marriage:
Even though by law child marriage is banned, being an orthodox community, 60-70% of the *Katkari* girls and boys are married at a very early age of 12-13 years as soon as they attain puberty. Therefore awareness about use of family planning methods is negligible. The simple logic being that as number of children will be more; they will be more number of earning hands.

Health:
Poverty again is a strong determinant of health conditions among the Katkari community. Government hospitals and clinics are there in the vicinity but due to meagre income the normal tendency of the *Katkaris* is to carry on with the disease and only in extreme conditions pay a visit to the doctor.

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Violence and Sexual Harassment:
The level of addiction (drinking liquor) among men, women and children is distinctively seen. Women are also sexually exploited by the contractors and employers. The question of registering a complaint at police station does not arise due to lack of awareness among the women and lack of evidence too.

DEVELOPMENTAL SCHEMES FOR TRIBAL WOMEN: 'WHO GETS THE BENEFIT?'
Although the government has made and implemented various schemes for the tribal communities in order to improve their levels of education, health care, nutrition, etc. for instance, the Kanyadan Scheme, Mahila Sabalikaran - Women Self Help Group - (Through Mavim), Hostels for Boys and Girls (Government and Aided), etc. the political parties propagate only those schemes which are favourable of their own vested interest and those which will benefit their party. Many women are not aware about the schemes run by the government at all levels. Benefits of such schemes are misused by the non-tribal people to fulfil their own vested interests thus not allowing the development funds to reach the grassroots level.

Overall the status of women from tribal areas is still inferior compared to the women from the mainstream rural and urban areas of Mumbai and its peri-urban region. Tribal women from Vasai and Bhiwandi display considerable heterogeneity in terms of their role and status within the tribal community. They also show significant differences in their fertility patterns, educational attainment, labour force participation, and other important variables (Mitra, A., 2006)

Education and employment create a sense of confidence and thus impart independence in decision making either at the individual level or at the family level. Both these factors seem to have played a crucial role in improving the status of tribal women from Vasai area. On the other hand, lack of education and ignorance has caused under-development among the tribal women from Bhiwandi.

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CO-EXISTENCE, CONFLICT OR EXTINCTION: AN INTERPLAY OF HUMAN CHOICES

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The 21st Century is facing serious global challenges of global warming, climate change, water scarcity, extinction of biodiversity etc. These are compounded by implications like- widening gap between haves and have not, socio-political conflicts etc. Man-environment relationship is at the centre of these complex issues. Different schools of thought in Geography and approaches that evolved in Ecology tried to analyse the man-environment interdependence and focused on the human evaluation of environment and impact of human actions on ecosystems.

In the light of these perspectives there is a need to understand the present dynamics of man-environment relationship. At the dawn of human civilization human society was dominated by environmental elements and post- industrial era is marked by ecological footprints of human actions. The nature of this man-environment is multifaceted and complex. Based on critical reviews of select articles that address man-environment interaction in recent decade, the present paper attempts to identify key factors that determine the strength and direction of man- environment relationship. There also attempt to look at possible solutions.

Since its evolution the Homo Sapien species has proved itself to be the most successful and dominating of all species on the planet Earth. Humans have colonized the entire planet in last 12,000 yrs. As Kalshian R. (2017) observes, asserts in his article that in last 6 decades humans have tampered the basic fabric of the Planet with far reaching impacts, to the extent that Earth scientist are exploring the possibility of coining new epoch – Anthropocene or the Age of Humans. A term introduced by Dutch chemist Paul Crutzen and American biologist Eugene Stoermer in 2000. They suggest that the new epoch began around 1950s, a period when the planet was drowned in a sea of radiations from a flurry of nuclear bomb test. Since then economic and population growth have resulted in massive transformation of the Planet.

Geography studies spatial interaction between natural and human phenomenon on the earth surface, as it progressed different schools of thoughts emerged – Determinism, Possiblism, Neo- determinism, Taylor's Stop –and –Go Determinism etc. These schools tried to explore the complexity of man – environment interaction.

In Geography 'Environmentalism' or 'Determinism' refers to the view that mans activities are strongly conditioned by his physical environment. Aristortle, Strabo linked national character of Asians, Europeans to their natural environment,(Negi D, 1993). Other proponent of determinism was Huntington who elaborated upon climatic relationships of man influencing his efficiency to production, his mental process and history of civilizations.

French school of Possibilism propagated man as an active force changing the environment. Man is seen as an active force, who utilizes organic and inorganic agencies of the Earth. Neo- Determinism and Stop- and- Go Determinism of Griffith Taylor agreed that man has advanced in his modification of natural limits but man is not a free agent. According to Taylor man should not depart from directions indicated by natural environment.

Bowman observes that there has always been a difference in social, political and economic institutions across the world, that affect exploitation of resources. Adjustment of political, economic and social system is necessary for development.

ECOLOGICAL APPROACHES

Similar ideologies developed in the stream of Ecology around 1970s which influenced new geographical perceptions. These ideologies emphasized on the philosophical aspects of environmental problems. These were influence by the works of scientist like Rachael Carson, Garrett Hardin, Aldo Leopold etc.

Anthropocentrism places humans at the centre of reality and everything else is considered only of existential value. Peter Vardy distinguished between two types of Anthropocentrism viz: Strong Anthropocentrism which stresses upon humans as the centre of reality and Weak Anthropocentrism which argues that reality can be interpreted only from the human point of view and therefore human are the centre. The contrasting ideology of Biocentrism extended inherent value to non human species, ecosystems and process. This had it's roots in the works of Paul Taylor, 'Respect for Nature'. Much stronger approach of Ecocentric Ethics was conceived by Aldo Leopold, which recognizes that all species including human are simply the products of log evolutionary process and are interrelated. Francoise d'Eaubonne coined the Ecofeminism philosophy based on the union of feminist and ecological thinking. The most recent ecological philosophy is Deep Ecology propogated by Arne

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Naess. It recognizes an inherent worth of all living beings, regardless of their instrumental utility to humans. Deep ecology is an evolving but consistent philosophy of being, thinking and acting in the world, that embodies ecological wisdom and harmony. In the light of above schools an attempt has been made interpret and review man –nature conflict issues.

ARTICLE REVIEWS

In the article 'Rage of Hills' (Mahapatra & Jeevan, 2018) speaks of the havoc caused by heavy rainfall in Uttarakhand and Himachal Pradesh in the recent years. Man made factors like expansion of HEP, construction of roads to accommodate ever increasing tourism, especially religious tourism are major causes for unprecedented scale of devastation. This expansion of HEP projects affects 80% of Basin areas of the Bhagirathi and 65% area of Alaknanda Rivers. Road –cutting has made Himalayas weak. Thus key factors are increasing demand for energy and growth of tourism. Anthropocentrism and Possibilism ideologies are the centre of this conflict.

A similar issue discussed by (Kukreti I. 2019) in, 'Fault lines in expressway'. To boost religious tourism the construction of Char Dam National Highway in Uttarakhand has been initiated but it is at heavy ecological cost. The once colourful landscapes are replaced by bare, deep cut rocks and debris dumped by road construction. This affected animal rearing and villages face risk of landslides. Even in the light of knowledge of ecologically high sensitivity of Himalayas the Central Government in 2016 launched the ambitious Char Dham National Highway project at cost of 12,000 crores. Ironically it was tribute to 2013 Kedarnath disaster victims. Illegal enchroachments along river banks were identified as key factors responsible for disaster.

Ajay kumar Saxena,(2017) examines the implications of Complementary Afforestation Act (CAF) 2016 . CAF, 2016 on one hand will unlock 42,000crores of rupees for afforestation and on the other hand, the provisions of Forest Rights Act (2006) have been diluted by taking away rights of forest dwellers. Union Ministry of Environment, Forest and Climate Change Government of India has granted clearance for 249 development projects spreading over an area of about 10,000 ha in 2016. Developing global economy of India is putting immense pressure on forestland. There is growing demand from forest communities for increasing autonomy in forest management. It leaves enough scope for debate on the intensions of political institutes.

Pol Meghna (2019) has brought to light the issue of the gradual conversion of once lush green wet land of Kasarvadavali covering 20.9 hectares into a dumping ground. The wetland is home to nearly 88 species of birds which include six rare species – Indian Spotted Eagle, Painted Stork etc. The wetland is located along the rapid urbanizing Ghodbander road and bears the burnden of construction and development debris. The RTI filed by environmental activist Rohit Joshi meet with little success. Thane Collector forwarded the RTI to Thane Municipal Corporation (TMC). TMC confirmed undertaking a road construction through the wetland but denied dumping of debris. This is clear evidence of the insensitivity on part of the administration.

2.5 % of Indian landmass holds 8% of world biodiversity. Although India has more than 2000 protected areas (PA) for wildlife conservation merely declaring an area as 'protected' does not guarantee protection of species. Urbanization and development projects are encroaching upon protected areas. Wildlife experts claim that territorial animals do not have enough space within reserves and their prey do not have enough fodder to thrive upon and the animals are forced to move out. Therefore there is need for more integrated development of wildlife habitats Mahapatra R and Jeevan S (2018).

Miller G (2007) highlights the term 'Affluenza' used to describe the unsustainable addiction to overconsumption exhibited in present lifestyles. Affluence results in overconsumption of resources and excessive dumping of waste, at the same time it can make people become concerned about environmental quality. It as provides money for developing pollution reducing technologies. Wealth can make possible obtaining resources from any part of the world and it helps to transfer waste and pollution to more distant locations. Globalization and global advertising helps in spreading the affluenza virus throughout the world.

One will agree with Miller G as he states "People with different environmental views and ethical and cultural beliefs can take the same data , be logically consistent and arrive at quite different conclusions because of different assumptions, moral principles and values."

Environmental historian James Moore argues that technology and humans are scapegoats, real culprits he claims are social, economic, political institutions, together with their inherent attitude towards environment and other cultures (Rakesh K. 2018).

CONCLUSION

In the light of above man-environment interaction conflicts discussed above it can be concluded :

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Anthropocentrism both weak and strong and to some extent possibilism continue to dominate man – environment interaction but the perception of human centred is by and large is materialist progress.

Accounting of environment resources associated with CAF (2016) appears to be actually diluting the objectives of conservation practices as it indirectly pave the way for clearance of forest for development projects. On other hand the provisions of Forest Rights Act of 2006 have been diluted and the rights of forest communities over forest products have been compromised. In this case it is neither the humans nor the forest which are considered important.

Gradual conversion of wetland to dumping ground is fighting example of what James Moore argues the real culprits are social, economic and political institutions and their cavalier attitude towards environment.

Affluenza is emerging as the dominant factor that decides the direction of the man-environment interaction.

Thus as Miller G. suggests the possible solution to minimize man-environment conflicts is to uphold environmental wisdom worldview – according to which, our success depends on learning how the earth sustains itself and integrating such environmental wisdom into ways we think and act. Finally it can be concluded that concentration of decision making power needs to discouraged and more integrated and inclusive decision making mechanism need to developed to minimize man-environment conflicts and nurture co-existence failing which extinction is bound to follow.

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ENVIRONMENTAL POLLUTION ATTITUDE OF RESIDENTS IN METROPOLITAN CITIES

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ABSTRACT
Urbanization has led to various changes in the environment such as leading to different types of pollutions. Pollution brings about unfavourable changes in the physical, biological or chemical characteristics of natural resources that can impact human beings physically and psychologically. The purpose of this study was to analyse the attitude towards environmental pollution of residents of metropolitan cities of Maharashtra. Using convenience sampling method, responses of 115 residents from different metropolitan cities were obtained by using Environmental Pollution Attitude Scale by Prof. Rajamanickam (1995). Total sample included 49 males and 66 females. 58 respondents were from Mumbai and remaining 49 were from other metropolitan cities like Pune, Nasik and Navi Mumbai. Data was compared and analysed by using descriptive and inferential statistics. The results were analysed with the help of independent sample t test which supported two hypotheses of this study.

Keywords: Environmental pollution attitude, air pollution, noise pollution, man-made environment, crowding, residents of metropolitan cities

INTRODUCTION
People are disturbed not by things, but their perception of things... Epictetus

The concept of environment is used by psychologists to explain all the surrounding conditions of an organism that influence and modify behavior of the organism. Therefore, it not only refers to physical forces but also the society in which an organisms lives. It also includes daily routine of people including their household and job related activities.

The relationship between human beings and his environment is two-way as both influence each other. Human beings alter their environment according to their needs. Similarly, environment influences human beings physically and psychologically. Physical influences include different stressors such as noise, air pollution, heat and overcrowding which eventually influence the attitudes, emotions and behavior of people.

Environmental pollution is the contamination of natural resources which harmfully impacts the life of human beings. It is a rapidly growing phenomenon especially in the urban areas due to industrialization and urbanization. It has an impact on the attitudes of people residing there.

An attitude can be understood as a tendency to respond positively or negatively towards certain idea, object, person or situation. It includes beliefs and values of the person. Attitude influences behavior of an individual.

Attitude towards environmental pollution can be explained with three theories. Slovic, Flischhoff and Lichtenstin (1978) gave the concept of risk underestimation/ inaction as necessary for "getting on with one's life". According to this theory, unless people ignore many hazards "his or her life would be spent in an obsessive preoccupation with risk that would prevent normal productive existence."

Taylor and Brown's (1988) model of mental health maintains that most people overestimate their own skills and positive traits and are overly optimistic about their future. Though such illusions are necessary for individual's mental health, it results in underestimation of severity and probability of some hazards which can eventually lead to mental health problems.

According to transactional theory of stress and coping (TTSC) (Lazarus, 1966; Lazarus & Folkman, 1984), which presents stress as a product of a transaction between a person (including multiple systems: cognitive, physiological, affective, psychological, neurological) and his or her complex environment. Negative psychological effect can occur only after a person perceptually and cognitively appraises an environmental element as a stressor. Primary appraisal assesses the nature and magnitude of environmental elements. Secondary appraisal determines whether the person has direct control over the environmental elements. In a way, if an individual thinks that they can control the situation may remove many stressors (Bell et al, 1980).

Human being exists in an environmental space environment offers great deal of services to the mankind. We get fresh air, water, sun, natural oil and it acts as geographical location for economic activities (Bella, 2003).

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NEED FOR THE STUDY

The need for the study was to find out experiences and attitudes of residents of metropolitan cities who face problem of environmental pollution on daily basis. Environmental pollution is serious issue that will affect future generations of living organisms. Thus, this issue needs immediate awareness and remedies. This will help in controlling and smoothening consequences of environmental pollution.

OBJECTIVES

To study the attitude of residents of Metropolitan cities towards environmental pollution.

To study the attitude of males and females of metropolitan cities towards environmental pollution.

To study and compare the attitude of residents of Mumbai and other cities of Maharashtra pertaining to environmental pollution.

HYPOTHESIS

- There is no significant difference in attitude towards environmental pollution in males and females in metropolitan cities.
- There is no significant difference in attitude towards environmental pollution in residents mumbai and other metropolitan cities of maharashtra.

METHODOLOGY

For the purpose of the present study, samples of metropolitan cities like mumbai, pune and nasik were selected by using convenient sampling technique. The investigators approached the sample through online google forms. We collected 115 samples from large pool of population. For this research, demographic variables like age, sex, city of residence, profession, travelling distance from home to workplace, number of family members and type of house were considered. The age range was 22 – 50 years which was selected based on prof .m rajamanickam's (1995) environmental pollution attitude scale (epas).

Environmental pollution attitude scale (epas) was designed and developed by prof .m rajamanickam (1995) for measuring attitude towards environmental pollution. This scale has been designed on the basis of helson's theory of adaptation level. Helson developed the adaptation-level theory of psychology. This theory states that an individual's basis of judgment of a stimulus is based on their prior experiences as well as their recollections of how they perceived similar stimuli in the past. This test consists of thirty statements each one expressing idea about environmental pollution. It is based on 5 point likert scale from strongly agree to strongly disagree. Lowest possible score is 30 and highest possible score is 150.according to the author of the test, high score indicates favourable attitude towards environment where as low score indicates unfavourable attitude towards the environment. And the author has given free hand to change the test interpretation, so the researchers took liberty to change the terminology while interpretation of the test items. Hence extremely favourable attitude is changed to extremely unfavourable attitude towards environmental pollution and vice a versa as the test items indicated this change.

Reliability and validity of EPAS, it was standardized on sample of 465 individuals and has validity of 0.92 and reliability of 0.84, $t= 51.72$ $p>0.01$.

The obtained data was analysed by using descriptive namely, percentage and inferential statistics specifically independent samples t-test.

RESULTS AND DISCUSSION

Cities face various kinds of pollution such as air pollution, noise pollution, crowding and manmade environments as there is heavy manmade environment and lack of greenery. So the ecological balance of metropolitan cities has lost and residents of metropolitan cities are exposed to harmful effects of environmental pollution. Demographic variables such as age, sex, city of residence, profession, travelling distance from home to workplace, number of family members and type of house were considered. With respect to age, it was found that 49.6% of the entire sample ranged in 22 to 30 years, 22.6% in 31 to 40 years and 27.8% in 41 to 50 year. This shows that the younger generation is responsive and sensitive and they are keen to voice their opinion pertaining to environmental pollution issues.
Considering their occupational status, all the respondents were either in-service or self-employed or students, only 4 of them were housewives and they are educated as they could fill the forms online in English.

When respondents were asked about travelling distance from home to workplace, 61.7% reported that they travelled for less than 20 kms everyday but considering situation of metropolitan cities travelling time of less than 20 kms requires at least 2 hours of journey. Out of the total respondents, 71.3% used various means of

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transportation such as bus, train, taxi, auto rickshaw and private car or combination of these, which is quite higher. It means that they require more travelling time due to heavy traffic jams, time required to change over in means of transportation, and they must be experiencing various environmental stressors like crowding, noise, air pollution, lack of space which forced them to develop unfavourable attitude towards environmental pollution.

The type of residence used by 48.7% respondents was 2BHK. It means remaining 52.3% share space in small houses, where they have to adjust to their surroundings which in turn made them more aware of the environmental problems.

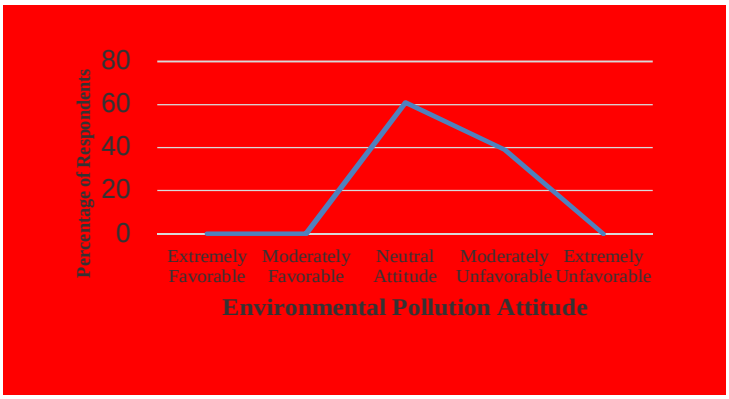

FIG. 1 A line graph showing distribution of scores on EPAS

While referring to Fig. 1, the researchers observed that the graph is negatively skewed as entire sample falls into only two categories when the expectation was the data will be divided into five categories. But it fell into these two categories, namely, 'neutral attitude' and 'moderately unfavourable attitude'. The reasons for obtaining such data must be 1) none had reported 'extremely unfavourable attitude towards environmental pollution' as individual are so adapted to day to day life that they have stopped reacting to it to as extreme 2) they can't perceive seriousness of the situation. Obviously they think that they have control over devastating effect of environmental pollution.

Attitude formed on the basis of direct experience are likely to be stronger and likely to come in mind when the attitudinal object is present (Petty, Briñol, & Tormala, 2002).

Participants did not express extremely unfavourable attitude towards environment pollution as they may have optimistic bias about the situation. People think that they are more to experience positive events and less likely to experience negative events (Sheppard, Ouellette and Fernandez, 1996). Also, when we consider our past, we remember negative events happened to us but when we look at the future, it is always positive by nature, focusing on happiness and we tend to perceive it in golden.

None of the participants responded positively to 'moderately favourable attitude towards environmental pollution' or 'extremely favourable attitude towards environmental pollution'. It is a good sign that each and every respondent was aware of the consequences of environmental pollution and they are not in favour of increasing it either. And this was the reason for getting negatively skewed curve.

TABLE I

T VALUE COMPARING MEANS OF EPAS SCORES OF MALES AND FEMALES IN METROPOLITAN CITIES

Gender	N	Mean	SD	T	Df	Sig
Females	66	108.37	11.81	1.974	113	0.051
Males	49	103.61	12.41			

While discussing our first hypothesis, there is no significant difference in attitude towards environmental pollution among males and females in metropolitan cities. Obtained mean for Female population is 108.37 which showed moderately unfavourable attitude and obtained mean for male population was 103.61 which showed neutral attitude towards environmental pollution. Obtained t value us 1.974 at significance level $p<0.051$ which indicates strong tendency towards statistical significance. But still, the mean difference between male and female population is insignificant and both genders held negative or unfavorable attitude towards environmental pollution. Hence, the obtained data supports our first hypothesis.

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TABLE II

T VALUE COMPARING MEANS OF RESIDENTS OF MUMBAI AND OTHER METROPOLITAN CITIES IN MAHARASTRA.

Cities	N	Mean	SD	T	Df	Sig
Mumbai	78	107.01	11.81	0.924	113	0.358
Other Cities	37	104.50	13.38			

While discussing the second hypothesis, there is no significant difference in attitude towards environmental pollution in residents of Mumbai and other metropolitan cities of Maharashtra. Obtained mean for Mumbai resident is 107.01 which showed moderately unfavourable attitude and obtained mean for other metropolitan cities was 104.50 which showed neutral attitude towards environmental pollution. Obtained t value us 0.924 at significance level $p<0.358$ which indicates insignificant t value. There is no difference among residents of metropolitan cities regarding environmental pollution attitude as every metropolitan city is facing similar set of environmental problems and the residents are more less having unfavourable attitude as they have to deal with the these problems on daily basis. Hence, the obtained data supports our second hypothesis.

LIMITATION

- This research was conducted on small sample size. Hence, care should be taken before generalizing it to larger population.
- Data was collected through online google forms so all the samples were educated enough to fill the form. Researchers can't approach illiterate and homeless sample as they cannot follow google link.

CONCLUSION

Both the hypothesis were supported through obtained data. To conclude, individuals seem to be having unfavourable attitude towards increasing environmental pollution. The researchers recommends that people should get knowledge awareness about conservation of our environment and ways to avoid harmful effects of environmental pollution.

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NERUDA'S LOVE POEMS AS RECORDS OF MAN-ENVIRONMENT INTERACTION

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Nature has been the basis of cultural practices since the genesis of human inhabitation on earth. Literature has been a potent medium of expression of such practices. Nature assumes various roles in the earliest oral and written instances of literature. Sometimes, as the subject of the poet's rumination, sometimes as a mode of pathetic fallacy, sometimes as a backdrop of tragedy or more commonly as a referent for one's beloved, nature has always remained a powerful presence in all forms of cultural expressions. The role of nature in the poems of Pablo Neruda transcends this interdependence of man with his environmentand enters into a new realm of rooting man to where he belongs. In doing so, the poems undoubtedly subscribe to the critical approaches encompassed by the umbrella term Environmental Humanities(EH), an interdisciplinary approach which conjoins philosophy, literature, art, religion, music, history, language studies, cultural geography and other natural and social sciences, in an attempt to address environmental crisis. EH is a sustained effort to write counter-narratives to the tales of social and economic development as well as of human achievement in the fields of science and technology. Just as EH recognizes the need to foster cross-disciplinary interfaces between the sciences and humanities, to attain ecological goals, the poems too, are a conscious expression of this counter culture. And here, it is nature who is assigned the role offostering rootedness among egocentric man to his land.

These love poems are the material base on which man-environment relationships are examined, evaluatedand reclaimed.

Sub-theme: Man-environment relationship

Keywords: ecology, environmental humanities, ecocriticism,love,rootedness

Nature has existed as a primal presence in cultural practices as well as in their expressions in various narratives of human existence. These narratives inform a wide range of disciplines like human history, philosophy, anthropology, sociology, natural science, law, politics and literature among many more.Nature has been the source of religious, medicine and social rites of early people when shamans sang, chanted and danced stories to heal disease or prevent disaster, which was seen as an imbalance in nature. (Howarth 71)Nature, in Ancient science, has been considered a synergy of matter and phenomena. The physical world has permeated cultural expressions in various levels: sometimes as vast expanses of wilderness uninhabited by man, sometimes as scenic spaces of forests, mountains, waterfalls, elsewhere as the pastoral countryside of woods, fields, cattle and shepherds, or a more urban, man-made natural space of a city garden.However, the consciousness of the interdependence of man and nature did not surface until the emergence of what we know as Nature Writing in the works of 19th century American writers Ralph Waldo Emerson and Henry David Thoreau. It is from their works that the "environmental imagination", (the title of Laurence Buell's work on Nature Writing) has stemmed and has begun to influence the literary arts. The relationship between the two, that is, the physical environment and the imaginative arts, has subsequently given rise to the critical area of study,in the late 1970s known as Ecocriticism.

Jonathan Bate, an ecocritic writes that colonialism and deforestation have gone together. (qtd. In Barry 242)Colonialism and its allied activities, followed by rapid industrial expansion had indeed threatened life on earth. Man had assumed that the motif of development is intrinsically related to the exploitation and mastering (colonizing) ofnature. As an aftermath of the growth of capitalism,industry and technological advancement, environmental issues such as global warming, depletion of resources, chemical poisoning, toxic waste contamination and so on, had begun to emerge. As a result, an environmental movement germinated in the U.S. in the late 1970s.The ongoing environmental debate had already engaged various disciplines in humanities like history, philosophy and sociology. Literature joined the dialogue only in the early nineties with the establishment of the ASLE(Association for the Study of Literature and the Environment).

Environmental Humanities is a broad domain of scholarship which encourages global dialogues between disciplines in order to combat environmental crises. It harps on the principle of interconnectedness, to be located between man and the physical environment, between science and the humanities, the East and the West, between the local and global ways of knowing the natural world, the place of humans in it and the ways of achieving sustainability. The humanities have conventionally dealt with questions of value, ethics, justice, meaning and the debates over knowledge production. In the Introduction to the *Environmental Humanities*

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journal, Deborah Rose and her co-authors opine: "In bringing these questions into environmental domains, we are able to articulate s 'thicker' notion of humanity, one that rejects reductionist accounts of self-contained, rational decision-making subjects." (Rose 2)The ontological categories of meaning and value are now to be understood in terms of live ecologies in which man is a participant. EH, like the environmental movement that came before it, offers a counter-culture to the narratives of anthropocentrism that places man at the center of this world.While humanities have erstwhile been engaged in negotiating standards of 'freedom' for varying segments of the human world, EH sees freedom as "a 'blanket category' for diverse imaginations of human autonomy and sovereignty" and that "the question of human freedom[is today placed] under the cloud of the Anthropocene"(Chakrabarty 35) EH posits that the narrative of 'development' has led to the depletion of the planet's resources at a global scale. The discursive domainaims to subvertthe culture of technocrats employing a multidisciplinary approach.

Some of these broad themes of EH may be located in the love poems of Pablo Neruda. He is known as the true poet of Nature. Whether it is in his love poems or elsewhere, nature or the physical world remains the lens through which he portrays mankind:

"The proper study of mankind is Man, according to Pope; for Neruda, the world of Nature cannot exclude the man-made world nor the "unaesthetic" facets of everyday life, since they too form a part of the external environment in which man resides"(Duran 43)

The love poems of Neruda are sensuous expressions of earthly matter. They not only showcase the interconnectedness of man with nature but also foster an ecological consciousness in anthropocentric man. "Ode with a Lament"which belongs to *Residence on Earth II*, is not anthologized as a love poem. Yet it deploys the framework of love and begins with praises for a woman in the manner of an Ode:

O girl among the roses, pressures of doves,

O fortress of fishes and rosebushes,

your soul is a flask of dried salts

and your skin is a bell full of grapes. (1-4)

The contrasting images: dried/full, salts/grapes drive home Neruda's predilection of the external world. The material nature of the images is made palpable with an evocation of contrasting colors, taste and the tactile sensations of roughness v/s smoothness in *salt* and *grapes*. Interestingly, the poet also includes both biotic and abiotic entities in the metaphors of praise. Thus, the world which furnishes the metaphors is not merely social but an entire ecosphere inhabited by man and other living and non-living entities. The deliberate binaries in the images is a comment on the necessity of myriad elements without which the celebratory introduction of the beloved would have been inadequate.

The tone of the poem soon turns into one of lament, as the poet admits that he has failed to bring any substantial presents for the beloved and all that he could manage were "fingernails, eyelashes, melted pianos" and dreams "like a flight of black horsemen" and those "full of haste and calamity" (6-9)

The 'calamity' and 'haste' are probably markers of the Anthropocene where men, in the pursuit of economic goals hardly have the time to enjoy their dreams. The word 'calamity' is particularly significant in the backdrop of industrial and technological expansion and its resulting degradation of the natural world.

The sensitive poet conceives of "kisses and poppies" as aesthetic epithets associated with love until the reality check comes in line 12: "as I brood on the ash of the horse and the yellow of dogs". Once again, contrasting images of hope and hopelessness are constructed to further the journey of love. This binary between vigour and disillusionment is the essence of the poem. Human experience is not free from these stark dichotomies constructed in the poem with the help of material objects and observable phenomena in the natural world: "poppies" (probably the yellow variants)and the "yellow of dogs"(the urinating animal). Both aspects of nature are to be accepted as a part of the ecosystem and in urging man to do so, the lover-poet roots man to his physical environment.

The lover is also aware of burningecological issues like children's deaths, sulphurand carbon contamination of the seasand the restlessness and confoundmentof the postmodern man:

Only with waves at my back can I love you:/

in the dubious clashing of Sulphur and preoccupied water"(13-14)

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Critics have likened these poems to the Cubist paintings of Picasso which were "characterized by distortions of human-and specifically female-anatomy, Neruda in Residence displaces and hides his images in a way that produces an overall effect of strong distortion." (Duran and Safir 47)

The lively image of doves in the first line of the poem comes to a morbid close in the last,where the poet summons the beloved to meet him among "a few twisted chairs and a dead dove". The theme of decay escalates into one of death and destruction. Even here the dichotomous image of the lady exists:

Come into my soul, dressed in white, like a branch/

of blood-roses, like a chalice of ashes,

as life and death are enfolded along the linguistic device of the comma.

The poem harbors a consciousness of environmental degradation and laments it too within the wider framework of an ode praising the beloved. Love itself is conditioned by the contaminated water of the waves which seems to be the syntactic agent causing the action of love. (c.f. lines 6-9). There is no hierarchy in the arrangement of the material metaphors and the poet makes it clear that the "chalice" is as potent as "roses" as the conventional image of aestheticism is fused with an unusual one in praising the female anatomy. "Chalice of ashes" is also a marker of the human culture and practice of cremation. In praising the beloved by means of these dual images, the poet dissolves the age-old binaries between nature and culture. It is evident therefore that the poem, with its earthly metaphors, is a material medium which engages into conversation the various discourses of ecology, ethics, language and literature. This is the chief agenda of EH. This is what Buell calls the "mutual construction" of discourse and the material world. (Buell 31)In doing so the poem offers a counter-narrative to the Anthropocene, as well as works as a launch-pad for the environmental debate.

Sonnet XLIII subverts the narrative of human freedom and development by employing the trope of praise of the female anatomy. The poet seems to search for the beloved's braids, eyes, her light step, her nails and hair and her tiny ears in her absence while he is sailing along the Mississippi. The river is a referent to the beloved herself as the poet both floats both along and with the beloved "toward a feminine sea" while loving her. Again, the act of love is determined by the Mississippi whose banks not only offer scenic beauty but is also a seat of human culture and development, like agriculture, industry and trade. The word 'feminine' is significant here. As the Mississippi flows into it, the geographical reference is undoubtedly made of the Gulf of Mexico which is a 'passive margin' formed by sedimentation. Thus the term "feminine". A 'passive margin' is a geological term for an ocean bed which is a transition between oceanic and continental lithosphere, formed by sedimentation above an ancient rift. The joyride of the lovers along the Mississippi, unlike Browning's "Last Ride", does not end in eternity but in a lifeless Gulf which has been a dumping zone for surplus mines, submarines, bombs, and ammunition post World War II. The Gulf's very first off-shore oil drilling platform was built in the late 1940s. Since then the Gulf ecosystem has been contaminated with toxic refuse and continual oil-spills. The biodiversity of marine life and migratory birds have been threatened largely, not to the ignorance of the poet, writing the present piece in the 1950s. The New York Times confirms in a 2010 article:

"There are around 4,000 offshore oil and gas platforms and tens and thousands of miles of pipeline in the centraland western Gulf of Mexico, where 90 percent of the country's offshore dealing takes place…Runoff and waste from cornfields, sewage plants, golf courses and oil stained parking lots drain into the Mississippi River from vast swaths of the United States, and then flow down to the gulf, creating a zone of lifeless water the size of Lake Ontario just off the coast of Louisiana"

The article also states that by the time the environmental movement in America gained impetus in the 1970s, the Gulf of Mexico had already earned the reputation "as a place where the country did its dirty work."Effective reclamation work has been foiled by politicians and administrators on account of funds and disputes related to jurisdictional complications between the federal government and the states.

The poet employs love as a poetic trope in the water way journey and in the process evokes an endangered ecosystem. He makes his readers conscious of the threatened ecoregion of the unuttered destination of the river. By refraining from mentioning it he only reiterates what was obvious but seldom discussed. The poem subtly examines man-environment relationship and suggests how one has been exploitative of the other in the Gulf ecosystem. Partly anachronistically, the poem embarks upon an environmental debate which involves culturalgeographers, geologists, environmental historians, environmental lawyers and political ecologists along with the language and literature departments across the world in order to propagate a subversive discourse of eco-consciousness.An eco-conscious identity is suggested for the reader with the help of earthly metaphors as they are newly rooted to their ecosystem through the environmental dialogue launched by the love poems. The

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poems help them recognize and reclaim the land of their consciousness which was clouded by an egocentric ethos.

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HOUSEHOLD AMENITIES IN RURAL AND URBAN AREAS OF DISTRICT KHANDWA, MADHYA PRADESH

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ABSTRACT
The present study was undertaken to investigate the access to household amenities in Khandwa District of Madhya Pradesh. Data on amenities available to the households were obtained from the district census handbook of Khandwa (2011) and also from the empirical information collected during field visit. The study revealed that, there is a spatial variation in the access to household amenities in the district however, as compared with the rural area, the situation in urban area is better. Though more than 50% households in both rural and urban areas had access to electric supply, they were lacking in access to other household amenities.

Keywords: Amenities, Rural, Urban, Household, Well-being.

INTRODUCTION

According to Shaw, A., (2007) the term 'basic amenities', refers to drinking water supply, sanitation, electricity and so on. Availability of modern household amenities has a great significance in the human life because it is conventionally believed that housing conditions, availability of drinking water, sanitation facilities, etc. might contribute to the health improvement of the people and determine the quality of life of the society (Nayar, K. R., 1997). The absence of these facilities or their inadequate availability in an area or region is not only the outcome of demand-supply gap but also it has been due to the lack of financial aids, political interests, inefficiency of institutions etc. It is also being realized that key dependencies exist between water supply and sanitation and improvement in the overall human development (Dreze, I. and M. Murthi 2001, Gupta, I. and A. Mitra, 2002). Access to basic amenities like drinking water, sanitation, electricity, housing, drainage and others are crucial to the well-being as they contribute to physical and material comfort and quality of life. They also benefit by ensuring better health, environment and providing opportunities for other useful activities. Access to basic amenities also enables the households to save foregone hours spent to arrange when these are not available in day to day life. Its importance has been highlighted in the international arena since it got included in the Millennium Development Goals (Kumar A., 2014). As household amenities are a key to recognize the quality of life, the present study attempts to know about the status of access to household amenities in the Khandwa district of Madhya Pradesh which is well connected to the major cities of the country by road and railway. Based on the census data for 2011 the present study centers on the access to household amenities viz. Tap water from treated source, Electricity connection, Latrine with piped sewer system, kitchen, LPG/ PNG, Banking services, television, computer /laptop with internet, mobile telephone, scooter/ motor cycle/ moped and car/ jeep/ van in the rural as well as urban areas of Khandwa district.

OBJECTIVE

The main objective of the present work is to learn about the status of access to household amenities in the Khandwa District of Madhya Pradesh.

AREA OF STUDY

Khandwa District of Madhya Pradesh situated in central part of India between 21^{o} 33' N and 22^{o} 25' N latitude and 76^{o} 10' E and 77^{o} 13' E longitude, with a geographical area of 6,206 km² has been selected as a study area. In the north, the district is partially bounded by river Narmada while in the south it is bounded by the ranges of Satpuda Mountain. The climate of the district is tropical. The summers are a lot rainier than the winters. According to Köppen-Geiger system the climate of the district is classified as Aw having a pronounced dry season, with less than 60 mm precipitation in driest month and less than $\frac{1}{25}$ of the total annual precipitation. The average annual temperature at Khandwa is 26.6°C. while the average rainfall is 932 mm. Narmada, Kherkhali, Choti Tawa and Shiva are the major rivers in the study area. The district with its 13, 09,443 population in the year 2011 is comprised of five sub-districts viz. Khandwa, Harda, Khalwa, Punasa and Pandhana. The city of Khandwa is the administrative headquarter of the district. The districts of Betul and Harda lies to the east, Dewas to the north, Khargone to the west and Burhanpur to the south of Khandwa district.

DATA BASE AND METHODOLOGY

The secondary data on amenities available to the households in the district were obtained from the district census handbook of Khandwa (2011) while, the empirical information was also obtained during field visit. The obtained data were compiled, tabulated (Table 1) and interpreted.

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Table 1: Amenities available to the households

Sr. No.	Sub-District	Total/ Rural / Urban	Total number of households	Tap water from treated source	Electricity connection	Latrine with Piped sewer system	Has kitchen	Has LPG/ PNG	Banking Services	Television	Computer /Laptop with internet	Mobile telephone	Scooter/ Motor Cycle/ Moped	Car/ Jeep/ Van
1	Harsud	Total	26,302	3,919 (14.9%)	17,671 (67.19%)	1,708 (6.49%)	15,123 (57.5%)	2,238 (8.51%)	14,282 (54.3%)	6,825 (25.95%)	77 (0.29%)	10,946 (41.62%)	4,731 (17.99%)	352 (1.34%)
		Rural	22,221	1,548 (6.97%)	14,126 (63.57%)	227 (1.02%)	11,882 (53.47%)	476 (2.14%)	11,961 (53.83%)	4,559 (20.52%)	31 (0.14%)	8,581 (38.62%)	3,543 (15.94%)	219 (0.99%)
		Urban	4,081	2,371 (58.1%)	3,545 (86.87%)	1,481 (36.29%)	3,241 (79.42%)	1,762 (43.18%)	2,321 (56.87%)	2,266 (55.53%)	46 (1.13%)	2,365 (57.95%)	1,188 (29.11%)	133 (3.26%)
2	Khalwa	Total	42,079	1,820 (4.33%)	31,572 (75.03%)	218 (0.52%)	13,355 (31.74%)	1,441 (3.42%)	19,379 (46.05%)	5,310 (12.62%)	67 (0.16%)	7,935 (18.86%)	3,813 (9.06%)	318 (0.76%)
		Rural	42,079	1,820 (4.33%)	31,572 (75.03%)	218 (0.52%)	13,355 (31.74%)	1,441 (3.42%)	19,379 (46.05%)	5,310 (12.62%)	67 (0.16%)	7,935 (18.86%)	3,813 (9.06%)	318 (0.76%)
		Urban	0	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
3	Khandwa	Total	113,944	39,188 (34.39%)	91,803 (80.57%)	4,594 (4.03%)	52,139 (45.76%)	30,488 (26.76%)	54,588 (47.91%)	44,869 (39.38%)	1,498 (1.31%)	42,576 (37.37%)	24,929 (21.88%)	2,310 (2.03%)
		Rural	76,072	13,081 (17.2%)	55,737 (73.27%)	753 (0.99%)	24,280 (31.92%)	3,992 (5.25%)	32,256 (42.4%)	15,806 (20.78%)	93 (0.12%)	20,317 (26.71%)	8,879 (11.67%)	420 (0.55%)
		Urban	37,872	26,107 (68.93%)	36,066 (95.23%)	3,841 (10.14%)	27,859 (73.56%)	26,496 (69.96%)	22,332 (58.97%)	29,063 (76.74%)	1,405 (3.71%)	22,259 (58.77%)	16,050 (42.38%)	1,890 (4.99%)
4	Punasa	Total	50,183	10,317 (20.56%)	38,793 (77.3%)	1,559 (3.11%)	19,933 (39.72%)	4,376 (8.72%)	27,216 (54.23%)	13,319 (26.54%)	222 (0.44%)	18,883 (37.63%)	7,122 (14.19%)	530 (1.06%)
		Rural	45,567	7,049 (15.47%)	34,783 (76.33%)	1,449 (3.18%)	17,416 (38.22%)	3,061 (6.72%)	24,916 (54.68%)	10,955 (24.04%)	184 (0.4%)	16,268 (35.7%)	6,262 (13.74%)	439 (0.96%)
		Urban	4,616	3,268 (70.8%)	4,010 (86.87%)	110 (2.38%)	2,517 (54.53%)	1,315 (28.49%)	2,300 (49.83%)	2,364 (51.21%)	38 (0.82%)	2,615 (56.65%)	860 (18.63%)	91 (1.97%)
5	Pandhana	Total	33,149	5,216 (15.74%)	22,871 (68.99%)	216 (0.65%)	10,232 (30.87%)	2,350 (7.09%)	15,434 (46.56%)	7,895 (23.82%)	43 (0.13%)	9,069 (27.36%)	3,927 (11.85%)	187 (0.56%)
		Rural	30,772	3,320 (10.79%)	20,727 (67.36%)	135 (0.44%)	8,923 (29%)	1,496 (4.86%)	14,357 (46.66%)	6,369 (20.7%)	23 (0.07%)	7,738 (25.15%)	3,383 (10.99%)	139 (0.45%)
		Urban	2,377	1,896 (79.76%)	2,144 (90.2%)	81 (3.41%)	1,309 (55.07%)	854 (35.93%)	1,077 (45.31%)	1,526 (64.2%)	20 (0.84%)	1,331 (55.99%)	544 (22.89%)	48 (2.02%)

Source: Government of India, District Census Hand Book 2011, Madhya Pradesh, Series 24, Part XII-B.

RESULTS AND DISCUSSION

Availability of tap water from treated source

Khalwa had lowest percentage (4.33%) of households with availability of tap water from treated source while Khandwa had highest (34.39%) percentage of households with water from treated source. In rural area, the situation was worse as compared with the urban area where the lowest percentage (4.33%) had found in Khalwa while the highest percentage (17.2%) was found in Khandwa. In urban area Harsud had lowest (58.1%) percentage of households with tap water from treated source while Pandhana had highest percentage (79.76%) in the district.

Availability of electricity connections

In all 67.19% households in Harsud had electricity connection which was recorded as lowest in the district while, the highest percentage (80.77%) of households with electric connection was found in Khandwa. In rural area, the range of percent households having electricity connection was between 63.57% (Harsud) and 76.33% (Punasa) while in urban area it was found between 86.87% at Punasa and 95.23% at Khandwa.

Availability of latrine with piped sewer system

In the study area not a single sub district had more than 5% of household with latrine with piped sewer system. In rural area the range of percentage of households with latrine with piped sewer system was between 0.44% (Pandhana) and 3.18% (Punasa). In urban area, the lowest percentage of households with latrine with sewer system was found in Punasa (2.38%) while the highest percentage of households (36.29%) was recorded in Harsud.

Availability of kitchen

More than 30% households in each of the sub district had kitchen. Pandhana had lowest (30.87%) percentage while Harsud recorded the highest percentage (57.5%) of households with kitchen. In rural area the percentage of households with kitchen was lowest (29%) in Pandhana whereas Harsud had highest percent (53.17%) of households with kitchen. In urban area the percentages were in range of 54.53% (Punasa) to 79.42% (Harsud).

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Availability of LPG/PNG Connection
The percentage of households with LPG/PNG connections was found less than 10% in different sub-districts except Khandwa (26.76%). The lowest percentage of households with LPG/PNG in rural area was found in Khalwa (3.42%) while Punasa recorded the highest percent (6.72%). This situation was better in urban area showing the range of percentage from 28.49% (Punasa) to 69.96% (Khandwa).

Availability of banking Services
During 2011 more than 40% of the households in the study area had provided with banking services. In rural area, Khandwa had the lowest (42.4) percentage while Harsud had highest (53.83%) percentage of households with banking services while in urban area this range was in between 45.31% (Pandhana) and 98.97% (Khandwa).

Availability of television
The lowest percentage of households (12.62 %) with television was recorded in Khalwa while it was found highest (39.38%) in Khandwa. In rural area, Khalwa recorded the lowest (12.62%) while Punasa recorded the highest (24.04%) percentage of households with television. In urban area Punasa recorded the lowest (51.21%) while Khandwa recorded the highest (76.74%) percentage of households with television.

Availability of computer / laptop with internet
The percentage of households with availability of computer/ laptop with internet in the district was found negligible. The highest percentage of this amenity was found in Khandwa (1.31%).

Availability of mobile telephone
As far as the percent households with availability of mobile telephones are concern, the lowest value was recorded at Khalwa (18.86%) while the highest value (37.63%) was found at Punasa. The percent of households in rural area was found lowest at Khalwa (18.86 %) while it was highest (38.62%) for Harsud. These values for urban area were found ranging between 55.99% (Pandhana) and 58.77% (Khandwa).

Availability of scooter/motor cycle/moped
The lowest percentage of households (9.06%) with scooter/motorcycle/moped was recorded in Khalwa (9.06%) while it was highest (21.88%) in Khandwa. In rural area, Khalwa recorded the lowest (9.06%) while Harda recorded the highest (15.94%) percentage of households with scooter/motorcycle/moped. In urban area Punasa recorded the lowest (18.63%) and Khandwa recorded the highest (42.38%) percentage of households with scooter/motorcycle/moped.

Availability of car/jeep/van
The percentage of households with availability of car/jeep/van in the district was negligible. The highest percentage (2.03%) of households with car/jeep/van was recorded at Khandwa.

CONCLUSION
It can be concluded that there was a spatial variation in the access to household amenities in the study area. As compared with rural area, the percentage of access to household amenities was better in urban area. As a district headquarter and urban settlement, Khandwa had a good access to household amenities while Khalwa, with no urban area had a lowest access to these amenities. The study reveals that though more than 50% households in both rural and urban areas had access to electric supply, both of these areas were lacking in other household amenities. It was found that the access to computer/laptop with internet was surprisingly negligible to the households in both rural and urban parts of the district.

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LIGHT POLLUTION – AN EMERGING FORM OF ENVIRONMENTAL POLLUTION

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INTRODUCTION

Man and environment are so closely related that he has always lived in harmony with nature through the cycles of day and night. So we need darkness as much as we need light. But the human activities have transformed nature's night sky across wider areas of the globe. Although, the quality of human life has been significantly improved by artificial lights at night in terms of visibility, safety and security, beauty etc., the changes in night environment has a profound influence on our ecosystem, astronomy, health and on the living organisms such as animals, plants, trees etc.

Celestial appearances have their own beauty and richness. Unfortunately, they are being lost as the artificial lights are washing out starry night skies/ milky-way, as the outdoor lights block the night sky our ancestors lived their life for thousands of years, thus giving rise to light pollution.

OBJECTIVES OF THE STUDY

1. To understand light pollution as a growing form of global environmental pollution.
2. To know about the various forms of light pollution in cities.
3. To examine the adverse impact of light pollution on environment, human health, animals and plant life.
4. To analyze the measures to combat light pollution

WHAT IS LIGHT POLLUTION?

Light Pollution is the presence of artificial light in the night environment. It is an outcome of excessive use of artificial light at night. In simple words, the inappropriate and excessive use of artificial light emitted from the city and commercial and residential buildings, traffic, advertising etc. is known as Light Pollution

Light Pollution is defined as the brightening of the sky in response to the excessive, misdirected or obtrusive use of light in the night.

Scientific definition of Light Pollution

- The degradation of photic habitat by artificial light
- The alterations of light levels in the outdoor environment due to man -made sources of light. Indoor light pollution is such alteration of light levels in the indoor environment due to sources of light which compromises human health.
- The alteration of natural light levels in the outdoor environment owing to artificial light sources.
- The introduction of artificial light by humans directly or indirectly, into the environment.

URBANIZATION AND LIGHT POLLUTION

Just like air, water and noise pollution light pollution is a growing urban menace having serious environmental consequences on human and wildlife and is necessarily a side effect of industrial civilization and urbanization. The increasing use of artificial lighting in the cities including building, exterior and interior lighting, advertising, in parking slots, stadiums, offices, factories, street lights etc. causes light pollution. Light pollution is most severe in industrialized and densely populated areas of North America, Europe, Japan and in major cities in the Middle -East and North Africa. In fact many city dwellers don't even know what a natural night sky looks like. For example, the residents of Los Angeles have not been able to see the stars in the night sky for long.

MAGNITUDE OF LIGHT POLLUTION – WORLD AND INDIA

According to a journal Science Advance, 99% of population in Europe and United States experience loss of night and darkness. According to the Royal Committee on Environmental Pollution 2009, globally, light pollution in increasing at 6% per annum. Some of the light polluted places in the world are Germany, Belgium, Netherland especially Amsterdam, England, Singapore etc. Cities such as Los Angeles, Washington DC, San Fransisco etc. suffer from intense light pollution.

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As far as India is concerned, a global study published in' Urban Climate' in 2019 revealed that brightness from artificial light is steadily increasing in various parts of India. In fact, India is losing its night over three times faster than the global average. Urban experts view that India is already experiencing the effects of light pollution in various forms, but do not recognize it as a pollution yet. Though, it is emerging as a threat having long term impact on the quality of health of humans. A study in New Delhi by Prof. Pawan Kumar showed that between 1993 to 2013 Telangana, Maharashtra, Karnataka and Uttar Pradesh had experienced a rise in gravity of light pollution. The study further stated that the outdoor brightness in the states of West Bengal, Gujarat and Tamil Nadu has been changed from low to high levels, between the same time periods.

TYPES OF LIGHT POLLUTION

The types of Light Pollution include Light Trespass, Over Illumination, Sky Glow, Glare and Light Clutter.

- Light Trespass

Light Trespass is the light falling where it is not wanted or needed. It occurs when unwanted light spills beyond the boundary in the adjacent area. For example, street lights shines in to bedroom windows of neighbours or illuminate roof tops or tree branches where it is not needed. It is found to be a serious nuisance in Britain, Untied States etc. as it causes sleep deprivation among people during night time.

- Over-Illumination

Over -Illumination is the excessive use of light. In United States, commercial building lighting alone consumes in excess of 81.68 Tetra Watts of electricity and residentials use 10.3% of the energy. American cities emit 3-5 times more light as compared to German cities.

Over- illumination is due to the following factors;

- Non-use of timers and occupancy sensors
- Incorrect choice of fixtures or light bulbs
- Substitution of old lamps with LEDs (Light Emitting Diodes)
- Day light lighting by citizens to reduce crimes or by shop owners to attract customers

- Urban Sky Glow

Sky glow is the scattering of artificial light due to particles in the atmosphere. It is the orange smog that is caused by poorly designed light shining in the sky. Sky Glow leads to brightening of the sky. It is the combination of all reflected light and upward-directed and unshielded light moving into the sky. The degree of Sky Glow depends on the level of artificial light and the way it is scattered in the atmosphere.

- Glare

Glare is a visual sensation caused by excessive and uncontrolled brightness. Glare is unsafe and dangerous as it causes discomfort to eyes and impairs our vision. Over illumination produces glare. Bright and badly shielded light around roads can cause partial blindness among drivers and lead to road accidents and pedestrian deaths. Glare also adversely affects the vision of old people. Blue lights are more powerful to create a glare at night.

- Light Clutter

The excessive grouping or combination of various colourful light sources is known as Light Clutter. Grouping of lights often causes a kind of light blast and creates confusion and also distracts night sky and the ecosystem. Badly designed street lights and brightly lit digital billboards surrounding the roads are responsible for this. The increase in light clutters in cities contributes to sky glow, trespass and glare. Over lighting and light clutter are designed for safety purpose, but in reality it is unsafe. Because it takes 20 minutes for our eyes to adjust from brightness to dark, many accidents occur within few kilometers of leaving an over lit area.

IMPACT OF LIGHT POLLUTION

Light Pollution has far -reaching and dangerous impact on ecosystem, safety, health, energy, astronomy, plants and wildlife.

❖ **IMPACT ON ECOSYSTEM**

The ecological consequences of night time lighting pollution is a great matter of concern. Light pollution threatens the plants' life by disrupting the seasonal cycle of trees. Prolonged exposure to artificial light prevents many trees from adjusting to seasonal variation, in turn harming the plant and animal physiology. The growth of night blooming flowers may be affected due to absence of pollination by moths. There is a negative impact on plants as it slows down the process of photosynthesis, which has implications for wildlife that depends on trees for their natural habitat. Nocturnal animals sleep during the day and are active in the night. Artificial lights

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disrupt the nocturnal activities like hunting prey, hatching, mating etc. Entomological studies have documented that night time light interfere with the ability of moths and other nocturnal insects to navigate. For example, Fireflies produce their own light and are sensitive to artificial light which affects their reproductive behavior leading to mass decline in insects.

Due to excessive lighting, some species of spiders are unable to build webs around electric posts, though it attracts certain insects. Due to lights on tall structures, millions of migratory birds are killed after being collided with tall towers and illuminated buildings. Artificial lights during night affect the sense of direction of the birds and can disrupt their migratory schedule. They leave too early or too late in the season, missing the ideal condition for nesting. Reflections of lights in water and sky disrupt habitat life and change predator-prey relations. Snakes tiger, frogs, turtles etc. forage only after dark, but brightly artificial light affect their foraging, mating or reproductive behavior which will reduce their population. For example, over- lit beaches make newly hatched sea turtles easy prey to predators. Artificial light also can cause developmental irregularities like retinal damage, pre mature metamorphosis, reduced sperm production and genetic mutation among amphibians and reptiles. Thus, Light Pollution causes harm to the biodiversity.

❖ IMPACT ON HUMAN HEALTH

Exposure to artificial lights at night puts one's health at risk. Human body needs both light as well as darkness. We need complete darkness for our bodies for releasing the hormone necessary for sleep. Melatonin is a hormone, which produces a healthy feeling and regulates body metabolism. It is vital for mental health as well as to keep the human Circadian Rhythm in balance. Circadian Rhythm is the brain's internal twenty four hour clock that communicates to the body's physiological process needed for health. This internal clock is stimulated by temperature, sunlight and darkness. The artificial light disrupts the circadian rhythm and create severe sleep disorder in humans during night. In addition ,the exposure to the high -intensity lights also create several health issues like eye injuries, obesity, hallucinations, headache, fatigue, anxiety, neurological problems, blood pressure, depression and cardio vascular diseases. The World Health Organization's International Agency for Research on Cancer showed that light pollution is associated with fatal diseases like cancer of the breast and prostate in developed countries. Seoul in South Africa which had the highest level of light pollution is reported to have highest number of breast cancer due to low melatonin production. Blue-rich lights at night in particular are harmful. Unfortunately, most LEDs (Light Emitting Diodes) used for outdoor lights, computer screens, TVs and other electronic displays emit abundant blue lights.

❖ EFFECTS ON ASTRONOMY

Light pollution prevents the visibility of sky objects like stars and nebula. Most such objects become invisible in heavy light polluted skies in the major cities and thus unable to enjoy its wonder and beauty. Increasing sky glow in the cities are also responsible for this. However, unpolluted skies are needed to study the universe. At the American Geophysicist Union meeting in San Fransisco, it was stated that light pollution destroys nitrate radicals by preventing normal night time. The NASA (National Aeronautics and Space Administration) reports predict that 75% of the areas in U.S. will be unable to see hundred stars in the sky due to light pollution.

❖ ENERGY WASTE AND WASTE OF MONEY

Outdoor lighting is responsible for one fourth of all energy consumption worldwide. Millions of barrels of oil waste, million tons of coal and million tons of carbondioxide are emitted per year because of unshielded lights. Excessive, unnecessary and inefficient artificial lighting not only cost money but also earth's resources and damages the earth's environment arising from air pollution (the energy used for lighting causes air pollution).

MEASURES/REMEDIES TO REDUCE LIGHT POLLUTION

New legislative and policy measures, educational researches, public awareness, citizen's responsibilities, advanced lighting technologies etc. can help in curbing various light pollution issues.

Some of these measures are listed below:

1. Selecting and designing lights equipments for the appropriate distribution and installing them correctly to limit uplight and spilling of light in unwanted areas to reduce trespass of lights.
2. Maintaining and increasing natural unlit areas for reducing ecological effects of lighting.
3. To increase public awareness on quality outdoor lighting by certain local, state and regional legislations related to minimum light levels and minimum wastage of energy.

The Awaaz Foundation, a Mumbai based NGO working on environmental pollution has asked the Government of Maharashtra to adopt policy measures related to minimizing light pollution. It is noteworthy here that the high density floodlights at Wilson Gymkhana on Marine Drive was removed after receiving complaints from

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south Mumbai residents, fearing the risk of eye injuries due to light pollution.The Awaaz Foundation found that the gymkhana was emitting 84800 lux .(the unit for light). According to doctors, the human eye should not be exposed to levels more than 50 -60 lux.

4. Adopting seasonal changes in lighting strategy depending on the need for light in summer and winter months.
5. Narrowing light beams can reduce bird hits at tall structures and light houses.
6. Carefully planned and developed LEDs and fluorescents can provide uniform moderate level of illumination. This can reduce energy use and protect the environment. But only white bulbs should be used.
7. Lighting should be turned off or dimmed when biological activity is high or significant such as during forging, breeding or migration activities for various species.
8. Outdoor lighting should be fully shielded so that lights shine down and not up the sky. In other words, ensure that bulbs are covered and lights face downwards. It is an essential remedy for sky glow and glare.
9. Utilizing light sources of minimum intensity wherever light is needed, that is, moving away from blue white lights to red lights.
10. Unnecessary indoor lighting in empty office buildings at night should be turned off.
11. Full cut-off fixtures or bulbs illuminates the ground and can save electricity. It reduces glare and improves visibility for motorists, pedestrians etc.

HOW TO MINIMISE LIGHT POLLUTION IN CITIES ?

- Use energy-efficient street light designed for minimizing glare
- Avoid light clutter (especially colourful lights)
- Educate public about the ill- effects of light pollution.
- Implement a light trespass Bi-Law
- Keep informed on the importance of darkness for protection of nocturnal environment.
- Red light is least disruptive
- For a quality sleep

a) Remove electronics from the bedrooms

b) Use red lights instead of white light

- Provide adequate lighting suitable to size of the street and traffic
- We can also make a difference by minimizing light in our house at night
- Talking to neighbours about good lighting
- Tell your friends and family to limit the exposure to blue/white lights at night
- Use energy saving features like timers, dimmers and motion sensors.
- Become a member of International Dark-Sky Association (IDA).

IDA is a U.S- based non profitable organization formed in 1988 that works to help stop light pollution and protect the night skies for the present and future generations through quality outdoor lighting. It also promotes public awareness about the issues related to light pollution.

CONCLUSION

Light Pollution is an emerging environmental issue that needs attention from all quarters-legislative, administrative, educational, technological, economic, cultural and other aspects. Light pollution is not just about the loss of beautiful starry sky and night, it affects everything around us and poses a threat to our lives. Unlike other types of pollution, light pollution is reversible because human activities contribute to this situation. Total elimination of outdoor lights at night is just impossible .Only the excessive and unnecessary use of artificial lights during night is blamed for light pollution. Just being aware of light pollution as a problem is not enough. Each one of us can make a difference. So, action is the need of the hour. In India, studies and research works

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on light pollution in cities is far lesser as compared to developed countries. So this study necessitates the importance of such initiatives from environmental planners, experts and researchers.

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IMPACT OF GANESH IDOL IMMERSIONS ON LAKES OF MIRA- BHAYANDER

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ABSTRACT
The immersion of idol of Lord Ganesh during Ganesh Ustav is a major source of contamination and sedimentation to the lake water. Environmental impact due to idol immersion in Lakes of Mira Bhayander is alarming. Idol immersion is a cause of water pollution peculiar to India with its large number of adherent to the Hindu religion. Idol are not only made of clay but non–biodegradable thermocol and paints containing heavy metals are also used .The immersion practices leads to degradation of water quality and siltation.The parameters like Turbidity, Total Hardness, Chemical Oxygen Demand (COD), Acidity, Total Solids etc have become higher on immersion activities. Idols have grown in number and size over the years and urban water bodies are facing on increasing nutrient load.

Keywords: Contamination, Idol Immersion, Lake ecosystem, water quality parameter.

INTRODUCTION
"Just as the world we inherited today is what our past generation left on us, the future generations would inherit the legacy we leave for them."

Water is essential for life on earth. Water is a unique liquid, without it, life as we know is impossible. Water the "Elixir of Life" is facing a severe threat due to pollution. Water, due to its great solvent power, is constantly threatened to get polluted easily. The requirement of water in all forms of lives, from micro-organisms to man, is a serious problem today because all water resources have been reached to a point of crisis due to unplanned urbanization and industrialization The topic of our concern here is pollution of lake water.

Water pollution refers to any type of aquatic contamination rendering the water body poisoned by toxic chemicals, which affect living organisms and all forms of life. Heavy metals constitute an important group ofenvironmentally hazardous substances. During this century, many lakes in India have received elevated inputs of heavy metals as a result of an increase in atmospheric deposition. Problems are aggravated with idol immersions

The idol immersionactivity is an anthropogenic activity which is responsible for adding pollution load in the lake. The idols are being made up of clay, hay, cloth, paper, wood, bamboo, thermo coal, adhesive material, paints, colored pigments etc, Bajpai (2002).The rise in water temperature is responsible for increasing the chemical as well as biological reaction in water and reducing solubility of gases (Murugesan et al, 2004). Effect of various religious activities and rise in temperature was also observed by Devi et al (2005)

OBJECTIVES
- To study the extent of pollution in surface waters- lakes of Mira- Bhayander
- To study the extent of pollution during idol immersions, pre immersion and post immersion
- To suggest corrective measures to combat pollution of lakes.

STUDY AREA
Mira-Bhayander is a city, in the district of Thane with an area 79 sq. km., in the western state of Maharashtra, in India, located around 20 kms to the north of Mumbai on the MumbaiAhmedabad highway. It extends between 18º42' N to 20º20' N latitude and 0º25' E to 73º44' E. Mira-Bhayander area is situated at the northern threshold of Brihan Mumbai Metropolis and has been identified as one of the growth centers. Mira-Bhayander has gradually developed into an important residential locality due to its proximity to Mumbai and lower cost of living. Earlier Bhayander was administrated by the Gram Panchayat system of local government. However subsequently in accordance with recommendations of MMRDA Mira Bhayander Municipal Corporation (MBMC) has been constituted for this area on 12th June 1985. Khari, Ghoddeo, Ghodbunder, Pen-pada, Mira, Kashi, Navghar, Bhayander and Mahajanwadi are the nine villages under its jurisdiction. Adjoining villages of the limits of Municipal Corporation are also showing trend of urbanization. Therefore govt. under its notification extended the limits of MBMC by including following 10 villages: Chene, Varsave, Raimurdhe, Murdhe, Morva, Uttan, Dongri, TarodiPaliChowk.

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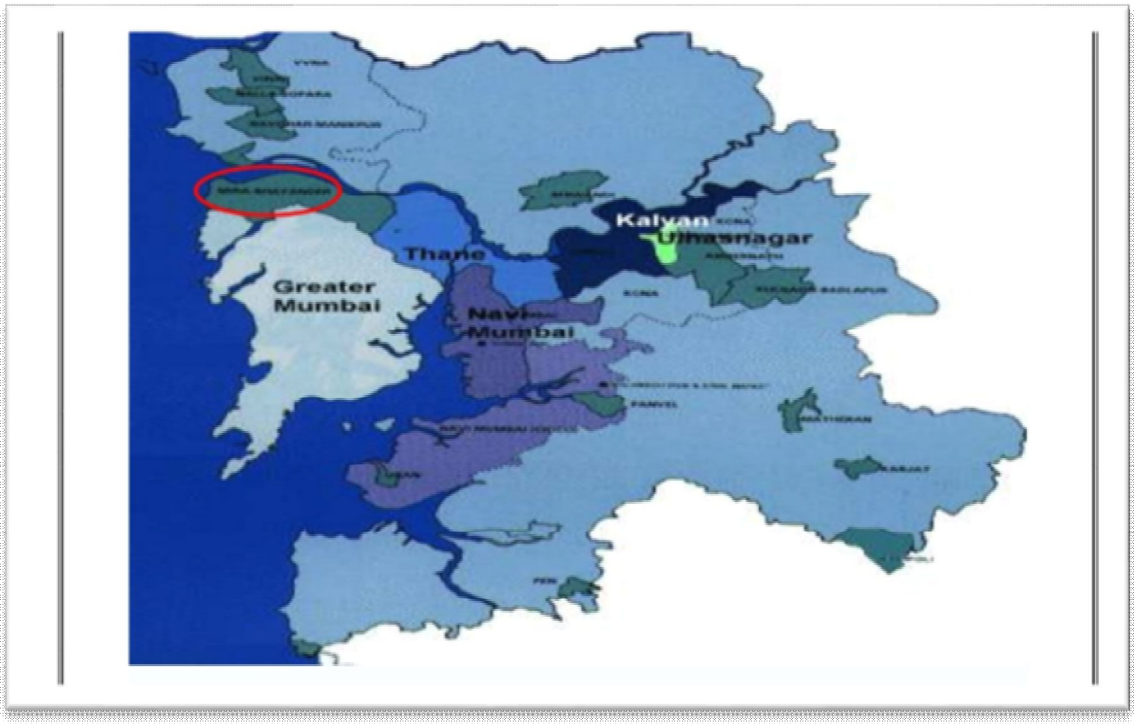

As per the City Sanitation Plan, 2012, in MBMC there are3 major lakes namely:

• Murdha Ram Mandir Lake

• UttanMoh Lake

• Raani Ram Mandir lake

The lakes have been put to various uses like washing, bathing, recreational facilities, idol immersion & as a supplementary source of water supply.

RESEARCH METHODOLOGY

The nature of study is primary data collection. Water samples were collected from selected locations by random sampling method.

Pre immersion water samples, water samples on 1-2 days Ganesh idol immersions, 5 days immersions, 10 days and post one month later were collected and were analysed.

Tritrimeric EDTA method for hardness, tritrimetric silver nitrate for chlorides, turbidity meter, open reflux method for COD are some of the methods used to determine the results.

RESULTS AND DISCUSSIONS

The water samples were tested for 10 parameters given as follows:

1. pH value

pH stands for potential of hydrogen. Values below 7 indicates acidity

The pH level ranged from 5.8 to 7.4which increases as the number decreases. Number 1 means most acidic.

TABLE-1. PH VALUE

LAKES (MBMC)		DURING IMMERSION (mg/lit)			
	PRE IMMMERSION (mg/lit)	1-2 DAYS	5 DAYS	10 DAYS	POST IMMERSION (mg/lit) 1 MONTH
MURDHA RAM MANDIR LAKE	7.6	6.8	6.4	5.8	7.8
UTTAN MOH LAKE	7	7.7	6.9	6.4	7.6
RAANI RAM MANDIR LAKE	7.4	6.3	5.4	6.6	5.8

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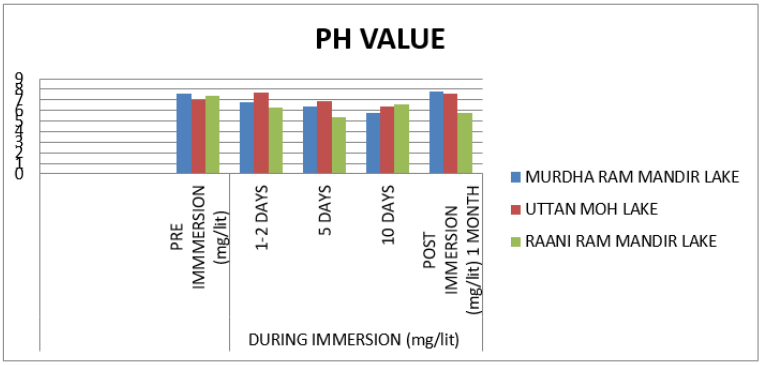


ANALYSIS

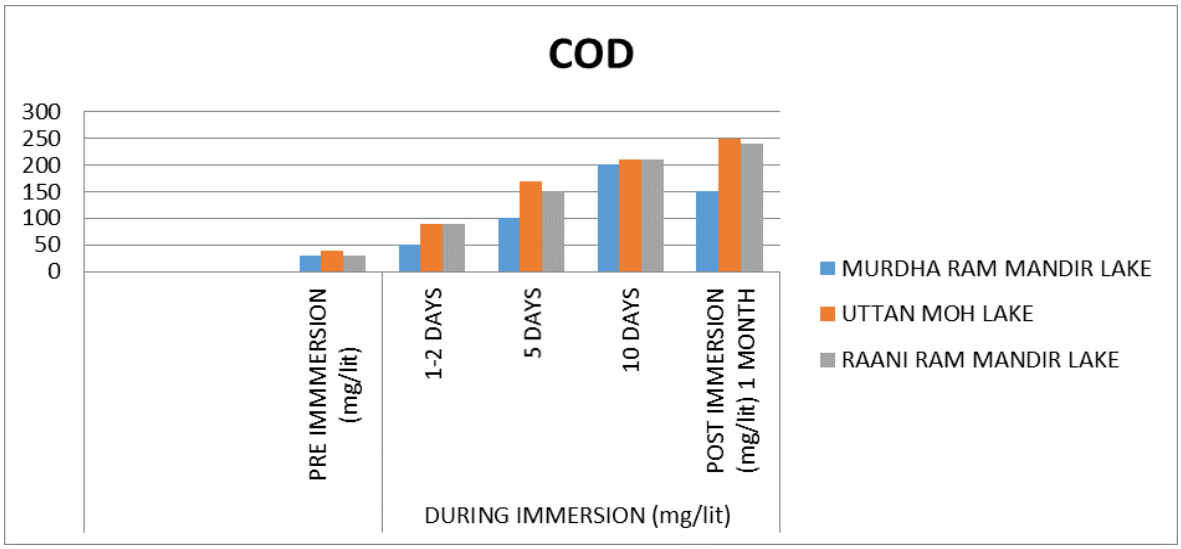
Minimum pH was observed during immersion which indicated acidic pH of water due to idol immersions.Post immersion pH was found to be 7.4 which is neutral. It clearly depicts the impact of idol immersion on quality of water. High pH levels are recorded in Murdha Ram Mandir lake with the 10 days idol immersions.

CHEMICAL OXYGEN DEMAND

The chemical oxygen demand test is commonly used indirectly measure the amount of organic compounds in water.

TABLE 2. CHEMICAL OXYGEN DEMAND

		DURING IMMERSION (mg/lit)			
LAKES (MBMC)	PRE IMMMERSION (mg/lit)	1-2 DAYS	5 DAYS	10 DAYS	POST IMMERSION (mg/lit) 1 MONTH
MURDHA RAM MANDIR LAKE	30	50	100	200	150
UTTAN MOH LAKE	40	90	170	210	250
RAANI RAM MANDIR LAKE	30	90	150	210	240



ANALYSIS

Chemical oxygen demand was low in all lakes _ below 50mg/lit.

The COD rises with the immersions and reaches at an alarming rate of 250mg/lit post 1 month of idol immersions.The chemicals used in idols are creating an havoc in the lake ecosystem.Too much COD has been recorded in UttanMoh lake with the 10 days idol immersions.

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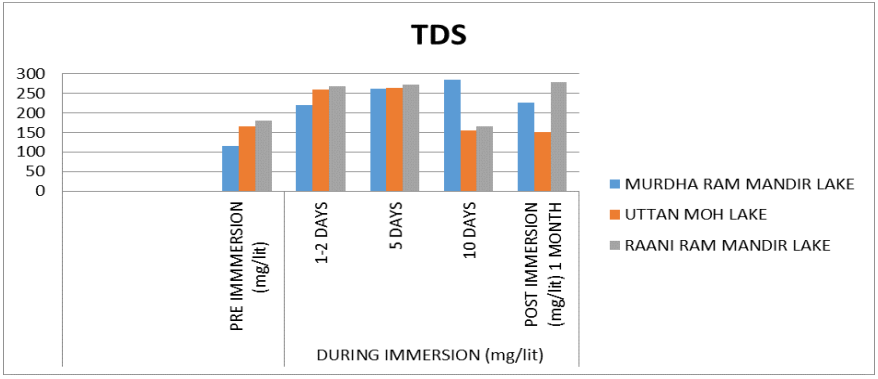
TOTAL DISSOLVED SOLIDS

The amount of Total Dissolved Solids (TDS) present in water determines its suitability for domestic use.

TABLE 3. TOTAL DISSOLVED SOLIDS

		DURING IMMERSION (mg/lit)			
LAKES (MBMC)	PRE IMMMERSION (mg/lit)	1-2 DAYS	5 DAYS	10 DAYS	POST IMMERSION (mg/lit) 1 MONTH
MURDHA RAM MANDIR LAKE	116	219	262	284	226
UTTAN MOH LAKE	165	260	264	154	150
RAANI RAM MANDIR LAKE	180	267	273	165	278



ANALYSIS

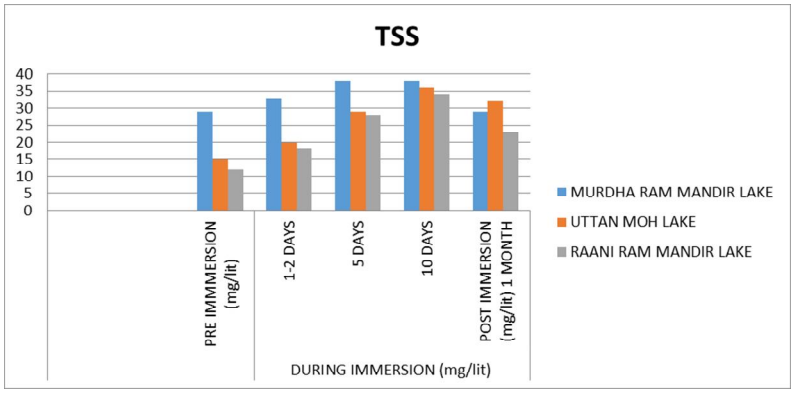
The permissible limits for TDS is 500mg/lit. The TDS levels rise with the immersions and are highest with the 10 days idol immersions.High TDS has been recorded in Raani Ram Mandir lake with the 10 days idol immersions.This is attributed to the presence of chlorides, carbonates, bi-carbonates, calcium, magnesium etc. The levels decreases post one month of immersions.

TOTAL SUSPENDED SOLIDS

Total Suspended Solids include a variety of materials such as silt, clay, decaying flowers and organic matter etc.

TABLE 4. TOTAL SUSPENDED SOLIDS

		DURING IMMERSION (mg/lit)			
LAKES (MBMC)	PRE IMMMERSION (mg/lit)	1-2 DAYS	5 DAYS	10 DAYS	POST IMMERSION (mg/lit) 1 MONTH
MURDHA RAM MANDIR LAKE	29	33	38	38	29
UTTAN MOH LAKE	15	20	29	36	32
RAANI RAM MANDIR LAKE	12	18	28	34	23



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ANALYSIS
TSS shows a remarkable increase with the immersions period

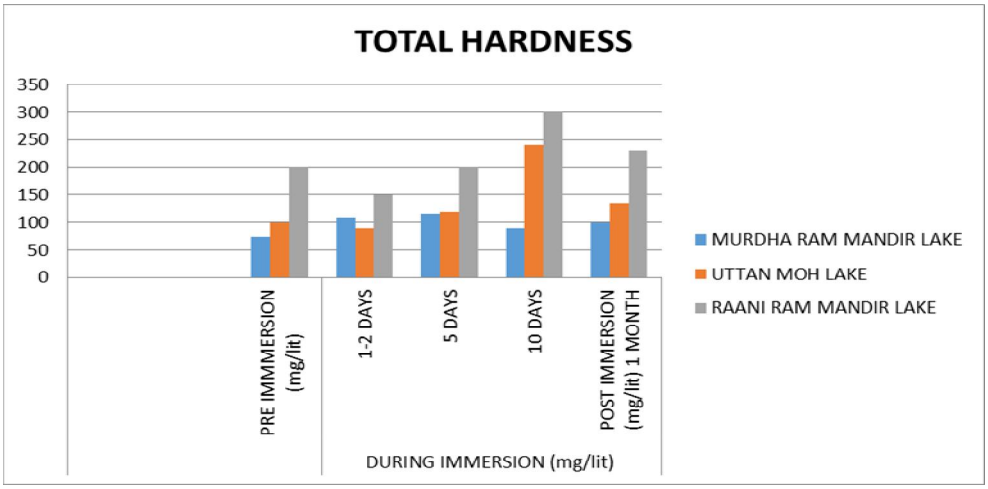
They slowly decline post one month of immersions. Too much TSS has been recorded in Murdha Ram Mandirlake with the 10 days idol immersions.High concentrations of suspended solids poses great danger to aquatic life

2. TOTAL HARDNESS

Total hardness is a measurement of the mineral content in the water that is irreversible by boiling.It is equivalent to total calcium and magnesium hardness.

TABLE 5. TOTAL HARDNESS

		DURING IMMERSION (mg/lit)			
LAKES (MBMC)	PRE IMMMERSION (mg/lit)	1-2 DAYS	5 DAYS	10 DAYS	POST IMMERSION (mg/lit) 1 MONTH
MURDHA RAM MANDIR LAKE	74	110	116	90	100
UTTAN MOH LAKE	100	90	120	240	135
RAANI RAM MANDIR LAKE	200	150	200	300	230



ANALYSIS
Total Hardness has increased considerably and has reached at an alarming rate of 300mg/lit.Post one month the values see a decline. Too much total hardness has been recorded in Rani Ram Mandirlake with the 10 days idol immersions. Total hardness has increased in all the three lakes considerably

3. TURBIDITY

The greater the scattering of light, the higher the turbidity.Low turbidity indicates high water clarity. It is measured in NTU(Nepheometric Turbidity Units) by Nephelometer.

TABLE 6. TURBIDITY

		DURING IMMERSION (NTU)			
LAKES (MBMC)	PRE IMMMERSION (NTU)	1-2 DAYS	5 DAYS	10 DAYS	POST IMMERSION (NTU) 1 MONTH
MURDHA RAM MANDIR LAKE	5	6.9	7.4	7.7	5.2
UTTAN MOH LAKE	4	5.7	6.6	6.4	5.8
RAANI RAM MANDIR LAKE	4.6	4.5	6.4	6.2	5.3

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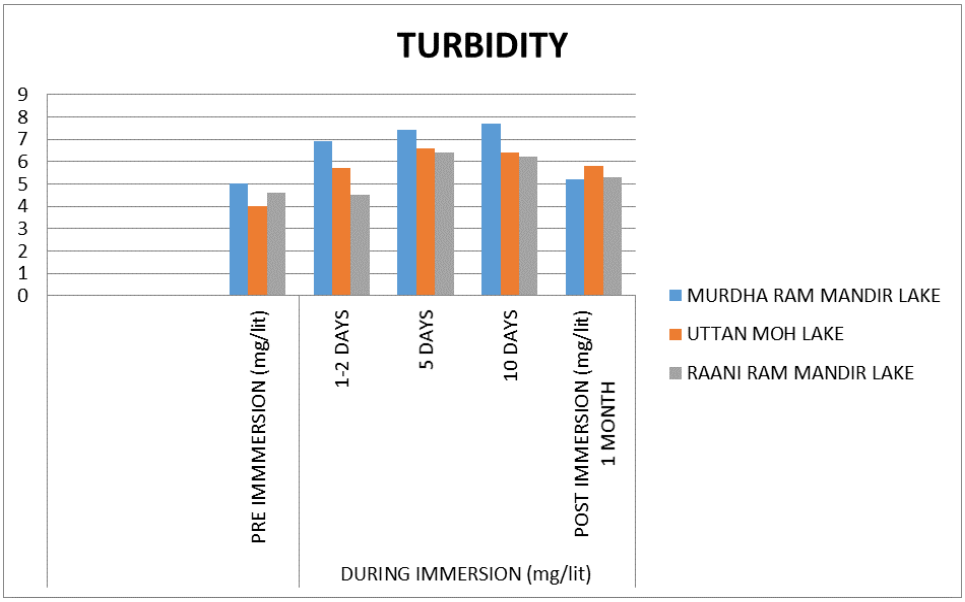


ANALYSIS

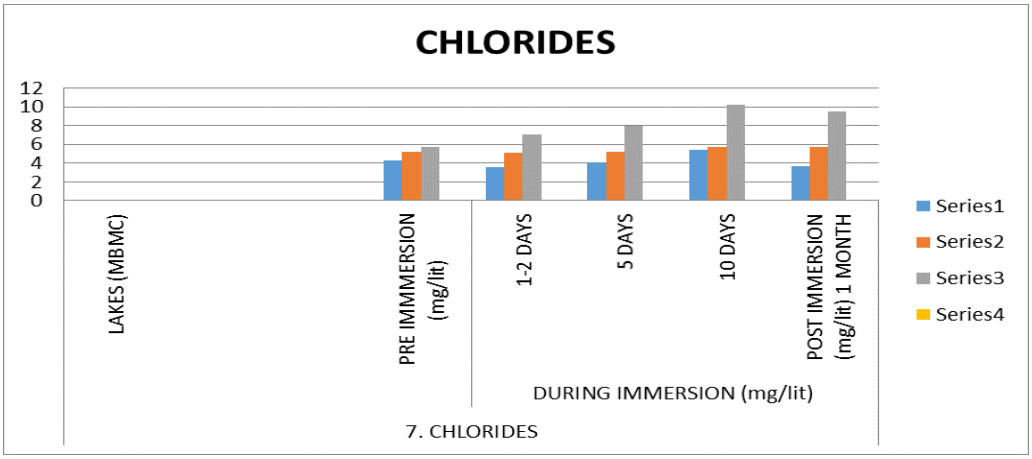
Too much turbidity has been recorded in Murdha Ram Mandirlake with the 10 days idol immersions.It is due to various organic and inorganic matter being immersed in the lakes.

CHLORIDES

The EPA Secondary Drinking Water Regulations recommend a maximum concentration of 250 mg/1 for chloride ions

TABLE 7. CHLORIDES

		DURING IMMERSION (mg/lit)			
LAKES (MBMC)	PRE IMMMERSION (mg/lit)	1-2 DAYS	5 DAYS	10 DAYS	POST IMMERSION (mg/lit) 1 MONTH
MURDHA RAM MANDIR LAKE	4.26	3.55	4.11	5.39	3.69
UTTAN MOH LAKE	5.25	5.11	5.26	5.68	5.73
RAANI RAM MANDIR LAKE	5.68	7.1	7.95	10.2	9.51



ANALYSIS

The chlorides levels are low in all the three lakes and are within the permissible limits which is a positive observation.

ACIDITY

Acidity is the quantitative capacity of the aqueous solution to neutralise the base.

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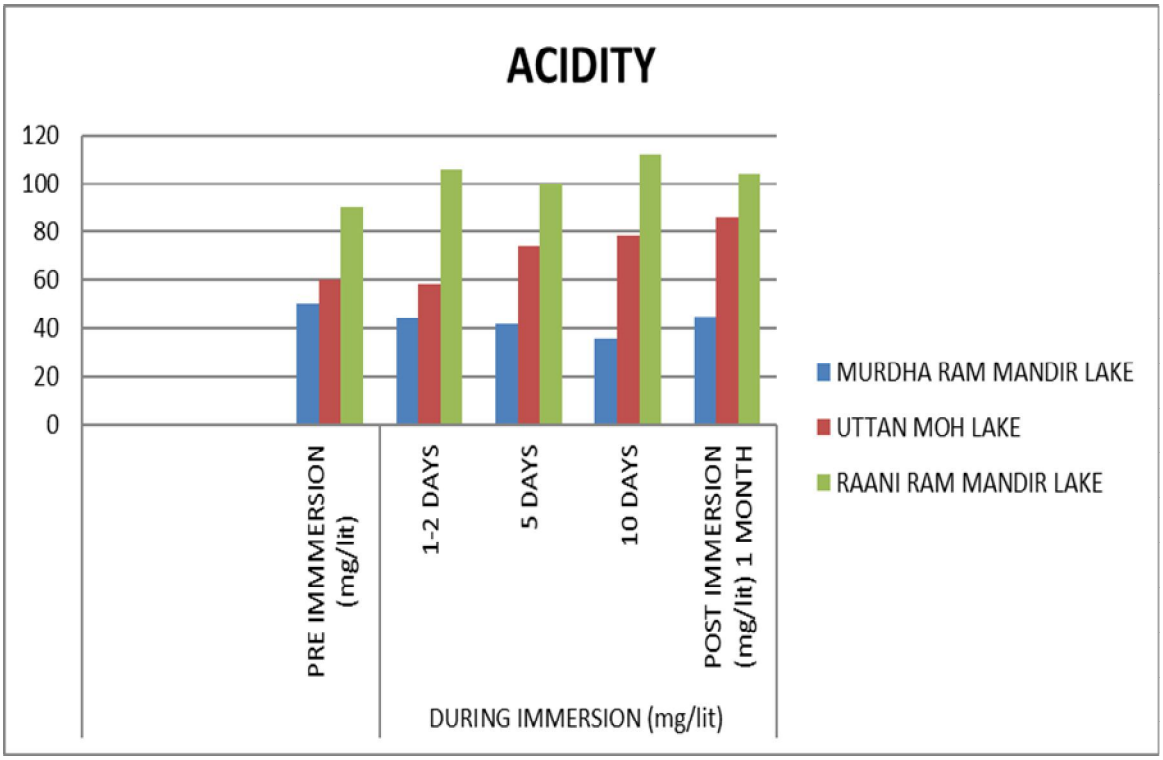
TABLE 8. ACIDITY					
		DURING IMMERSION (mg/lit)			
LAKES (MBMC)	PRE IMMMERSION (mg/lit)	1-2 DAYS	5 DAYS	10 DAYS	POST IMMERSION (mg/lit) 1 MONTH
MURDHA RAM MANDIR LAKE	50	44	42	36	45
UTTAN MOH LAKE	60	58	74	78	86
RAANI RAM MANDIR LAKE	90	106	100	112	104



ANALYSIS

Very high levels of acidity in lake waters are observed – above the permissible limits.

Highest levels are recorded with Raani Ram Mandir Lake.Increased use of metals, synthetic chemicals, ornaments,synthetic colours and other decorative items used for the idols.

ALKALINITY

Alkalinity is the quantitative capacity of the aqueous solution to neutralise the acid.

TABLE9. ALKALINITY					
		DURING IMMERSION (mg/lit)			
LAKES (MBMC)	PRE IMMMERSION (mg/lit)	1-2 DAYS	5 DAYS	10 DAYS	POST IMMERSION (mg/lit) 1 MONTH
MURDHA RAM MANDIR LAKE	80	70	90	98	86
UTTAN MOH LAKE	100	96	92	86	68
RAANI RAM MANDIR LAKE	120	116	112	108	100

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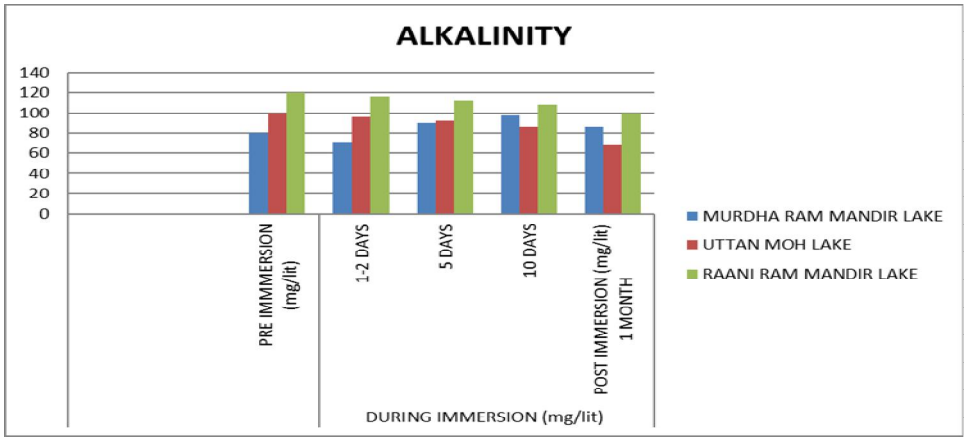


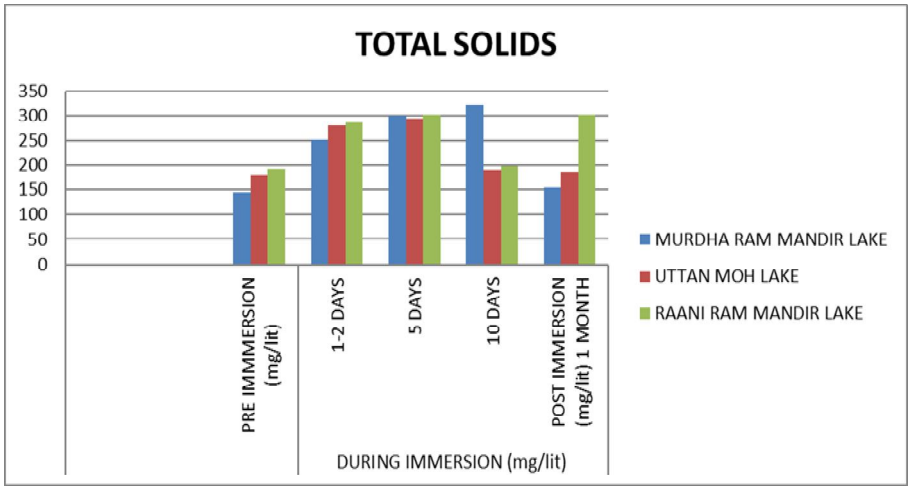
ANALYSIS
High alkalinity is seen in all the three lakes with the immersion period. These alarming rates are much higher than the permissible limits

It declines post one month of idol immersions

10.TOTAL SOLIDS
Total solids are a measure of all suspended, colloidal and dissolved solids in water sample.

TABLE10.TOTAL SOLIDS

		DURING IMMERSION (mg/lit)			
LAKES (MBMC)	PRE IMMMERSION (mg/lit)	1-2 DAYS	5 DAYS	10 DAYS	POST IMMERSION (mg/lit) 1 MONTH
MURDHA RAM MANDIR LAKE	145	252	300	322	155
UTTAN MOH LAKE	180	280	293	190	186
RAANI RAM MANDIR LAKE	192	285	301	199	301



ANALYSIS
High concentrations of total solids are seen in nearly all of the three lakes post idol immersionsHighest levels are seen in Murdha Ram Mandir Lake with the 10 days immersions and Raani Ram Mandir Lake shows highest values post one month of immersions also.

CONCLUSION
In MBMC, these 3 lakes have the common issues which are identified asUnplanned development, mushrooming of slums and rampant quarrying of the catchment area. Initiatives have been undertaken by MBMC to improve the overall lake water quality. Deteriorating water quality of Murdha Ram Mandir&UttanMoh Lake

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The phosphate and nitrate are two important nutrients in the lake loading through point and non-point pollution sources such as washing, bathing, agricultural activities in fringe area, joining of domestic raw sewage, and huge growth of aquatic macrophytes. Phosphate is considered to be the most significant among the nutrients responsible for eutrophication of lakes, as it is the primary initiating factor. Phosphate enters the lakes in domestic wastewater, accounting for the condition of eutrophication..

The present study on assessment of idol immersion on physico-chemical characteristics of lakes revealed that idol immersion activity has negative impact on water quality of the lake. The total hardness was also reported higher in post-idol immersion. The values of COD and turbidity, acidity, TSS have shown an increase during and after immersion of idols.

The input of biodegradable and non-biodegradable substances deteriorates the lake water quality and enhances silt load in the lake. The floating material released through idol in the lake, after decomposition result in eutrophication of the lake.

The present study on Impact of idol immersion on water quality of Mira Bhayander lakesrevealed that idol immersion activities have negative effect on water quality of lakes.

With 2,070 immersions recorded in the Mira Bhayandar region on occasion of AnantChaturdashiin 2018, the total number of Lord Ganesh idols which graced the twin-city during the 11-day festival touched the 20,543 mark.

As per official comparative statistics provided by the civic body, an increase of 972 idols had been registered. Last year the figure had stood at 19,571. In the year 2018, 432 idols were immersed in the lone artificial pond created by the Mira Bhayandar Municipal Corporation (MBMC) in Mira Road after a gap of four years.

There is a dire need to create more artificial ponds for immersions so as to save our natural lake ecosystems.

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STUDY OF VITAL RATES OF NASHIK DISTRICT, MAHARASHTRA

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ABSTRACT
Vital statistics are statistics on live births, deaths, fetal deaths, marriages and divorces. The most common way of collecting information on these events is through civil registration, an administrative system used by governments to record vital events which occur in their populations. Efforts to improve the quality of vital statistics will therefore be closely related to the development of civil registration systems in countries.

Vital rates refer to how fast vital statistics change in a population (usually measured per 1000 individuals). There are 2 categories within vital rates: crude rates and refined rates. Crude rates measure vital statistics in a general population (overall change in births and deaths per 1000). Refined rates measure the change in vital statistics in a specific demographic (such as age, sex, race, etc.)

Keywords: CBR, CDR, IMR, TFR, Still Birth Rate, Normal Child, MAM, SAM.

INTRODUCTION
Vital rates, relative frequencies of vital occurrences that affect changes in the size and composition of a population. When calculated per 1,000 inhabitants—as is conventional in vital-statistics, publications—they are referred to as crude rates. More refined rates often must be applied in the more meaningful analysis of population change. Principal among vital rates are the crude birth rate and the crude death rate; *i.e.*, Annual numbers of births or of deaths per 1,000 populations, based on the midyear population estimate. The conflict between these two rates is the pace of natural growth (or decrease, if deaths exceed births). Rates of natural increase are a net result of fertility trends, health conditions, and variances in the age composition of the population. They approximate rates of population growth, a result of natural increase and the balance of migration (immigrants minus emigrants), when the latter is relatively low.

The marriage rate records the annual number of marriages per 1,000 habitants. It is a crude measure, since, aside from the effects of age composition and preferred ages at marriage, it also is influenced by remarriages by previously widowed or divorced persons. More significantly, it does not include marriage unions that are not legally formalized, and there are differences in the definition of legal union. Some countries, for example, recognize common-law marriages as legal, while others do not; and in some Latin-American countries, marriages performed under indigenous tribal rights are not recorded as legal. Divorce rates and the infant mortality rate complete the set of the most widely published vital rates. The infant mortality rate is computed as the routine of infant deaths (deaths of youngsters below 12 months of age) occurring in a given year per 1,000 live births occurring in the same yr.

These vital rates are widely used and facilitate much useful comparison of time trends and of local variations within or among states. Being summary measures, they do not reveal many factors that may have a distorting effect for purposes of more specialized comparison. Chief among these factors is the variable age composition of the population. Thus, the crude birth rates are somewhat distorted measures of productivity, because the percentage of total population at reproductive ages is not taken into account. The crude death rates distort the comparison of mortality conditions to an even larger extent. Even under the best health conditions, mortality is at least relatively high at advanced ages; therefore, the proportion of age persons in the population—*e. g.*, Those aged 65 and over—has a large effect. *See also* mortality.

OBJECTIVES
- To study the CBR, CDR, IMR and TFR in the Nashik District.
- To examine the Infant Mortality Rate and Still Birth Rate in the Nashik District.
- To assess the Malnutrition in the Nashik District.

MATERIALS AND METHODS:
The present study is primarily based on both secondary and primary data. The secondary data have been obtained from Statistical Handbooks, District Census Handbook, Socioeconomic Abstract of Nashik District, Tribal Development Department Nashik, Tribal Research and Training Institute, Pune, Zilha Parishad Nashik District Report 2013-14, Times of India-2014 and District Census Handbook of Nashik District.

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VITAL RATES IN NASHIK DISTRICT:
A significant role of CBR, CDR, IMR and TFR in population change;

CBR:-

Chandna (2004) Crude birth rate (CBR) is not only the simplest but also the most common measure of human fertility. It is expressed in terms of number of births in a year per thousand of the midyear population. It may be pointed out than only live birth during a year is to be taken into account. It is calculated as below.

$$CBR = \frac{B}{P} \times 1000$$

Where

B = Stands for live birth during a year.

P = Stands for estimating midyear population.

2. CDR:

Chandna (2004) Crude death rate (CDR) is the simplest measure of mortality indicating the number of death in a particular year per thousands of the population. It is expressed asunder.

$$CDR = \frac{D}{P} \times 1000$$

Where

D = Stands for number of deaths in a year.

P = Estimated midyear population for the year.

3. IMR:

Bhende (2004) Infant mortality rate (IMR) is calculated for connoting mortality among children of less than one year of age. It is expressed as under

$$IMR = \frac{D_0}{B_1} \times 1000$$

Where

D_0 = Stands for number of death of children under one year of age.

B_1 = Stands for number of live births.

4. TFR:

Chandna (2004), The total fertility rate (TFR) is another age-sex adjusted measure of fertility, which has been regarded as the most sensitive, and the most meaningful cross-sectional measures of fertility. It is obtained by summing up the age specific birth rates and multiplying it by the number of years in the age interval. Therefore, it can be expressed as under for quinquennial age groups.

$$TFR = S \times \sum_{a=15-19}^{a=45-49} \left(\frac{B_{15-19}}{PF_{15-19}} \times 1000 \right) \qquad \sum \left(\frac{B_{15-19}}{PF_{15-19}} \times 1000 \right)$$

Result:
According to the 2001 census in the Nashik district the CBR is 22.5 percent, however it is 17.17 percent in 2013. The CDR is 7.10 percent in 2001 and it is 5.75 percent in 2013. The IMR is 28.42 percent in 2001 which is 21.27 percent in 2013. The TFR is 2.91 percent in 2001 which 2.05 percent in 2013.

Table 1: Vital Rates of Nashik District (2001 to 2013)

Year	Nashik			
	CBR	CDR	IMR	TFR
2001	22.5	7.10	28.42	2.91
2002	21.91	7.50	23.50	2.60
2003	21.57	6.90	21.76	2.76

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2004	21.48	6.09	25.14	2.74
2005	19.80	6.30	22.78	2.52
2006	19.21	7.41	37.04	2.49
2007	17.13	5.81	27.08	2.12
2008	18.77	6.11	28.09	2.29
2009	17.91	5.77	27.95	2.17
2010	17.46	5.96	25.30	2.14
2011	17.38	5.74	24.07	2.12
2012	17.15	5.72	22.16	2.04
2013	17.17	5.75	21.27	2.05

Source: Zilha Parishad Nashik District-2013.

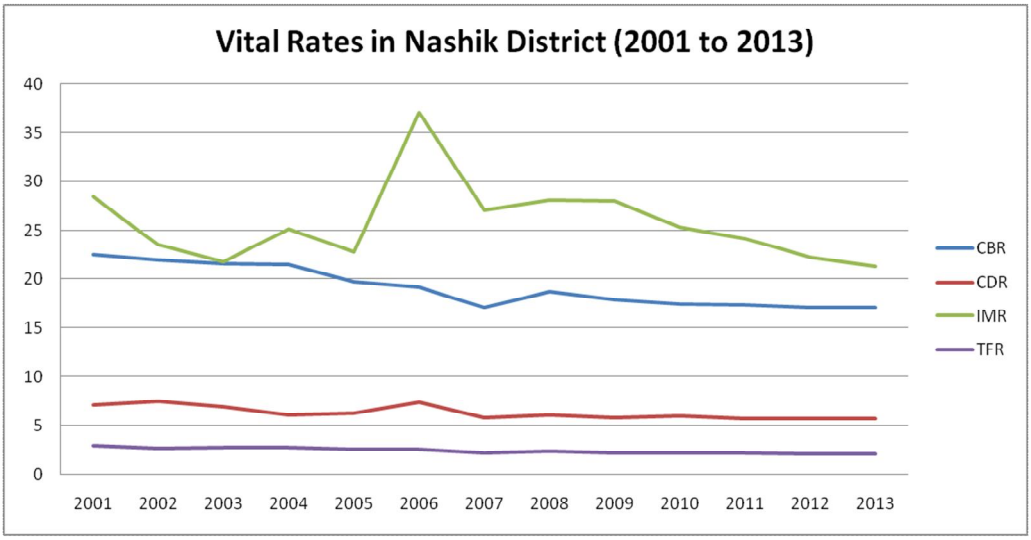

Fig. 1: Vital Rates in Nashik District

- **Infant Mortality Rate**

Infant mortality is the death of a child less than one year of age. Generally the most common cause of worldwide has been dehydration. Many factors contribute to infant mortality such as the mother's level of education, mean age at marriage, environmental conditions, malnutrition, and health facilities. Political and medical infrastructure, all the factors are responsible for high mortality among tribal area. Infant mortality rate (IMR) is he numbers of death of children less than one year of age per 1000 live birth. The rate for a given is the number of children dying under one year of age divided by the number of live birth during the year multiplied by 1000.

The infant mortality rate in 2012-13 is highest in Peint tahsil. It is 35.34 percent it is followed by Trimbak (31.07), Surgana (29.55), Nashik (26.39) and Igatpuri (23.2) respectively. The infant mortality is highest in western part of study region. It is concluded that because lack of medical insufficiency, age at marriage, low literacy, superstitions, transportation facility, and the infant mortality is greater. The lowest infant mortality is in Baglan tahsil which is 10.24 percent. However Deola tahsil has 10.86 percent infant mortality.

Table 2: Distribution of IMR in Nashik District (2012-14)

Sr. No.	Tahsil	Infant Deaths		IMR in Percentage		Volume of Change
		2012-13	2013-14 (Till Oct. End)	2012-13	2013-14 (Till Oct. End)	
1	Baglan	60	30	10.24	9.53	-0.71
2	Chandwad	68	21	20.13	9.51	-10.62
3	Deola	29	17	10.86	10.82	-0.04
4	Dindori	107	41	17.6	12	-5.6
5	Igatpuri	89	34	23.2	14.53	-8.67
6	Kalwan	47	22	13.26	9.4	-3.86
7	Malegaon	67	27	11.36	8	-3.36
8	Nashik	100	24	26.39	17.06	-9.33

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9	Nandgaon	45	19	14.53	10.29	-4.24
10	Niphad	100	40	13.71	8.06	-5.65
11	Peint	95	28	35.34	16.12	-19.22
12	Sinnar	86	20	16.68	6.64	-10.04
13	Surgana	114	62	29.55	27.92	-1.63
14	Trimbak	109	70	31.07	32.36	0.66
15	Yeola	75	26	21.13	23.74	2.61
	Total	**1191**	**481**	**18.55**	**13.07**	**-4.85**

Source: Times of India, 2014.

In 2013-14 the infant mortality of Nashik district is 13.07 percent. In Trimbak tahsil it is greater than other tahsil which is 32.36 percent. In 2012-13 to 2013-14 the infant mortality is increased in Trimbak by 1.29 percent, however in Surgana tahsil this percentage is 27.92 and in Yeola tahsil it is 23.74 percent (Fig. 3.19).

In 2012-13 to 2013-14 the infant mortality in Peint tahsil is going down it is near about -18.97 percent if followed by sinner (-10.04), Nashik (-9.33), Igatpuri (-8.47), Chandwad (-10.62) Tahsil, but in Trimbak Tahsil, it is increasing slightly (Fig. No.3.19 C).There is positive correlation between infant mortality and literacy (r value= 0.1473). Infant mortality and below poverty line Tribal people correlation (r value=0.6591) is Positive.

- **Still Birth Rate**

Bhende (2004), a stillbirth occurs when a fetus has died in the uterus. Once the fetus has died the mother may or may not have contractions and undergo child birth. The term is often used in distinction to live birth or miscarriage and the word miscarriage is often used incorrectly to describe birth occur in fall term pregnancies

Table-3: Distribution of SBR in Nashik District (2012-14)

Sr. No.	Tahsil	Still Births		CBR in Percentage		Volume of Change
		2012-13	2013-14 (Till Oct. End)	2012-13	2013-14 (Till Oct. End)	
1	Baglan	70	20	11.995	6.3	-5.69
2	Chandwad	47	13	13.91	5.88	-8.03
3	Deola	25	9	9.36	5.72	-3.64
4	Dindori	08	44	17.76	12.91	-4.85
5	Igatpuri	69	31	17.99	13.43	-4.56
6	Kalwan	38	13	10.72	5.55	-5.17
7	Malegaon	48	22	8.14	6.52	-1.62
8	Nashik	58	5	15.3	3.55	-11.75
9	Nandgaon	46	15	14.88	8.12	-6.76
10	Niphad	69	9	9.46	1.81	-7.65
11	Peint	77	18	28.64	10.36	-18.28
12	Sinnar	86	27	16.68	8.96	-7.72
13	Surgana	105	42	27.22	18.91	-8.31
14	Trimbak	90	34	25.65	15.68	-9.97
15	Yeola	63	6	17.75	5.47	-12.28
	Total	**999**	**308**	**15.56**	**8.37**	**-7.19**

Source: Times of India- 2014.

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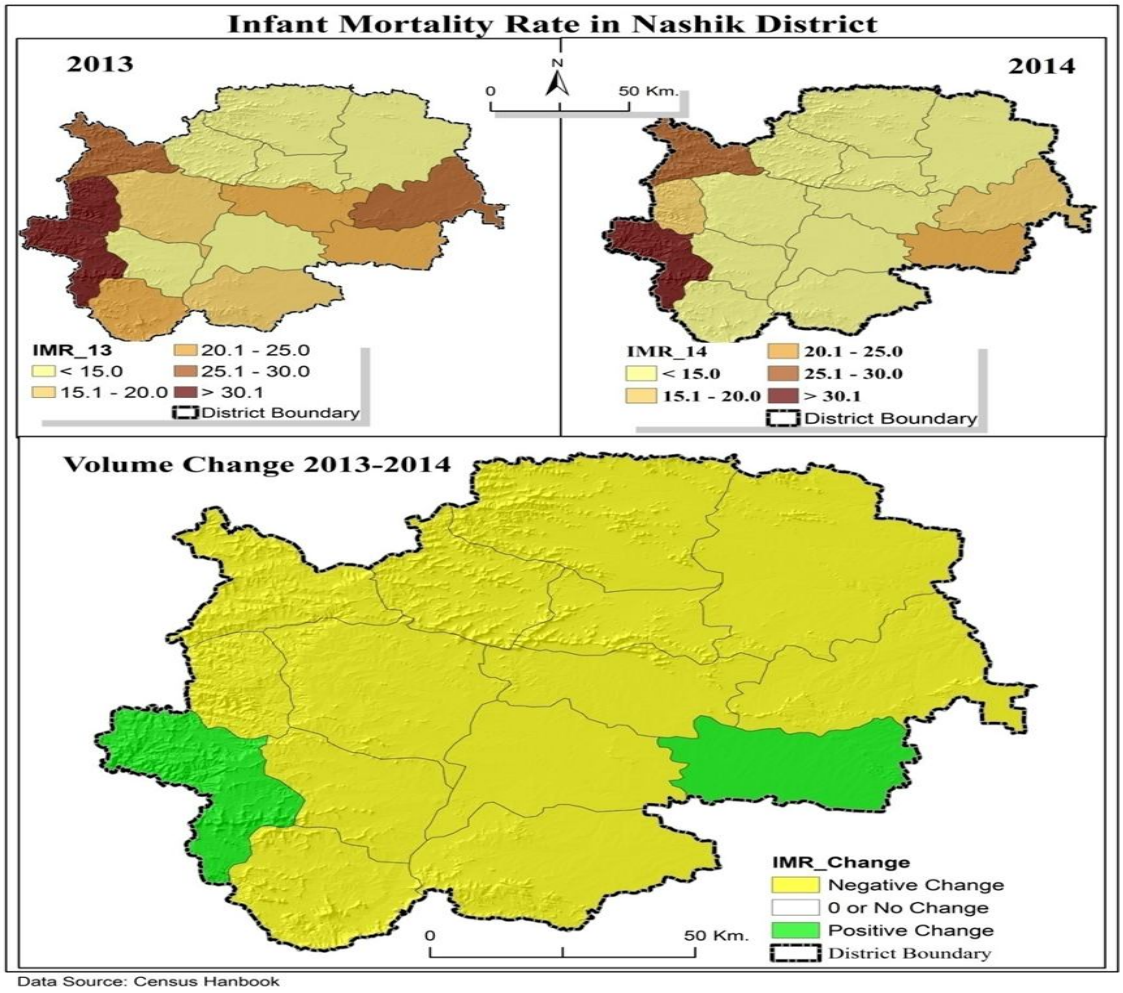

Fig-2: Infant Mortality Rate and Change in Nashik District (2013-14)

In Nashik district the still birth rate is 15.56 percent in 2012-13. The highest still birth rate is in Peint Tahsil which is 28.64 percent it is followed by Surgana (27.22), Trimbak (25.63) and Igatpuri (17.99) Tahsil. These are tribal Tahsil in this area the literacy percentage of women are lowest so that the stillbirth rate is greater than other area. Lacks of medical facilities, transportation, suppressions, age of marriage etc. factors are responsible for high stillbirth rate in the tribal area.

In 2013-14 the still birth rate is going down in Nashik district which is 8.37percent .In other Tahsil this rate is also going down. In Paint Tahsil the stillbirth rate is going down by 18.28 percent but in Trimbak the rate is normal. There is Positive correlation among the still birth rate and malnutrition, infant mortality, below poverty people and literacy.

- **Malnutrition**

Malnutrition is the major problems faced by all developing countries. Malnutrition is very dangerous for the mental and physical development of the human being. The area where people get nutritional diet not suffer from problem of malnutrition, but the areas which are known as backward, hilly, educationally and industrially underdeveloped suffer from malnutrition. Malnutrition is an unhealthy condition caused by poor intake, absorption or use of nutrients by the body; symptoms of malnutrition include cramps, diarrhea weakness and weight loss.

Malnutrition is a state of physical body which does not get required diets containing necessary vitamins, minerals and proteins essential for brain and physical development. Malnutrition was determined on the weight according to the age. Later on the same norm of the weights was connected with height, of course the factors responsible for the malnutrition heed to be identified and addressed. Central governments as well as state government both have undertaken various programmers, for the eradication of malnutrition all over India.

As per this criterion malnourished children are divided into three types. They are normal children, second is MAM (moderate acute malnutrition) and the third is SAM (severe acute malnutrition).

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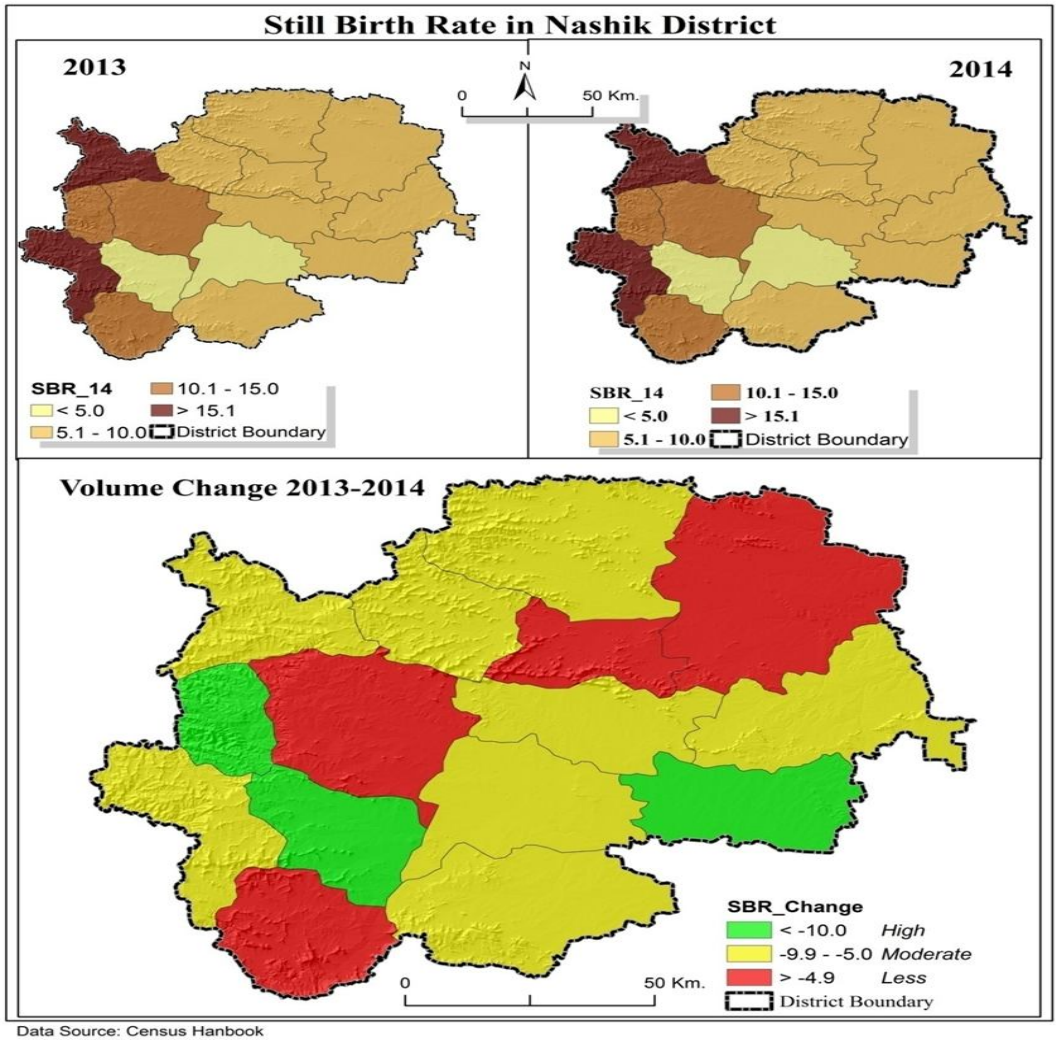
Fig-3: Still Birth Rate and Volume of Change in Nashik District (2013-14)



- **Normal Child**

According to socio-economic survey of 0-06 age children in Nashik district total children are 440441 out of them 419407 children had been weighed. It is 90 percent children are normal children out of them.

- **Moderate Acute Malnutrition (MAM)**

MAM affects a greater number than SAM. While children suffering from both moderate acute malnutrition and severe acute malnutrition are susceptible to fullness, severely malnourished children are at greater risk of medical complication and death from illness, infection and micronutrient deficiencies.

As per Table 3.24, it is observed that western part of Nashik district is highly affected by MAM. In this part concentration of tribal community is a high Peint (21.94) Tahsil is found to be more affected by MAM. It followed by harshly (Trimbak 20.10), Surgana (15.82), Trimbak (15.73), Barhe (Surgana 15.82), Igatpuri (13.90), Kalwan (13.28) under come to MAM category. It is because of these Tahsil is situated in remote areas and because of it agriculture has also become difficult to be undertaken; transportation and medical facilities are also not fully available which ultimately results in malnutrition. In other tahsil like Dindori, Nashik, Deola, Sinner, Niphad, Yeola, Nandgaon, Chandwad, Malegaon is also affected by MAM. Their percentage is within the range of 2 to 9 percent. 8 percent of child in the Nashik district has under the MAM category.

- **Severe Acute Malnutrition**

In Nashik district, there are 419407 children had been weighted 419407 out of 7414 children come under severe acute malnutrition. This percentage is 1.77 percent. The highest severe acute malnutrition percentage is in Harsul (Trimbak) which is 6.23 percent. After that come Trimbak and Peint having percentage 5.98 percent and 4.14 percent, respectively. In Igatpuri Tahsil this is 3.90 percentages. From this we conclude that in west Nashik district it means in Peint, Trimbak, Igatpuri and Surgana there are highest children in severe 166cute malnutrition. However, in Malegaon, Chandwad, Nandgaon, Yeola, Niphad, Sinner, Baglan, Nashik and Dindori this percentage is generally 0-3 percent.

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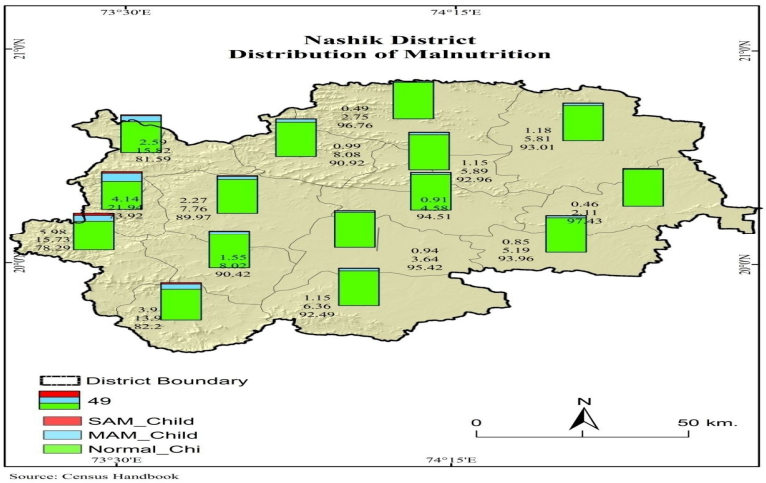
Table 4: Distribution of Malnutrition in Nashik District-2014

Sr. No.	Name of Tahsils	Surveyed Child between 0 to 6 Age group	No. of Child to take a weight	%	Normal Child	%	MAM Child	%	SAM Child	%
1	Peint	16893	14701	87.02	10867	73.92	3225	21.94	609	4.14
2	Harsul	11854	11232	94.75	8274	73.66	2258	20.10	700	6.23
3	Surgana	16270	15125	92.96	12341	81.59	2393	15.82	391	2.59
4	Barhe	7769	8002	90.22	7011	87.62	792	9.90	119	2.49
5	Igatpuri	25438	24540	96.47	20172	82.20	3412	13.90	956	3.90
6	Dindori	20033	19537	97.52	17577	89.97	1516	7.76	444	2.27
7	Umrale	15119	14727	97.41	12610	85.63	1785	12.12	332	2.25
8	Kalwan 1	14801	14381	97.22	13083	90.92	1163	8.08	143	.99
9	Kalwan 2	9383	8751	93.26	7440	85.02	1162	13.28	149	1.70
10	Nashik	22433	21865	97.47	19771	90.42	1754	8.02	340	1.55
11	Trimbak	10207	9841	96.49	7711	78.29	1549	15.73	589	5.98
12	Deola	16018	15592	97.34	14494	92.96	919	5.89	179	1.15
13	Baglan 1	28713	27787	96.77	26888	96.76	763	2.75	163	0.49
14	Baglan 2	12853	11882	92.45	11131	93.68	590	4.97	161	1.35
15	Sinnar 1	17100	15869	92.80	14677	92.49	1010	6.36	182	1.15
16	Sinnar 2	15384	14338	93.20	13150	91.71	988	6.89	200	1.39
17	Niphad	16941	16530	97.57	15773	95.42	602	3.64	155	094
18	Manmad	17328	16969	97.93	15871	93.53	933	5.50	165	0.97
19	Pimalgaon	13605	13271	97.55	12427	93.64	682	5.14	162	1.22
20	Yeola 1	13102	12149	92.73	11415	93.96	630	5.19	104	086
21	Yeola 2	12210	11497	94.16	10918	94.96	515	4.48	64	0.56
22	Nandgaon	25360	23279	91.79	22680	97.43	492	2.11	107	0.46
23	Chandwad 1	15332	15176	98.98	14343	94.51	695	4.58	138	0.91
24	Chandwad 2	9420	9302	98.75	8702	93.55	490	5.27	110	1.18
25	Malegaon	31576	29969	94.91	27875	93.01	1741	5.81	353	1.18
26	Ravalgaon	24199	23079	95.37	21157	91.67	1576	6.83	346	1.50
	Nashik District	**440441**	**419407**	**95.00**	**378358**	**90.00**	**33635**	**8.00**	**7414**	**1.77**

Source: Zilha Parishad Nashik District 2014

Table 4: Distribution of Malnutrition in Nashik District-2014



Source: Census Handbook

Fig. 4: Distribution of Malnutrition in Nashik District-2014

CONCLUSION

From the above study following conclusion have been drawn

1) In the Nashik district the CBR is 22.5 percent, however it is 17.17 percent in 2013. The CDR is 7.10 percent in 2001 and it is 5.75 percent in 2013. The IMR is 28.42 percent in 2001 which is 21.27 percent in 2013. The TFR is 2.91 percent in 2001 which 2.05 percent in 2013.
2) In 2013-14 the infant mortality of Nashik district is 13.07 percent.
3) In Nashik district the still birth rate is 15.56 percent in 2012-13. The highest still birth rate is in Peint Tahsil which is 28.64 percent it is followed by Surgana (27.22), Trimbak (25.63) and Igatpuri (17.99) Tahsil.
4) Geographical, social, economic factors have a large impact on creating malnutrition among the children.

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5) Peint, Surgana, Trimbak, Igatpuri, Kalwan, Baglan, tahsil are very susceptible tahsil to the malnutrition of the categories viz. SAM and MAM.

6) So far as the MAM is concerned Nandgaon Tahsil is less affected.

7) Regarding Sam Nandgaon Tahsil is less affected.

8) There is positive correlation (r value =0.8175) between malnutrition and BPL people.

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ONE STEP TOWARDS SUSTAINABILITY…..

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ABSTRACT
As India is having largest youth population, perception towards fashion industry is augmenting with the fast pace. We are trying to copy the culture of western countries so the consumption of apparels is increasing substantially. Increasing disposable income, brand awareness and increasing techno savvy millennial population are the driving factors of corporatized retail within the country. As Indian economy is known to be an emerging third world economy, is witnessing major shifts in consumer preferences. The culture of "Use & Throw" is perpetuating in this globalized era is adversely affecting to our earth. Because whatever we buy, after its use we throw it directly to the landfills. India has many ways and means to recycle the clothing as we have a very good legacy in making handicrafts like doormats, purses, blankets, wall hangings, furniture, jewellery, cushions and many more. After the adoption of new economic policy, India opened her economic doors for overseas investors. So the entry of foreign brands in the country increased substantially. As we are trying to fulfil the hunger of fashion we are letting down the concern of environment. But compared to western economies the share of consumption of fashion is less in India. So, Researcher is trying to find out flip side of this daunting fashion industry and showing the ways and means through which we can recycle the clothing and maintain sustainability of an environment.

INTRODUCTION
Fashion is derived from a Latin word'Facere'which means to make. Fashion word is used in relation with clothing, garments, textiles etc. In the contemporary era, people are becoming more conscious towards their standard of living followed by attire. In this today's world we are to be judged mostly by our attire. India is known to be for youth population. Perception of Youth population towards fashion industry is becoming trendier. Entry of international brands, changes in preferences from non-branded to branded, the fast growing economy, large young consuming population in the country has made India a highly lucrative market. India has the world's largest youth population, which is becoming fashion conscious owing to mass media and social media penetration. This has opened unprecedented retail market opportunities. Indian economy, one of the fastest growing economies of the world, is witnessing major shifts in consumer preferences. Overall, Indian retail scenario has shown sustainable long-term growth compared to other developing economies. As this fashion keeps on changing after a particular period, fashion industry has to concentrate on that and accordingly changes have to be made in production.

As India is having largest youth population perception towards fashion industry is augmenting with the fast pace. We are trying to copy the culture of western countries so the consumption of apparels is increasing hugely. Increasing disposable income, brand awareness and increasing tech-savvy millennial population are the driving factors of corporatized retail within the country. As Indian economy is known to be an emerging third world economy, is witnessing major shifts in consumer preferences. The culture of "Use & Throw" is perpetuating in this globalized era is adversely affecting to our earth. Because whatever we buy, after its use we throw it directly to the landfills. India has many ways and means to recycle the clothing as we have a very good legacy in making handicrafts like doormats, purses, bags, hats, wall hangings, furniture, jewellery, cushions and many more. After the adoption of new economic policy, India opened her economic doors for overseas investors. So the entry of foreign brands in the country increased substantially. As we are trying to fulfil the hunger of fashion we are letting down the concern of environment degradation. But compared to western economies the share of consumption of fashion is less in India. So, Researcher is trying to find out the ways and means through which we can recycle the clothing and maintain sustainability of an environment. Rising urbanisation hasled to increase in demand for new design and fashion. A number of initiatives have been taken by the government to make the industry more competitive. Nowadays fashion designer and manufacturer promote their clothes not only to retailers but also to media i.e. fashion journalist

Fusion wear celebrates the beauty of both the world and the Indian fashion industry.As foreign country is giving more importance to fashion and to prove we are not lacking in that we aregiving more importance to fashion industry. Indian designers have given a large contribution towards the world market. Indian textiles

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and fashion industries has now sweeping innovative Indian design to the world market. This tremendous increase in fashion industry has affected our environment.

HISTORY OF FASHION INDUSTRY

Every country is having strong legacy of fashion industry. Fashion is considered as a buzz word for showing the standard of living by each and every individual. Now none of the country is lagging in this fashion industry. Researcher is trying to give an impetus of fashion industry generally and textile industry particularly over different economies. China is playing prominent role in textile and clothing sector since 1949ie. just after its independence. But the industry in china started exploring herself from 20th century. China's fashion industry stimulated by World War I, and expanded rapidly until the depression in the 30s. since imports of western manufactured goods stopped during World War I, the cotton industry in China & Japan developed rapidly to fulfil the need in Asia. So textile and clothing industry is a strong pillar for China. Due to economic reform and open door policy in the year 1979 China's export started increasing from 1979 due to open door policy and economic reform**.**In Italy, fashion was given importance from 18thcentury. Till now Italy stands first in fashion. Many of the innovative designersare born in Italy. The first Italian style dress was made in velvet and produced entirely in Italy. During the Middle Ages and renaissance period Italian fashion was extravagant. Since 1950s, Italy achieved its own independent identity as a source of fashionable clothing for the rest of the world as in the beginning of the 1949 Italy emphasize more on Italy's heritage of art and culture were gained the capture of foreign social media. Its modern fashion came in the light rapidly after the World War II. Though the Italy is known as for innovation in the fashion industry, Paris started dominating the world of fashion. Paris, France proved herself prominently in this fashion industry from 15th of century but in 18th and 19th century, it exploded a lot. Under stiff competition, of New York, London and Tokyo, Parisspearheaded this fashion industry. Now Paris acts as the centre of fashion industry and holds the name of global fashion capital. In UK as well fashion started in the year 1890's. In 21st century London was ranked in fashion centre.

India has varied cultural heritage and each region follows different fashion culture. Fashion industry in India is growing tremendously as it not only covered our country but international development took place. In India fashion industry emerged in the mid 1980's.Due to urbanisation lead to increase in demand for new design and fashion in our country. After globalisation India's fashion industry burgeoned with adoption of fusion of Indian and western style i.e. designer used Indo-western. Now days, India fashion weeks is gaining popularity amongst the youths.

OBJECTIVES

1. To study the comparison of fashion trend of other countries
2. To study adverse impact of ambitious fashion industry
3. To know ways of recycling of clothing
4. To evaluate recent trend of fashion industry in India

SIGNIFICANCE OF THE STUDY: - Fashion is becoming ambitious industry in today's era. Consumer's taste is changing for the fashion. But this industry is exhausting our environment. Chemical substances from these textile industry generally and fashion industry particularly are coming directly and indirectly into our food chains and affecting to the human health. Researcher is trying to curb down the rate of use of apparels and trying to give ways and means for its recycling so the environment will affect least.

Hypothesis:-

1. Fashion industry is growing aggressively
2. Exhaustive use of textile harming to our earth

Per capita apparel consumption in major markets in US dollar

Year	USA	European Union	China	India
2015	978	693	172	45
2025	1116	766	435	123

Table No. 1 Source: -www.worldbank.com

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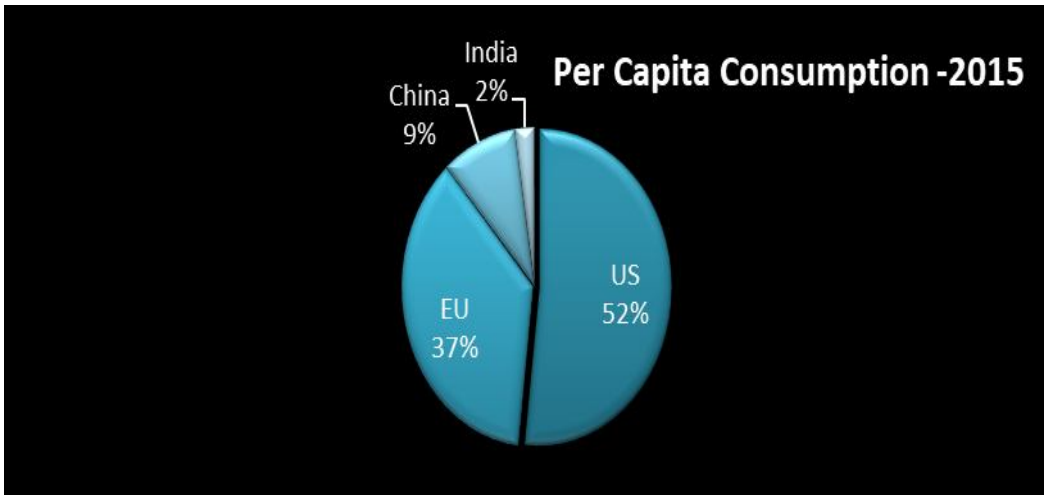
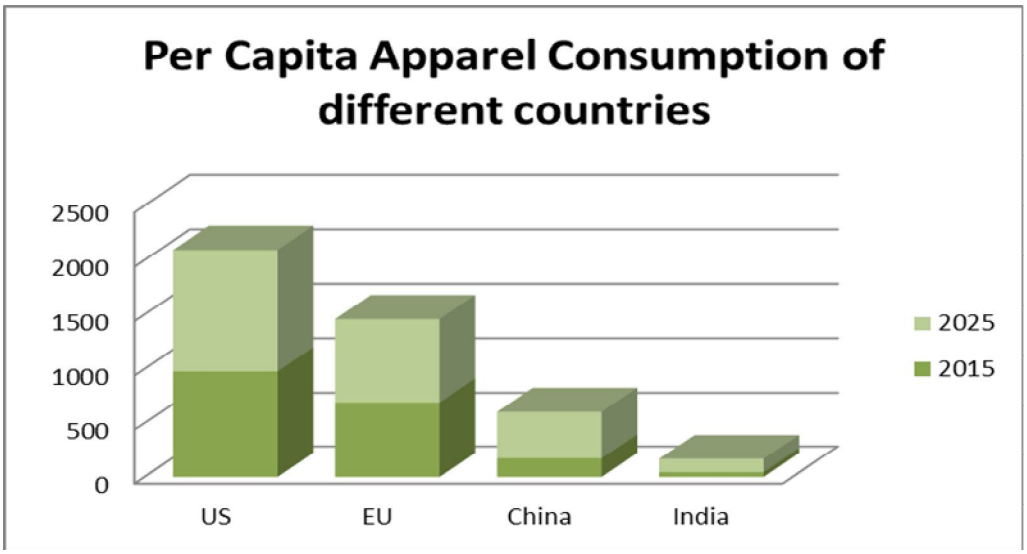


Graph No. 1 Source: -www.worldbank.com, www.ibef.org, Bureau of Economic analysis (USA)



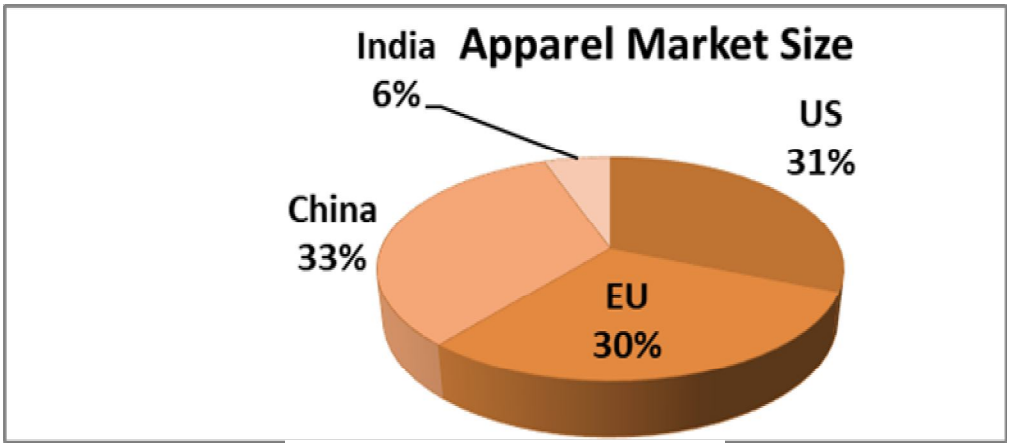
Graph No. 2 Source: -www.worldbank.com , www.ibef.org, Bureau of Economic analysis (USA)

As per the Table No. 1 and Graph No. 2, Per capita apparel consumption of four major economies of 2015 have taken, in that Per Capita Consumption is very high compared to Asian countries generally, and India particularly. In near future this consumption is going to increase as per the data of 2025.

Apparel Market Size of the top 4 countries

Year	USA	European Union	China	India
2017	288 Billion USD	277Billion USD	309 Billion USD	51 Billion USD
2025	373 Billion USD	363 Billion USD	550 Billion USD	97 Billion USD

Table No. 2 Source: -www.pwc.in



Graph No. 3 Source: -www.pwc.in

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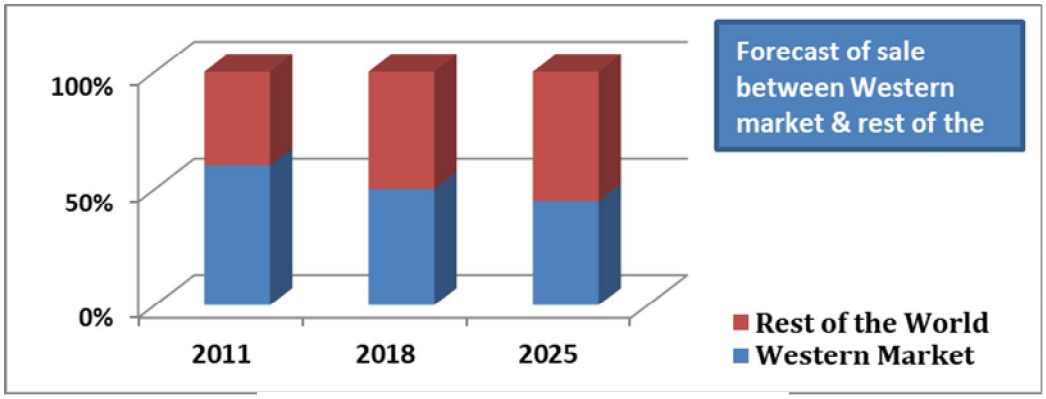
As per the Table No. 2, Market share of India accounts for 51 Billion US$ and expected growth to 97 Billion USD which is very less compared to giant markets like USA and European Union which accounts for 288 and 277 Billion USD in 2017 respectively.

Global apparel sale forecast 2011-2025

Year	Western Market	Rest of the world
2011	60%	40%
2018	50%	50%
2025	45%	55%

Table No. 3 Source: -www.consultancy.asia



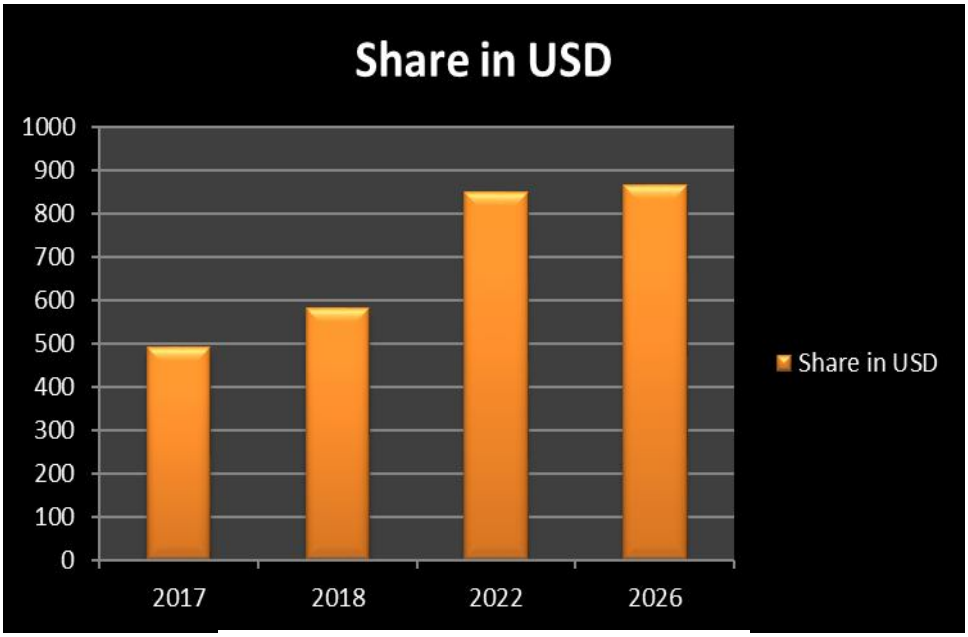
Graph No. 4 Source: - www.consultancy.asia

As per the Table No. 3, researcher has studied the share of western market and rest of the world for its comparison, as the sale is tremendous in the western market compared to rest of the world. But as we can see, in 2011 share of western market and rest of the world is around 60 and 40 per cent respectively. In 2018, the share of both western and rest of world is equal. Expected global sale forecast for 2025 will be 45% and 55% for western market and rest of the world respectively.

India's Fashion Retail Market in Billion US$

Year	Share in Billion USD
2017	**490**
2018	**580**
2022	**850**
2026	**865**

Table No. 4 Source: -www.technopak.com



Graph No. 5 Source: -www.technopak.com

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As per the table no. 4, India's share in the fashion industry is around 490 and 580 Billion USD for 2017 and 2018 respectively and its expected growth will be around 850 and 865 Billion USD for 2022 and 2026 respectively. Therefore,country is showing its substantial growth, in its share of fashion retail market.

Some facts about Textile Industry

1 Kg	of chemicals is needed to produce 1 Kg of textiles
23%	of all chemicals produced worldwide are used for the textile industry
10%	of carbon emission is from apparel industry
70 Million	Trees are cut down each year to make our clothes
30%	of Rayon comes from endangered and ancient forests
5%	of the global apparel industry uses forest based fabrics
23 Kg	of Greenhouse Gases are generated for each Kilo of fabric produced
70 Million	Oil Barrels are used each year to produce Polyester
400%	More Carbon emissions are produced if wear a garment 5 times instead of 50
200 years	Take up to decompose Synthetic Fibres
72%	Synthetic Fibres are used substantially
20%	of the industrial water comes from textiles treatment and dying
2 Lakh Tons	of dyes are lot to effluents every year
90%	of wastewaters in developing countries is discharged into the rivers without treatment
1.5 Trillion	Litres of water are used by the Fashion Industry each year
750 Million	People in the world do not have access to the drinking water
1900 individual Microfibers	are released into the water, every time we wash a synthetic garment
1,90,000 tons	of textile microplastic fibres end up in the ocean every year
15% only	of our clothing are recycled or donated
5.2%	of the waste in our landfills are textiles
3 years	Is the only average lifetime of a garment today
257 Gallon	of water is require to produce cotton for making 1 T-Shirt

CONCLUSION

Although, fast fashion may seem like a victory for fashion because, at such low prices, everyone can enjoy changing trends without breaking the bank. However, these fast fashion production and consumption cycles have resulted in a trail of destruction, including increased textile waste generated along the entire fashion supply chain, from production, consumption to disposal. In addition, the fashion and textile industries use extensive amounts of water, energy, chemicals and raw materials throughout the supply chain, all of which places heavy demands on Earth's natural resources. To make matters worse, alarming amounts of chemical pollutants, carbon dioxide and other toxic substances are released into waterways, soil and air during clothing's production.

As per the above data and information and some facts, Fashion industry is known to be for second largest polluter in the world. Some sustainable steps needed to be taken to slash down the consumption of fashion industry. From the above tables, we can say that, consumption over fashion is very high in the western countries compared to rest of the world & especially by India. But in this globalized era Asian countries like India and China are moving more towards consumption of fashion as because of standard of living of the consumers has increased and thus consumer behaviour. India has a demographic dividend so it is quite favouring towards fashion. As we can see, there are 'n'numbers of ways through which this textile vis-a vis fashion industry is not only just polluting our environment but also destroying our scarce water reservoirs, quality of soil & air, trees etc. which is very concern issue not just for India but for the whole world. There are some solutions that we need to adopt so that to mitigate these problems. First and foremost thing is to build awareness and willingness change the present scenario by some green steps such as use of organic fibres instead of BT cotton, synthetic

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fibres which do not require fertilizers to grow. Cotton is a very water intensive crop that it requires 20,000 litres of water to produce just 1 kg of cotton which gives rise to dramatic ecological consequences and lead to desertification of land and scarcity of drinking water of millions of lives. Use of low water consumption fibres such as Linen and recycled fibres etc. consumers should buy less and should focus on its mending and recycling. Choose only sustainable brands and look for the garments which have certification label of less chemical content. New business models, should be invented which will reduce the speed and level of consumerism, and counter the emerging throwaway culture in the clothing and fashion industry. Accountability and transparency is a peculiar thing which need to adopt by the stakeholders who will be there in the textile supply chain and should aim for zero hazardous chemicals. This concept will be fostered if there will be standards and certification body controlling will be by Government authority, NGO or any other voluntary based organization. We can emphasis more on circular economy such as "Cradle to Cradle" system in which after end life of the product that will be again reused as inputs for next generation of material. India is having very good legacy in this "Cradle to Cradle" system from our age old times as we re-use the used clothing in making fascinating Godhadi, cushions, beds, handicrafts. Here researcher wants to conclude that India should become an ideal example for its sustainable and green development in its fashion world and should let the entire world move towards sustainability.

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HINTERLAND TOURISM: EXPLORING THE UNEXPLORED. PERSPECTIVES FROM MUMBAI METROPOLITAN CITY REGION

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ABSTRACT
The term urban hinterland has become commonplace when denoting thetributary regions that get closely linked to the central city. The hinterland areas often experience and reflect the development corollaries of its metropolitan city. With increasing urbanization these areas start experiencing growth of tourism and recreation activities. Potentials exist and often revolve around the natural environment because of their beauty and serene landscapes of the hinterland areas that promote tourism. In the times when urban tourism is significantly increasing further sustainable development lies in hinterland areas of metropolitan cities. It is from this perspective that the present research paper attempts to elucidate contemporary tourism processes in the urban periphery of Mumbai metropolis and promote hinterland tourism as a key to sustainable tourism development in the Mumbai Metropolitan Region (MMR) by leveraging the existing unexplored tourism potentials in the peripheral areas. It also seeks to illustrate the significance of planning tourism activities within MMR and suggests feasible policy measures required for tourism development with sustainability approach at its core.

Keywords: Hinterland tourism, urban periphery, metropolitan region, tourism potentials, sustainable tourism development.

INTRODUCTION
The term urban hinterland has become commonplace when denoting thetributary regions that get closely linked to the central city(Britannica). The concept of regions has been traditionally used in geography as a useful paradigm for organization of space. Various scholars identified such city regions as "Umland' used by German and Scandinavian geographers, 'urban field' (Friedmann & Miller, 1965), 'hinterland', 'urban sphere of influence' (Hartshorne, 1980), 'Catchment area', 'complementary region' by Christallers in his 'Central Place Theory'. In similar fashion the city of Mumbai hasexperienced growth in functions and spatial expansion for the past several decades and has also altered the economic and social organization of its region. Owing to its spatial proximity as well as functional linkages the hinterland areas often experience and reflect the development corollaries of its metropolitan city. Mumbai has been a good example of peri-urbanisation, a process by which people move away from the city's main hub and radiate away towards the periphery.(Mumbai Human Development Report – 2009). Though the hinterland areas often semi-urban and rural in character have few facilities for promoting tourism activities, yet there exists immense potential which remains unexplored by the mainstream tourism. Potentials exist and often revolve around the natural environment because of their beauty and serene landscapes of the hinterland areas that promote tourism. With increasing urbanization these areas start experiencing growth of tourism and recreation activities and thus turn into what Turner and Ash (1975) have termed as the pleasure periphery (Brown & Hall, 2000). Moreover the existing urban tourism which itself is a cluster of economic activities with significant socio-economic and environmental consequences on the individual cities.

Moreover the existing urban tourism which itself is a cluster of economic activities with significant socio-economic and environmental consequences on the individual cities(Paskaleva-Shapira, 2004).
Even as the term periphery stands to represent something marginal and remote, yet from the viewpoint of urbanites these areas turn into a centre of attractionfor recreation and leisure duringthe weekends shaping the development of tourism. In the times when urban tourism is significantly increasing the key to its further sustainable development lies in exploring this vast and unexplored potential of hinterland areas of metropolitan cities. In almost all cases where conservation is proposed, management of resources encompasses economic development and nature based tourism fits best as a pragmatic approach (Zurich, 1995). The Mumbai Metropolitan city vividly displays this character and it is from this perspective that the present research paper attempts to elucidate contemporary tourism processes in the urban periphery of Mumbai metropolis and promote hinterland tourism as a key to sustainable tourism development in the Mumbai Metropolitan Region (MMR) by leveraging the existing tourism resources and at the same time explore the unexplored tourism potentials in the peripheral areas. It also seeks to illustrate the significance of planning tourism activities within MMR and suggests feasible policy measures required for tourism development with sustainability approach at its core.

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AIMS AND OBJECTIVES

1. To classify the major forms of tourism in the study area and identify core and allied activities.
2. To understand the various elements forming the bases of tourism development.
3. To identify potentials for promoting tourism based on activity matrix and facility analysis.
4. To explore the nature of opportunities and threats arising out of tourism.

DATA BASE AND RESEARCH METHODOLOGY

Research methodology involves empirical study based on primary data obtained from the field visit and interviews for facility analysis. Field survey observations have also been useful in locating new tourism activities and places.

The research has also relied on secondary data obtained from MTDC tourist information guide, Travel and tour advertisement brouchers, Regional plan of Mumbai Metropolitan Region (1996-2011) and websites to prepare an inventory of the tourism resources for MMR. With the help of Activity specific matrix the tourism potential of the region has been evaluated to highlight the existing resource base for tourism in MMR and to identify the potentials for future tourism development.

STUDY REGION PROFILE

Geographically, the Mumbai Metropolitan Region lies in North Konkan towards the west of the Sahyadri Ranges between 18o 33' and 19o 31' north latitude, and between 72o 45' and 73o 28' east longitude. The present boundaries of the Region thus encompass a total area of 4355 sq.km. and consists of the following administrative units: 1.

Mumbai City District; 2. Mumbai Suburban District; 3. Part of Thane District comprising a) Thane, Kalyan, Bhiwandi and Ulhasnagar tehsils; and 4. Part of Palghar District comprising of a.) Part of Vasai tehsil. 5. Part of Raigad District comprising a) Uran tehsil and b) Part of Panvel,

Karjat, Khalapur, Pen and Alibag tehsils.The boundaries are marked by natural features such as Vaitarna Creek and Tansa River in the north, Patalganga River in the south and foothills of Sahyadri in the east, Arabian Sea on the west and the north-eastern boundaries are coterminous with the administrative boundaries of Kalyan and Bhiwandi tehsils.

The southern boundaries of the Region extend to include part of Pen and Alibag tehsils of Raigad District. The study region is known for its administrative prominence, vast area, huge population size , economic significance, socio-cultural significance, bio-geographical areas, physical landscapes and biodiversity, all of which form the basis of tourism resources.

ANALYSIS AND OBSERVATION

The analysis is carried out based on the research aims and objectives outlined earlier for this study. These are organised under the following heads:

FORMS OF TOURISM ANDACTIVITIES IN THE STUDY AREA: CORE AND ALLIED

The forms of tourism developed in the urban hinterland of the MMR mainly relate to those which are developed based on the natural resources and cultural resources. Thus tourism based on natural resources in MMR is mainly characterised by Nature tourism, Eco tourism and Adventure tourism.

Whereas cultural resources support innumerable forms of tourism such as Cultural tourism, Religious tourism, Agro tourism, Historical tourism, Heritage tourism, Archaeological tourism, Educational tourism, Leisure tourism, Culinarytourism and Medical tourism.The following charts displays the many forms of tourism and the respective tourism destinations present in MMR.

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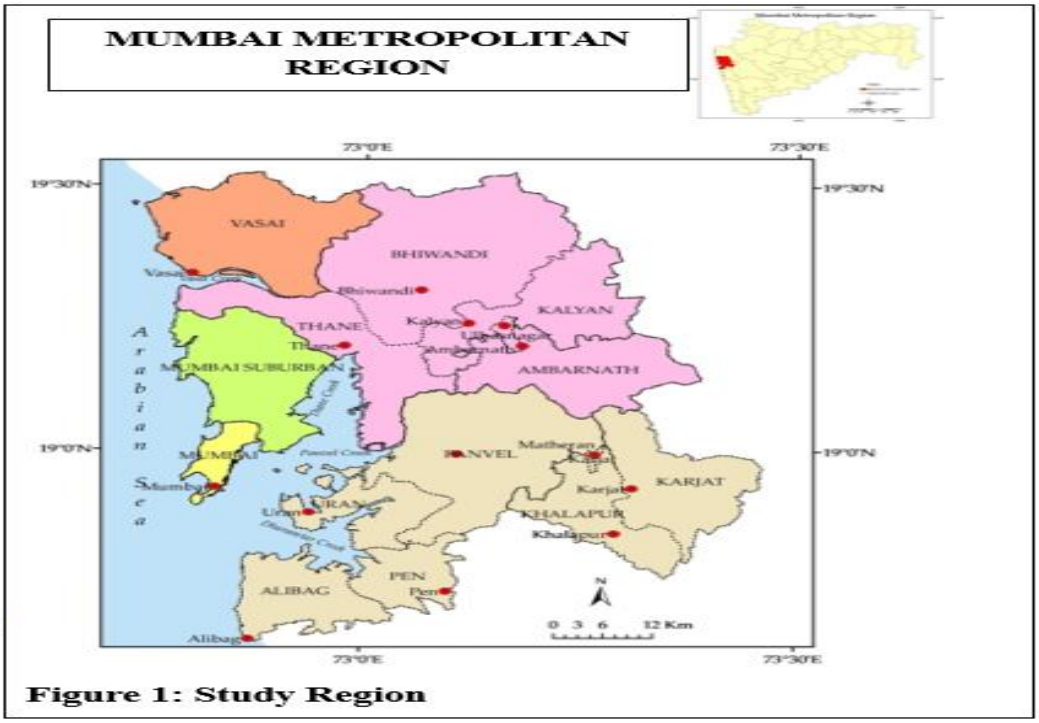

Figure 1: Study Region

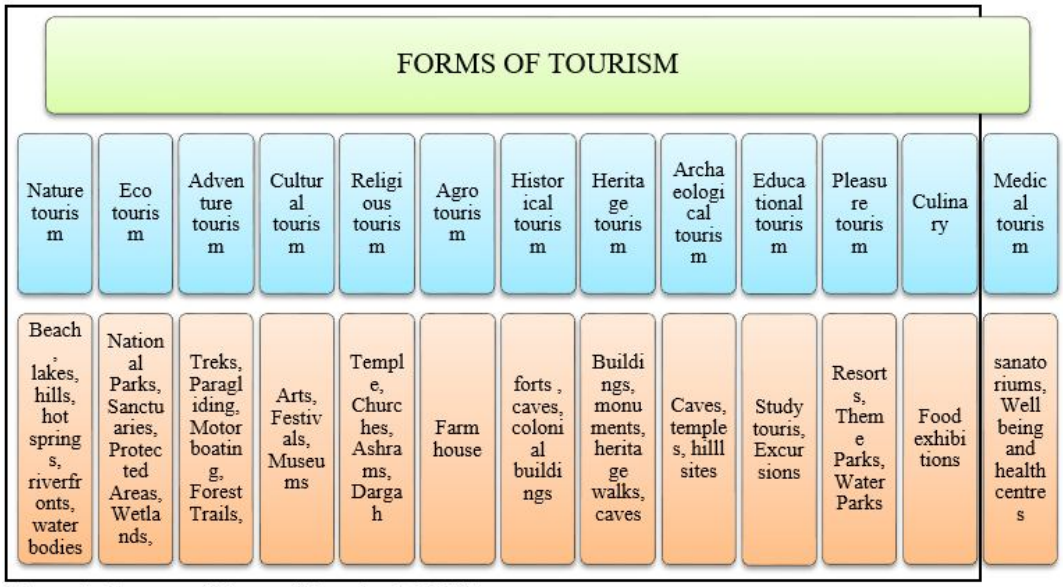

Figure 2: Forms and Types of Tourism in MMR

The core and allied activities of these various forms of tourism are summarized in the table below:

Table-1: Major forms of Tourism in MMR and the related core and allied activities

Sr. No.	TOURISM FORM	TOURISM DESTINATION	CORE ACTIVITIES	ALLIED ACTIVITIES
1.	Nature tourism	Beach, lakes, hill stations, hot springs, riverfronts, water bodies	Sight-seeing, Boating, Swimming etc.	Restaurants, Food joints, Photography, Shopping, Animal rides, Motor rides
2.	Eco tourism	National Parks, Sanctuaries, Protected Areas, Wetlands	Nature visit, Wildlife, Picnicking	Photography
3.	Adventure tourism	Treks, Paragliding, Motor boating, Forest Trails	Adventure rides	Food joints
4.	Cultural tourism	Arts, Festivals, Museums	Visiting Art Galleries, Museums, Tourist Festivals, Musical Performances etc	Exhibitions, Shopping, Photography, Restaurants etc

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5.	Religious tourism	Temples, Churches, Ashrams, Dargah	Rituals, Solace, Meditation, Healing	Religious ceremonies, Shopping, Food joints, Educational courses
6.	Agro tourism	Farm house	Farm visits, Farm stays, Experiences with domesticated animals.	Plantations, Livestock, Dairy, Party and Celebrations
7.	Historical tourism and Heritage tourism	forts , caves, colonial buildings, monuments, heritage walks	Sightseeing, heritage walks,	Photography, Shopping,
8.	Archaeological tourism	Caves, temples	Sightseeing,	Religious ceremonies, Shopping, Food joints
9.	Educational tourism	Study tours, Excursions	Field visits,	Shopping, Photography, Restaurants etc
10.	Pleasure tourism	Resorts, Theme Parks, Water Parks	Water games, Rides, Relaxation	Conferences, Restaurants, Wedding events, Birthday Parties, Weekends.
11.	Culinary tourism	Food exhibitions	Food delicacies	Shopping, Business promotions
12.	Medical tourism	Sanatoriums, Well being and health centres	Courses on Yoga, Mediation, Health care centres	Lodging and Restaurants

ELEMENTS OF TOURISM DEVELOPMENT : The observations thus reveal the following major elements of tourism development in the urban hinterlands:

Table-2: Elements of Tourism development in MMR

ELEMENTS	SUBCOMPONENT
Natural features	Landscapes, waterbodies, flora and fauna.
Cultural features	Religious, structures, architecture, attractions, food, events, art, exhibitions.
Infrastructure	Transport systems, Power supply, Water supply, Sewage disposal
Tourist operations and facilities	Accommodation, Restaurants, tour packages, shopping zones, Tour operators, travel agencies, hospitality, Information centres, reservation systems.
Market oriented services	Tourism offices, Travel agents, banks, ATM's, currency exchange, shops
Human resources	Migrants, Skilled workforce, positive attitude towards tourists, small to medium scale local entrepreneurships
Landuse planning	Planning and zoning regulations, Eco-sensitive regions

A variety of natural and cultural features act as tourist Attractions such as Landscapes, waterbodies, flora and fauna, farmhouses., holy places, resorts and water parks, river sides and dams, caves, ashrams, farm houses, theme parks, malls, shopping areas, architecture etc. The tourist operations and facilities look after service provision to the tourists ranging from accommodation of Private type i.e. Hotels, Resorts, Bungalows, Farmhouses, Hostels etc. to Government run such MTDC stays. Apart from the core infrastructure such as electricity, water supply, sewage disposal, transport the tourist infrastructure such as tourist information services, tour packages, guided tours, hospitality services, tourism products, etc. help in effectively organizing the tourism activity in the region. The various tourist Market oriented services such as Tourism offices, Travel agents, banks, ATM's, currency exchange, shops help in promoting tourism to greater scale. The tourism industry is also benefitted with Mumbai attracting large pool of migrants providing the required skilled labour force. A large number of small and medium scale local entrepreneurs successfully manage to utilize the exiting tourism market through sale of variety of goods and services. The positive outlook of the local residents also present a tourist friendly image of the city thus attracting tourists from India and the world. The landuse plans and the existing environmental regulations helps in conserving the few remaining natural areas around the metropolis which are the few of major tourist attractions of the city region such as the wetlands, national parks,

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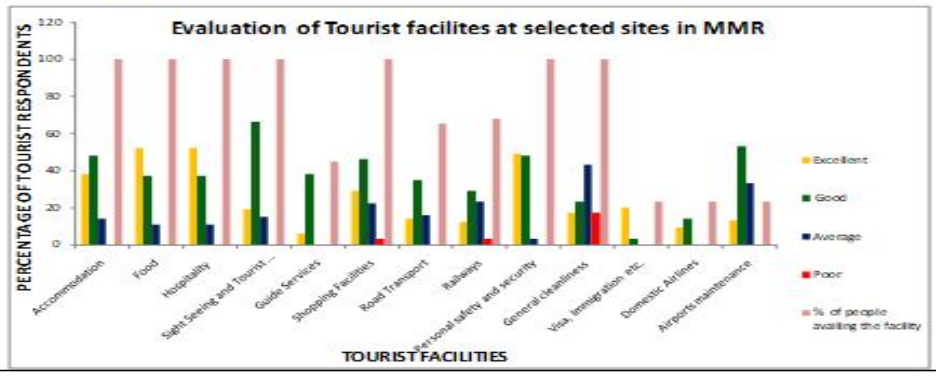
bird sanctuary, mangroves etc. In all it is amalgamation of the various elements both geographical, socio-cultural, economic and technological which sustain and promote the tourism in MMR.

TOURISM POTENTIALS BASED ON ACTIVITY MATRIX FOR MMR AND FACILITY EVALUATION OF SELECTED TOURIST SITES

The prominent tourist attractions were selected for facility evaluation across the study region. Based on the ratings given by tourists (Figure 3) the results of the facility are summarized below. Considering the highest rating in each grade following is the existing state of facilities as per tourist experience. Excellent : Hospitality, food, safety and security ; Good: accommodation, sight seeing, guide service, shopping, transport, airport maintenance; Average : General cleanliness.

Table-3: Activity specific matrix for MMR.

Figure 3 : Tourist ratings to the facilities



Natural resource based	Water based / Sea fronts	Activities	Current resource opportunities	Potential Resource Opportunities
		Boating	Low	Moderate
		Harbour Cruise	Moderate	High
		Watersports	Moderate	High
		Beach walk	High	High
	Land based	Picnic ground	Moderate	High
		Camping	Low	High
		Hiking/trekking	Moderate	High
		Cave exploration	Low	High
		Cottaging	Low	High
		Cycling	Low	High
		Equestrian trails	Low	High
	Flora and Fauna	Forest trails	Moderate	High
		Bird watching	Low	High
		Wildlife viewing	Low	Moderate
		National parks	Moderate	High
		Bird Sanctuaries	Moderate	High
Cultural resource based	Village based	Farmhouse	Low	High
	Heritage and Historical resource based	Historic sites	Moderate	High
		Archeological attractions	Low	High
		Museums	Low	High
	Niche – special interest	Urban villages	Low	High
		Slums	Moderate	High
	Religious	Places of worship	High	High
		Religious fairs and festivals	Moderate	High
	Educational resources	Science Centre and Planetarium	Moderate	High
		Libraries	Low	Moderate
		Art galleries	Moderate	High

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		Museums	Low	High
	Medical and wellness	Multi-specialty hospitals	High	High
		Hot Springs	Low	Moderate
		Ayurveda and Yoga	Low	High
	Gastro	Food walks	Low	High
		Food festivals	Low	High
	Culture	Tourist Fairs and festivals	Moderate	High
		Indigenous crafts and events.	Low	High
	Recreation	Amusement Park	High	High
		Water Park	High	High
		Malls	High	High
		Theatre	Low	High
		Shopping	High	High

Based on the existing tourism resources of the MMR the following ACTIVITY SPECIFIC MATRIX has been designed. It indicates the levels of existing activities and the resource potential with regards to tourism opportunities in MMR.

PERSPECTIVES FOR TOURISM PLANNING - THREATS AND OPPORTUNITIES

Considering the multifold impacts of tourism it becomes imperative to have a strong planning base. Understating of the threats and opportunities provide directions for future planning. Following observations have been made in this regard:

THREATS: The conditions of threat which mostly exist at the popular tourism destinations are Resource crisis, Population Pressure, Crowd management, Social Tensions, lack of medical aid at remote tourist spots, environmental aesthetics, Hygiene and Sanitation, Clash of interest between the various stake-holders.

OPPORTUNITIES: lie in harnessing the existing potentials of the less developed tourism destinations. Thus these are support to the local economy, women empowerment, environmental protection, availability of short distance recreation and tourism destinations. Opportunities also lie in well-known tourist attractions with regards to promoting affordable accommodation, Budget Tourism Products and Packages, protection and management of existing tourist resources and Integrated Business opportunities based on Public Private partnership model.

The Tourism ministry also has recommended identification and development of new geographic regions for promoting rural tourism.Keeping in view this policy the present research study identifies certain areas as having potential for tourism development in the periphery of the city areas. These include the coastal towns like Vasai, Arnala, Kalamb; hilly areas Kanheri and Yeoor; fort of Vasai, Tansa lake environs and wildlife sanctuary,nature park and sanctuaries of Karnala near Panvel, Mandwa and Kihim beaches of Raigad district.As a measure to conserve the delicate ecology of the region areas of mangrove and river tracts can be developed as places of tourism within the regulated policy framework. Development of tourist zones will be a useful strategy to achieve this with regards to type of tourism being permissible. Services like transport especially railways and local road transport, power supply, provision of clean and healthy surroundings, well maintained entry and exit points like airports and railway terminals have to be strengthened.In-order that the basic infrastructure remains strong it is essential to regulate the ongoing tourism activity and to seek its dispersal over a wider area.Provision of Package tours linking the famous destinations with the new potential tourist centres will help the evenly spread of tourism activity in the region.Proper advertising and marketing of the varied tourism product of the region particularly Thane, Palghar and Raigad districts is essential to draw tourists away from Mumbai.New tourist centers thus need to be identified nearby the existing tourist corridors in those regions which are economically weak.Creating tourism opportunities while respecting the local sentiments will help to improve the situation.Promoting local entrepreneurship is yet another means for ensuring long term sustainable tourism especially through agro tourism, eco tourism rural tourism, homestays etc.

CONCLUSION

Tourism Planning in MMR thus is essential to maintain tourism as a long term economic activity on an environmentally sustainable basis.Though there are many barrierrs to tourism planning but the rewards resulting from an effective tourism planning process outweigh the efforts needed to surmount these. With effective tourism plan corresponding to that of the tourism policy of the region will enhance the positive role of the industry to minimize the regional imbalances and achieve environmental conservation simultaneously.

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MATHEMATICAL TECHNIQUES USED IN GEOGRAPHY.

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ABSTRACT
This paper intends revealing the close relationship between Mathematics and Geography. Both the subjects have evolved together in the history and both are instrumental in initiating progress of each other. Geography and Geometry both the subjects have study of "Geo" that is earth in common. Basic concepts of geography like dividing earth by imaginary horizontal and vertical lines called latitudes and longitudes, dividing earth into five zone depending on climates, scaled map making etc. are invented by mathematicians. Eretosthenes(276 BC – c. 195/194 BC) who is called as father of geography was himself a mathematician. He used basic mathematical techniques available at that time to obtain circumference of an earth elegantly. Right from the time of birth of Geography as a scientific discipline, till today mathematics is the back bone of Geography. Today weather prediction models in geography are mainly using complex mathematical models and theory of chaos.

The relationship between these two subjects is not one way relation, Mathematics has also borrowed ideas from problems in geography. The famous history making four color problem has its origin in geography. In the history, many geometrical ideas and formulae were developed since they were needed in land survey.

In this paper I have tried to reveal the connection of these two disciplines.

OBJECTIVES
The first section of this paper is for explaining the techniques used by Eretosthenes to obtain circumference of earth and the birth of Geography. In the second, third and fourth sections are devoted to different mathematical techniques used in geography. Fifth section states the story of famous four color problem in mathematics. Sixth section gives concluding remarks.

FINDING CIRCUMFERENCE OF EARTH AND THE FIRST GEOGRAPHICAL MAP
Eratosthenes of Cyrene was a Greek mathematician and geographer. He is best known for being the first person to calculate the circumference of the earth, which he did by comparing angles of the mid-day Sun at two places a known North-South distance apart. His calculation was remarkably accurate. He was also the first to calculate the tilt of the Earth's axis, again with remarkable accuracy. Additionally, he may have accurately calculated the distance from the Earth to the Sun and invented the leap day. He created the first map of the world, incorporating parallels and meridians based on the available geographic knowledge of his era.

Eratosthenes calculated the Earth's circumference without leaving Egypt. He knew that at local noon on the summer solstice in Syene (modern Aswan, Egypt), the Sun was directly overhead. He knew this because the shadow of someone looking down a deep well at that time in Syene blocked the reflection of the Sun on the water. He then measured the Sun's angle of elevation at noon in Alexandria by using a vertical rod and measuring the length of its shadow on the ground. Using the length of the rod and the length of the shadow, as the legs of a triangle, he calculated the angle of the Sun's rays. This turned out to be about 7°, or 1/50th the circumference of a circle. Taking the Earth as spherical, and knowing both the distance and direction of Syene, he concluded that the Earth's circumference was fifty times that distance. He made five important assumptions (none of which is perfectly accurate)

1. That the distance between Alexandria and Syene was 5000 stadia,

2. That Alexandria is due north of Syene

3. That Syene is on the Tropic of Cancer

4. That the Earth is a perfect sphere.

5. That light rays emanating from the Sun are parallel.

Eratosthenes later rounded the result to a final value of 700 stadia per degree, which implies a circumference of 252,000 stadia, Eratosthenes now continued from his knowledge about the Earth. Using his discoveries and knowledge of its size and shape, he began to sketch it. In the library of Alexandria he had access to various travel books, which contained various items of information and representations of the world that needed to be pieced together in some organized format. In his three-volume work *Geography* (Greek: *Geographika*), he described and mapped his entire known world, even dividing the Earth into five climate zones, two freezing

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zones around the poles, two temperate zones, and a zone encompassing the equator and the tropics. He had invented geography. He created terminology that is still used today. He placed grids of overlapping lines over the surface of the Earth. He used parallels and meridians to link together every place in the world. It was now possible to estimate one's distance from remote locations with this network over the surface of the Earth. In the *Geography* the names of over 400 cities and their locations were shown this had never been achieved before. Unfortunately, his *Geography* has been lost to history, but fragments of the work can be pieced together from other great historians like Pliny, Polybius, Strabo and Marcianus.

WEATHER PREDICTION MODELS

Weather prediction models are systems of non-linear equations involving many parameters. Current values of these parameters are the initial conditions using which we predict the weather conditions in the near future, say after one hour or one day, these predicted values will be the input to predict the weather of next time interval and so on. Since the system contains many parameters and the equations are non-linear, a small error in the value of any of the parameters causes a big error in the final outcome. Moreover only the starting inputs are known accurately; afterwards the next inputs are predicted values which may not be correct. Non-linear equations will cause the error factor to get multiplied rapidly. Chaos in a system was discovered by American mathematician and meteorologist Edward Lorenz (1917-2008) during research performed at Massachusetts Institute of Technology in the United States. In the late 1950s and early 1960s, Lorenz modeled the weather using twelve differential equations. He wanted to save time on one occasion and started the program in the middle, rather than at its initial conditions, and stored computer data to three decimals rather than the usual six. Instead of getting an expected close approximation to his result, Lorenz got a very different answer. His 1962 paper “Deterministic Non periodic Flow” is considered the beginning of chaos theory. Lorenz rationalized that a small change in the initial conditions can drastically change the long-term behavior of a meteorological system. He called this phenomenon the “butterfly effect.” In its extreme case, Lorenz contended it was possible for the flapping of butterfly wings to cause a massive storm a half world away. His 1972 paper “Predictability: Does the Flap of a Butterfly's Wings in Brazil Set off a Tornado in Texas?” originated the term. Based on his results, Lorenz stated that it is impossible to predict the weather accurately. Even though Lorenz contended it was impossible to accurately predict meteorological events, when computers were invented their ability to handle massive amounts of variables changed that impossibility to, at least, a possibility. Meteorologists in the twenty-first century attempt to predict weather and climate using complicated mathematical equations that model the behavior of Earth's atmosphere. They would also like to be able to estimate global climate changes caused by human activities.

WILD FIRE MODELS

Wildfire modeling attempts to reproduce fire behavior, such as how quickly the fire spreads, in which direction, how much heat it generates. A key input to behavior modeling is the Fuel Model, or type of fuel, through which the fire is burning. Behavior modeling can also include whether the fire transitions from the surface (a "surface fire") to the tree crowns (a "crown fire"), as well as extreme fire behavior including rapid rates of spread, fire whirls, and tall well-developed convection columns. Fire modeling also attempts to estimate fire effects, such as the ecological and hydrological effects of the fire, fuel consumption, tree mortality, and amount and rate of smoke produced. Wild land fire behavior is affected by weather, fuel characteristics, and topography. Weather influences fire through wind and moisture. Wind increases the fire spread in the wind direction, higher temperature makes the fire burn faster, while higher relative humidity and precipitation (rain or snow) may slow it down or extinguish it altogether. Wildfire fuel includes grass, wood, and anything else that can burn. Small dry twigs burn faster while large logs burn slower; dry fuel ignites more easily and burns faster than wet fuel. Topography factors that influence wildfires include the orientation toward the sun, which influences the amount of energy received from the sun and the slope (fire spreads faster uphill). Fire can accelerate in narrow canyons and it can be slowed down or stopped by barriers such as creeks and roads. It has long been recognized that "fires create their own weather." That is, the heat and moisture created by the fire feed back into the atmosphere, creating intense winds that drive the fire behavior. The heat produced by the wildfire changes the temperature of the atmosphere and creates strong updrafts, which can change the direction of surface winds. All these factors makes the model more and more complex but Mathematics can still give some predictions and these predictions are extremely useful in disaster management.

CONTRIBUTIONS OF GEOGRAPHY TO MATHEMATICS

Geometry is a main branch of mathematics and it was the need to measure area, perimeter of fields and land which led to inventions of geometrical formulae. In a way it was geography providing practical problems and the need to solve these problems led to theoretical development of geometry. Not just geometry but geography

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has posed challenging problems which helped in the development of Spherical trigonometry, Theory of chaos, Numerical methods, graph theory, computational mathematics and topology also.

The story of four color problem is an interesting and important example to illustrate the relationship between these two subjects. The Map-makers usually color the adjacent countries with different colors. It is observed that four colors are enough to color any map in which no two adjacent countries receive same colors but the question was is it true for all the maps and can it be proved mathematically?

As far as is known the conjecture was first proposed on October 23, 1852 when Francis Guthrie, while trying to color the map of counties of England, noticed that only four different colors were needed. At the time, Guthrie's brother, Frederick, was a student of Augustus De Morgan(the former advisor of Francis) at University College London. Francis inquired with Frederick regarding it, who then took it to De Morgan. one of the two Guthries, published the question in *The Athenaeum* in 1854 and De Morgan posed the question again in the same magazine in 1860.It remained unsolved till 1976. Finally in 1976 it was proved by Kenneth Appel and Wolfgang Haken, but only after many false proofs and counterexamples. It was the first major theorem to be proved using a computer.

CONCLUSIONS

Mathematics and geography subjects are closely related and both the subjects have helped each other to evolve.

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AN ASSESSMENT OF THE POPULATION CHARACTERISTICS OF MULUND, MUMBAI

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ABSTRACT
Suburban Mumbai is getting more and more populated day by day. However, this growth is not uniform throughout. Therefore, it becomes necessary to comprehend the changing characteristics of individual suburbs for understanding the demographic dynamics of the region in-depth. With this understanding, the present paper assesses the evolving characteristics of Mulund's population. In doing so, the objectives of examining the changing characteristics of Mulund's population and drawing on its emerging population pattern are undertaken. The study is based on analysis and interpretation of Census of India's DCBH (District Census Handbook) for the Mumbai Suburban District, 2001 and 2011. The aspects of population growth and density, sex ratio, and literacy rate are studied for the suburb. The study brings out many interesting aspects in terms of the population dynamics in Mulund.

Keywords: Population, Suburb, Characteristics, Trend, Mulund

INTRODUCTION
Suburban growth is inevitably associated with the growth of the city (Dixit, 2011). With the saturation of Mumbai's core, suburbs of the city have gained a lot of prominence. While the core of Mumbai at present is witnessing a negative growth rate of population, the suburbs, on the contrary, are undergoing a positive growth rate. The growth rate of population in the Mumbai City District has been -7.57 for the decade of 2001 to 2011 whereas, for the same decade, Mumbai Suburban District has recorded a positive growth of 8.29 percent (Census, 2011). Thus, it can be said that suburban Mumbai is getting more and more crowded day by day. However, there are local variations in terms of the emerging characteristics of the population in the region. In the wake of this tremendous growth of population in suburban areas of Mumbai and the existence of local variations, it becomes necessary to comprehend the changing characteristics of population in the individual suburbs for a better understanding of the demographic dynamics of the region. Therefore, in this study, an attempt has been made to assess the evolving characteristics of Mulund's population and to draw on the emerging pattern. It is hoped that the study will serve its bit in the understanding of the demographic dynamics of Mumbai.

OBJECTIVES AND RESEARCH QUESTIONS
The main objectives of the study and the associated research questions are given below:

Objective No. 1: To examine the changing characteristics of Mulund's population

Research Questions:

What is the pattern of population growth and density in the suburb?

What is the sex ratio in the suburb and how has it evolved in the last few decades?

What is the status of literacy in the suburb? What is its gendered nature?

Objective No. 2: To draw on the emerging scenario of the population in the suburb.

Research Questions:

What is the emerging pattern of population in the suburb?

What is to be given attention?

METHODOLOGY
Data for the study has been derived from the Census of India's DCBH (District Census Handbook) for the Mumbai Suburban District, 2001 and 2011. DCBH provides the most authentic details of the census and non-census information from village and town level to district level (Census, 2011). Data on the variables of population, gender, and literacy have been collected from the DCBH. The collected data is tabulated, processed and graphically represented to supplement the analysis and thereby derive the findings.

LIMITATIONS OF THE STUDY
Due to various constraints, this study restricts itself to the analysis of certain selected population parameters. Thus, the study not being all inclusive of the various aspects of the population in the suburb is limited in scope.

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BACKGROUND OF THE STUDY AREA

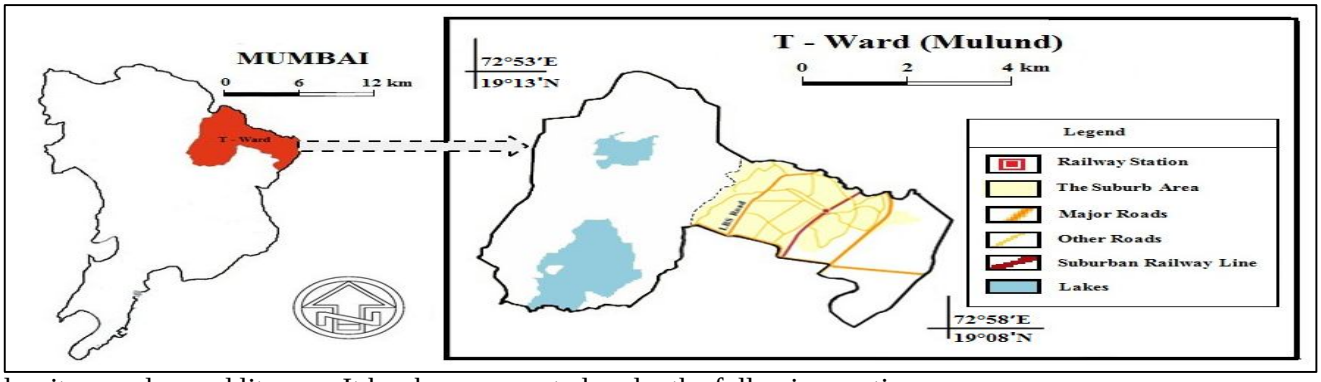
The study area, Mulund is a prominent suburb of Mumbai. It geographically extends from 19°08'N to 19°13'N latitudes and 72°53′E to 72°58′E longitudes. Mulund is located in the Kurla Taluka of Mumbai Suburban District and is administered under the T-Ward (Fig 1). In fact, the names Mulund and T-ward are used interchangeably as it is the only suburb under the jurisdiction of the T-Ward.

Mulund is surrounded by the city of Thane in the north, the Sanjay Gandhi National Park in the west, the Thane creek in the east, Bhandup in the southwest, and Kanjurmarg in the south. The suburb is divided into two parts – Mulund East and Mulund West – by the suburban railway line passing through it. Mulund East is mostly residential in character, whereas Mulund West in residential-cum-commercial in nature. Since Mulund is the only suburb comprising the T-Ward of Mumbai Suburban District; the demographic data published on the T-Ward by the Census of India essentially depicts the demographic scenario of Mulund.

Fig-1: Map showing the location of T – Ward (Mulund) in Mumbai

ANALYSIS/DISCUSSION

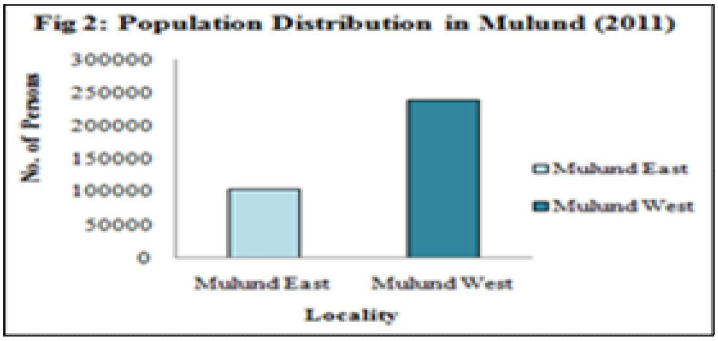
The analysis was carried out by means of taking certain selected parameters of population, such as growth, density, gender, and literacy. It has been presented under the following sections:



- Population Growth and Density
- Sex ratio
- Literacy Rate
- Population Growth and density:

The term ‘population growth' basically refers to a change in the population size, either positive or negative. ‘Population density' on the other hand refers to ‘the measure of the number of people per unit area, commonly represented as people per square mile (or square kilometer)' (Rosenberg, 2019). It is measured by dividing the total population by total area.

As per the 2011 census, the total population of Mulund is 3,41,463 persons of which 1,02,918 persons reside in Mulund East and 2,38,545 reside in Mulund West (Fig 2). The density of population in the suburb is 7,517.9 persons/sq.km.



The population of Mulund can be seen to have undergone positive growth. However, an analysis of the rate of growth reveals further details of the scenario. In the year 1971, the total population of Mulund was recorded to be 1,25,165, which grew to become 2,22,555 in 1981 depicting a percentage growth of 77.81 percent. In the span of the next ten years, the population increased to become 2,89,182. The percentage growth for this decade (1981 – 1991) was only 29.93 percent. In the following two decades, i.e. 2001 and 2011, the population

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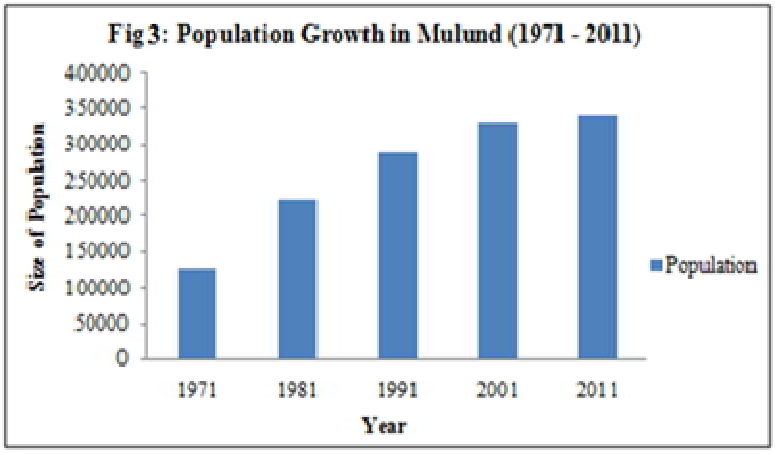
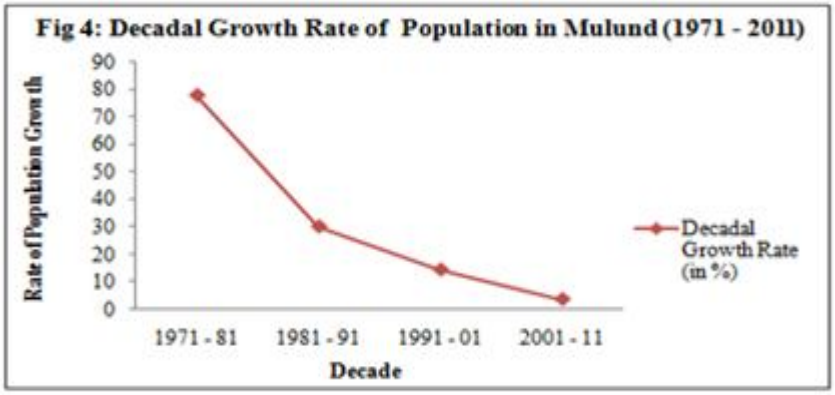
increased up to 3,30,195 and 3,41,463 respectively. The percentage growth in these two decades dropped further to 14.18 percent in 1991 – 2001 and 3.41 percent in 2001 – 2011.

The pattern of growth undergone by Mulund's population over the last few decades is depicted by means of a bar graph in Fig 3.



The declining trend of the percentage growth in Mulund's population across these five decades is depicted using a line graph in Fig 4.



- Sex Ratio:

The sex ratio of a population is defined as the number of males per 100 females (Newbold, 2013). It reveals how balanced or imbalanced the population of an area in terms of gender. The total male population of Mulund is 1,76,156 and the female population is 1,65,307 (Census, 2011). Using this data, the sex ratio of Mulund is determined, as shown below:

$$\text{Sex Ratio} = \frac{Number\ of\ Females\ in\ Mulund}{Number\ of\ Males\ in\ Mulund} X\ 1000$$

$$= \frac{1,65,307}{1,76,156} X\ 1000$$

$$= 938$$

Therefore, the sex ratio of Mulund is 938. This is higher than the sex ratio of Mumbai Suburban District and the Greater Mumbai (M. Corp) which are 860 and 853 respectively. A comparison of the sex ratio of Mulund and Mumbai Suburban District for the decades of 1991, 2001, and 2011 reveals that sex ratio for the whole of Mumbai Suburban District declined from 1991 to 2001. In 1991 it was 831, whereas it declined to reach 822 in 2001. However, contrarily in case of Mulund, there was a partial improvement. The sex ratio of Mulund increased from 888 in 1991 to 894 in 2001. By 2011, the scenario improved significantly with a drastic increase in sex ratio for Mumbai Suburban District (860) as well as Mulund (938).

A comparison of the changing pattern of sex ratio in Mulund and Mumbai Suburban District is shown in Fig 5.

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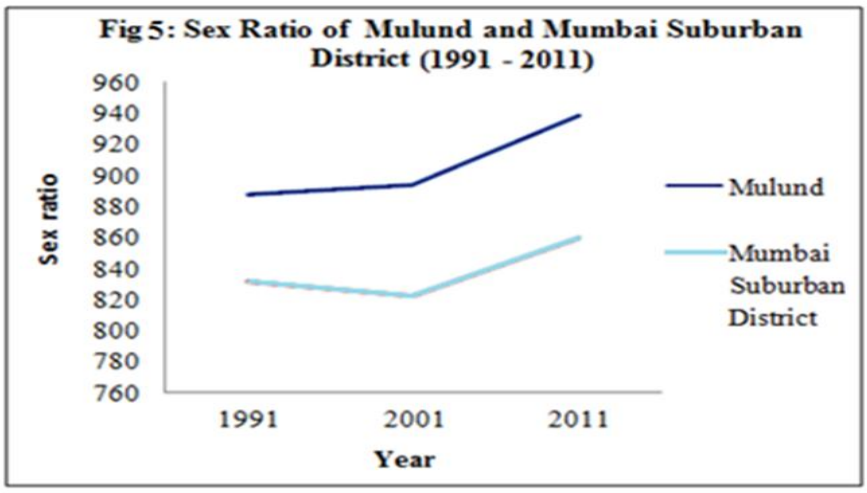
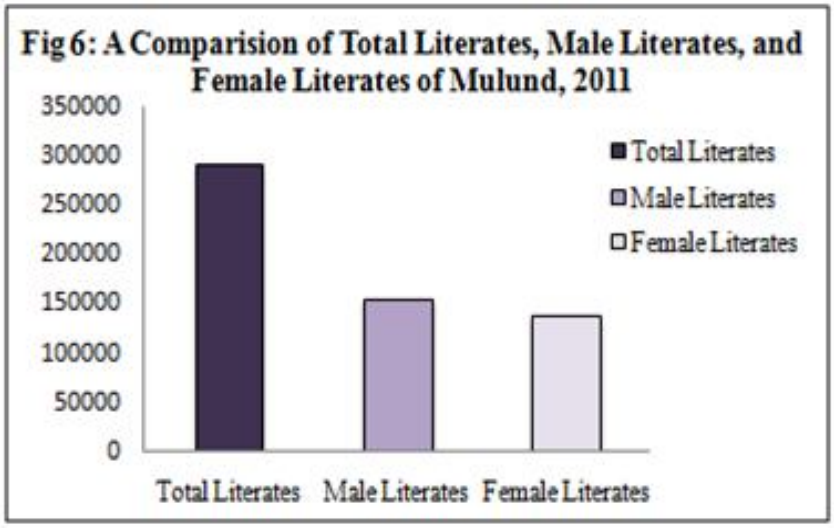


- Literacy Rate:

In India, a person aged seven and above, who can both read and write with understanding in any language, is treated as literate (Census, 2011). Literacy is positively correlated to the degree of economic progress (Qazi & Qazi, 2006). In other words, a low rate of literacy is an obstacle to economic development. The number of literates in Mulund as per the 2011 census is 2,92,182 persons, out of which 1,54,079 (i.e. 53 percent) are male literates and 1,38,103 (i.e. 47 percent) are female literates.

A comparative picture of total literates, male literates and female literates of Mulund as per 2011 census is given in Fig 6.



Using the data on total population and number of literates, the literacy rate of Mulund is calculated as follows:

Crude Literacy Rate =

$$\frac{Number\ of\ Literate\ Persons}{Total\ Population} \text{ X } 100$$

$$= \frac{2,92,182}{3,41,463} \text{ X } 100$$

$$= 85.57\%$$

A gender-wise analysis of Mulund's literacy as per 2001 and 2011 census reveals the predominance of males. However, the percentage of male literates have gone down from 56.5 percent in 2001 to 52.73 percent in 2011, whereas, the percentage of female literates have gone up from 43.5 percent in 2001 to 47.27 percent in 2011. This is shown in Fig 7.

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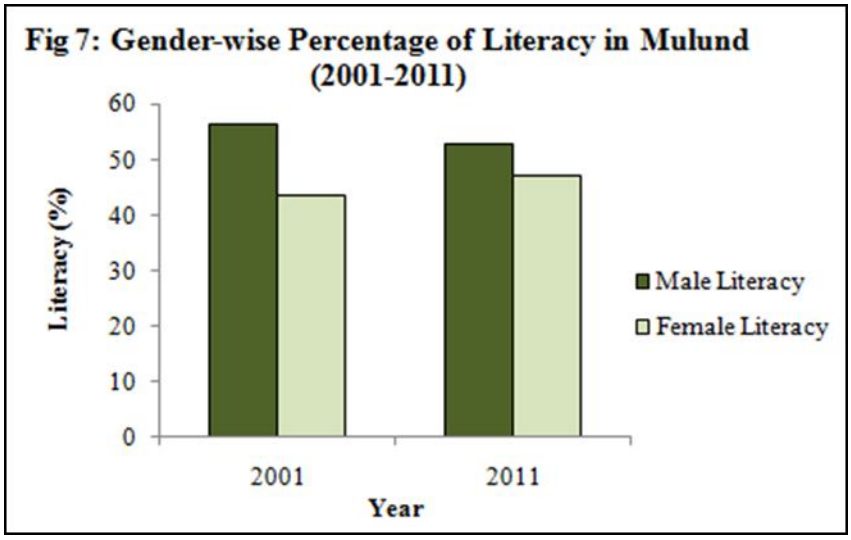

SUMMARY AND CONCLUSION

The analysis of Mulund's population data reveals the following aspects of population change in the suburb:

(i) Although the population of Mulund is growing in a positive direction, there has been a decreasing trend in the rate of population growth in the last few decades.

(ii) Mulund depicts a healthy sex ratio. The sex ratio in the suburb is also seen to have increased in the last three decades and it stands higher than that of the Mumbai Suburban District as a whole.

(iii) Literacy rate in the suburb is not bad, yet there is room for improvement. The percentage of male literates in the suburb predominate females. However, in the decade 2001 to 2011, female literacy is seen to depict an increasing trend whereas male literacy is seen to depict a decreasing trend.

Therefore, it can be concluded that the emerging pattern of population in the suburb mostly reveals a positive scenario. However, the decreasing trend of male literacy needs to be given attention to for ensuring a balanced literacy ratio.

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AN ANALYSIS OF NOISE LEVELS DURING DIWALI FESTIVAL IN SOUTH MUMBAI

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Noise pollution, in the recent times, has been well recognized as one of the major trepidations that impact the quality of life in urban areas across the globe. By and large noise is an urban product. Noise pollution and its impact on environment and life quality of human being is a topic of research in scientific community. Noise is a sound that exceeds the tolerance limit of a listener. In the present world noise is increasingly being recognised as an important environmental pollutant and is a serious health hazard at high levels. Outdoor noise is considered to be one that is created by vehicular transport or by industrial activities. Celebrations of different festivals by burning high volume crackers or use of high power music system also contribute to noise pollution. Noise pollution may be perceived differently by different persons. Continuous exposure to noise is harmful to children and old people.

Noise leads to various health hazards like hearing impairment, nervous breakdown, insomnia, mental disorder, dizziness and can even affect blood pressure. Noise as high as 60dBs is found in the vicinity of schools and hospitals, which are legally declared 'silence zones'South Mumbai is highly urban in nature and has started facing severe noise pollution problem. The noise assessment study clearly revealed the alarming condition of noise pollution in South Mumbai. This paper would bring forth the comparative analysis of sound levels during Diwali festival in south Mumbai and highlight the concern for reducing it. Pollution literacy through awareness campaign is warranted to resolve the intensity of the issue.

Keywords: Noise, Diwali, South Mumbai, Analysis

INTRODUCTION

Noise pollution creates health related issues in urban areas all over the world. Because of the rapid increase in the number of cars and industrial activities, noise pollution has also increased. Noise in cities, especially along main arteries, has reached at disturbing levels. Residences far from noise sources and near silent secondary roads are currently very popular. People prefer to live in places far from noisy urban areas (Yılmaz and Özer, 1998).

What is Noise?

Sound is a phenomenon created by an object producing vibrations, which form stimulus for the tympanic membrane of living beings (Cuniff, 1977). Sound is defined as audible air vibrations which may or may not be heard and conveys specified impressions. Sound travels in the form of waves, either longitudinal or transverse (Shukla and Srivastava, 1997). Noise on the other hand is sound that exceeds the tolerance limit of a listener. In the present world noise is increasingly being recognised as an important environmental pollutant and is a serious health hazard at high levels. Noise is considered to be one that is created by transport or sudden loud impact. It is derived from the Latin word 'Nausea' implying unwanted or unpleasant sound (Singh and Davar, 2004). Noise pollution may be perceived differently by different persons, e.g. loud music played during festivals is entertaining for some people but is absolutely irritating to some others, especially old or unwell. Continuous exposure to noise is harmful to children, and old people (Palmer et al, 2006).

Many surveys addressing the problem of noise pollution in many cities throughout the world have been conducted (Li et al., 2002; Morillas et al., 2005; Zannin et al., 2002; Alberola, 2005; Lebiedowska, 2005; Pucher, 2005; Tansatcha et al., 2005), and have shown the scale of discomfort that noise causes in people's lives (Butcha and Vos, 1998; Kura et al., 1999; Ali and Tamura, 2003; Marius et al., 2005). Depending on its duration and volume, the effects of noise on human health and comfort are divided into four categories; physical effects, such as hearing defects; physiological effects, such as increased blood pressure, irregularity of heart rhythms and ulcers; psychological effects, such as disorders, sleeplessness and going to sleep late, irritability and stress; and finally effects on work performance, such as reduction of productivity and misunderstanding what is heard (Job, 1996; Evans and Hygge, 2000; Stansfeld et al., 2000; Passchier-Vermeer and Passchier, 2000; Quis, 2001; Marius, 2005). With the increase in urbanization and the developmental activities like construction/digging of road, metro railway line, demolishing the old building for redevelopment has resulted in increased noise levels.

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Noise as an environmental pollutant

The main sources of noise are urban noise and industrial noise (Satterthwaite, 1997). The other sources are Transport or vehicular noise, social noise (60-80dB) and ocean noise. These can be further classified on the basis of the sound range, e.g. Road Noise(70-85 dB), Rail Noise(50-60 dB), Aircraft noise(150-200 dB) etc. (MPCB Report, 2004). Mumbai is the third noisiest city in the world and noise tends to hamper the quality of life. Noise leads to various health hazards like hearing impairment, nervous breakdown, insomnia, mental disorder, dizziness and can even affect blood pressure (Saha, 2001). Noise as high as 60dBs is found in the vicinity of schools and hospitals, which are legally declared 'silence zones' (MPCB report, 2004)

Ideal Noise Levels

Area Code	Category of Area/Zone	Limits in dB(A) Leq*	
		Day	Night
(A)	Industrial Area	75	70
(B)	Commercial Area	65	55
(C)	Residential Area	55	45
(D)	Silence Zone	50	40

*Source: MPCB Report, 2004; Pg 107

OBJECTIVES OF THE STUDY

i) To carry out comparative analysis of noise levels during Diwali festival in south Mumbai.

ii) To find out the other contributing factors for noise in the city and suggest measures for it.

SOURCE OF DATA AND METHODOLOGY

Secondary data of Noise levels is obtained from the MPCB website for the period of 2014 to 2018. The day-night data is selected and tabulated for the day of Lakshmi Poojan for all the years. Vehicular related data from road transport office website is used to add to the analysis. The processed data is used in the form of maps, tables and diagrams for the current research paper.

STUDY AREA AND GEOGRAPHICAL LOCATION

The District Mumbai City is situated on the West coast of India between 18˚ 52′ and 19˚ 04′ North latitudes and 72˚47′ and 72˚54′ East longitudes. It is surrounded on three sides by water, the open Arabian Sea to the West and South and Thane creek to the East. To the North it is bordered by Mumbai (Suburban) District. It is the Southern part of Greater Mumbai Municipal Corporation, which covers an area of 157.0 sq.kms as per the Surveyor General of India and has a population of 30, 85,411 persons as per the Census 2011. Mumbai is the capital city of Maharashtra and the most populous city in India. It is the 4th most populous city in the world and one of the populous urban regions in the world.

RESULT AND DISCUSSION

The average decibels of last five years of Laxshmi Pujan (i.e Diwali day) shows that there is clear cut violation of noise pollution act and the levels prescribed by Maharashtra Pollution Control Board. Diwali is very important festival for a common people India. Celebration of this festival is commonly associated with burning of crackers. The day time average decibel level is going much beyond the limit given by WHO and MPCB (Table 1 and 2). The reason behind this high level of noise is burning of crackers in the early morning and late in the night. Congestion of buildings also supports to increase the noise levels.

Mumbai being highly crowded with buildings and other establishment the noise level is further aggravates. Besides cracker noise the noise also comes from road traffic and from developmental work like building construction and demolishing activity and construction of metro line. Day time highest average noise is recorded at Kamathipura (79.7db) and followed by Parel (77.42dB) and Prabhadevi (76.88dB) (Refer Map 1) All this pockets are dominated by Hindu population which celebrates the festival with burning of crackers. The average noise of all these location is very close to 75dB.

Table-1: Day Time Noise Level Monitoring during Diwali Festival- South Mumbai (dB)

Location	7th Nov 18	19th Oct 17	30th Oct 16	11th Nov 15	23rd Oct14	Average dB
Colaba - Nariman Point (Intercontinal Hotel)	70.9	81	74.5	80.9	75.9	76.64
Mantralaya Adminstrative Building	72.8	77.9	74.4	78.6	78.8	76.5
Mazgaon - Tadwadi	68.6	77.4	79.2	82.2	72.2	75.92

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Girgaon -Metro Cinema	78	70.3	62.3	81.5	80.6	74.54
Worli - Passport Office	73.7	67.8	73.3	84.8	77.3	75.38
Prabhadevi - Siddhivinayak Temple	75.9	65.5	72.4	79.6	91	76.88
Mahim - Police Colony	75.9	69.8	70.3	79.7	81.9	75.52
Parel - Bhoiwada	76.6	73.6	71.8	83.5	81.6	77.42
Byculla - Church West	73	72	74.4	88.3	76.5	76.84
Dadar - Shivaji Park	69.9	69.1	77.5	83.2	81.5	76.24
Sion -Sion Circle	71.7	71	72.6	75.8	83.2	74.86
Dadar - Hindu colony	67.2	80.3	74.5	78.1	63	72.62
Matunga - Gandhi Market	70.6	75.3	71.4	80.8	66.6	72.94
Kamiathipura - kamathipura	71	80.2	75.6	88.3	83.4	79.7
Malabar Hill - Sahyadri guest House/ 3 Batti/ Bangunga	71	78.5	72.1	83.2	72.4	75.44

Table-2: Night Time Noise Level Monitoring during Diwali Festival- South Mumbai (dB)

Location	7th Nov 18	19th Oct 17	30th Oct 16	111th Nov 15	23rd Oct 14	Avarage dB
Colaba - Nariman Point (Intercontinal Hotel)	62.4	58.2	65.3	67.6	99.8	70.66
Mantralaya Adminstrative Building	61.1	59.6	71	85.8	90.6	73.62
Mazgaon - Tadwadi	70	62.2	60.6	63.7	79.2	67.14
Girgaon -Metro Cinema	71.2	64.8	65.2	67.1	94.9	72.64
Worli - Passport Office	70.7	62.5	62.5	77	86.1	71.76
Prabhadevi - Siddhivinayak Temple	64.6	61.7	67.2	71.3	89.5	70.86
Mahim - Police Colony	60.7	58.4	66.9	66.3	71	64.66
Parel - Bhoiwada	63.8	65.9	60.9	70.7	62.5	64.76
Byculla - Church West	63.8	67.7	63.4	65.8	59.2	63.98
Dadar - Shivaji Park	69.3	67.3	63.9	66.8	87.1	70.88
Sion -Sion Circle	63.9	67.3	63.1	69	70.9	66.84
Dadar - Hindu colony	63	69.2	65.5	59.3	84.2	68.24
Matunga - Gandhi Market	62.4	70.5	63.7	58.6	68.8	64.8
Kamiathipura - kamathipura	62.2	69.4	63	68.6	74.1	67.46
Malabar Hill - Sahyadri guest House/ 3 Batti/ Bangunga	54.4	75.8	65.3	63.4	79.3	67.64

The average of noise level during the same period for the night time is comparatively low with day time but very high than what is prescribed by MPCB. These noise levels also show the violation of Noise Pollution Act. During the night time Mantralaya, Girgaon, Worli, Prabhadevi and Dadar area is showing more than 70dB average sound levels. (Refer map 2).

Besides festival and cracker noise vehicular traffic noise also get accumulated during this period. Fig 1 shows the growth of vehicles during the last five years. There is a 69.33 percent growth of the vehicles during the same period. As per the road transport office record in 2014 there were 707806 vehicles were there in the city area which increased by 1020883 in 2018.

Fig-1: Growth of Vehicles in Mumbai City: 2014 to 2018

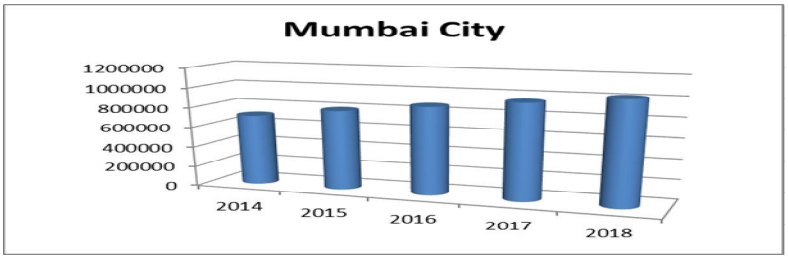

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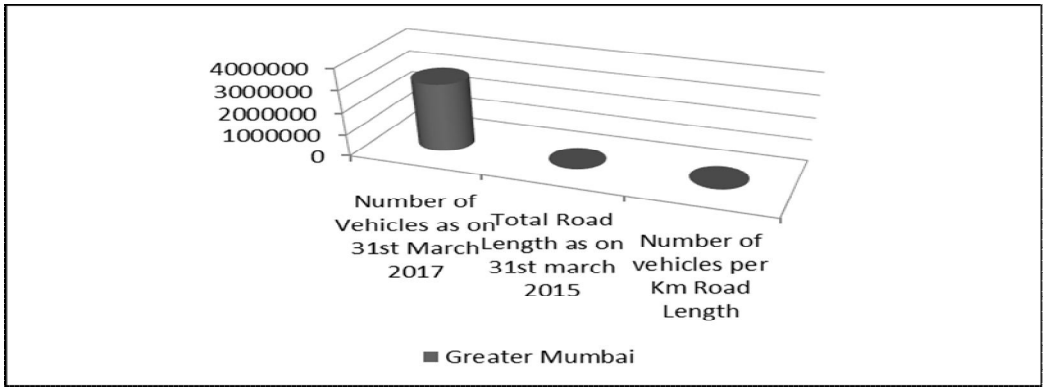
Fig 2: Number of Vehicles per Km of road length- Greater Mumbai



The ratio of Number of vehicles and the available road to ply these vehicles is highly inverse in Greater Mumbai. Fig number 2 represents the fact that total road length in greater Mumbai is 1990 kms and the 1534 vehicles are there for per kilometer of road length.

This suggests that the length of these 1534 vehicles is more than a kilometer. When the number of vehicles are more and less road space is available vehicles compete to acquire their space on roads and more friction happens on road which in turn increases the noise pollution.

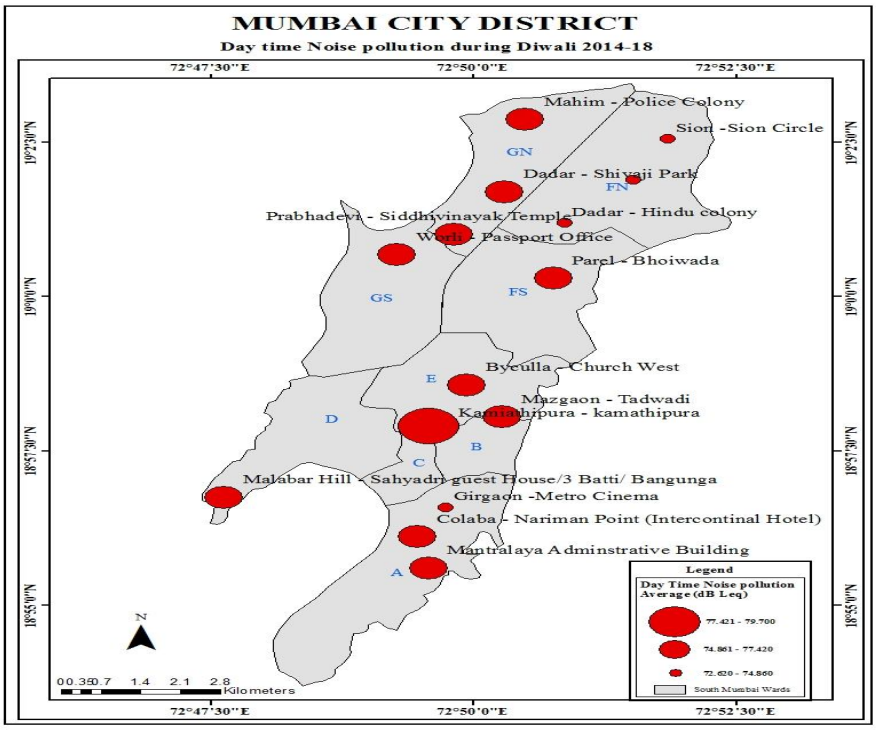
CONCLUSION AND SUGGESTIONS

It is evident that in increasingly cosmopolitan and festival loving city, there is bound to be more unavoidable noise. In an already existing city there cannot be demolition of buildings to stop noise. The only option left is trying to reduce it and abating it.

The two best solutions to combat noise are majorly creating environmental literacy through public awareness so that they realize the harmful effects and also contribute in reducing noise. The other easy, in expensive and convenient method is planting of trees. The best trees are *Casuriana* and *Couroupita*. Other tree species also act as good noise absorbers.

Most of us are very used to the sounds we hear in everyday life. Loud music, the television, people talking on their phone, the traffic and even pets barking in the middle of the night.

All of these have become a part of the urban culture and rarely disturb us. For many of us, the concept of pollution is limited to nature and resources. However, noise that tends to disrupt the natural rhythm of life makes for one solid pollutant. Map 1



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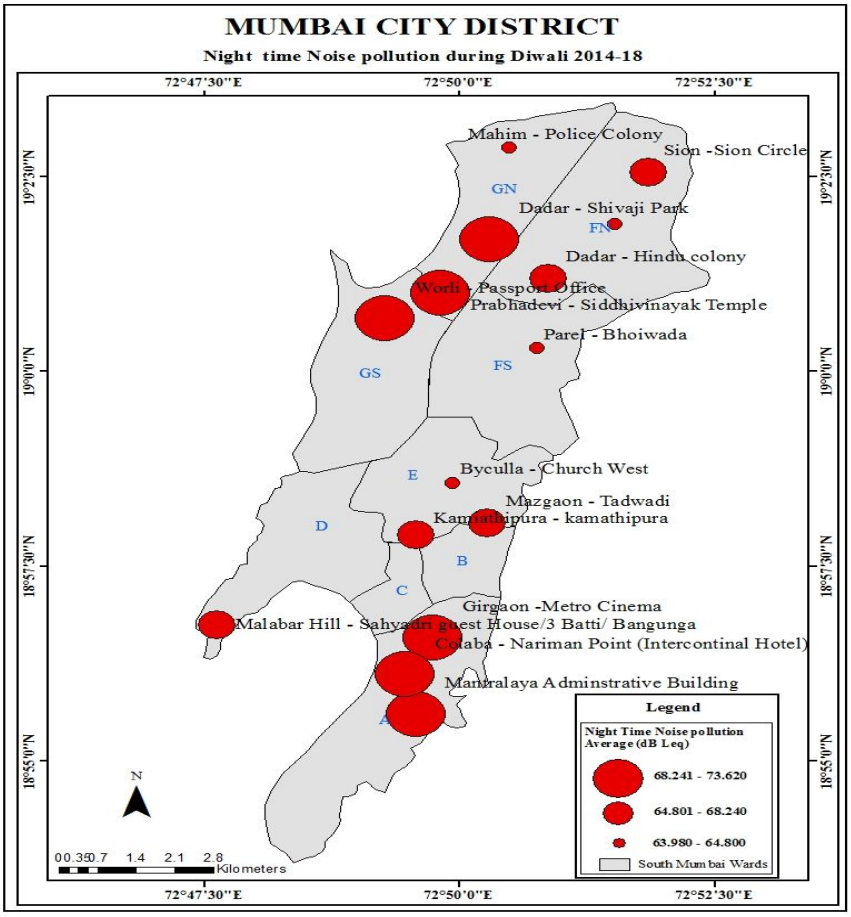

Map 2

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SOCIAL MEDIA AND GASTRO-TOURISM: AN INFLUENCE OF DIGITAL ENVIRONMENT ON THE GASTRONOMY SECTOR

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1. INTRODUCTION

Gastronomy, as a new branch of tourism, paved its path in the arena of tourism 1990s, which predominantly focuses on the theory of culinary arts [1] of eating and drinking [2] and the concept was laid forward by Lucy Long in 1998 [3]. It has been designated by different terms in various tourism literatures like "gastro-tourism", "gastronomy tourism", "wine tourism", "culinary tourism", "gourmet tourism" and "food tourism" and focuses on the originality of the dishes of a particular place or region ([4], [5], [6], [7]). Besides, it includes a broad spectrum of various experiences like visiting food producers, eating festivals, restaurants and tasting special dishes ([1], [5], [8], [9], [10]). In the effort of protecting local products of the region and historical and cultural heritage, development of gastronomic tourism on top occupies a significant role ([10], [11], [12]). Gastro-tourism embraces a multi-disciplinary approach which is not limited with only eating and drinking but with other branches of science and arts as well including humanities, geography, history, anthropology, ethnography, sociology, technology, economy, communication, medicine, nutrition and law ([1], [14]).

Technological advancement and widespread of the internet have redefined the tourism sector and the tourist's perspective. It has helped in increasing the traveler's confidence for making better information available, in the decision-making process and increases the quality of the trip [15]. The Internet and Information and Communication Technologies (ICTs) have given tourists and consumers a medium to access information to arrange intermediaries earlier and modify their purchasing opportunities [16]. The rapid technological evolution and the development of applications have not only granted more power to the tourist and consumers about choosing the destination and making prior arrangements but also they are able to suggest their own preferences, comment about their experiences of the food they have, the visit they have made and places they have visited. So, social media provide these other travelers' experiences on the same place they visited & food they had which to a significant extent modified the present traveler's planning process ([17], [18]). IIsui-Yuan Wang (2011) through his study throws light on the role of gastronomy blogs that influences readers' intention to taste. To him, these gastronomy blogs act as a primary channel for electronic word-of mouth(eWOM). And with the advent of media technology, the sites and blogs provide photos and read information about the ambiance of the place thus provides an experience of the sights in advance [19]. While the work of Elliot Anneberg and Edward Kung (2015) put emphasis on how the access to internet and wireless networks determined the future of urban consumption amenities, where to focus on the emergence of the mobile communication technologies particularly focusing on smartphones in the use of locating food truck across cities of Los Angeles, San Diego and Washington DC [20]. Wherein Sinai and Waldogel (2004) identified two potential mediums, firstly, the internet acts as a *substitute* to the city, which acts in the global marketplace by providing access to a vast variety of goods and services supplied and secondly, the internet as a *complement* to the city, which acts in the local sphere by providing information about goods and services which consumed locally, and both can be achieved through online reviews [20]. And in the postmodern society, the people are becoming more and more dependent upon the mobile device and applications to carry out their everyday activity. And this emergence of the digital environment has equally affected the gastronomy sector as well. As we all are very busy these days but hungry as usual for good food, the food applications or more commonly known as "apps" like swiggy, zomato, uber eats, foodpanda and others offers us to enjoy the delicious food at home without being present at the restaurants. Therefore, this places a remarkable impact on gastro-tourism perspective in the mid of contemporary young and middle age group citizens. hence, it becomes noteworthy to examine the influence of social media on the gastronomy of the and reshaping their perspective of gastro-tourism.

2. OBJECTIVES

1. To recognize the influence of the digital environment on gastronomy via the use of food application.
2. To understand the considerable variation of the use of social application across various strata of the population and the probable reasons behind their usage.

3. STUDY AREA

Kolkata Metropolitan Area (KMA) is located in the state of West Bengal, represent India's third largest metropolitan area in terms of population after Mumbai and Delhi. Encompassing an area of 1,886.67 sq. km, KMA is located in the eastern part of the Indian subcontinent and consists of three municipal corporation, 39

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municiplaities, 2 cantonments, 1 notified area and 75 non-municipal or census towns and 446 rural bodies. Kolkata is a hub of diffeent cultural groups like Bengali, Islam, Chinese, Anglo-Indian and Jewish, and this multi-cultural dimension of Kolkata adds to its culinary treats as well. Kolkata a city which loves to eat and their love for food is remembered for its famous culinary arts whole across the world, which ranges from bengali, mughlai, chinese and anglo-indian cuisines. So, from the perspective of gastronomy study and to understand the changing nature of gastro-tourism, KMA forms a strong study area (Fig 1).

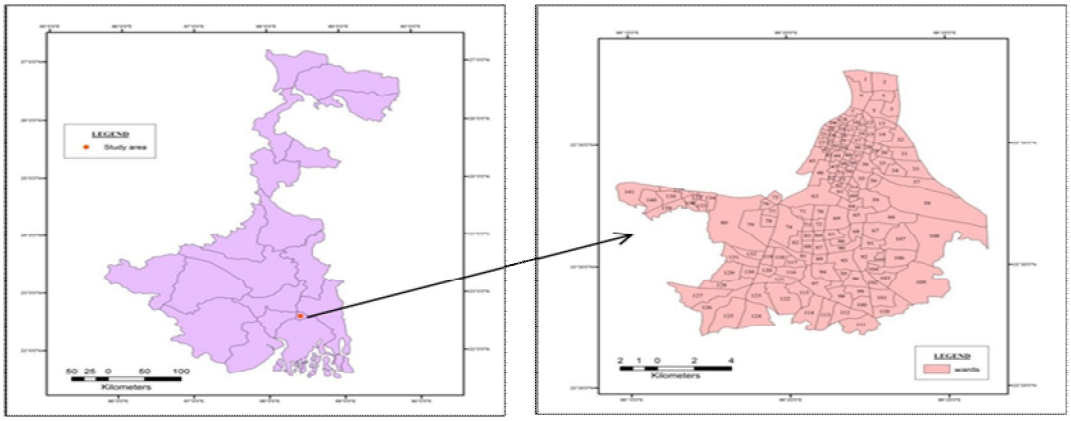

Figure 1: Location of the Study area

4. METHODOLOGY

The mixed-methodology is adopted for the analysis of the data collected which include both quantitative analysis and qualitative analysis. The purposive sampling method is adapted to include only the young and middle age group population (16 – 35 years) who are most likely to utilize the social networks in their everyday life. 60 samples were interrogated with both open-ended and close-ended questions to know how often they used food apps to find restaurant, or for satisfaction of their gourmet. The quantitative analysis outcomes are reported graphically in MS-Excel (version 2010) to bring out the relation among the various strata of population and the use of the apps. The open-ended questions are analyzed using word frequency analysis and cloud diagram in NVIVO 10 software.

5. RESULT & DISCUSSION

5.1 *Influence of Digital Environment on Gastronomy*

The survey revealed that out of 60 persons surveyed 55 persons (91.67%) are using food apllications in their daily lives while only 8.33% (5 persons) stand aloof. While out of those 55 persons who are using food apps are 51% female and 49% male acomprises this group. This highlights the profound influence of the smart digital food apps in lives of the citizens and whose dominant influence is found among the female section groups. Total 10 food applications are identified- Zomato, Swiggy, Food Panda, Uber Eats, Tiny Owl, Easy Diner, Just Eat, Tasty Khana, Food Mingo and online services of Dominos and Pizza Hut. Among the three most used dominant apps are Swiggy used by 89% followed by Zomato 84% and Food panda 44% (Fig 2).

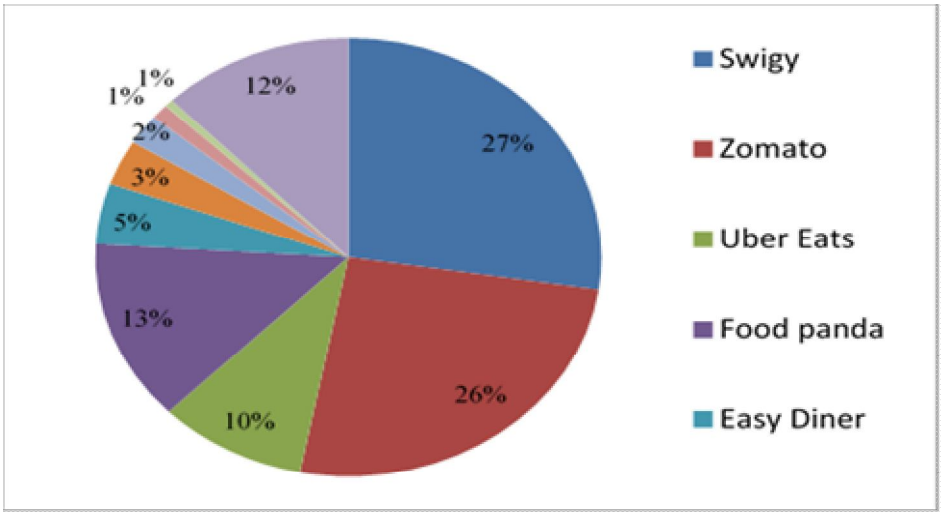

Figure 1: Popular food applications

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In respect to the frequency of usage of the food applications five groups are identified which include, very rare, daily, weekly, monthly, and non-users. The result in respect to age- groups portrays that 16-20 years population are either non users or uses very frequently because this section on population represent the student section who are unemployed, while the age groups of 21-25years and 30-35 years fall in four groups non-users (5%), very rare (10%), monthly (16.67%) and weekly (13.33%). While the 26-30 years groups fall in all the five groups. This section comprises office goer, scholars, bachelors and housewives who due to their busy schedule and lazy to cook at home attitude or with motivation to spend special time with family and friends use these apps to have home delivery or locate restaurants on the way from office to have food (Fig 3). While the results in respect to the gender group highlight that female uses food apps more frequently (daily and weekly) on the other hand males are arare user of food apps (Fig 4). The stack diagram too highlighted that in respect gender group the non-users are equal. This section mainly comprises persons who prefer home-made foods and are less accustom with smart applications and devices due to their limited digital literacy. and whenever they prefer to have food they like to do it as per traditional grastro-tourism process.

5.2 *Variation of usage among different strata and underlying reasons*

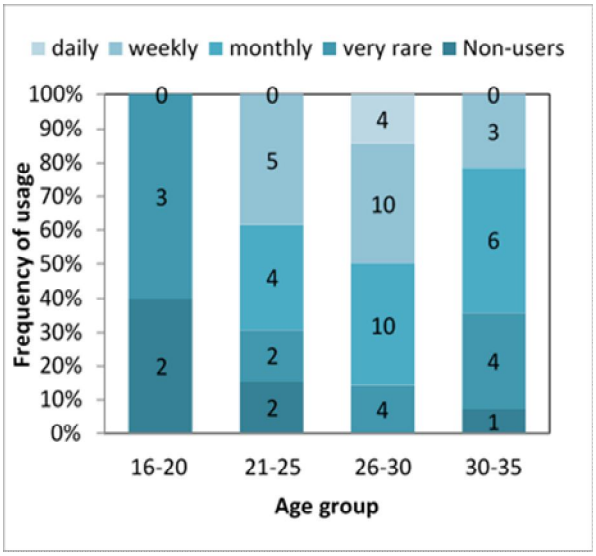

Figure 3: Frequency of usage of Food apps among different age group

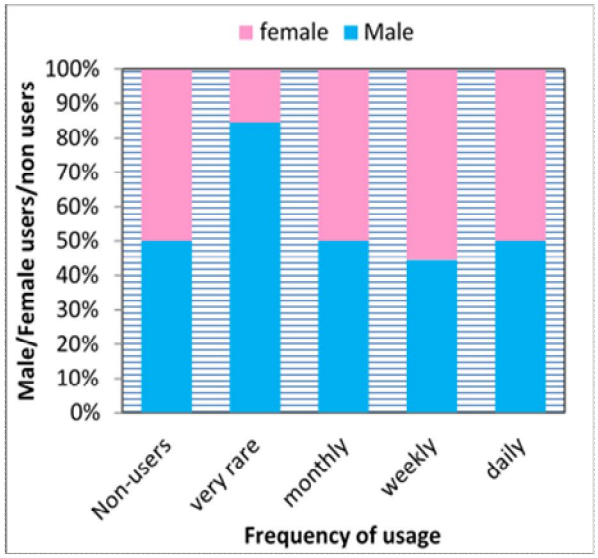

Figure 4: Frequency of usage of food apps among gender group

The usage of food applications are analyzed across the various strata. In respect to the gender group, female lying in the age group of 21-30 years uses more food apps than the male while the male of age group 16-20 years and 30-35 years surpasses the female users (Fig 5). This highlight that female shows more inclination towards outside foods. In respect to the age groups it reflects, that above 20 years population used more than two food applications while in the lower age group only 5% of the population uses food app of one type. While age group of 26-30 years mostly preferred food apps to order food or to find restaurants with nil non-users (Fig 6). With the increase in the income level the use of more than two apps is also increasing and moreover, with income of above 30,000 the non-users of the apps are insignificant. This throws light on the fact, that with increase in the income level the preference of the users to have outside food increases (Fig 7). And with education level as well the apps uses increases. And graduate and post graduate population are dominant user (Fig 8). This too highlights that education is related to digital literacy as well without which the apps cannot be used effectively.

The word cloud diagram is used for analyzing the open-ended questions along with the percentage of the usage of the word i.e., the word frequency. The reason for using the apps when asked, the respondents mainly focused on the 'different types of food' (20 %) that they can have at home with the help of these apps. 'Locating of the restaurants' help them to reach the spot on time and the apps along with the locations provides menu on the day. The usages of the apps also enable the users to gain culinary experience, help to order food during gathering or to spend precious time with friends and family. Many highlighted the apps satisfied their unwillingness to cook (Fig 9). The advantages of using the apps as laid emphasis by the respondents that they 'save time' (31%) of cooking and can have 'variety of food' (28%) at 'late night' and can make 'cashless payments' (Fig 10). While on the disadvantageous side they mentioned that 'location marking' (23%) their home and restaurants becomes difficult and the delay arrival of food (22%). They equally said that packing is sometimes improper and unhygienic and quite often wrong delivery happened as well (Fig 11).

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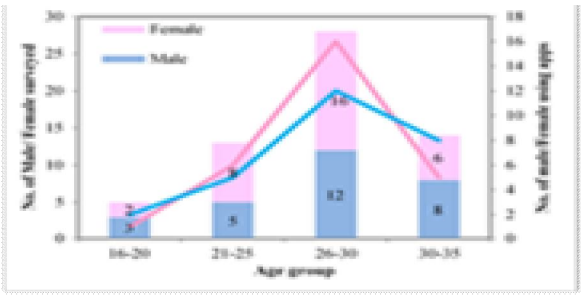

Figure 5: Variation of users among gender group

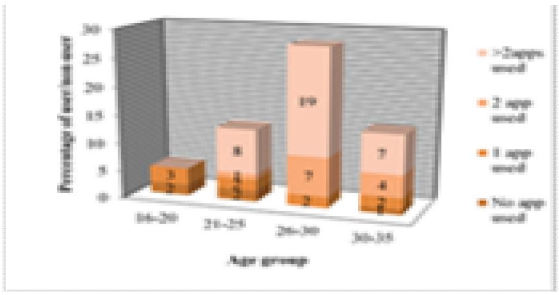

Figure 6: variation of usage among age groups

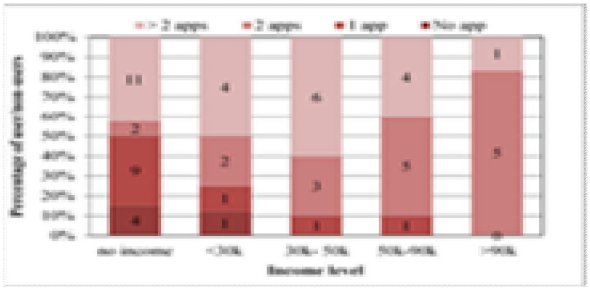

Figure 7: Variation of usage with income level

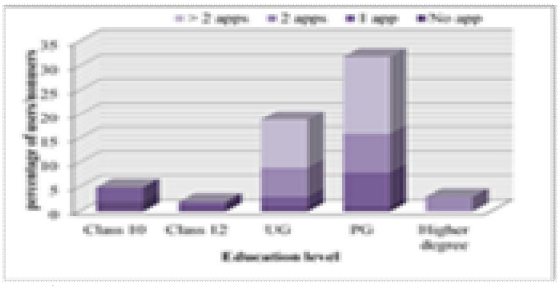

Figure 8: Variation of usage with education level

Figure 9: Purpose or reason behind the use of food apps

Figure 10: Advantages of using food

Figure 11: Disadvantages of using food

6. CONCLUSION

The widespread availability of smartphones and social applications, principally focusing on food applications, has changed the gastronomy perspective of the consumers. The consumers nowadays prefer food apps to order food at home or office. The essence of gastro-tourism is seemed to decrease to a large extent. Only a few among those who can manage free time from their busy schedule think of vising nearby restaurants. And in this case also, they prefer apps so that prior to their visit they could know about the cuisines and ambiance of the restaurants and whether any seats are available or not. In fact, many restaurants have co-ordinated itself with the app companies for making the delivery at their preferred location. Nonetheless, the numbers of people visiting the restaurants haven't decreased, but the food apps have become the intermediaries in visiting and booking tables. The state government of Kolkata to an extent is also evolving in the gastronomy sector as well, they are arranging several food festivals (Maach utsav, Posh pithe utsav) for the people to come and taste their authentic Bengali delicacies from the famous restaurants. The digital environments encompassing the citizens are making them more and more dependents upon these apps. The traditional gastro-tourism perspectives are depleting, and a new form has emerged, which affected each and every stratum of the population as revealed from the study.

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SPATIOTEMPORAL CHANGES OF VEGETATION COVER IN RELATION TO PHYSIOGRAPHY IN BHIWANDI TEHSIL OF THANE DISTRICT

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ABSTRACT
Forest is important part of an ecosystem in particular region and also necessary to regularize and maintain the ecological balance. With the help of science and technology, man over exploited the natural resources. Vegetation and forest is very much useful to man and his activities. It also regularizes the climate, conserving the soil, maintaining the underground water level and so on. Natural vegetation is getting degraded over a period of time due to human induced activities such as expansion of agriculture, urbanization, development of transport etc. The flora and fauna composing biodiversity is most important resource as it influences the climate, soil and raw material for human activities. Over exploitation of forest resources, shrinking the forest land for urban and agricultural expansion and other human activities are responsible for the reducing the land under forest as well as having a great threat to biodiversity and environment. Thus there is urgent need of research on these issues and rapid action for conservation of it. The present investigation is looking forward to study the green cover of Bhiwandi Tehsil of Thane district which is a part of MMRDA. The planners, government and environmentalists are filed the need of vegetation cover study for planning and implementing sustainable regional development strategies. The Geospatial Technology tools and techniques facilitate and support in analysis of the LULC, drainage pattern, vegetation analysis and terrain analysis at great accuracy and speed. In present investigation, 3 D models, landform classification, slope analysis, morphometric analysis etc. are the techniques used for the purpose of physiographic analysis. NDVI (Normalized Difference Vegetation Index) is the technique used to analyze the characteristics and distribution of vegetation cover. The area selected for the research is Bhiwandi Tehsil of Thane District, as it is influenced by the urbanization very rapidly.

Key concepts: Spatiotemporal Change, Physiography, NDVI and Vegetation Distribution

INTRODUCTION
Bhiwandi Taluka is located in North West part in Thane district of Maharashtra having 213 villages and 14 towns. As per census 2011, the total geographical area of Bhiwandi Tehsil is 699.72 sq. km. Bhiwandi Tehsil has 2,34,249 households, population of 11,41,386 of which 6,53,758 are males and 4,87,628 are females with the sex-ratio around 746 and literacy rate is 68.83%. 24.33% of population lives in urban area and 75.67% lives in rural area. The density of population was 360 in 1971 and 1761 in the year 2011. The NH 3 highway passes through the Bhiwandi and also connected by the central railway. Bhiwandi is known as 'Manchester of India' because of the textiles, garments and handloom industry. Today it is also knows for warehouse for MMRDA cities and towns. Khoni, Kon, Kalher, Shelar, Karivali, Kharbao, Katai Kambe, Padagh etc. are the towns and Bhiwandi-Nizampur city is located in Bhiwandi Tehsil.

Geographically tehsil boundary is lies along the Tanasa , Bhatasa and Ulhas rivers also the Tungareshwar hills to north west and Mahuli hills to the east. Because of proximity of Arabian Sea, the average temperature is around 23^0 to 27^0 C. The average rainfall 115 cm received during the rainy season. Summer season is hot and moist whereas winter is mild.

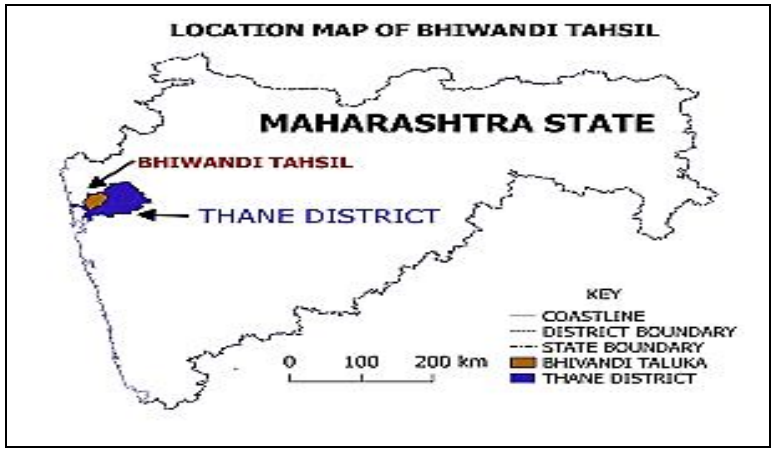

Fig. 1 : Location Map

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Ecologically the rich forest areas of Bhiwandi Tehsil are located towards the Tungarshwar, hills, and Vajreshwari as well as Mahuli hills covered by the reserved and open forest. Industrialization, development of transport network and urban growth is responsible for reducing the green areas very rapidly in recent years. The area under forest was 177 sq. in 1977, 160 sq. km in 1988 and 187 in 2005 (The Konkan Forest – Dr. Prakash Dongare). The Bhiwandi Tehsil is benefitted by Tansa, Ulhas, Bhatsa, Kamori River and Usgaon dam for irrigation and drinking water. Tehsil is undergoing transition in landuse land cover due to the rapid urbanization having greater impact on urban-rural fringe areas.

Gutman and Ignatov (1998) derived green vegetation cover from a scaled NDVI taken between bare soil NDVI and dense vegetation NDVI. Aman and others (1992) analyzed the relationship between NDVI measured from average reflectance and NDVI related from individual NDVI by simulating AVHRR data of high spatial resolution SPOT 1 HRV and Thematic Mapper data. The present investigation is an attempt to find out the green cover change in relation to physiography in Bhiwandi Tehsil. The vegetation study is only covers Bhiwandi Tehsil for the duration of last two decades.

AIM AND OBJECTIVES

Study the vegetation characteristics and distribution in Bhiwandi Tehsil in relation to physiographic characteristics.

1. To identify the physiographic characteristics and landforms of Bhiwandi Tehsil.

2. To calculate the NDVI for understanding the characteristics and distribution of vegetation cover.

3. To identify the areas of change in vegetation cover and reasons of it in Bhiwandi Tehsil.

4. To learn the skills related to use and applications of Geospatial Technology platforms for the study of physiographic and vegetation characteristics of the Bhiwandi Tehsil.

METHODOLOGY

Review of different literature related to present topic given insight that NDVI is the technique through which many researchers had investigated the relationship between physiography and vegetation characteristics and also change in vegetation cover. The time duration considered for the study is of past two decades as urban growth has been rapidly encroached in Bhiwandi Tehsil because of proximity of Mumbai city. The primary information regarding the socio-cultural and physical aspects were collected and analyzed from the census data and topomap. For the study and analysis of vegetation cover and physiography, satellite remote sensing data was downloaded from Bhuvan / ISRO website. The Cartosat 1 DEM and Resourcesat-1 medium resolution multispectral sensor LISS-III images were used to understand and calculate vegetation cover and landforms as well as slope of the study area. The NDVI of different time period was compared with respect to physiographic divisions to understand the role of physiography in change of vegetation cover. The investigator also used Survey of India (SOI) topographic sheets, Google earth maps and GPS survey for ground truthing, correction in data and validation of research analysis. Downloading the RS data from Bhuvan website, preprocessing of images, clipping and mosaicking, fill no data, surface reflectance, projected coordinate system of NDVI, histogram, convert to table, area calculation etc. carried out with the help of QGIS and SAGA softwares for the year 2008 and 2016. Initially the study area images converted as a surface reflectance. The NDVI was measured by using LISS III, Band III and IV data images taken year 2008 and 2016. The area was calculated from the NDVI map, histogram and table. The vegetation was also studied in relation to physiographic characteristics such as landforms, slope etc. The spatiotemporal characteristics of vegetation were described by the investigator from the 3D models, maps, diagrams and tables. Causes for the change in vegetation identified by surveying few places. Suggestions were given for the conservation of forest resources and biodiversity.

NDVI (Normalized Difference Vegetation Index)

Living green plants (Photographic) absorbs solar radiation in the process of photosynthesis. NDVI is calculated from the visible and near infrared light reflected by vegetation. Leaf cells scatter solar radiation in near-infrared spectral region. Fresh green vegetation appears relatively dark in the PAR and relatively bright in the near-infrared (Gates, 1980). NDVI was calculated by NDVI = (NIR – Red) / (NIR + Red) – where RED and NIR which stand for the spectral reflectance measurements received from red and near-infrared bands. NDVI thus varies between -1.0 and +1.0 depend of type and quantity of vegetation cover. The seasonal variation also considered and verified the data accordingly before the conclusion.

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NDVI - 2008

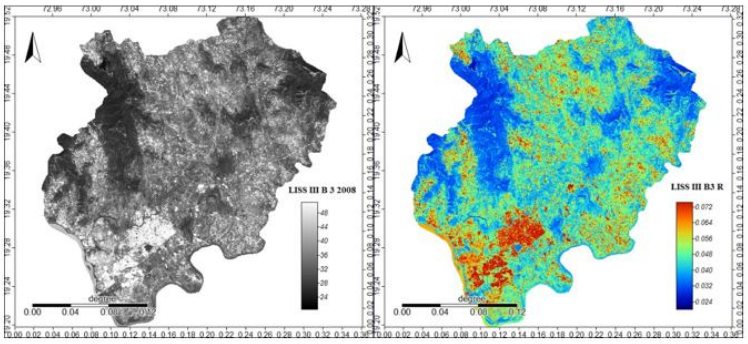

Fig. 2 : LISS III Band III image and surface reflectance

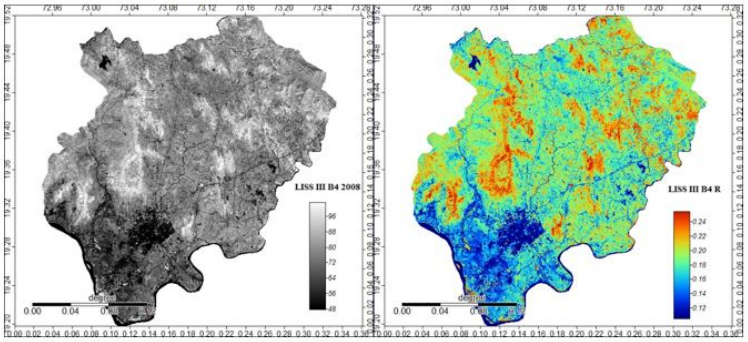

Fig. 3a: LISS III Band IV image and surface reflectance

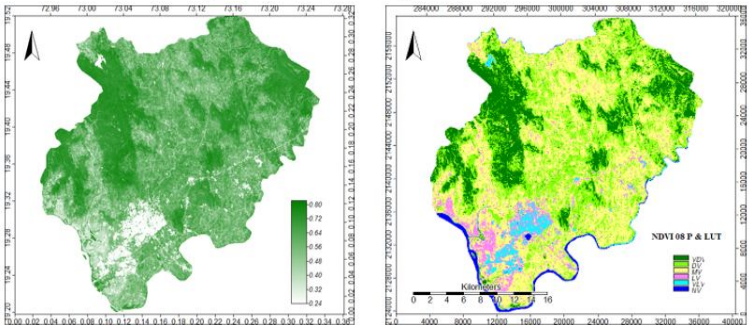

Fig. 3b: NDVI mapping using Lookup Table

Bhiwandi : NDVI 2008

Class	Name	Area in sq.km.	% Area
1	NV	14.47	2.07
2	VLV	49.16	7.03
3	LV	141.44	20.22
4	MV	198.23	28.34
5	DV	148.33	21.21
6	VDV	147.77	21.13
		699.40	100.00

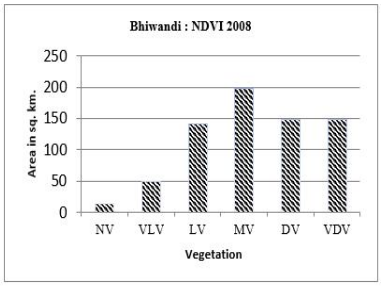

Table 1and Fig 4: Vegetation Cover (2008)

Table 1and Fig 4: Vegetation Cover (2008)

In all maps, tables and diagrams VDV means Very Dense Vegetation exist in the area. Similarly DV project Dense Vegetation, MD - Moderate Vegetation, LV – Less Vegetation, VLV – Very Less Vegetation and NV stands for No Vegetation cover.

The processing and analysis of LISS III remote sensing data of Band III and Band IV for the year of 2008 projects that the moderate vegetation cover identified in large area (28.34 %) as it is agricultural and small open forest on the small hills. The area without vegetation is least in Bhiwandi Tehsil as it is either built up or water body areas. The dense and very dense vegetation found only 20 % each on the major hilly areas. Less dense vegetation found on 21 % area and remaining region is having very less vegetation.

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PHYSIOGRAPHIC ANALYSIS

The terrain and landform analysis was carried out from the DEM where the pixel values indicates multi dimensions of surface area of the earth, indicate the vertical dimension from the horizontal equivalency. From it we can determine and calculate the physiographic analysis of the terrain and related features. The relationship of vegetation and topography were analyzed by using topographic maps and other sources of information. The ground verification / truthing carried with the help of vising the places, conducting interview, topomaps, Bhuvan and other website, literature, Census data etc. related to the subject of investigation.

The methods adopted to calculate the physiographic divisions were the Measuring the Slope, Landform Classification, Calculation of Curve, Contour and 3-D Map and Morphometric Features.

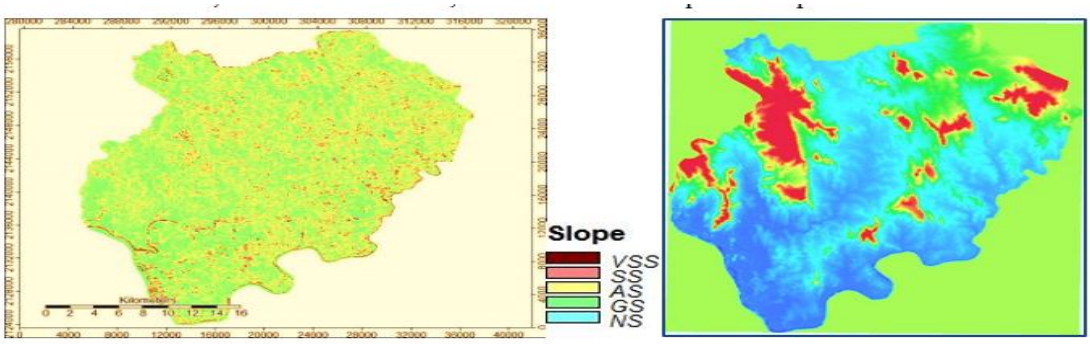

Fig No 5 : Slope Analysis and 3D Model

Large part of the Bhiwandi is flat and plain area because of the riverine plains and only small areas having moderate to steep slope. Table 2 and Fig 6, 7 and 8 indicates that large area, around 553 sq. km area out of 699 km is plain having 20 to 150 meters height from the MSL. 118 sq. km area covered by forest from it.

Bhiwandi : Altitude wise area

Altitude in Mts	Total Area in Sq. Km	Total Forest in Sq. Km.
0- 20	89.55	14.99
20- 150	553.17	118.74
150- 300	43.9	39.77
300 -450	11.92	11.92
450- 600	1.66	1.54
600>	0.17	0.14
Total	**699.37**	**187.1**

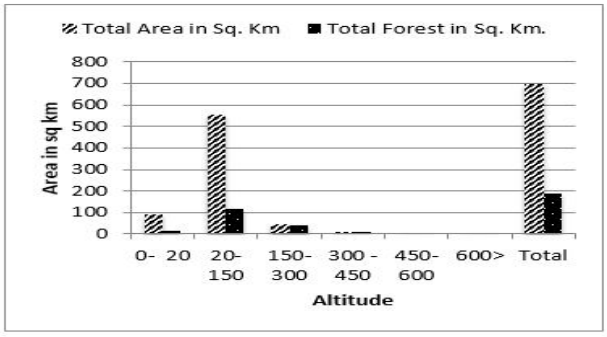

Table 2 and Fig. No.6

References : SOI, MRSAC and Boosampada and RS data (Area slightly varies in each reference)

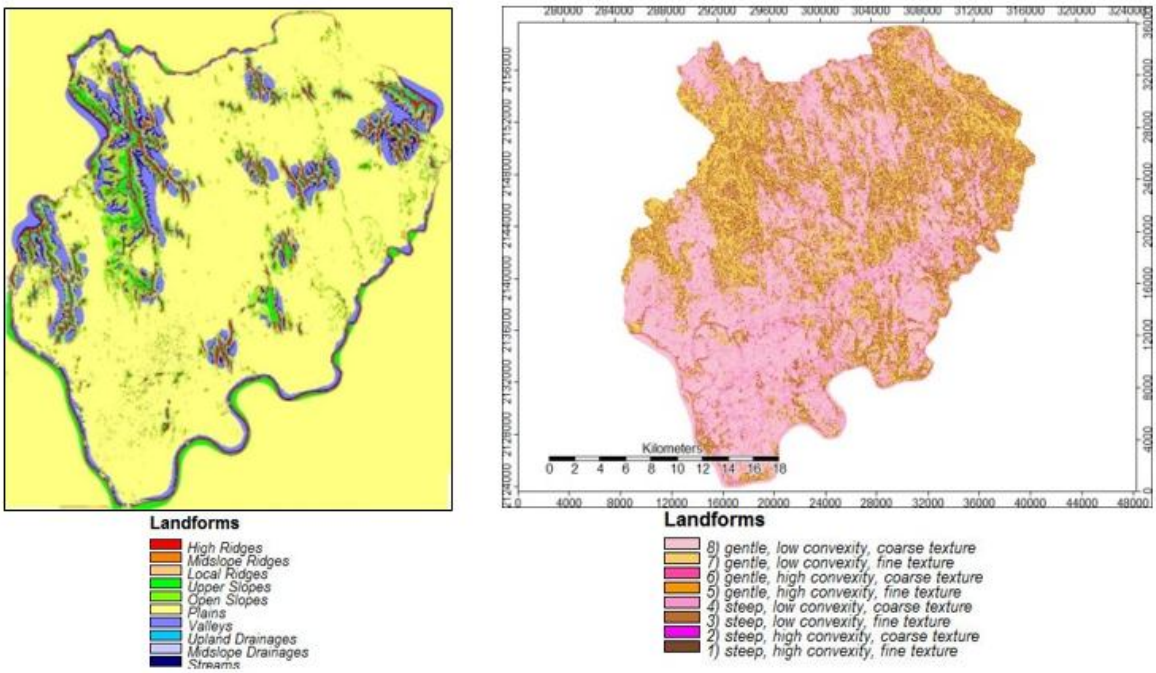

Fig. No 7 : Landform classification

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Class	Name	Area in sq. km.	% Area
1	Streams	36.06	5.15
2	Midslope Drainages	54.82	7.84
3	Upland Drainages	0.91	0.13
4	Valleys	52.86	7.56
5	Plains	409.59	58.55
6	Open Slopes	0	0.00
7	Upper Slopes	49.46	7.07
8	Local Ridges	0.23	0.03
9	Midslope Ridges	42.85	6.12
10	High Ridges	52.81	7.55
		699.59	100

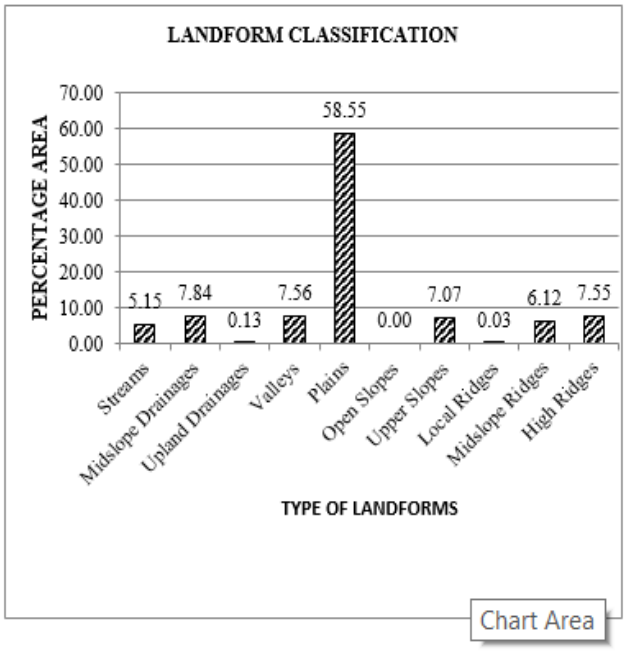


Table 3 and Fig. No 8 : Area covered by different landforms

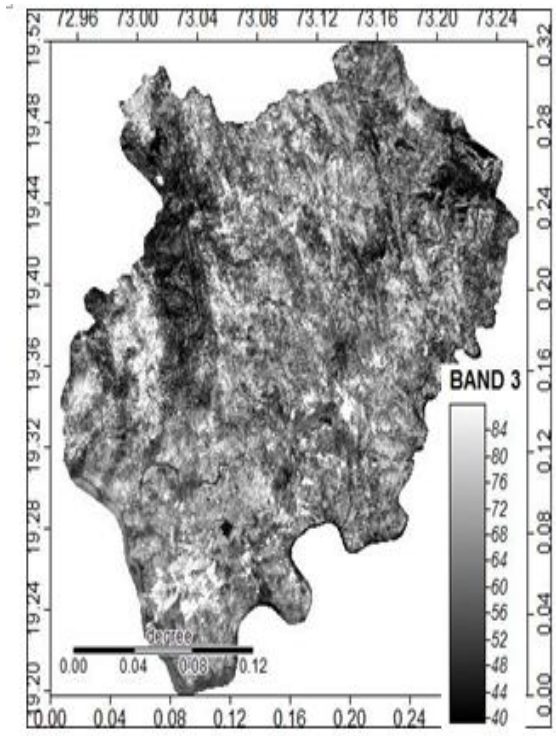
Based on the analysis carried out in Table No 3 and Fig no 7 and 8, the Bhiwandi Tehsil is divided in the following physiographic divisions .

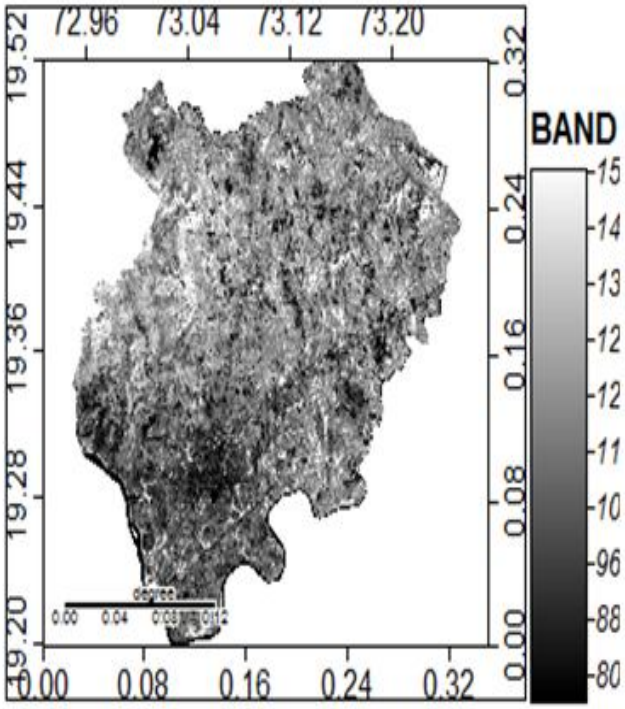
A) Hilly area B) Plains C) Drainage

Large part of Tehsil is plain (58 %) followed by the river valley and water bodies. Upslope drainage and lofty mountainous areas are absent. Hilly area is located near to Tungareshwar, Vajreshwari and near to Tanasa lake as well as at Mahuli.

NDVI - 2016

The NDVI was calculated for the year 2016 from LISS III satellite images where similar method applied for the year 2008. The figure 9a and b shows the DEM and Surface Reflectance of band III and IV.





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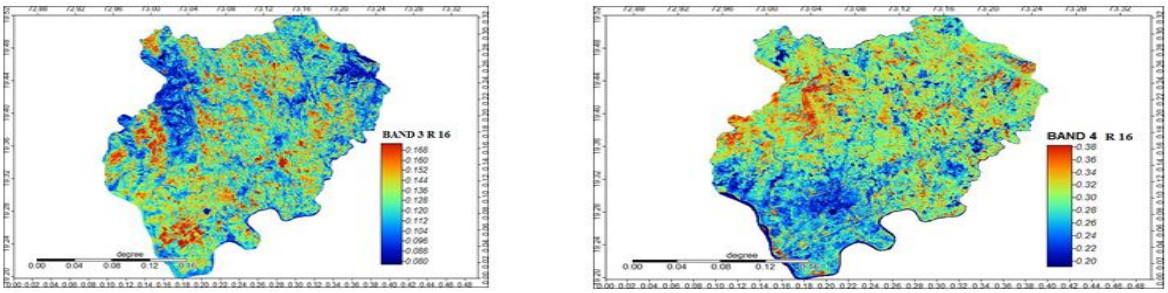

Fig. No 9 : LISS III Band III and IV images and Surface Reflecatance of 2016

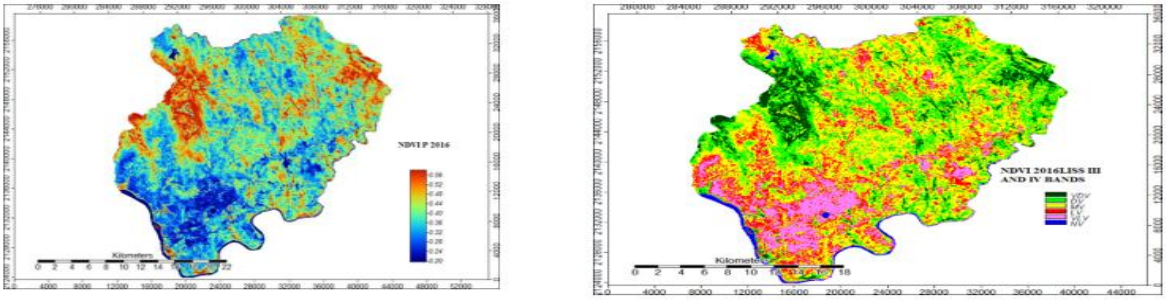

Fig. No 10 : NDVI of 2016 with Look up Table

Class	Name	Area in sq. km.	% Area
1	NV	1.81	0.26
2	VLV	12.66	1.81
3	LV	105.10	15.02
4	MV	283.73	40.56
5	DV	200.84	28.71
6	VDV	95.46	13.64
Total		699.59	100

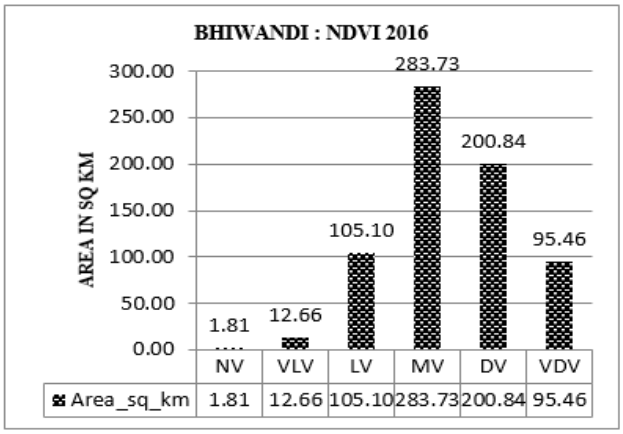

Fig. No 11 : Vegetation Cover (2016)

The calculated values of NDVI for the year 2016, reveals the pattern of vegetation cover where the moderate dense and dense vegetation area found extensive that is 40 % and 28 % respectively. The very dense is forest area is around 14% only.

Comparison of NDVI of 2008 and 2016

From the NDVI, we can calculate the area under each category of vegetation density or existence of vegetation. The comparative analysis from 2008 to 2016 projected the reduction in forest cover within short span of time. The negative values of difference of Moderate and Dense Vegetation area is because intensive agricultural land uses due to availability of irrigation. It was also supported by the plantation of trees under different programmes. It is found that area under dense vegetation is decreased by 7% from the year 2008 to 2016.

Class	Name	2008		2016		Difference
		Area sq. km.	% Area	Area sq. km.	% Area	
1	NV	14.47	2.07	1.81	0.26	12.66
2	VLV	49.16	7.03	12.66	1.81	36.50
3	LV	141.44	20.22	105.1	15.02	36.34
4	MV	198.23	28.34	283.73	40.56	**-85.50**
5	DV	148.33	21.21	200.84	28.71	**-52.51**
6	VDV	147.77	21.13	95.46	13.64	52.31
		699.40	100	699.59	100	0

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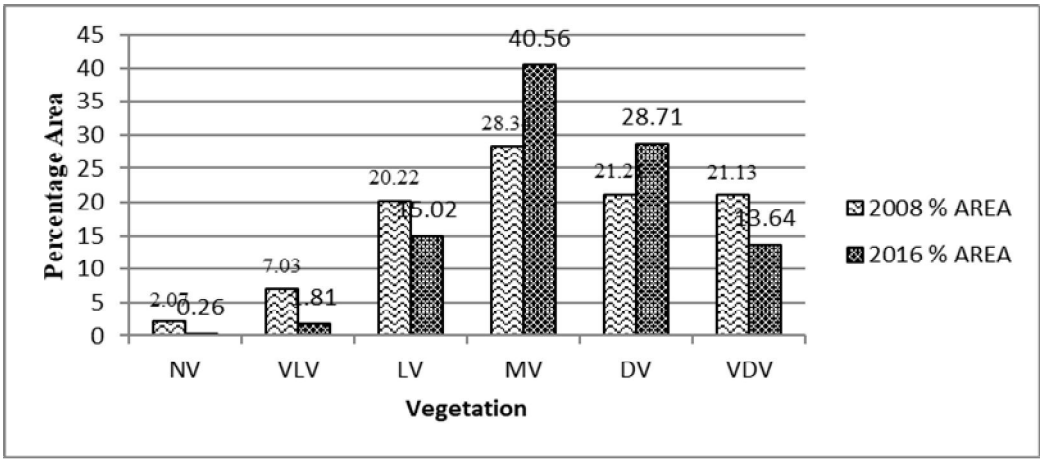

The comparative study of vegetation cover in Bhiwandi Tehsil with the help of NDVI technique, it was come to know that the areas of Very Dense Vegetation is reduced (from 21 % to 13 %) because of the encroachment of human activities in reserved forest areas especially the expansion of cultivable land in the areas where irrigation is provided, cutting the forest for firewood by local communities, forest fire, developmental projects like roads, railways, dams etc. The reduction of very less dense vegetation areas is because of the urban expansion or suburnization or growth of urban centers, built up areas which is responsible for the reducing forest or green areas. In the map it is very clearly observed that along the NH-3 Highway because of warehouses, storehouses, garages, hotels and growth of villages reduced the vegetation area and increase in built up area. The area along the river also vegetation area is also reduced because of growth of villages and agricultural land. The moderate vegetation areas get increased because of the afforestation and crop areas.

CONCLUSIONS

- There is a significant relationship of physiography and vegetation in Bhiwandi Tehsil. The hilly areas yet protected for the conservation of green areas. But still the area under the forest is getting reduced (from 21% to 13%) for the purpose of developmental projects and careless use, forest fire etc.
- Agricultural activities with irrigation and afforestation programme supported to increase in moderate dense vegetation area and dense vegetation cover in Bhiwandi Tehsil from 28 % to 41 % and 21 to 29 % respectively.
- The built up area of rural and urban centers is responsible of reducing the green cover along the highway and river. The expansion of agricultural land and other activities reduced the forest area.
- The developmental projects like roads, railways and dams are also responsible for the loss of green cover.
- The majority of dense forest area is on the high elevated hilly areas and less dense vegetation cover near to the river or urban areas. Thus urbanization is a major cause for loss of vegetation in Bhiwandi. The tourism activity at Vajreshwari and Akloli also decreased the vegetation cover.

SUGGESTIONS

- Urgent need to conserve the forest on the hills and tree plantations with the help of NGOs, NSS and local bodies to restore the ecological balance.
- The detailed research on type of vegetation and species diversity can be undertaken for research.
- Optimum utilization and application of knowledge regarding the forest and environment with the support of modern technology for the sustainable development.

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SPATIOTEMPORAL ASSESSMENT OF VEGETATION COVER USING NDVI IN VASAI TAHSIL OF PALGHAR DISTRICT

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ABSTRACT

Land, water and forests are the basic natural resources which consist of minerals, soils, water bodies, flora and fauna. The forest is most important resource as it influences the climate, soil and various human activities. Since the last few decades, forest ecosystem is constantly under threat due to increased number of anthropogenic activities. Over exploitation, destruction and fragmentation of forest land cover is rapidly taking place on the outskirts of large cities mainly for expansion of agricultural land, infrastructure development, industrialization and urban expansions.

Up to date information of land use and land cover, especially the vegetation cover is important for urban and regional planning. This information will also help the town planners to make sustainable land use models within and in the outskirts of the cities. The Geospatial Technology provides platforms to analyze the information related to landuse and landcover very precisely. NDVI (Normalized Difference Vegetation Index) is a technique which gives an idea of the characteristics of the vegetation. The area selected for the study is Vasai Tahsil of Palghar District, which is in the outskirts of Greater Mumbai. The tahsil is rapidly undergoing land use changes due to the expansion of Mumbai city, since the last few decades. The time duration taken for the study is of last two decades. The satellite data is taken from Bhuvan (Cartosat DEM, Resourcesat-1 a medium resolution multispectral sensor LISS-III and Advanced Wide Field Sensor (AWiFS). The image analysis and mapping of NDVI for spatiotemporal analysis of vegetation characteristics has been carried out with the support of software. Survey of India (SOI) topographic sheets and GPS data for ground truthing has been used for verification. QGIS and SAGA software's have been used for data analysis.

The processes involved are downloading the RS data from Bhuvan website, preprocessing, clipping and mosaicking, NDVI processing and preparation of graphs and tables. The vegetation is also studied in relation to physiographic aspects such as landforms and slope. The spatiotemporal characteristics of vegetation are described by the investigator from the maps, diagrams and tables retrieved from the soft wares of RS and GIS after data analysis, ground truthing and verification from secondary sources. Suggestions have also been given to protect the green zones in Vasai Tehsil.

Key concepts: Spatiotemporal assessment, NDVI and Vegetation cover and characteristics

INTRODUCTION

Land cover is the physical material at the surface of the earth. Land cover includes grass, trees, bare ground, water, etc. Land use is the human use of land. Land use involves the management and modification of natural environment into built environment such as fields, pastures and settlements. Information on the rate and kind of change in the use of land resources is essential for proper planning, sustainable management and regularizing the use of these resources

In the outskirts of the large metropolitan cities of developing countries land use changes are very rapid. These changes are due to expansion of cities, population growth, development of infrastructure, upcoming residential and commercial areas etc. Since 1980's process of urbanization is rapidly taking place towards the northern and eastern side of Mumbai along with suburban railway lines. This process of urbanisation is bring undesirable land use changes and associated environmental issues. Natural vegetation plays a crucial in ecological balance as well as it is important its economic benefits. Disturbances to physical landforms, loss of natural vegetation, loss of wetlands, encroachment on mangroves and salt pans, transformation of agricultural field to non-agricultural uses, unscientific disposal of solid waste etc. are some of the issues observed in the rural-urban fringe areas of the Mumbai City.

Up to date information of land use and land cover, especially of the vegetation cover is important for urban and regional planning. This information helps the town planners to make sustainable land use models within and in the outskirts of the cities. Natural vegetation play an important role biogeochemical cycles. It helps to reduce impacts of all types of pollution. The Geospatial Technology provides platforms to analyze the information related to land use and land cover very precisely. NDVI (Normalized Difference Vegetation Index) is a technique which gives an idea of the characteristics of the vegetation. The area selected for the study is Vasai

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Tehsil of Palghar District, which is in the outskirts of Greater Mumbai. The Tehsil is rapidly undergoing land use changes due to the expansion of Mumbai city, since the last few decades.

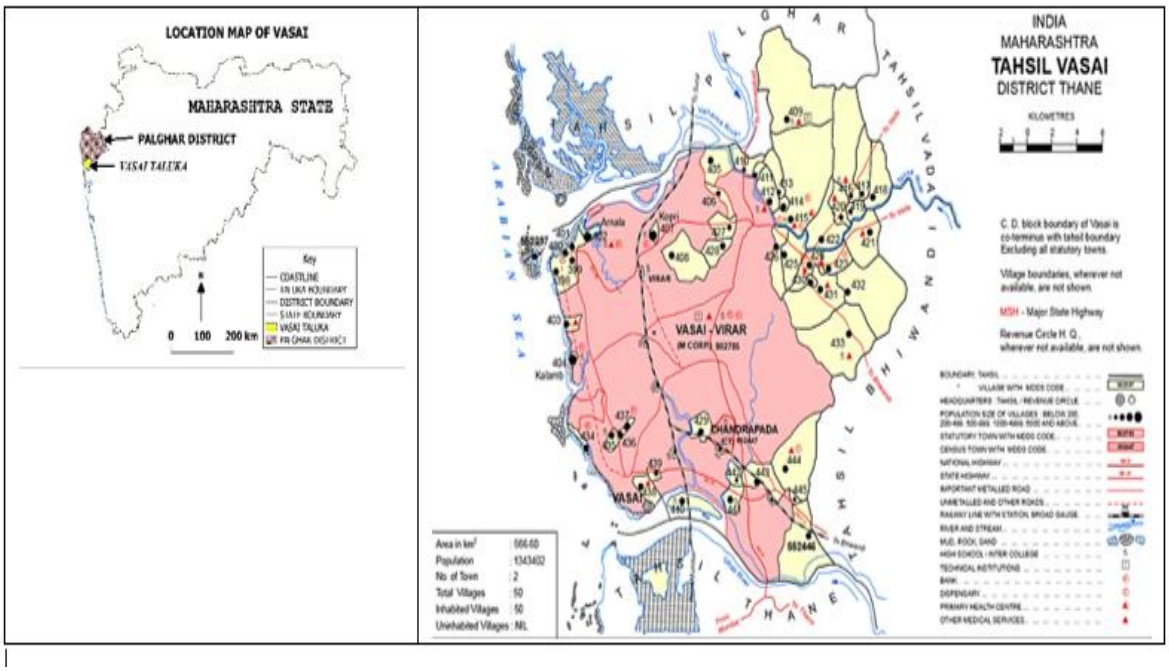
OBJECTIVES OF THE STUDY

- To understand geography and demography of Vasai tehsil
- To carry out vegetation analysis with help of NDVI of Vasai tehsil
- To identify areas of loss of vegetation cover in Vasai tehsil
- To identify possible causes of loss of vegetation in Vasai tehsil
- To give possible suggestions and recommendations for sustainable land use

Geography of study Area: Geographically Vasai Tehsil is situated between 19^0 24' to 19^0 24' North and latitudes 72^0 48' to 72^0 54' East longitudes in newly formed Palghar district of state Maharashtra. Vasai is a coastal tehsil with total geographical area of 566.60 Km^2. Table -1, shows altitude wise geographical area in Vasai Tehsil. In this Tehsil more than 87% area has altitude less than 150 mts above MSL. This area is in western part of tehsil along with the coast and associated with fishing and agricultural villages and Vasai –Virar Municipal Corporation. Remaining 13% area is above 150 mts and it is the hill area located in the eastern part of the Tehsil. This area is associated with small tribal settlements and patches of reserve forests.

Altitude in Mts	Area in kms ^{2}	% Total Area
0- 10	192.90	35.82
10- 150	278.71	51.76
150- 300	37.98	7.05
300 -450	21.37	3.97
450- 600	6.82	1.27
600>	0.92	0.17
Total	538.50	100

As per Census 2011 tehsil has total population of 13, 43, 402 persons. In decade 2001 to 2011 urban population growth rate in tehsil was 68.8% whereas rural population growth rate was -59.1%. This is mainly due merger of 54 villages of Tehsil to form Vasai-Virar City Municipal Corporation, (VVCMC) in 2009. In year 2001 proportion of urban population in tehsil was 65% and it increased to 92% in year 2011. Table -2 clearly showing rapid urbanisation in Vasai Tahsil, mainly after year 1991.



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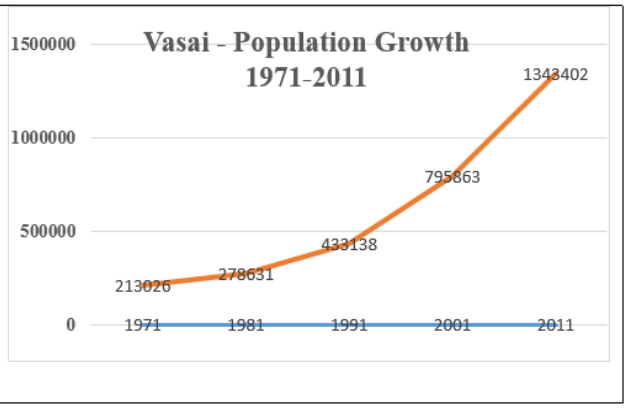
Year	Total Population	% of Urban population
1971	213026	27.04
1981	278631	28
1991	433138	49.81
2001	795863	65.2
2011	1343402	91.5

Table -2



METHODOLOGY: The present investigation assessing the spatiotemporal changes of vegetation covers in Vasai Tahsil of Palghar district in Maharashtra. To carry out this task, the multispectral remote sensing data of Landsat sensors and LISS III images of Band 3 and 4 for the year 2008 and 2016 are downloaded from the Bhuvan website. The benefit of utilizing the Landsat series data is because of its long-term archive with medium spatial resolution and consistent and regular spectral and radiometric resolution. Photo synthetically active healthy green vegetation absorbs red wavelength and scatters large portion of near-infrared wavelength of electromagnetic radiation received from the sun or terrestrial radiation which is falling on it. Non climax and unhealthy or dry vegetation reflects large portion of the red wavelength as comparison to near-infrared and other wavelengths. The **Normalized Difference Vegetation Index (NDVI)** is a Numeric Indictor that applies red and near-infrared wavelengths of electromagnetic spectrum to analyze and study the characteristics of the vegetation in particular area. It is the common technique commonly and but very effectively used to measure vegetation index and monitor vegetation cover of area over a period of time and determines the change in vegetation cover in the region.. NDVI can be calculated per-pixel level using following formula.

$$NDVI = \frac{\rho()^* - \rho^*,-}{\rho()^* + \rho^*,-}$$

Where, ()* and ρ*,- are spectral reflectance of a pixel in near-infrared and red band respectively.

NDVI values lies from -1 to +1, where -1 indicates no presence of vegetation in the region or place and +1 indicates presence of dense and healthy vegetation in the number of pixel from the digital satellite image of the area. In remote sensing technology, the NDVI value of zero and less than zero represents water or bare or wet soil. The value from 0.0 to 0.4 represents less dense to moderate dense vegetation. The NDVI value above 0.6 predicts forest with dense healthy vegetation cover. The interpretation of Spatio-temporal NDVI values should interpret with care and ground truthing that is sample physical verification is must. The purpose of present investigation is to monitor the spatiotemporal changes in vegetation cover of the Vasai Tahsil over a certain period of last two decades as urbanization encroached in the forest and green areas at the vicinity of metropolitan cities for residence or industries as well as market gardening. The temporal images used in the study should be around the same season of the year. In this research, Resourcesat-2, LISS-III with resolution 24m of 13th October, 2008 and 17th January, 2016 are used to assess the spatiotemporal change of vegetation cover in the Vasai Taluka. The tiles were downloaded from the Bhuvan belongs to area covered by toposheet no E43-A/11, E43-A/14, E43-A/15, E43-B/02, E43-B/03. The downloaded images with band 2, 3, 4, and 5 either mosaicked and subset or merged and clipped in QGIS and SAGA softwares. In order to calculate NDVI, the digital number (radiometry) of *red* and *near-infrared* image bands to near ground spectral reflectance. However, for simplifying the investigation the top of atmosphere spectral reflectance is utilized. The characteristics of vegetation interpreted with help of NDVI map, scatterplot, histogram and table derived from the images with the help of SAGA software very much useful for image processing, interpretation and analysis.

ANALYSIS AND FINDINGS

The **Normalized Difference Vegetation Index (NDVI)** is a numeric indictor that applies red and near-infrared wavelengths of electromagnetic spectrum to analyze and study the characteristics of the vegetation in particular area. NDVI values lies from -1 to +1, where **-1 indicates no presence of vegetation** in the region or place and **+1 indicates presence of dense** and healthy vegetation in the number of pixel from the digital satellite image of the area. The value from 0.0 to 0.4 represents less dense to moderate dense vegetation. The NDVI value above 0.6 predicts forest with dense healthy vegetation cover.

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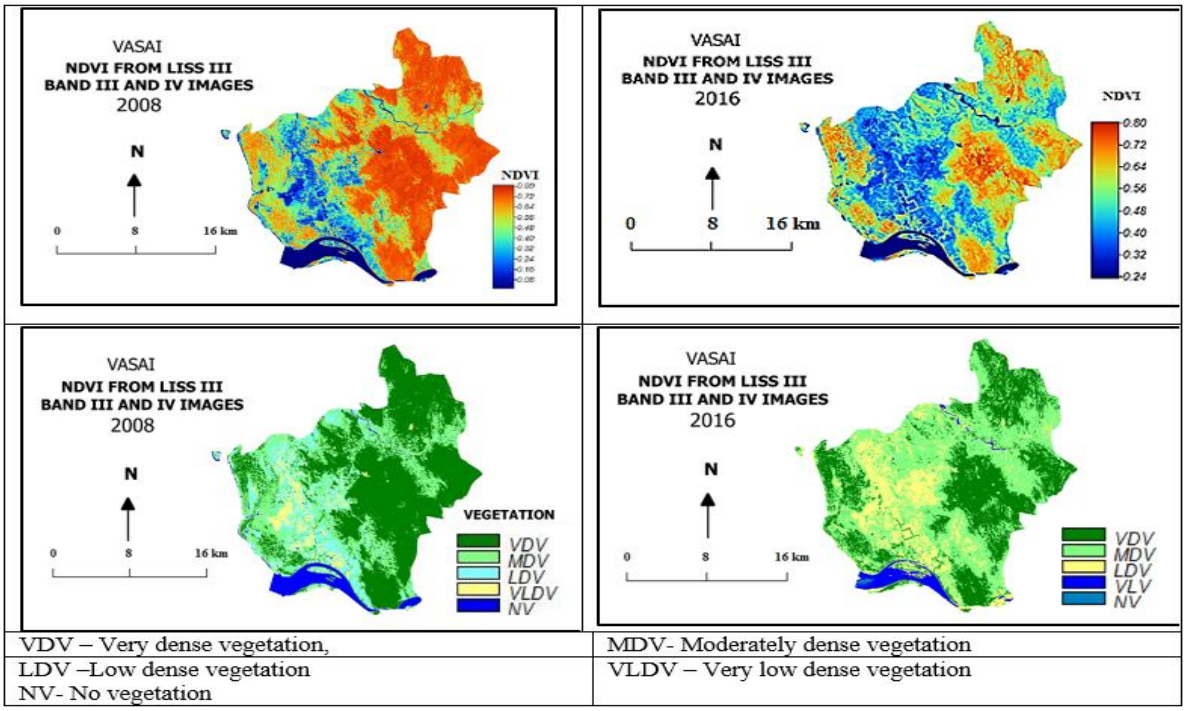
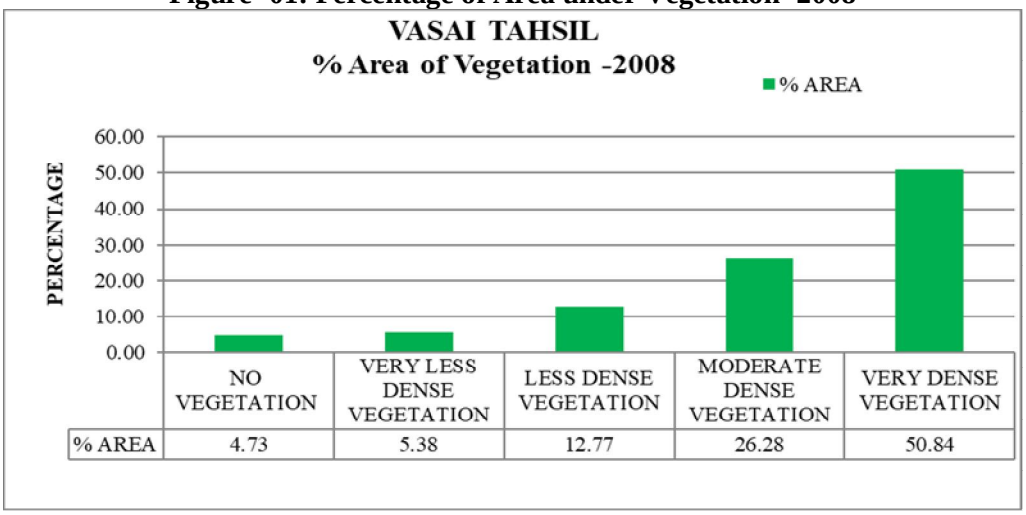
Image - 01 to 04



VDV – Very dense vegetation,	MDV- Moderately dense vegetation
LDV –Low dense vegetation	VLDV – Very low dense vegetation
NV- No vegetation	

Since 2003 onwards FSI use three level classification of the forest cover as - **Very dense** forest with canopy cover between 70% - 100%, **moderately dense** forest with canopy covers between 40% - 70% and **Open forest** with canopy cover between 10% - 40% (FSI, 2012)

Figure- 01: Percentage of Area under Vegetation -2008



Looking at above images and figures it is clear that until 2008 more than 77% geographical area of the tehsil was under very dense and moderately dense categories of vegetation. The large patches of vegetation are observed in towards eastern side of Western Express Highway connecting Mumbai with Ahmadabad. This is basically hilly areas of Tungareshwar National Park, Kaman Durg and to the east of it the areas of Inam reserved forest. Many villages of these area including Sativali, Chinchoti, Bramhandpada, Kaman, Shillottar, Majivali, Shivansal, Bhuttaripada, Khadaki, Pimpalshet etc were having good vegetation cover. Other patches of dense vegetation cover were around Vasai town. Here one can see vegetation of planted trees such as coconut, banana and other horticultural crops.

Area between western railway track and western express highway was associated with no or poor vegetation. Here there is presence urban settlement with very high density of population. Proximity to Mumbai metropolitan city and well connectivity provided by suburban railways promoted urban growth in this part of Tehsil. Here the vegetation cover is very poor and approximately 20% Tehsil area is under this category in 2008.

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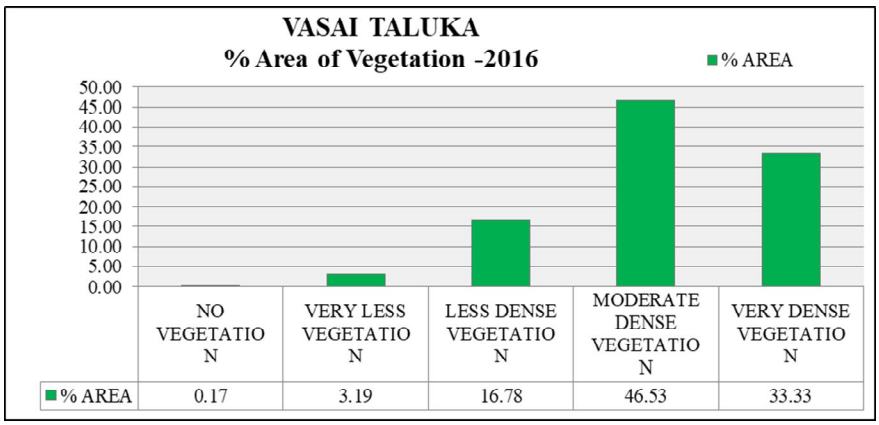
Figure- 02: Percentage of Area under Vegetation -2016

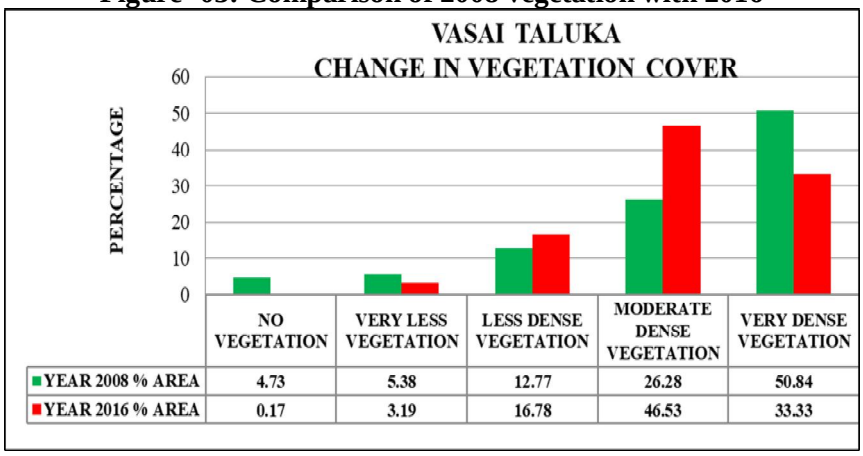


After analysis of 2016 images one can say that very dense vegetation in tehsil is about 33% and moderately dense categories of vegetation is 47 %. All these patches of vegetation lies in eastern part of the tehsil in hilly areas those are having altitude from 10 mts to more than 700 mts.

Areas of poor vegetation is in central part of the tehsil between western railway track and western express highway. Areas of poor vegetation is also observed in Tansa River valley between Shirsad and Vajreshwari. Another patch of poor vegetation was observed between Navghar and Bhiwandi in the tehsil.

Comparison of 2008 vegetation with 2016:

Figure- 03: Comparison of 2008 vegetation with 2016



After comparing vegetation cover of 2008 with 2016 one can say that there is tremendous decline in very dense vegetation cover in the tehsil. As compare to vegetation cover of 2008 very dense vegetation declined by 18%. This decline in very dense vegetation is clearly observed fringe areas of Tunagershwar National Park and Inam Hills. Even area around Jivdani Hills also lost its vegetation cover. One can say here that due to expansion of anthropogenic activities around railway stations and along with major roads there is decline in vegetation cover. Vegetation cover also declined between western railway track and sea coast due expansion of buildup areas. Here there loss of horticulture tree crops. As impact decline in very dense vegetation increased area under moderately dense vegetation. It had increased from 26 % to 47% in the study period. Minor changes are observed in other categories of the vegetation.

CAUSES OF DECLINED IN VERY DENSE VEGETATION

After careful investigation, reference work, field visits and observation of satellite images following causes have been identified as responsible factors for declined in vegetation cover.

1. Rapid urbanization: This is mainly taken place due to rapid population growth after 1991. Population of town Virar, Nallasopara, Vasai and Manikpur increased very rapidly due immigration of people from Mumbai. Highland value and lack of availability of cheap houses many middle class and lower middleclass families shifted from Mumbai to towns of Vasai Tehsil. Expansion of Western suburban railway lines, development of four tracks of railway up to Virar, comparatively cheaper formal and informal houses, improvement in water supply after construction of Surya dam and increased frequency of local trains attracted people to the Vasai-Virar City Municipal Corporation, (VVCMC) Areas.

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Table- 3: Population Growth in urban areas of Vasai Tehsil

Name of Town	Year → 1971	1981	1991	2001	Area in 2001 in Kms^2
Nallasopara	--	4337	67332	184538	14.3
Navghar Manikpur	7610	9331	35112	116723	17.3
Vasai	30594	34940	39781	49337	6.7
Virar	12713	23303	57600	118928	9.5
	5,0917	**71,911**	**1,99,825**	**4,69,526**	**Total Urban area =47.8 Kms^2**
Growth rate		**41.23**	**177.88**	**134.97**	**2011=160.19**
After Formation of VVCMC, **Total Population in 2011= 1,221,233**					**Total Urban area =311 Kms^2**

Source: District Census Handbook -1971 to 2011

Figure- 04: Urban Population Growth in Vasai Tehsil

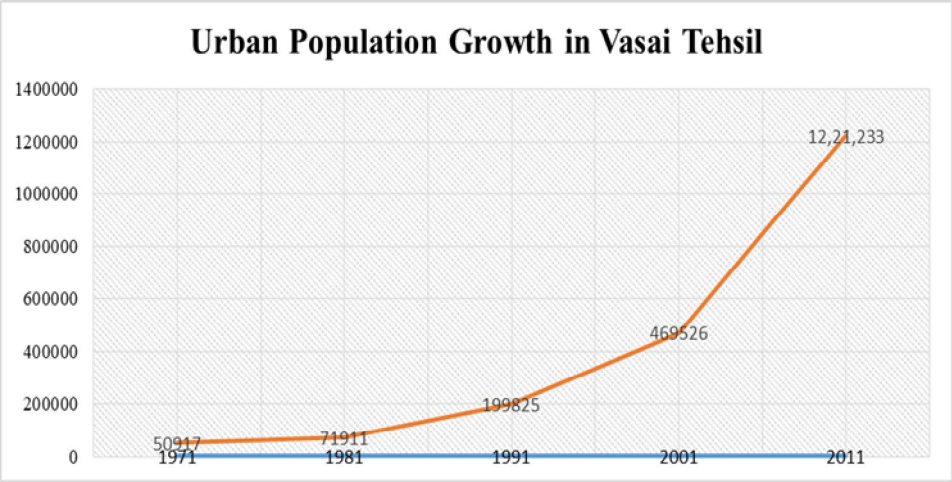

Table -3 and Figure -04 shows urban population growth in Vasai tehsil. Very rapid urbanization had been observed in tehsil after the year 1991. Growth rate of urban population in Tehsil for the decade 1981 - 1991 was 178 %. In decade 1991 – 2001 it was 135% and it got further accelerated in decade 2001-2011 up to 160%. Total urban population in Tehsil in year 1971 was about 50,000 and it increased to more than 12 lakhs in year 2011. This growth of urban population mainly due increase frequency of local trains between Virar- Vasai and Mumbai. Area under urban land use was less than 40 kms ^{2} before 2001 and it increased to more than 300 kms ^{2} in year 2011. This expansion of urban area reduced the natural vegetation cover in the Tehsil.

2. Expansion and construction of roads: Under the project golden quadrilateral in the India all the major national highways are widened and extended. As per the Thane Forest Circle report 2009-10, due to expansion of Mumbai-Ahmadabad National Highway (NH-08) in Thane district, Forest Department lost 260 ha of reserved forest. Similarly expansion and extension of major roads in Tehsil such as Shrisad –Virar, Shirsad-Vajreshwari, Chinchoti –Anjur road, Parol road etc. also responsible for deforestation. These extended and expanded roads also attracted people towards interior villages of Vasai tehsil those carried out encroachments on forest land. This encroachment is clearly visible around Jivdani Hills and Tungareshwar hills.

3. Conversion of horticultural farm land to other non-farming activities:
Since 1991 tourism and related activities got boosted in Vasai Tehsil. This urban recreational tourism got promoted in two green areas – beach side horticultural farms and on outskirts of reserved forest areas in eastern hilly section.

Starting from Vasai creek in the south up to Vaitarna creek in the north along with coastline there is presence of lush green horticultural farms – also called as Green Belt of Vasai. Coconut, palm, mango, drumstick, tamarind, banyan, banana and cashurina plants made tis belt with thick vegetation cover. Since 1991 onwards beach side tourism in the form of resorts in booming around village Arnala, Tembhi, Navapur, Rajodi, Kalamb, Bhuigaon, Rangaon and other. Majority of these resorts are developed in agricultural farms those initially associated with greenery.

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CASE STUDY

Arnala is a coastal village with an area of 4 kms^2. In this village there are 22 resorts and majority of them are on beach side farmland. Each of these resorts sprayed over an area of one acre to five acres. These resorts has facilities like swimming pools, water slides, rain dance, accommodation, play grounds, parking etc. As per the observation all these resort together converted more than 75-100 acres of green farm land to non-agriculture utilities. Similar types of resorts are also seen along with NH-8 and Shirsad –Vajreshwari road on previous private forest land.

SUGGESTIONS AND CONCLUSION

Efforts made through plantations, afforestation and regenerations are not sufficient to increase natural vegetation cover of the Tehsil. Public awareness, active involvement of people, motivated forest staff, active support from state government and local political leaders are the need of the hour in order to conserve existing natural vegetation. There is need of strict rules and regulations to convert forest and agricultural land to non-forest and noon-agricultural utilities. Town planner should understand importance of natural vegetation and in town planning process they should protect patches of natural vegetation on priority basis. In the areas of high urban densities they should make buffer zones of natural or planted vegetation which will help in maintaining ecological balance and reduce the negative environment impacts. Over all every citizen should try to protect and expand the area under natural vegetation.

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GRAFTING ONTO POTATO STARCH. III. SYNTHESES AND CHARACTERIZATION OF METHACRYLIC ACID GRAFTED POTATO STARCH

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Abstract
The grafting of Methacrylic acid on to granular potato starch in an aqueous medium initiated by Ammonium Per Sulphate (APS) has been studied. The effect of concentration of initiator and monomer, polymerization time and temperature, material-to-liquor ratio and presence of solvent have been studied in terms of percentage grafting(%G) and grafting efficiency (%GE). Gravimetric method was used for the confirmation of formation of graft copolymer. Grafting was further confirmed by infra-red spectroscopy (IR), X-ray diffraction and Scanning electron microscopy (SEM). As a result of grafting the crystallinity of starch found affected while SEM revealed that grafting is merely a surface phenomenon.

Keywords: Graft copolymerization, Methacrylic acid, Potato starch, SEM, XRD.

INTRODUCTION

Starch is abundant in nature and is one of the most important carbohydrate produced from renewable resources. It consists of two macromolecules, amylose and amylopectin comprising of glucose monomer units joined through α-1, 4 linkages. In spite of being biodegradable and low cost, starch has variety of applications in different field of scientific and industrial interests. This very fact has attracted the attention of many researchers towards starch. However, raw starch has some shortcomings which limit its industrial applications. It is possible to overcome these shortcomings by modification of starch. Graft copolymerization is one of the simple but effective technique for modifying the chemical and physical properties of natural polymers without significantly affecting its basic properties [1]. Graft copolymerization of vinyl monomers onto natural polymers was reported by various researchers for the synthesis of polymeric materials for their better utilization [2-5]. Chemical modification of starch via grafting of vinyl monomers is a most effective method for improving its properties. From last two decades, grafting of acrylamide[6, 7], acrylic acid[8], and acrylonitrile [9] on starch has been studied using various initiators.

Methacrylic acid (MAA) has been graft copolymerized onto starch using variety of initiators, such as potassium per sulphate[10, 11], manganese(IV)-acid system[12], chromic acid [13], Fentons reagent [14], tetravalent cerium [15] etc. However, we did not come across the use of ammonium per sulphate(APS) as initiator to graft–polymerize MAA.Therefore we found interest in studying the use of APS as initiator in graft copolymerizing MAA onto starch. The optimum conditions for grafting were established with respect to initiator as well as monomer concentration, polymerization time and temperature, material-to-liquor ratio and presence of solvent in the medium of reaction.

EXPERIMENTAL

Materials Insoluble Potato starch supplied by Thomas Baker Chemicals, Mumbai, India was first dried at 110^0C for 10 hours to remove absorbed moisture and then was stored over anhydrous $CaCl_2$. Methacrylic acid (Loba Chemie Pvt. Ltd., Mumbai, India) was used as supplied and stored in refrigerator. Ammonium per sulphate (APS) (HPLC Pvt. Ltd., Mumbai, India) was dried at 50^0C in vacuum-oven for 6 hours and then stored over $CaCl_2$ in desiccator. A solution of 0.1 mol.L^{-1} APS was prepared in distilled water.

Graft Copolymerization The reaction was carried out by making the mixture of 2 g of dried starch with 70 mL of distilled water and stirring magnetically at 400 rpm to make uniform slurry in presence of air. It was then treated with predetermined quantity of APS for 10 min to facilitate free radical formation on starch. It was followed by addition of monomer and then the total volume of the reaction mixture was made to 100 mL with distilled water. At scheduled time, the reaction mixture was immediately filtered through preweighed Whatman filter paper no. 40. The residue was made free of homopolymer by repeatedly washing with lukewarm distilled water. After extraction of homopolymer, the residue was dried in vacuum-oven at 50^0C for 24 hours [16].

Control reactions were carried out with 2g of starch under identical experimental conditions except the addition of monomer in each set of reaction.

The grafting parameters namely the percentage grafting efficiency (%GE) and percentage grafting (%G) were based on gravimetric estimation and were calculated as follows [17]:

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$$\%GE = 100\ (W_2 - W_1)\ /W_3$$
$$\%G = 100\ (W_2 - W_1)\ /W_1$$

Where W_1 = weights of pure starch
W_2 = weights of graft copolymer
W_3 = weights of monomer

Infrared spectral analysis Infrared (IR) spectra of pure starch, starch graft copolymer and poly (MAA) were recorded on Shimadzu-FTIR-single beam spectrophotometer in the range of 4000-400cm^{-1} using ATR method.

X-ray diffraction studies The X-ray diffraction studies were carried out using a Shimazdu-Maxima-7000. The graft copolymer and pure potato starch samples were scanned on XRD between 5° and 80°.

Scanning electron microscopy The surface morphology of polymer samples was studied using a scanning electron microscope (SEM) of FEI model quanta 200ESEM. The micrographs were taken at magnification of 250, 500, 1000, 2500 and 5000.

RESULTS AND DISCUSSION

Physical appearance Most of the samples of graft copolymers of starch-g-MAA were white in colour and amorphous in nature.

Evidence for grafting

Gravimetric estimation The graft copolymerization was followed gravimetrically. The increase in the weight of the residue for each copolymerization reaction over control reaction, confirms the occurrence of grafting. The control reaction was carried out with 2g of starch using 0.004 $mol.L^{-1}$APS at 30°C for 180 min. During filtration, the average weight loss was found to be 0.32g for control reaction, which was considered at the time of calculation of grafting parameters.

Infrared spectroscopy The FTIR spectra of potato starch, starch-g-(MAA), and homopolymer of MAA (PMAA) are depicted in Figure 1 while the details of peak wavenumber and corresponding functional groups are tabulated in Table 1.

Table - 1: FTIR peak wavelength values of potato starch, starch-g-(MAA), Poly (MAA)

Compound	Functional groups	Frequency in cm^{-1}
Starch [Fig. 1 (A)]	(i) C-O	1170-1020
	(ii) C-H for CH_2	2930
	(iii) O-H	3600-3000(broad)
S-g-MAA [Fig. 1 (B)]	(i) C=O	1710
	(ii) C-O	1170-1020
	(iii) O-H	3600-3000(broad)
Poly (MAA) [Fig. 1 (C)]	(i) C-H	2931
	(ii) C=O	1710
	(iii) C-O	1253
	(iv) C-O	1165

IR spectra in Figure 1(A) and 1(C) show characteristic peaks of starch and poly methacrylic acid. Figure 1(B) depicts the FTIR spectrum of starch-g-(MAA) with 15.20% GE. In this spectrum all characteristic peaks of starch and poly (MAA) are present. The most important peaks between 3600-3000 $cm^{-1}$and 1170-1020 cm^{-1} derives from starch. Characteristic peak at 1710 cm^{-1} for C=O originate from poly (MAA) and confirm the grafting of MAA on starch. These result were the direct proof for the grafting of poly (MAA) onto starch.

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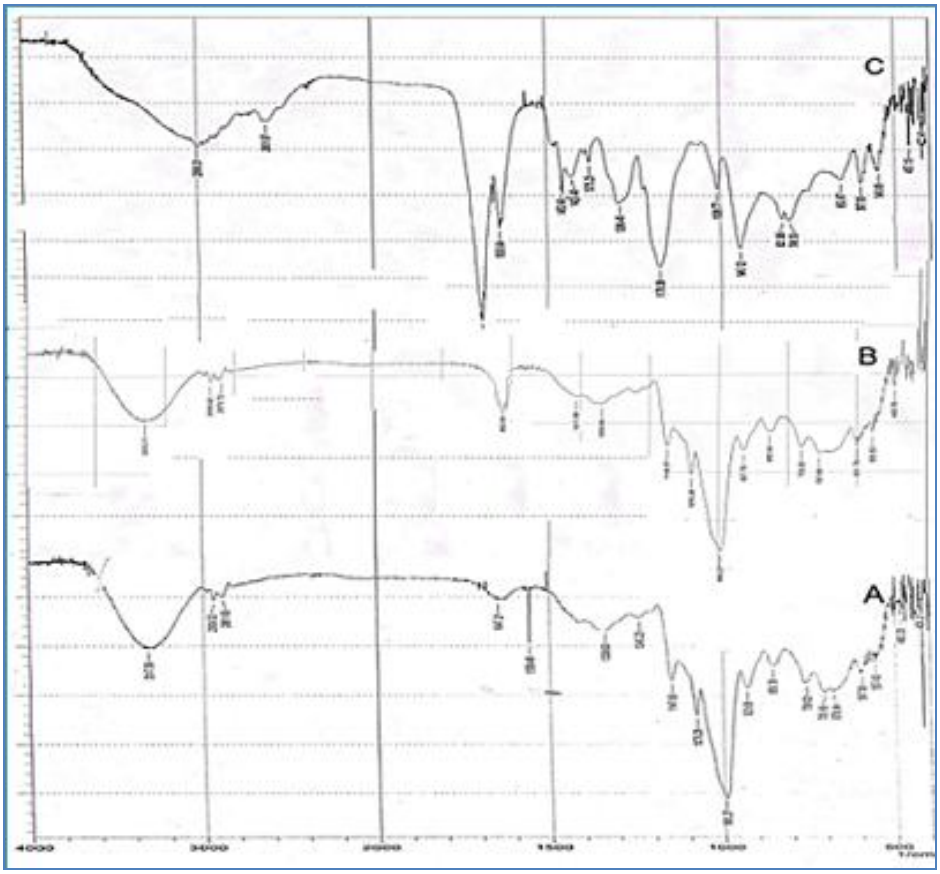

Figure – 1: FTIR spectra of (A) Starch (B) S-g-(MAA) (C) Poly (MAA)

Grafting parameters

Effect of initiator concentration Table 2 shows the effect of concentration of APS on the %GE and %G. The %GE and %G initially increase steadily with the increase in APS from 0.001 to 0.004 mol.L^{-1}, however these grafting parameters later on decrease gradually with further rise in concentration of APS. Similar results are reported by M. Liu et al with CAN as initiator [18].

Table – 2: Effect of initiator concentration on the grafting of MAA onto insoluble potato starch

APS(mol.L^{-1})	%GE	%G
0.001	13.46	13.50
0.002	14.06	14.10
0.004	15.16	15.20
0.006	13.91	13.95
0.008	13.66	13.70
0.010	13.46	13.50

[**Reaction conditions**: Starch=2g,[MAA]=0.233 mol.L^{-1} in each case the volume was made to 100 mL with distilled water at 30°C for 180 min.]

The initial rise in %G and %GE may be attributed to the formation of increasing number of free radicals on the starch backbone at which the monomer molecules can be grafted at. The decline in %GE and %G at higher concentration of APS (>0.004 mol.L^{-1}) can be rationalized as follows:

(i) Non-availability of sites on starch molecules at which APS can react to generate more free radicals;

(ii) The initiation of homopolymerization by unutilized APS.

In case of grafting of MAA initiated by APS, the extent of grafting increases with the increase of initiator concentration up to a certain limit (0.004 mol.L^{-1}), beyond which grafting no longer increases.

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Effect of monomer concentration Table 3 shows the effect of concentration of MAA on the %GE and %G. With increase in [MAA] from 0.118 to 1.509 mol.L^{-1}, % GE shows a gradual decrease from 27.26 % to 2.18 %, in contrast to it %G rises from 13.85 to 15.75.

As [MAA] increases, most of the monomer is consumed in homopolymer formation rather than grafting on to starch. This is evident from the fact that the viscosity of the reaction medium, in which homopolymer is soluble, increases with rise in [MAA]. Furthermore the large deposits of homopolymer reduce the accessibility of starch macro radicals to the monomer molecule. In short, the higher rate of homopolymerization and the lower accessibility of starch macro radicals, both simultaneously, play key roles in lowering the %GE at higher concentration of monomer. Indeed in order to obtain maximum %G for grafting onto potato starch, 0.470 mol.L^{-1} is the most suitable concentration of MAA while in contrast to it, lower concentration of MAA favours %GE. Similar results were reported by Singh et al [19].

Table - 3: Effect of monomer concentration on the grafting of MAA on to insoluble potato starch

MAA(mol.L^{-1})	%GE	%G
0.118	27.26	13.85
0.233	15.16	15.20
0.470	7.78	15.75
0.705	5.09	15.45
1.132	2.96	14.45
1.509	2.18	14.20

[Reaction conditions: Starch=2g, [APS]=0.004 mol.L^{-1} in each case volume was made to 100 mL with distilled water at 30°C for 180 min.]

However, it should be noted that, the increase in %G is merely a consequence of a decrease in the ratio of starch to monomer with increase in monomer concentration.

Effect of polymerization temperature As the present study was confined to granular starch, the temperature was not allowed to exceed the gelatinization temperature of starch. The result**s** obtained for the graft copolymerization by varying the temperature between 30°C to 50°C are listed in Table 4.

The effect of polymerization temperature on the %GE and %G has been shown in Table 3. It can be noted that %G and %GE reaches a maximum of 15.60% and 15.56% respectively at an optimum temperature of 35°C and then decreases steadily with further rise in temperature to reach as low as 6.35% of %G and 6.33% of %GE at 50°C. The increase in grafting parameters can be attributed to

1) increase in the mobility of monomer molecules with temperature resulting in more number of collisions with starch macro radicals;
2) increased propagation of grafted chains.

It is observed that the particle size of starch graft copolymer is inversely proportional to temperature.

Table – 4: Effect of polymerization temperature on the grafting of MAA onto insoluble potato starch

Temperature (°C)	%GE	%G
25	13.86	13.90
30	15.16	15.20
35	15.56	15.60
40	9.67	9.70
45	7.03	7.05
50	6.33	6.35

[**Reaction conditions**: Starch=2g, [APS]=0.004 mol.L^{-1}, [MAA]=0.233 mol.L^{-1} in each case in 100 of distilled water for180min.]

Effect of polymerization Time Table 5 shows the effect of polymerization time on %G and %GE. It is seen that the grafting shows an initial fast rate (during first 2 hours)which slows down with time and then levels off.

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As the time proceeds, more and more monomer gets added up to the growing grafted chains. Leveling off grafting is perhaps a direct consequence of the depletion in monomer concentration and so less availability of monomer for further grafting. Similar observations were made by Athawale and Lele [20].

Table – 5: Effect of polymerization Time on the grafting of MAA on to insoluble potato starch

Time(min)	%GE	%G
30	3.91	3.95
60	7.36	7.40
90	10.21	10.25
120	15.01	15.05
180	15.16	15.20
240	15.31	15.35
300	15.36	15.40

[**Reaction conditions**: Starch=2g, [APS]=0.004 mol.L^{-1}, [MAA]=0.233 mol.L^{-1} in each case in 100 mL of distilled water at 30°C.]

Effect of polymerization material-to-liquor ratio Table 6 exhibits the dependence of %G and %GE on the material-to-liquor ratio. This ratio was changed by decreasing the quantity of water in the reaction mixture.

A glance at Table 6 makes it evident that the decrease in the quantity of liquor, favors the rate of grafting. As the quantity of liquor is reduced, the kinetic probability of collision between monomer molecules and starch macro radicals increases, resulting in a rise in %GE and %G. Although in this case, the rise in %G and %GE is not appreciable, the maximum %GE was obtained at material-to-liquor ratio of 1:15. Further, decrease in the quantity of liquor led to a decline in %GE, probably because of the restricted movement of the monomer molecules in a relatively small volume of the reaction mixture of 60 mL. In other words, a material-to-liquor ratio of 1:15 is most suitable for this study.

Table – 6: Effect of polymerization material-to-liquor ratio on the grafting of MAA on to insoluble potato starch

Material-to-liquor ratio	Volume of Liquor	%GE	%G
1:25	100	15.16	15.20
1:20	80	15.36	15.40
1:15	60	15.46	15.50
1:10	40	15.26	15.30
1:5	20	15.11	15.15

[**Reaction conditions**: Starch=2g,[APS]=0.004 mol.L^{-1}, [MAA]=0.233 mol.L^{-1} in each case in 100 mL with distilled water at 30°C for 180min.]

Effect of solvent Table 7 shows the effect of presence of various solvents in the reaction medium, on the grafting of MAA onto granular potato starch. The magnitude of %G and %GE follows the order methanol> ethanol> propanol.

Table – 7: Effect of solvent on the grafting of MAA on to insoluble potato starch

Medium	Dielectric constant of medium	%GE	%G
Water	81.0	15.16	15.20
Water : Methanol	71.2	14.41	14.45
Water : Ethanol	69.7	12.26	12.30
Water : Propanol	68.8	11.77	11.80

[**ReactReaction conditions**: Starch=2g, [APS]=0.004 mol.L^{-1}, [MAA]=0.233 mol.L^{-1} in each case in 100 mL of distilled water at 30°C for 180min, Water:alcohol=4:1 (v/v).]

With increase in hydrocarbon chain length of alcohol, %G and %GE decreases from methanol to propanol.This can be reasoned on the basis of miscibility of alcohols with water and the dielectric constant of the reaction medium.

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As the length of the hydrocarbon (non-polar) chain increases, because the size of polar hydroxyl group remains the same, the miscibility of alcohol with water and the dielectric constant of alcohol from methanol to propanol decreases gradually (Table 8).

Table – 8: Values of dielectric constant of different alcohols [21]

Solvent	Dielectric constant
Water	81.0
Methanol	32.7
Ethanol	24.6
Propanol	20.3

The high polarity of water must be playing a key role in the grafting of hydrophilic, polar monomer such as MAA on to starch. As the dielectric constant of the reaction medium decreases from pure water to Water-Propanol system through other two mediums namely water-methanol and water-ethanol, the grafting reaction is affected. This is exhibited through decrease in %G and %GE concurrent with the dielectric constant of the medium.

Characterization of graft copolymers

X-ray diffraction studies Pure starch is a semi-crystalline polymer with amylose and amylopectin fraction. Crystalline domains of the starch granules are due to the clustered branches of amylopectin chains that are packed together. X-ray diffraction pattern of starch shows diffraction peaks at 15.8^{o}, 19.3^{o} and 21.6 ^{o} which demonstrates crystallinity of starch. Compared with the diffraction peaks of the starch, starch-g-MAA copolymer shows a broad dispersion peak, which indicates starch-g-MAA is a kind of amorphous polymer. The aggregation of starch has changed and the original peak intensity of starch decreases after grafting with methacrylic acid [22].

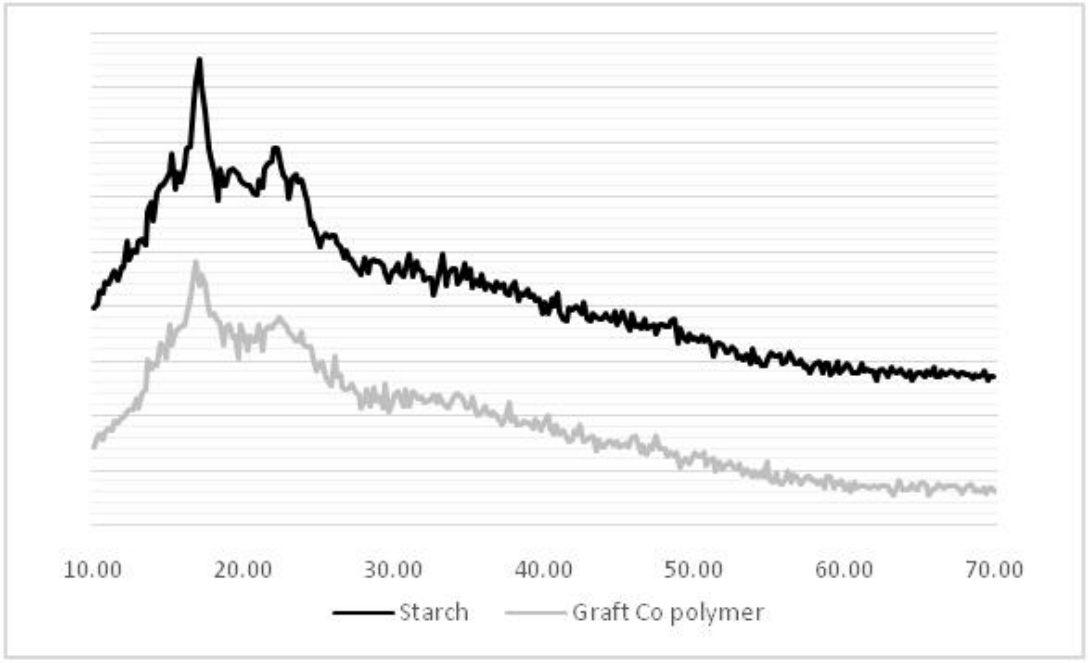

Figure - 2 : XRD of starch, starch-g-MAA copolymer

SEM A Scanning Electron Microscope provides detailed surface information by tracing a sample in a raster pattern with an electron beam. The surface morphology of starch and starch graft copolymer was viewed by scanning electron microscopy. Most of the starch granules are irregular in shape, few of them are oval in shape. Size of particle varied form 5 to 100 µm with smooth surface. SEM picture of starch graft copolymer clearly shows change in surface morphology of starch after grafting due to the coating of poly (methacrylic acid). It can be observed that almost all starch granules are uniformly coated with graft copolymer and remain seperate. A few of the starch granules have joined through this surface coating. [23, 24].

With increase in magnification, differences in shapes of starch granules get clearly visible and at 5000 magnification spherical and oval shape of starch granules is distinctly exhibited.

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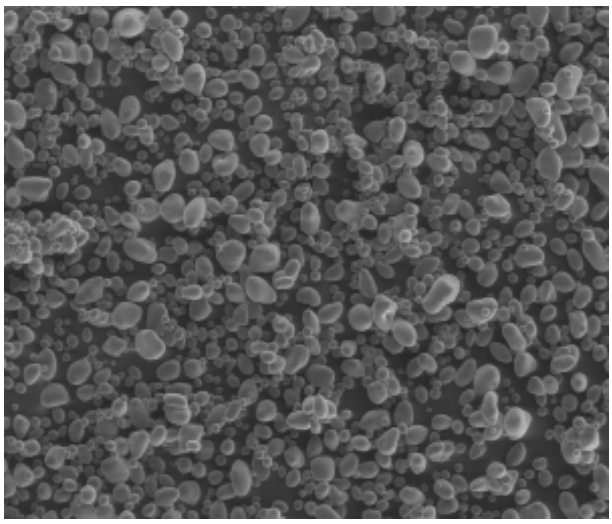

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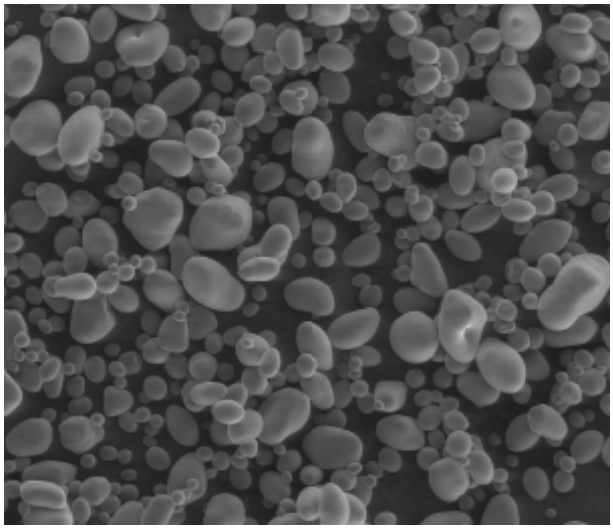

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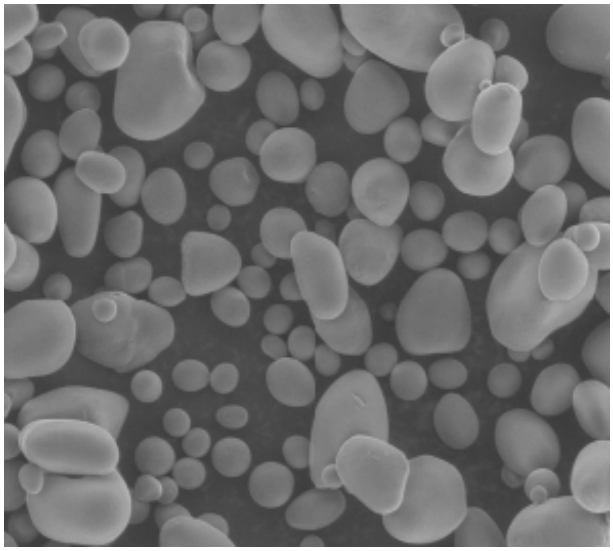

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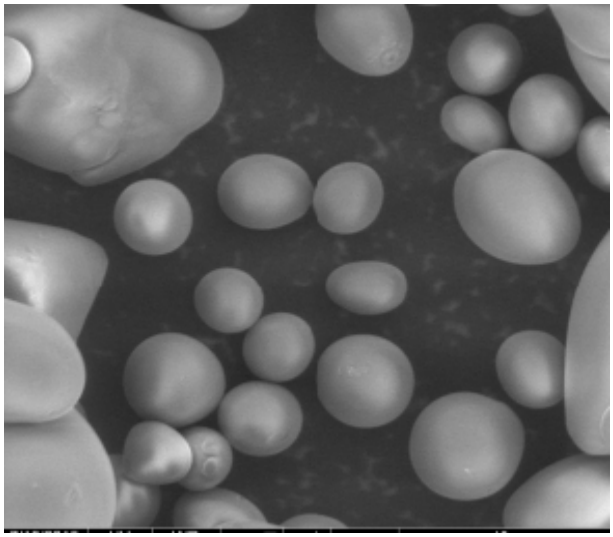

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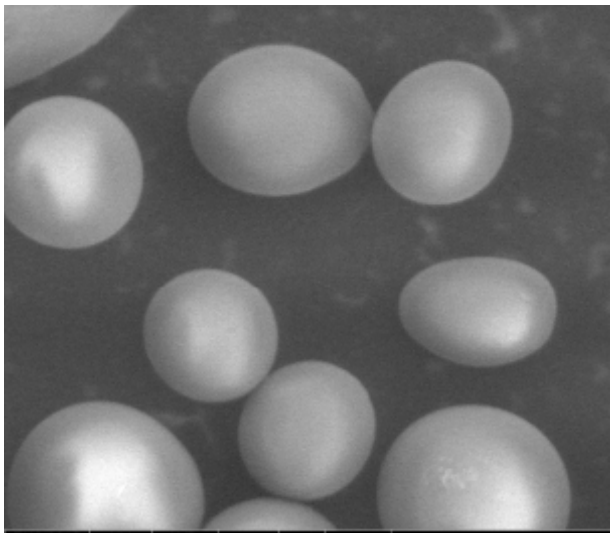

Magnification : 5000

Figure - 3: SEM micrograph of insoluble Potato starch at various magnification

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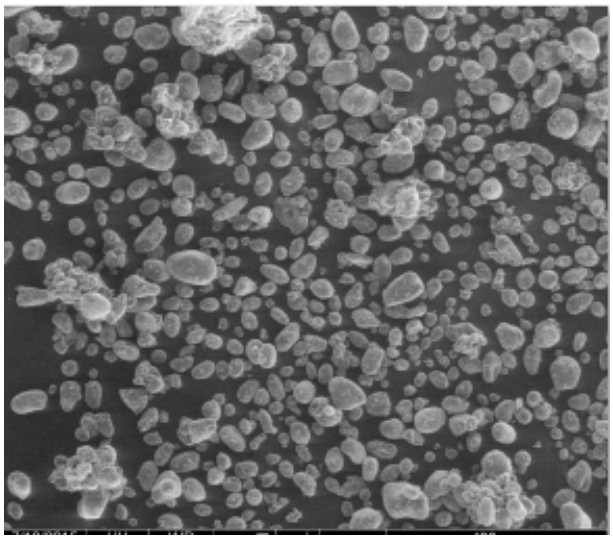

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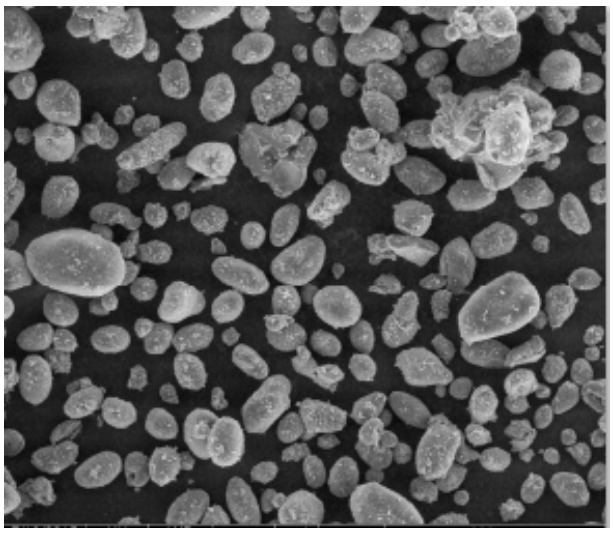

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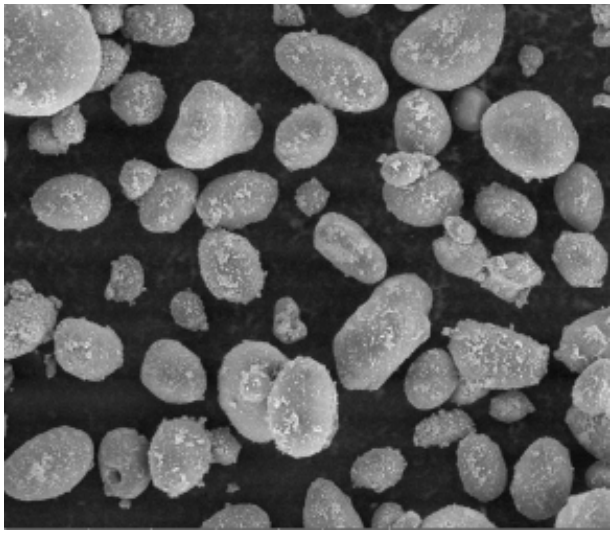

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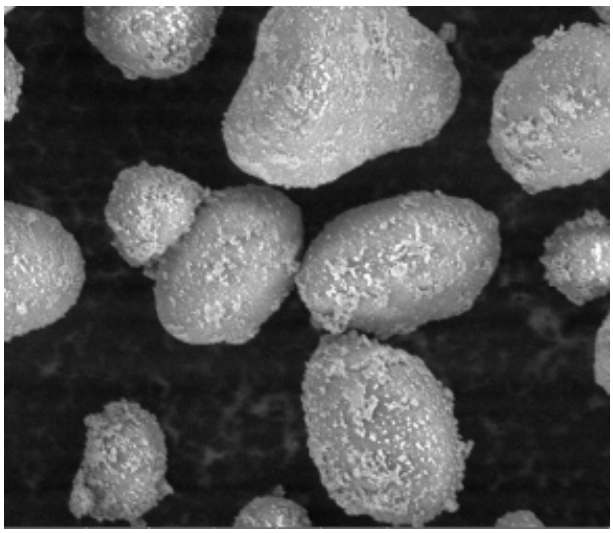

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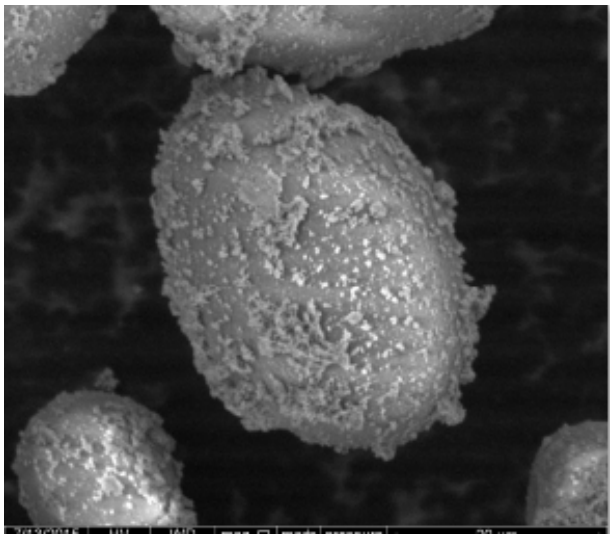

Magnification : 5000

Figure - 4: SEM micrograph of starch graft Methacrylic acid at various magnification

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CONCLUSION

- The optimum conditions of grafting worked out on the basis of present work are as follows:

[APS] =0.004mol.L^{-1}

[MAA] = 0.470mol.L^{-1}

Reaction time = 120 minutes

Polymerization temperature = 35°C

Material-liquor-ratio = 1:15

Medium for reaction = Water

- Along with amorphous region, the crystalline region of starch is also involved in grafting.
- The grafted starch forms a coating over individual starch granules and few strach granules are connected to each other through this surface coating.

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EVALUATION OF PHYSICOCHEMICAL AND PHYTOCHEMICAL PROPERTIES OF POLYHERBAL FORMULATION FOR GOUT

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ABSTRACT
The aim of the study was to standardize an inhouse polyherbal formulation on the basis of organoleptic characters, phytochemical analysis, physicochemical parameters and fluorescence analysis as per WHO guidelines and to set up the scientific basis for standardisation of polyherbal formulation Kaishore Guggul. KG is used to control gout, purifies blood and eliminates toxins from the body. It is used as an anti-inflammatory, antibacterial, antiallergic, and antioxidant agents.

The values of percentage lose on drying (w/w %), moisture content (w/w %), pH of Lab formulations was found to be as 3.70 ± 0.08, 3.43 ± 0.03 & 6.63 ± 0.02 respectively. The total ash, acid- insoluble ash, and water-soluble ash values were found to be 18.85 ± 0.08, 2.05 ± 0.29 and 3.92 ± 0.35 (w/w %) respectively. Extractability values for aqueous, alcoholic and pet ether extracts were found to be as 42.17±0.42, 19.2±0.14, 6.45±0.23 (w/w %) respectively. Fluorescence analysis of formulation was studied using different chemical reagents and it can be used to identify formulations. The phytochemical analysis of KG revealed the presence of mainly phenolics, flavonoids, tannins, alkaloids, carbohydrates, steroids.

This whole study has shown that if we followed the same procedure with authentic drugs then large-scale production could also have quality assurance.

Keywords: phytochemical analysis, physicochemical parameters and fluorescence analysis, Kaishore guggul.

INTRODUCTION
Gout is a form of inflammatory arthritis caused due to deposition of crystals of monosodium urate monohydrate in the joints and tendons[1]. These crystals cause intense inflammation leading to pain, swelling and redness. Kaishore guggulu (KG), an ayurvedic guggul formulation is used for raised uric acid, mild to severe attacks of gouty arthritis. It is also effective for all types of skin disorders, diabetic furuncles, allergic disorders & as a blood purifier[2]. It is effective in soothing wounds and ulcers and also boost digestive system.

The quality assessment of herbal formulations is of paramount importance in order to justify its acceptability in modern system of medicine[3]. Phytochemical standardization encompasses all possible information generated with regard to the chemical constituents present in KG and it is of special significance as it has a direct bearing on the activity of the KG [4].

KG prepared using traditional methods may not have desired quality and batch to batch consistency. Hence there is a need for standardisation of KG following scientific parameters including organoleptic characters, phytochemical screening and fluorescence analysis by using standard procedures, physicochemical studies as per WHO guidelines [5] and determination of these parameters are very essential to assure the quality, safety, and efficacy of this formulation.

MATERIALS AND METHODS
Chemicals: All the reagents and solvents used were of analytical grade. All the solvents used in this experiment were procured from Merck, Mumbai. Karl Fischer Regent (Polychem)

Instruments
Analytical Balance: Contech, Mumbai, India, pH analyser: LabIndia , Mumbai, India.

Karl Fischer Titrator: Veego / Matic -I Mumbai, India, Hot air oven: Bio Technics, Mumbai, India

Plant materials
Polyherbal formulation consists of 11 ingredients mentioned in Table 1. Specific morphological parts of the plants are used in the formulation. All these plant parts were procured from the local market of Mumbai, Navi Mumbai and were authenticated by Blatter herbarium, St. Xaviour College, Mumbai and Agarkar Research Institute, Pune depending on the availability of plants materials. All the plant parts except guggulu were collected, cleaned, dried and powdered separately, passed through the 40# sieve.

Preparation of polyherbal formulation
In house formulation of KG was prepared as per traditional methods.[6]

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Purification of guggulu was done with a decoction of Triphala (3 myrobalans i.e. Haritaki, Bibhitaki and Amalaki) and Guduchi in the given ratio of 3:3:6 by weight in water as per standard procedure. This solution was heated slowly to get syrup like liquid. Small amount of gritha was added to this guggulu and heating continued till semisolid consistency attained. Powders of herbs (Table 1) were added and this mixture is pounded either by hand or in a mortar and pestle. Processing this mixture for some hours decreases the particle size and increases the bioavailability of the mixture. Thereafter, tablets are made from this gum like mixture by hand and dried in air dryer and further dried at 60^0C to remove excess moisture content and stored in amber coloured air tight glass bottle. The average size varies between 250-500 mg per tablet.

Standardization parameters
The various standardization parameters studied were organoleptic properties, physicochemical investigations, preliminary phytochemical analysis, determination of moisture content, determination of pH, determination of crude fat and fluorescence analysis.

Marketed Samples Marketed Samples of brands of Baidyanath (B) and Zandu (C) and In-house formulation of KG were studied for their physicochemical properties.

Organoleptic evaluation
Organoleptic evaluation refers to the evaluation of formulation by colour, odour, taste etc. [Table2]

Physicochemical Parameters
Physicochemical parameters like loss on drying, total ash, water soluble ash, acid insoluble ash, moisture content, water, alcohol and ether soluble extractive values were determined as WHO guidelines.[5,7]

Loss on drying
Loss on drying were determined by oven drying method. In triplicate 1g powdered KG samples were weighed in pre-dried and weighed flat weighing bottle and dried in an oven (Biotechnics-India) at 110 ^{0}C for 1hr. They were then cooled and reweighed. Percentage (w/w) was calculated with reference to initial mass.[7]

Determination of Moisture content
The test was performed by using Karl Fischer instrument by Veggo –Matic –I.

Total Ash content
2g of dried Powder samples of Polyherbal formulation were ignited in tared silica crucible in a Muffle Furnace at $\leq 500^0$C until the ash was carbon free. Then, it was placed in desiccators for cooling and re-weighed. The initial and final weights of the sample were taken. Percentage of total ash was calculated with reference to air dried powder sample.[8]

Acid insoluble ash
The ash obtained as above dissolved in 25ml dilute hydrochloric acid and boiled the solution for 5minutes. The insoluble matter was collected on ash less filter paper and washed with hot water till no test for presence of Chloride ions and ignited in muffle furnace at $\leq 500^0$C to a constant weight. The percentage of acid-insoluble ash with reference to air dried drug was calculated.[8]

Water soluble ash
The total ash obtained, was boiled for 5minutes with 25ml distilled water. The insoluble matter was collected in ash less filter paper, washed with hot water and ignited at $\leq 500^0$C to a constant weight. Subtract the weight of insoluble matter from the weight of the ash. The percentage of water-soluble ash with reference to air dried drug was calculated.

Extractive Values
Extractive values (i.e. Water-soluble extractives, Alcohol soluble extractives and Pet ether extractives) were determined as per WHO guidelines.[7]

Determination of pH
1% aqueous solution of each powdered plant material and polyherbal formulation of KG were prepared in distilled water and filtered. The pH was measured using a digital pH meter (Lab India), after calibrating the apparatus using standard buffer solution of pH 4,7 and 9.

Fluorescence analysis:
Fluorescence characters of powdered poly herbal formulation with different chemical reagents were determined under ordinary light and ultraviolet light at 254nm and 356nm respectively [9]. 1mg of PHF was taken in a glass

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slide and treated with various reagents for the presence of their fluorescence character under ultra-violet lamp. Fluorescence analysis was carried out in accordance with the procedure reported by Kokoshi et al. Table 4

Phytochemical evaluation

Preliminary qualitative phytochemical test was carried out on powder of polyherbal formulation and on methanolic extract for the presence or absence of various phytoconstituents like alkaloids, glycosides, saponins, tannins, carbohydrates etc.[10],[11] Table 6

Preparation of extract

The methanolic extract of polyherbal formulation was prepared using soxhlation. 10.0 g of dried and powdered formulation was extracted using 250 ml methanol until the solvent becomes colourless. The extract was filtered through Whatman paper no.41 and used for testing various phytoconstituents present.

Table 1: Composition of In- house polyherbal formulation (Kaishore Guggul)

Sr. No.	Ingredient Name	Scientific name	Family	Parts Used	Quantity	Quantity
1	Guggul	Commiphoramukul Hook	Burseraceae	Oleo gum resin	768g	96 parts
2	Haritaki	Terminalia chebula Retz.	Combretaceae	Fruits	8g	1 part
3	Bibhitaki	Terminalia bellerica	Combretaceae	Fruits	8g	1 part
4	Amalaki	Emblica officinalis	Euphorbiacea	Fruits	8g	1 part
5	Guduchi	Tinospora cordifolia	Menispermaceae	Stem	48g	6 parts
6	Sunthi	Zingiberofficinale	Zingiberaceae	Rhizomes	24g	3 parts
7	Marica	Piper nigrum Linn.	Piperaceae	Seeds	24g	3 parts
8	Pippali	Piper longum Linn.	Piperaceae	Fruits, roots & stem	24g	3 parts
9	Vidanga	EmbeliaribesBurm	Myrsinaceae	Fruits	24g	3 parts
10	Trivrit	Operculinaterpethum L.	Convulvulceae	Root	12g	2 parts
11	Danti	Baliospermum montanum	Euphorbiaceae	Root	12g	2 parts
12	Grhita	Clarified butter				
Herbs used for Decoction Preparation (Triphala & Guduchi)						
1	Haritaki	Terminalia chebula Retz.	Combretaceae	Fruits	256g	32 parts
2	Bibhitaki	Terminalia bellerica	Combretaceae	Fruits	256g	32 parts
3	Amalaki	Emblica officinalis	Euphorbiacea	Fruits	256g	32 parts
4	Guduchi	Tinospora cordifolia	Menispermaceae	Stem	1.536kg	192 parts

RESULT AND DISCUSSIONS

Table 2: Organoleptic evaluation of KG

Appearance	Colour	Odour	Taste
Solid	Brown	Characteristic pleasant	Bitter

Table 3: Physicochemical parameters of Inhouse (LF) & Marketed formulations 1and 2

S. No.	Parameters	L.F. (n=3 ± SD)	M.F1 (n=3 ± SD)	MF2 (n=3 ± SD)
1	Loss on drying (w/w %)	3.70 ± *0.08*	4.50± 0.24	6.17 ± *0.05*
2	Moisture content (w/w %)	3.43 ± *0.03*	4.47 ± 0.13	5.16 ± *0.09*
3	Total Ash value (w/w %)	18.85 ± *0.08*	11.70 ± *0.32*	23.77 ± *0.43*
4	Acid insoluble ash (w/w %)	2.05 ± *0.29*	2.55 ± *0.12*	4.92 ± *0.17*
5	Water soluble ash (w/w %)	3.92 ± *0.35*	3.13 ± *0.11*	3.93 ± *0.69*

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6	pH	*6.63 ± 0.02*	*4.90± 0.01*	*6.51 ± 0.02*
7	Water soluble extractives (w/w %)	42.17±*0.42*	29.80±*0.51*	40.10±*0.25*
8	Alcohol soluble extractives (w/w%)	19.2±*0.14*	12.73±0.15	26.17±*0.17*
9	PET soluble extractives(w/w%)	6.45±*0.23*	2.53±*0.26*	2.37±*0.12*

Table 4: Fluorescence Analysis of In house polyherbal formulation KG

S. No.	Test	Visible Light	UV light (254nm)	UV light (356nm)
1	Powder as such	Dark brown	Black	Black
2	Powder +Aq. $FeCl_3$	Blue black	Black	Black
3	Powder +Conc. HCl	Brown	Dark green	Black
4	Powder +Conc.HNO_3	Yellow	Yellow Green	Black
5	Powder + Conc.H_2SO_4	Pink Brown	Fluorescent Black	Dark Brown
6	Powder + Glacial Acetic acid	Pale Yellow	Pale Green	Fluorescent Green
7	Powder + NaOH	Dark Brown	Dark Green	Dark Brown
8	Powder + $AgNO_3$	Brown	Pale Green	Black
9	Powder +Picric acid	Yellow	Green	Dark Green

Table 5: pH of each ingredient of KG Poly herbal formulations. (n=3) mean± s. d.

S. No.	Ingredient Name	pH	S. No.	Ingredient Name	pH	S. No.	Ingredient Name	pH
1	Guggul	6.39±0.091	6	Giloy	7.02±0.014	11	Tirivrt	6.28±0.016
2	Shodhit Guggul	4.11±0.36	7	Sunthi	4.34±0.036	12	Danti	6.21±0.021
3	Haritaki	3.08±0.014	8	Marica	6.30±0.020	13	KG (LF)	6.51±0.016
4	Bibhitaki	3.39±0.012	9	Pippali	5.54±0.016	14	KG(MF1)	6.64±0.023
5	Amalaki	2.31±0.009	10	Krmiripu	5.44±0.030	15	KG(MF2)	4.90±0.004

Table 6: Phytochemical Analysis of Polyherbal formulation

S.No.	Phytoconstituents	Name of the test	Result
1	Carbohydrates	Molisch test Benedicts test	Present Present
2	Tannins & phenols	Ferric chloride test Lead acetate test	Present Present
3	Phlobatannins	HCl test	Absent
4	Resins	General test	Present
5	Flavonoids	Shinoda test Ammonia Test	Present Present
6	Steroids	Libermann –Burchard test	Present
7	Alkaloids	Mayer's Test Wagner's Test	Present Present
8	Anthraquinones	Borntragers test	Absent
9	Glycosides	Legal test	Present

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DISCUSSIONS

In-house formulation was prepared using 11 ingredients (Table1) in accordance with Ayurvedic formulatory of India. As a part of standardisation procedure, the finished product Kaishore Guggulu was tested for relevant of physical and chemical parameters along with samples of two different manufactures MF1 and MF2 for comparative study. All the samples were dark brown in colour. They have characteristic odour, bitter taste (Table 2).

Quality test for the finished product were performed for the parameters LOD, moisture content, ash content, acid insoluble ash, water soluble ash and are given in Table3 and they were found close to /within range of standard values. On the basis of pH values, formulation has been found to be weakly acidic in nature and extractive values in water, alcohol and petroleum ether were determined and it was found that the percentage soluble extractives values decrease from water to petroleum ether. (Table 3) and study has shown that water and alcohol were suitable solvents for extraction. The results are expressed in mean (n=3) ±SD. Variations were observed in most of the physicochemical properties studied.

The total ash value of inhouse formulation (LF) was 18.85 ± *0.08* and was comparable to reference value [14] and it was found that ash value for MF2 was found to be higher than that of LF and MF1. [Table3] Acid insoluble ash for in house formulation was found to be 2.05 ± *0.29* and for MF1 and MF2 was found to be 2.55 ± *0.12 and* 4.92 ± *0.17* respectively. Water soluble ash percentage of LF, MF1 & MF2 were comparable. The phytochemical constituents like flavonoids, alkaloid, steroids, terpenes, flavonoids, fixed oils , resins are present in the polyherbal formulation . Fluorescent analysis results shown that some characteristic phytochemicals in the formulation were shown distinguished florescent activity and this can be used to identify the formulation.

CONCLUSIONS

The formulation showed the presence of phenolic compounds, alkaloids, flavonoids, steroids, essential oils, tannins and these phytoconstituents were known as anti-inflammatory agents and may be inhibit the uric acid production which needs further investigation. The results obtained could be used to lay down new set of pharmacological standards for preparation of polyherbal formulation used for gout treatment.

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