CRITERIA III - Research, Innovation & Extensions

3.2.1.1 List of Research Publications - 2020-2021 (Total No.: 14)

Sr. No.	Title of the paper	Name of Author/s	Department of teacher	Name of the Journal	Year of Publication	ISBN/ISSN Number	Pg.no.
01	Empirical Investigation on Preparedness of Basel III Norms in the Indian Banking Sector	Mrs. Reshma Prabhy Verlekar and Dr. Manoj S. Kamat	Commerce	Zeichen Journal, UGC Care Approved Group II, Scopus	November, 2020	0932-4747	
02	Analysis of Relationship between Financial Variables of Indian Banking Sector	Mrs. Reshma Prabhy Verlekar, Dr. Manoj S. Kamat	Commerce	Akshar Wangmay - UGC Care Listed International Research Journal	December, 2020	2229-4929	
03	Sectoral Impact on IPO Underpricing: An Empirical study of the Indian Markets	Kedar Mukund Phadke, Dr. Manoj S. Kamat	Commerce	Akshar Wangmay - UGC Care Listed International Research Journal	December, 2020	2229-4929	

04	A case study on Impact of Tourism in North Goa	Vibha Pal Angle, Dr. Manoj S. Kamat	Commerce	Akshar Wangmay - UGC Care Listed International Research Journal	December, 2020	2229-4929	
05	Determinants of Earnings of Motorized Canoes in Goa - An Analysis	S. Faria & Dr. Manoj Kamat	Commerce	Arth Vijnana - Journal of the Gokhale Institute og Politics and Economics - Scopus and UGC Care Listed Journal	December, 2020	0971-586X (Print)	
06	BASEL III Requirements and Compliance by the Indian Banking Sector	Reshma Prabhu Verlekar, Dr. Manasvi Kamat & Dr. Manoj S. Kamat	Commerce	International Journal of Advance Science and Technology, Scopus, Peer Reviewed	2020,	2005-4235	
07	Agro Tourism: For Sustainable Agricultural Development in Canacona Taluka	Dr. Sucheta Naik	Commerce	Akshar Wangmay - UGC Care Listed International Research Journal	December, 2020	2229-4929	

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08	Green Marketing-Step Towards Sustainable Development-A study of South Goa	Dr. Sucheta Naik	Commerce	Akshar Wangmay - UGC Care Listed International Research Journal	January, 2021	2229-4929	
09	An overview of the alternative tourism potentials of Canacona, Goa- India	Dr. F.M.Nadaf	Geography	Akshar Wangmay - UGC Care Listed International Research Journal	December, 2020	2229-4929	
10	Role of Coastal Vegetation in Protecting Coastal Erosion	Dr. F.M.Nadaf	Geography	Akshar Wangmay - UGC Care Listed International Research Journal	December, 2020	2229-4929	
11	Milk Cooperative Societies- Some Issues of Sustenance A case study of Canacona	Dr. C.P.Hiremath	Geography	Akshar Wangmay - UGC Care Listed International Research Journal	December, 2020	2229-4929	
12	Climatic Disasters & Displacement of People in India	Mr. Anand Velip	Geography	Akshar Wangmay - UGC Care Listed International Research Journal	December, 2020	2229-4929	

13	Body Mass Index Changes Due to Covid 10 Lockdown related inactivity, & its health implication on Health	Mr. Savio Agnelo Leitao	Sports	Akshar Wangmay - UGC Care Listed International Research Journal	December, 2020	2229-4929	
14	COVID 19 & Bioinformatics: Mini Review	Dr. Nisha Kevat, Anup S. Deshpande, Nissar Reshi	Botany	Akshar Wangmay - UGC Care Listed International Research Journal	December, 2020	2229-4929	
	Total Publication =14						

Empirical Investigation onPreparedness of Basel III Norms in the Indian Banking Sector

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Abstract

The Primary objective of the present paper is to assess the Basel III preparedness level in the Indian banking industry. This paper compares the dimensions of the Basel III preparedness (BP) between the public and the private banks in India. More specifically, this study tries to measure the impact of independent dimensions of Basel III preparedness on the dependent dimensions of Basel III preparedness. A primary data was collected through a pre-designed structured questionnaire. The descriptive statistics es were used to organize and summarize data, while Pearson correlation coefficient was used to check the relationship. Multivariate linear regression analysis is used to measure the impact of several independent variables on the single dependent variable. The results reveal that, expected benefits and anticipated impact are the most important factor in implementing Basel III, whereasthe other factors shows an insignificant impact on the Basel III preparedness of Indian banks. Indian banks are well prepared to implement Basel III norms. This is due to fact that capital ratios are maintained by the banks at much higher level then prescribed by RBI.

Keywords: Basel III norms, Indian Banking Sector, Preparedness

I Introduction

The concern regarding credit risk management at an international level began in 1974, with the creation of the committee for regulation and supervision of banking practices known as the Basel Committee on Banking Supervision (BCBS). Due to this concern, the formal framework for the bank's capital structure was evolved in 1988 with an introduction of Basel I. Basel I primarily focused on credit risk and appropriate Risk-Weighted Asset (RWA). Basel I was criticized for its rigidity of the "One Size Fit" approach and the absence of risk sensitivity in capital requirements (Jayadev, 2013). Also, according to Chkrabarti (2014), Basel I dealt only with credit risk and other risks are not covered. To respond to the deficiencies in the Basel I accord, the BCBS introduced Basel II. It was built on three mutually reinforcing pillars: Minimum Capital Requirements (pillar1), Supervisory Review (pillar 2) and Market discipline (pillar 3). Even in the presence of Basel II requirements, banks had to face a global financial crisis. Therefore, in response to the 2007-08 global financial crisis, BCBS issued its latest guidelines called Basel III, toensure that credit flows even during an economic crisis. Basel III aims at making most banking activities such as their trading book activities more capital intensive. Basel III focused on four vital banking parameters viz. Capital, Leverage, Funding, and Liquidity. Basel III introduced Counter-Cyclical Capital Buffer (CCCB), Capital Conservation Buffer (CCB), Leverage Ratio (LR), Liquidity Coverage Ratio (LCR) and Net Stable Funding Ratio (NSFR).

Analysis of Relationship between Financial Variables of Indian Banking Sector

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Abstract

The credit risk is a threat for banks as it has a devastating effect in terms offinancial loss to banks. This demands banks to analyse the financial position using financial variables.

Methods

The analysis of relationship betweenthree financial variables such liquidity, profitability and leverage for 21 public and 18 privatebanks in India is identified using Correlation analysis.

Results

The result shows an inverse relationship between liquidity and profitability, and no relation between profitability and leverage and also between liquidity and leverage.

Keywords: Liquidity, Profitability, Leverage, Credit Risk, Indian Banking Sector

Introduction

The growing NPA's of the bank's business due to dynamic environment gave rise to credit risk. Credit risk refers to the probability of counterparty failing to repay a debt to an organization, rises due to lending activities. The credit risk is a curse for banks for decades as it has a devastating effect in terms of financial loss to the banks. This demands banks toanalyse the financial position using financial variables, which aids in the measurement of credit risk. Measurement of credit risk is an essential mechanism for preventing financial losses and maintaining continuity of the banking business. It provides a mechanism for monitoring credit risk and reliable reporting.

Rational of study

Analysis of financial variables for Indian banks perceives higher significance due to the higher NPA level of Indian banks compared to the global benchmark. As per the RBI report, the facts state that Gross NPA to Gross Advance ratio of a public bank is 13.2% (September 2020), as against it is 2.99% of foreign banks. For the last few years, NPAs have emerged as an inevitable burden on government and Reserve Bank of India (RBI). Several steps have been undertaken by both to curb the increasing NPA of Indian banks, but the efforts were not fruitful.This situation drives the attention of the banker towards assessment of the financial position of its banks with the help of financial variables. Therefore present paper tries to identify the relationship between profitability, liquidity and leverage variable of public and private banks in India.

Objectives

The present paperaims to identify the relationship between liquidity, profitability, and leverage variable,of public and private banks in India, with the assistance of financial ratios.An analysis of profitability, liquidity, and leverage position, helps to understand the financial position of banks it is positively or inversely affected by these three variables. These variables are the essential determinants for the success and survival of the banks and hence there should be an optimum tradeoff between these three variables. Considering this fact, the present paper attempts to find the interrelationship between these three variables and measures CRMP using these variables.

Literature Review

Past studies were reviewed, to understand the interrelationship between these three variables. It is identified from the reviews that, in certain banks there is positive relationship between liquidity and profitability, whereas other banks showed no relationship between these two variables. This depicts that, there persists a controversial issue on the relationship of these two variables. There are studies such as Lartey et al. (2013), Awais et al. (2016), Nabeel and Hussain (2017),which shows a negative relationship between liquidity and profitability in banking industry.

A study by Lartey et al. (2013), found a weak relationship between liquidity and profitability of the banks listed on the Ghana stock exchange. Similarly, Awais (2016) developed a relationship between profitability and liquidity using the regression model. The empirical results reveal that there is a significant negative relationship between banks liquidity measurement and ROA ratio. Also, Nabeel and Hussain (2017) examined the effect of liquidity management on profitability in the

banking sector of Pakistan. Data were analyzed using correlation and regression techniques. Its study concludes that cash and current ratios show negative relations whereas quick and Capital Adequacy Ratio (CAR)show positive relations towards profitability.

The studies which show no relationship between liquidity and profitability are Abdullah (2014) and Ahmed (2016). A study by Abdullah (2014) analysed the impact of liquidity on profitability in the banking sector of Bangladesh and concluded that there is no significant relationship between liquidity and profitability. Also a study by Ahmed (2016) does not show a significant relationship between profitability and liquidity. Its study was conducted in Pakistan on standard chartered bank.

A leverage ratio measures the extent to which a bank has financial assets with equity. The leverage ratio places a cap on the borrowings as a multiple of banks equity.Empirical literature is available, stating the relationship between profitability and leverage. Most studies found an inverse relationship between profitability and leverage. These studies are Ebiringa (2012) Taani (2013) and Zafar and Fartyal (2015).

A study by Ebiringa (2012), analyzed the effect of financial leverage on Nigerian bank performance, the study found a negative effect of leverage on the performance of the bank. Research by Taani (2013) examined the impact of leverage on the profitability of Jordan banks. Its study concludes that the presence of high leverage affects the return on banks. A study by Zafar and Fartyal (2015) analyzed the leverage position of the Indian banking industry and its impact on the profitability for a period 2001-2010. Its study concludes that leverage has an impact on the profitability of the banks. High leverage may reduce the profitability of the firm hence banks should make efforts to control the risk. Thus most of the studies claim a negative relationship between leverage and profitability. However a study by Moghaddam (2017) covered the effect of leverage and liquidity ratios on the earnings of banks listed on the Tehran stock exchange for a period of 2010-2015 using a multivariate regression model. The study concludes that there is a significant positive effect of liquidity and leverage on the earnings of the firm.

A literature in the area of understanding relationship between liquidity and leverage is less, as also the liquidity and its effect on the debt level have been a controversial issue among scholars in finance studies. Prior studies have demonstrated that liquidity increased debt level while other studies found that high liquidity was less leveraged and more regularly financed by their capital. A study by Ghasemi and Rajak (2016) concludes that a quick ratio has a positive effect on leverage, whereas the current ratio harms the leverage of banks.

5 Data andMethods

This study used 'Financial Ratios' to measure the liquidity, profitability, and leverage position of the public and private banks in India. In this study, nine financial ratios are used to measure the above variables.For the sake of simplicity, codes are given to financial ratios, which are mentioned in the following table.

Table 5.1: Codes to Financial Ratios used by Bankruptcy Models

Liquidity		Profitability		Leverage	
Financial Ratio	Bankruptcy Model	Financial Ratio	Bankruptcy Model	Financial Ratio	Bankruptcy Model
L1- Working Capital to Total Asset (WC/TA)	Altman Z-score Springate Model Grover Model	P1 – Earnings Before Interest and Tax/Total Asset (EBIT/TA)	Altman Z-score Springate Model Grover Model	LV1-Retained Earnings/Total Asset (RE/TA)	Altman Z-score
L2 - Current Asset/ Current liability (CA/CL)	Zmijewski model	P2 – Return on Asset (ROA)	Grover Model Zmijewski model	LV2-Market Value of Equity /Total Liability (MVE/TL)	Altman Z-score
		P3 –Profit Before Interest and Tax/Current Liability (PBIT/CL)	Springate Model	LV3 – Total Deposit /Total Asset (TD/TA)	Zmijewski model
		P4- Total Income (TI)/Total Asset (TA)	Springate Model		

Source: Authors compilations

Table 5.1 shows that the variable Liquidity is measured using Working Capital to Total Asset (L1), and Current Asset to Current Liabilities (L2). The variable Profitability is measured using Earnings before Interest and Tax to Total Assets (P1), Return on Asset (P2), Earnings Before Interest

and Tax to Current Liability (P3), and Total Income to Total Asset (P4). While the Leverage is measured using Retained Earnings to Total Asset (LV1), Market Value of Equity to Total Liability (LV2), and Total Deposit to Total Asset(LV3). Table 5.1 shows that ratio L1 and P1 is used by most of the bankruptcy model.

Time-series data for a period from 2004-05 to 2016-17 and cross-sectional data of 21 public sector banks and 18 private banks was used to compare the liquidity, profitability, and leverage position of public and private banks in India.Pearson's correlation coefficient is used to find the correlation between liquidity and profitability, profitability and leverage, liquidity, and leverage that will state the existence, direction, and strength of the relationship.

6 Results and Discussion

The present paper used Pearson's coefficient of correlation to understand the relationship between liquidity, leverage, and profitability variables. This study investigated the strength and directions of the relationship that exists between two variables. A Pearson's correlation generates a coefficient known as "r" that indicates the magnitude of relationship, which can range from -1 to + 1. This matrix develops a relationship between profitability and liquidity, profitability and leverage, and liquidity and leverage.

Table 5.6: Result of a correlation matrix of 21 public and 18 private banks from 2005-2017 taking into account 526 observations

Relationship between Liquidity and profitability	Type of relation	Relationship between profitability with leverage	Type of relation	Relationship between Liquidity and Leverage	Type of relation
Corr (L1, P1)= -1.56	Weak Negative Relation	Corr (P1, LV1)= -0.097	No correlation	Corr (L1, LV1)=0.067	No correlation
Corr (L1, P2)= -.165	Weak negative relation	Corr (P2, LV1)= 0.021	No correlation	Corr (L1, LV2)=-.028	No correlation
Corr (L1, P3)= -.005	No correlation	Corr (P3, LV1)= -0.079	No correlation	Corr (L1, LV3)=.219	Weak positive correlation
Corr (L1, P4)= -.188	Weak Negative Relation	Corr (P4, LV1)=-0.023	No correlation	Corr (L2, LV1)=.010	No correlation
Corr (L2, P1)= -0.233	Weak negative relation	Corr (P1, LV2)=.087	No correlation	Corr (L2, LV2)=-.010	No correlation
Corr (L2, P2)= -0.137	Weak Negative relation	Corr (P2, LV2)=.022	No correlation	Corr (L2,LV3)= 0.495	Moderate Positive correlation
Corr (L2, P3)= 0.372	Weak positive relation	Corr (P3, LV2)=.075	No correlation	**Result: 60% of the cases shows no correlation**	
Corr (L2, P4)= -.010	No relation	Corr (P4, LV4)=.080	No correlation	**40% of cases show a positive correlation between liquidity and leverage**	
Result: 63% result shows a negative correlation between 25% shows no correlation 12% shows a positive correlation		Corr (P1, LV3)=.192	Weak Positive correlation		
		Corr (P2, LV3)=.155	Weak Negative correlation		
		Corr (P3, LV3)=.677	Strong Positive correlation		
		Corr (P4, LV3)=.012	No correlation		
		Result: 75% of the cases shows no correlation 16% shows a positive correlation, 9% shows a negative correlation			

* Sources: Calculated by Author Notes: (-0.1 to-0.3 weak negative relation, 0.1to0.30 weak positive correlation; -0.3 to -0.5 Average negative correlation, 0.3-0.5 average positive correlation; -0.5 to -1.0 Strong negative correlation, 0.5 -1.0 strong positive correlation)

6.1 Correlation between Profitability and Liquidity

Liquidity is needed for short term survival and profitability for the long term survival of the entity. The literature review claims that there should be a tradeoff between liquidity and profitability. Thus, this is a difficult situation for bankers to demonstrate, as both variables have an inverse relationship with each other as per past studies. Hiriyogan (1985), argues that in long-run relationship between profitability and liquidity could become positive. In the study conducted by Abdullah, (2014), there is a short-run tradeoff between profitability and liquidity.

In the present study, profitability is measured using ratios such as P1, P2, P3, and P4. Liquidity is measured using two ratios L1 and L2. Thus the relationship of eight ratios is being found using coefficient correlations. The coefficient table shows that there is a significant weak negative

relationship between three ratios, such as L1 and P1, L1 and P2, L1, and P4. However, there is no relationship between L1 and P3. Similarly, the second liquidity variable L2 shows a weak negative relation with two variables, i.e., P1 and P2, but the same variable shows no relationship with P1 and P4.

The overall results show five variables out of eight variables, account for 63% of the observations shows an inverse relationship between liquidity and profitability. This may be the case of those banks, which satisfy the depositors, at the cost of profitability as depositors ask for maximum liquidity as a guarantee for safety. Also, it may be the case of other banks that satisfy their shareholders at the cost of liquidity. These findings of inverse relationships are contradicting to the findings of Ahmed (2016). These variations in result may be on account sample selected in its study is an international bank (Standard Chartered Bank) from Pakistan. Similarly, the variations in results are also found in a study by Lartey and Samuel (2013). These contradictions may be on account of country differences as the sample for the study is from Europe, North America, and Australia. Also, another reason for the contradictory results may be due to the time gap, as the above studies were conducted from 1972 to 1981, a period when investment management was not a serious issue. However, findings of Awais and Khursheed (2016), is in line with the findings of the present study. Thus, most of the time, to achieve the objective of better liquidity, profitability is lowered as the cash is withheld and not invested to reap benefits. Therefore, liquidity management should be done in such a way so that it has to develop a positive relationship with profitability.

6.2 Correlation between Profitability and Leverage variable

Some of the studies found that there is a positive relationship between profitability and leverage variable. However, some other studies conclude the inverse relationship between profitability and leverage. Whereas some other finance researchers claimed that financial leverage does not have an impact on profitability. Thus the issue of capital structure and the performance of the banks remain controversial and puzzle issues around the world (Aragie et al. 2015). The trade-off theory says that there is a positive association between profitability and leverage. Pecking Order Theory claims that the firm can increase profitability by using its inside funds rather than debts. In the present study, profitability is measured using ratios such as P1, P2, P3, and P4. Leverage is measured using three ratios LV1, LV2, and LV3. Thus the relationship of twelve ratios is being found using coefficient correlations.

The matrix shows a weak negative relationship between LV3 and P2. However, it shows a positive relationship with two variables, such as LV3 with P1 and also with P3. The matrix shows no relation between the nine out of twelve ratios, which accounts for 75% of the observations that do not show any relationship between leverage and profitability variable. In other words, leverage of the bank is not affected by profitability and vice versa in the present study. This shows that a capital structure choice does not have a relation with bank performance. Finally, every bank should maintain an optimum leverage level to ensure that financing risk does not increase beyond an acceptable limit, which will decrease the returns of the shareholder.

6.3 Correlation between Liquidity and Leverage

The leverage and liquidity variables are interlinked in a variety of ways. Past studies reveal a positive as well as a negative relationship between leverage and liquidity. Thus there is a controversial issue concerning leverage - liquidity relationship. The relationship between these variables sometimes depends on the dividend policy. Higher the level of leverage will put the firm in a poor position. Since in case of bankruptcy, the debenture holder has a higher priority of settlement of debt, leading towards poor liquidity. This shows the inverse relationship between liquidity and leverage. Also, sometimes the inverse relationship can be seen through another way whereby increased liquidity lowers the cost of equity, making equity more attractive. In other words, those firms which enjoy liquidity adopt significantly less debt in the capital structure. There is also a positive relationship between leverage and liquidity, such as a highly leveraged company hold the liquid asset to absorb the economic shocks in the market.

The present study measures liquidity using two variables, such as L1 and L2, and it measures leverage using three variables such as LV1, LV2, and LV3. Six observations are used to judge the relationship between liquidity and leverage. In the present study, 60% of the observations in the matrix table 5.6 do not show any relationship between liquidity and leverage, and 40% of observations show a positive relationship between liquidity and leverage.

7 Conclusion

The present study also used financial ratios to analyze the liquidity, profitability, and leverage position of the banks. This study examined the relationship between liquidity profitability and leverage with the help of the Pearson's correlation coefficient. Present paper found an inverse relationship between liquidity and profitability, and no relation between profitability and leverage and also between liquidity and leverage.

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Sectoral Impact on IPO Underpricing: An Empirical Study of the Indian Markets.

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Abstract

This study examines the influence of sectoral affiliation of listing firms on IPO underpricing using a sample of IPOs listed in India across a substantial period of 15 years. To examine the listing day performance, "Marginally Adjusted Abnormal Return on Opening (MAARO)" is calculated for every IPO to identify underpriced IPOs. The evaluation and study on the extent of mean underpricing among selected sectors are validated using a one-way ANOVA test on MAARO. The study finds that there exists a statistically significant difference in the mean underpricing between sectors with "Computers Software (Medium & Small)" sector exhibiting the highest level of underpricing.

Keywords: IPO, underpricing, MAARO, sectoral influence

Introduction

While raising capital is a major factor for firms going public, other factors include things such as maximisation of shareholder value, raising funds at more attractive rates, ease of company valuation, and an opportunity for the listing firms to get better branding. The principal issue when going public is the pricing of IPOs. Underwriters, investment banks, and the issuing companies all try to price the IPOs most accurately; however, more often than not, the price of IPOs is way off the market reception and readiness. Underpricing occurs when an IPO is listed below their market value, which leads to, in some cases, substantial first-day gains for some investors.

A few of the possible reasons provided by Reilly and Hatfield (1969) for observed underpricing include (1) inability of the underwriters to correctly judge the investor's perceived value of the new equity issues in cases where the listing firm's operations that deal with new technology or product offerings, and (2) underprice issues to guarantee over-subscription, which leads to sizeable returns on listing. While external and internal factors significantly influence IPO underpricing, there are market-specific factors, including hot and cold market periods, market liquidity, sectoral affiliation, etc., that affect an IPO's price discovery process.The motivation to write this paper is to understand if '*IPOs associated with specific sectors priced better than others?*'.

This study is further arranged as follows. The introduction is followed by a review of literature and hypothesis in Section 2, data and methodology in Section 3, results and discussion in Section 4. Lastly, the conclusions are covered in Section 5.

Literature Review and Hypothesis

Various theories/hypothesis such as market feedback hypothesis, market timing theory, certification effect and signaling effect stem from the understanding that information asymmetries do exist in the capital markets. Henrick (2012) examined the significance of a firm's industry affiliation on IPO underpricing and finds that the underpricing of an IPO is closely related to the sectoral affiliation of the firm. Technology and consumer services IPOs have a higher probability of being underpriced since they have a characteristic risk which is not related to the macroeconomic environment and requires their IPOs to be underpriced to induce investor participation. Karlis (2000) studied IPO underpricing, focusing on the high technology sector and finds that investors have a difficult time determining the quality and real value of the firm. This is especially true in fast-developing sectors such as the Internet and Technology sectors. Singh and Kumar (2012) find that total oversubscription (institutional & retail investors) to be the main determinant of underpricing and that the IT sector gave higher initial returns in the short-run.For an empirical study in the Indian context, our study assumes no statistical difference in marginally adjusted returns among the chosen sectors. The hypothesis to examine the impact of sectoral influence on underpricing is as follows:

H_0: The extent of underpricingdoes not differ significantly across sectors.

H_A: The extent of underpricing differs significantly across sectors.

Data and methodology

A sample of 445 IPOs listed on the National Stock Exchange (NSE) listed between FY 1999 and 2013 is under study. Out of the sample, 297 IPO issues are underpriced. Access to listing information in addition to historical price data for every IPO issue is obtained from the Prime database. This study does not consider small-medium enterprise (SME) due to higher underpricing (Dhamija and Arora, 2017), or secondary equity offerings (SEO) due to their influence on average level of underpricing (Kim, 2005).

To identify underpriced IPOs and examine the listing day performance, 'Marginally Adjusted Abnormal Return on Opening (MAARO)' is calculated for every IPO. MAARO is determined using Equation 1, where S_R is the percentage difference between the offer price and the closing price (on the first listing day) and M_R is calculated using closing index values of the NIFTY index on the offer and the listing date for each IPO. The stock and market returns allow for adjusting the raw returns for any volatility in the markets between the offer date and the listing date. Towards achieving results on non-normalised data, MAARO is transformed using Johnson transformations (Johnson, 1949). MAARO is calculated as follows

$$MAARO = \left[\frac{(1+S_R)}{(1+M_R)} - 1\right] \times 100 \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots(1)$$

In the selected sample, 8 out of 63 sectors had ten or more IPOs issued and were selected for listing day sectoral performance. The sectors selected for listing day sectoral performance are Banks-Public Sector, Computers (Software), Computers (Software Medium & Small), Construction & Contracting (Civil), Construction & Contracting (Real Estate), Media & Entertainment, Miscellaneous Issues, and Pharmaceuticals.

Results and discussions

Table 1: Average MAARO for selected sectors.

Sector	IPO's	Mean	Std. Dev.
Banks - Public Sector	10	19.63	65.43
Computers - Software	17	41.16	94.52
Computers - Software (Medium & Small)	22	54.21	80.31
Const. & Contracting - Civil	15	30.63	59.03
Const. & Contracting - Real Estate	11	11.43	72.16
Media & Entertainment	27	23.96	68.00
Miscellaneous	16	45.42	58.22
Pharmaceuticals	14	36.63	92.80
	132		

Source: Mean computed from MAARO obtained using Equation 1.

The average marginally adjusted returns for select sectors are presented in Table 1. Computers (Software Medium & Small) sector has the highest average marginally adjusted return while Construction & Contracting (Real Estate) had the lowest marginally adjusted return.

Table 2: Result of one-way ANOVA test for selected sectors using MAARO

Sector	IPO's	Std. Dev.	Mean Difference	Sig.	Confidence Interval Lower Bound	Confidence Interval Upper Bound
Computers - Software (Medium & Small)	22	80.31				
Computers - Software	16	84.00	6.2	1.000	8.35	97.27
Miscellaneous	16	58.22	8.8	0.998	12.16	83.41
Const. & Contracting - Civil	12	41.93	12.2	0.964	15.21	81.47
Pharmaceuticals	14	92.80	17.6	0.972	9.69	134.68
Media & Entertainment	27	68.00	30.2	0.121	25.29	132.89
Banks - Public Sector	10	65.43	34.6	0.147	23.17	176.76
Const. & Contracting - Real Estate	11	72.16	42.8	0.013	35.80	229.18
	128					

Source: Author Computed.

Extreme climatic events are more or less synonymous with climate change. Changes noticed in the proportion of greenhouse gases (GHG) in 19th, 20th and early part of 21st century has led to catastrophic atmospheric events and resulted in large scale destruction of life and property as well displacement of people and domesticated animals. As per Global Report on Internal Displacement (GRID) 2020, the total number of new displacements caused by natural disasters in the year 2019 was 24.9 million, out of which 23.9 million (95.98%) are weather related phenomena. Among these, maximum new displacements are caused by storms (13 million or 54.39%) while flood constitutes 2nd largest number of movements (10 million or 41.84%) followed by wildfires (0.5 million or 2.09%). Most of these displacements were recorded in East Asia, Pacific and South Asia underlying the vulnerability of India and Indian subcontinent. South Asia alone accounted for 9.5 million (38.15%) new displacements cases of the world.

Climate Migrants in India

India is among the high risk regions for climatic extremities among the countries of the world as per Global Climate Risk Index 2020 report. The proportion of climatic events causing disturbance to life and properties in India is high and same is the case of displacement of people as evident from table No. 1.

Table No. 1, Displacement of People caused by natural disasters

Year	New Displacement* World	New Displacement* India	% to world total
2008	38241000	6662000	17.42
2009	16733000	5304000	31.69
2010	42350000	1411000	3.33
2011	15016000	1503000	10.01
2012	30146000	9110000	30.22
2013	22130000	2145000	9.69
2014	19122000	3426000	17.92
2015	19193000	3655000	19.04
2016	24217000	2400000	9.91
2017	18778000	1346000	7.17
2018	17185000	2675000	15.57
2019	24855000	5018000	20.19
Total	287966000	44655000	15.51

* Refers to number of movements and not to individuals Source – GRID Report 2020

As per the data published by Internal Displacement Monitoring Centre (IDMC) in Global Report on Internal Displacement (GRID), 2020, there were 5.02 million people in India who were displaced by the disasters especially by climate borne events. It amounts to 52.8 % of new displacements in South Asia and 20.19 % of global movements in 2019. In terms of absolute number of cases between the period of study (2008 – 2019), year 2012 constituted maximum number of displacements (9.11 million) followed by 6.66 million cases in 2008, 5.30 million in 2009 and 5.02 million in 2019. In relation to world total new displacement caused by disasters, India accounted for 31.69 % cases in the year 2009 followed by 30.22 % share in 2012. In the years 2008, 2014, 2015, 2018 and 2019, the country's share in total new displacements was in the range of 15 - 20 %. This indicates the vulnerability of Indian population to the natural disasters especially of climatic origin.

Table No. 2, Major Natural Disasters in India: 2008 – 2019

Year	Number of disasters reported							
	Floods	Droughts	Cyclones	Heat waves	Cold waves	Forest fires	Dust storms	Geophysical**
2008	02	-	-	-	-	-	-	-
2009	01	-	02	-	-	-	-	02
2010	01	-	03	01	-	-	-	-
2011	-	-	-	-	01	-	-	02
2012	01	-	-	-	01	-	-	-
2013	02	01	03	-	-	-	-	-
2014	01	-	-	-	-	-	-	-
2015	03	-	01	01	-	-	-	04
2016	01	-	02	01	01	01	-	03
2017	05	-	01	-	01	-	-	02

							01	-
2018	01	-	-	-	-	01	-	-
2019	06	01	01	01	-	01	-	-
2020*	02	-	03	-	-	01		

* Till November 30th   ** includes earthquakes and volcanic eruptions

Source: https://en.wikipedia.org/wiki/Category:2019_disasters_in_India#~text=Pagesin category"2019

Displacements of people in India caused by natural disasters are mainly of climatic in origin. Compare to geophysical disasters, weather related events like floods, cyclones, heat/cold waves and others are destabilizing Indian people more often. As indicated in the table no. 2, incidences of floods and cyclonic disasters are higher than rest of the other climatic disasters indicating vulnerability of Indian states to these phenomena and consequent migration. India is among the countries most affected by floods. Monsoonal extremity, silted river channels, large scale deforestation coupled with cyclonic storms are responsible to heavy floods every year. About 40 million hectares of land (1/8th to country's total) is flood prone area of the country (Country Report India, Visiting Researcher Programme ADRC Counterpart: Ministry of Home Affairs, India FY-2018 pp. 08). In case of tropical storms and cyclones, the country is witnessing 10 % of the world tropical cyclones (Country Report India, Visiting Researcher Programme ADRC Counterpart: Ministry of Home Affairs, India FY-2018 pp. 11), most of which are creating havoc along the eastern coast of India. Similar situation exist in case of droughts, heat waves and cold waves incidences in India. As evident from experience and scientific studies, with increase in global average temperature of +1.8°C (1.1°C to 2.9°C) for 2090 to 2099 relative to 1980 to 1999 (IPCC – Global Climate Projection) on minimum scale, the severity and extent of such events is bound to increase. Following map highlight climatic disasters risk area in India

Conclusions

As evident from discussion, the probability of occurrence of climatic extremity in India is high enough to induce large scale displacement of people. With conservative projection of average global increase in temperature of 1.8°C for 2090 to 2099 in relation to 1980 to 1999, the scale of displacement of people would be very high. Though, from the study years' data (2008 – 2019) on displacement of people is not sufficient to project a future scene, the trend of increase in greenhouse gases is sufficient enough to anticipate more extreme climatic disorders in the years to come. As there is no national policy and legal institutional framework to address the issues of internally displaced people (IDPs) as India has not ratified the 1951 Convention and 1967 Protocol and does not permit UNHCR access to most refugee groups (Mahendra P Lama,2000). In such situation, India needs to prepare itself for more extensive mitigation measures by drafting long term frame to deal with IDPs.

Recommendations

1. Developing policy and legal framework to deal with internally displaced people to provide safety and security to the vulnerable. 2. Campaign to convert open spaces with green cover so as to enable greater carbon sequestration and ground water recharge 3. Enhancing availability of clean energy sources for larger public with assistance develop non-conventional energy

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The results of the one-way ANOVA test using MAARO presented in Table 2. The one-way ANOVA test was conducted to determine if the MAARO returns were different based on the sector. There was a presence of three outliers which were not considered for analysis. The assumption of homogeneity of variances, was violated, as assessed by Levene's test for equality of variances $(p=0.039)$. A Welch-ANOVA test was run, and the extent of underpricing was statistically significantly different for different sectors, Welch's F $(7, 45.091) = 3.996, p = 0.002$. Games-Howell posthoc analysis (results used if homogeneity of variances assumption is violated) revealed that the mean MAARO were statistically significant $(p <.05)$ between sectors such as Computers-Software (Medium & Small) and Const. & Contracting-Real Estateas well as between Const. & Contracting-Real Estate and Const. & Contracting-Civil as well as Miscellaneous sector. We thus fail to accept the null hypothesis.

Summary and conclusion

Empirical findings show us that the Computers Software (Medium & Small) sector exhibits the highest level of underpricing, whereas the Const.& Contracting (Real Estate), followed by Banks-Public sectors, exhibits the lowest level ofunderpricing. A possible reason could be because newer industries, especially ones where high technology is utilised, are more subject to non-fundamental factors and signalling effects than more seasoned industries with a longer, more informative history. Many technology companies that go public have dismal or no earlier revenue records to study. Also, many are yet to be profitable before their stock is trading on the exchanges. As a result, underwriters underprice such issues to generate interest amongst investors. Our outcome is similar to those found in other countries and documented by researchers such as Karlis (2000); Henrick (2012); Singh and Kumar (2012).Future research would entail examining the 3-year long-run performance of these select sectors.

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A Case Study on Impact of Tourism in North Goa

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Abstract

Tourism is the backbone of Goa's economy. Thepurpose of the studyis to analyze the positive and negative impact of tourism on environment, social culture and economic impact with special reference to North Goa.The survey was conducted in North Goa covering 6 talukas i.e. Sattari, Ponda, Bardez, Tiswadi, Bicholim and Pernem of 190 respondents to study the impact of tourism. This study concluded that there were advantages as well as disadvantages of tourism destinations in North Goa. The advantages and disadvantages rose among economic, socio-cultural, and environmental aspects.

Introduction

The word 'tourism' is related to the word 'tour' which is derived from the Hebrew word 'torah' which means learning, studying or searching. Man has been engaged in to travel from the very beginning of history, after the invention of the wheel, man started travelling from one place to another in search of food, shelter and trade. In the civilized world, man was fascinated to travel in order to discover new places and to undergo new experiences.Tourism is said to be the backbone of Goa's economy.The state of Goa, in India is famous for its beaches and places of worship and tourism in its primary industry. Tourism is generally focused on the coastal areas of Goa, with increased tourist activity inland. This relatively small state is situated on the western cost of India, between the borders of Maharashtra and Karnataka, and is better known to the world as a former Portuguese enclave on Indian soil.

Literature Review

Sarkar (2020) studied positive impact of tourism such as increase in income, increase in employment, added revenue, and foreign exchange earnings as well as negative socio economic and environmental impact such as loss of mangroves, erosion, reduced fish catch, loss of species and seasonality of employment, growth of prostitution and sex-tourism associated with tourism industry.The study found that negative impacts are associated with the pattern of growth of tourism in Goa.Rath, N., Singh, N., & Lopes, S.A. (2017).examines the impact of India's economic growth on tourism, Contributors to economic growth, Role of Tourism industry in India's GDP, Foreign versus Domestic Tourists. The Study also explores that there has been a tremendous growth in tourism in India because of the policies of the government and support from all levels.Dayananda. K.C(2016) studies positive and negative impact of tourism in India and concludes that Eco-tourism needs to be promoted so that tourism in India helps in preserving and sustaining the diversity of the India's natural and cultural environments.However, the present study concentrates on impacts of tourism in North Goa Talukas.

Objectives of The Study

- To analyze the positive and negative impact of tourism on environment, social culture and economic impact with special reference to North Goa Talukas.
- To observe the attitude of residence towards tourism under different talukas of North Goa.
- To study the inappropriate behavior of tourists at the culture and heritage sites in Select talukas.
- To observe the role of government in dealing with negative impact of tourism towards society.

Research Methodology

Data was gathered through both sources primary as well secondary sources.The data was gathered by questionnaireand interview method by interviewing 190 local respondents situated Pernem, Bicholim, Sattari, Bardez, Tiswadi and Ponda talukas.Secondary data has been collected from online journals and websites.

Datasources and Techniques:

The Study was evidenced by a survey conducted in North Goa talukas i.e. Sattari, Ponda, Bardez, Tiswadi, Bicholim and Pernem of 190 respondents to study the impact of tourism in North

Goa. The data was collected using questionnaire and interview method. Collected data was analyzed and interpreted using percentages.

Source: Primary Data

Table A.1 No. of employment opportunities through tourism								
Options	North Goa Talukas						Total	Percentage (%)
	Bardez	Tiswadi	Ponda	Bicholim	Sattari	Pernem		
Great extend	11	5	4	4	21	19	64	33.68%
Some extend	11	21	5	13	8	9	67	35.26%
Not agree	18	14	11	3	11	2	59	31.1%
							190	100%

The above table A.1 represents the no. of employment opportunities through tourism. According to the respondents around 34% of respondents felt that employment opportunities had increased to great extend. Around 35% respondents believe that employment opportunities have been increased to some extend. Around 31% of respondents did not at all agree that employment opportunities increase due to tourism.

Table A.2- Increase of infrastructure facility through tourism								
Options	North Goa Talukas						Total	Percentage (%)
	Bardez	Tiswadi	Ponda	Bicholim	Sattari	Pernem		
Great extend	14	5	6	8	15	15	63	33.16%
Some extend	22	24	10	11	24	10	101	53.16%
Not agree	4	11	4	1	1	5	26	13.68%
							190	100%

Source: Primary Data

The above table A.2 depicts the increase of infrastructure facility through tourism. According to the respondents around 33% of respondents felt that infrastructure had increased to great extend. This group was compelled by another group of 53% respondents who believed that infrastructure facility has been increased to some extend. A small but considerable group of around 14% respondents did not agreed at all.

Table A.3- Negative effects of tourism								
Options	North Goa Talukas						Total	Percentage (%)
	Bardez	Tiswadi	Ponda	Bicholim	Sattari	Pernem		
Drug abuse and alcohol	19	14	14	10	31	12	100	52.63%
Vanishing traditions culture	7	4	2	0	4	13	30	15.79%
Interference in community life	5	5	1	10	2	0	23	12.11%
Environment pollution	9	17	3	0	3	5	37	19.47%
							190	100%

Source: Primary Data

The table above A.3 describes that majority respondents that is 53% felt that drug abuse and alcohol are the main aspects of negative effects of tourism, while 16% respondents said that negative effect of tourist vanishes the traditional culture. While very few respondents around 12% felt that tourist

unnecessarily interfere in community life and around 19% respondents said that tourism is responsible for creating environment pollution.

	North Goa Talukas							
Options	Bardez	Tiswadi	Ponda	Bicholim	Sattari	Pernem	Total	Percentage (%)
Steps towards cleaning area	14	22	4	14	9	14	77	40.53%
awareness campaigning	13	17	16	4	26	14	90	47.37%
other	14	1	0	2	5	1	23	12.11%
							190	100%

Table A.4- Improvement need to done by government towards society and economic development

Source: Primary Data

There are different views of respondents on improving the social and economic development. The above table A.4 illustrates that according to 41% of respondents said that government should implement steps towards cleaning area, while 47% of respondents felt that government should take steps towards awareness campaigning on various issues, and 12% of respondents felt that there should be other steps to improve the social and economic development.

	North Goa Talukas							
Options	Bardez	Tiswadi	Ponda	Bicholim	Sattari	Pernem	Total	Percentage (%)
Great extend	10	19	7	9	13	13	71	37.37%
Some extend	25	21	13	9	14	14	96	50.53%
Not agree	5	0	0	2	13	3	23	12.11%
							190	100%

Table A.5- Price of essential commodities increase by tourism development

Source: Primary Data

The above table A.5 depicts that 51% of price of essential commodities had been increased to some extent, few respondents said that 37% of price of essential commodities had been increased to great extent and only 12% of respondents felt that price of essential commodities not at all increased by tourism development.

	North Goa Talukas							
Options	Bardez	Tiswadi	Ponda	Bicholim	Sattari	Pernem	Total	Percentage (%)
Yes	26	32	7	3	26	18	112	58.95%
No	14	8	13	17	14	12	78	41.05%
							190	100.00%

Table A.6 Damaging the beauty of cultural heritage

Source: Primary Data

There are different views of respondents about damaging the beauty of cultural heritage. The above table A.6 depicts that 59% of respondents said that tourist damage the beauty of cultural heritage and 41% of respondents felt that beauty of cultural heritage was not damaged by the tourism development.

Results And Discussion

The Present study observed that maximum respondents agreed that employment opportunities increased to some extent. Respondents believe that infrastructure facility has been increased to some extent. The study also observes that maximum respondents agreed to some extent that lost tradition

are saved by tourism activities. There is negative effect of tourism activities mainly because of drug abuse and alcohol. Tourism has damaged the beauty of cultural heritage in a great proportion.Goa's tourism industry is booming but tourism is also harming Goa-not just economically but also culturally.Due to tourism activities the price of essential commodities had increased to great extend which is difficult for local people to afford.Number of tourists increases at time of festive season to know the Goan culture better and festive season brings full of lights and happiness. Due to development of tourism activities the standard of living of people have been increased to some extend. Respondents of age group 20-40 felt that awareness campaigning must be conducted to make the people aware about negative impacts of tourism activities in the state. Tourist inflow providing self image of the community helps state to attract more tourist which in turns increases revenue.

Conclusion

The Study concludes that unregulated development of tourism is bound to bring problems with it if the required infrastructure for the tourist are not developed or if over tourism takes place then environmental problems in the form of water, air, noise pollution, degradation of culture and moral values and displacement of traditional occupations can take place. Goa being a beautiful state of India attracts tourist's almost equal to its population every year. Infrastructural facilities as per the requirements of tourist's are yet to be developed. Environmental problems have erupted in the areas disturbs peace of mind of local people. Tourist visiting thestate also experience some difficulties and problems due to shortage of infrastructural facilities . This proves that unregulated development of tourism creates negative effect. If tourism is to be sustainable, it must include the peaceful life of local people, protect the environment and offer them a better future. Tourism commodifies cultures and their associated business and goods.All the negative and positive effects of tourism on the environment, bring us to a conclusion that tourism can be treated in negative as well as positive aspect in regards to the environment. The negative impacts can be reduced by taking initiative towards conserving natural resources.Looking at thenegative impact, tourism in the state has to be developed in the balanced manner and add much more value to the economic development.

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Determinants of Earnings of Motorized Canoes in Goa: An Analysis

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Primary data was collected using simple random sampling method through interview schedules from 140 traditional fishermen owning 26-38 ft motorized fishing canoes with engine capacities varying from 8 to 9.9 horsepower in the six coastal talukas in North and South Goa. Determinants of the economic earnings from motorized canoes with the log-log model of multiple regression examined the impact of selected input of factors of production on the gross earnings from fish catch show that three independent variables, namely, horsepower, fishing hours and fuel costs had a statistically significant positive relationship on the dependent variable of gross earnings. Motorized fishing units have created employment opportunities to the people in the marine villages.

1 Introduction

Motorized canoes used in the traditional sector in Goa locally known as *"Patthe"* are made of wood or fibre reinforced plastic. The Department of Fisheries in Goa, permits fishermen to build or purchase motorized canoes from 26 to 38 feet fitted with eight and 9.9 outboard horsepower motor engines to carry out fishing activities. Fishermen use traditional fishing gears, i.e., gill nets and mini-purse-seine nets.

II Review of Literature

Selvaraj, *et. al.* (2000) used the linear regression model and found that fishing was a major source of income for the fishermen owning motorized and non-motorized canoes. Raju's (2013) comparative analysis between 75 motorized and

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BASEL III REQUIREMENTS AND COMPLIANCE BY THE INDIAN BANKING SECTOR

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Abstract

The formal framework for banks capital structure evolved in 1988 with an introduction of Basel I followed by Basel II, and the latest guidelines, Basel III. Basel III requirements require banks to enhance their capital structure and hold more reserves to face the credit risk prudently. It was perceived that compliance of Basel III would be a challenge for Indian banking industry and hence the study of compliance of Basel III accord was demanded. The present paper aims to compare the implemented Basel III requirements for Public and Private Banks in India with the stipulated requirements as specified by the RBI and the compliance after the adoption of Basel III. Our result shows that the Indian banks across both sectors have high compliance of the Basel III than those prescribed by the RBI. The new literature we add on capital and credit risk will help to undertake precautionary steps to manage credit risk and capital prudently, and also aid the bank regulators in revising their policies

Keywords: Banking Sector, Basel III requirements, India, Public Sector Banks, Private Banks

JEL classification: G21, G32

1 Introduction

The concern regarding the credit risk management at an international level began after the introduction of Basel norms, better known as Basel I, Basel II and Basel III. The Basel III aims at making most banking activities (such as their trading book activities) more capital intensive. This norm also focuses on four vital banking parameters viz. capital, leverage, funding, and liquidity by proposing new requirements with respect to Capital Conservation Buffer (CCB), Counter-Cyclical Capital Buffer (CCCB), Leverage Ratio (LR), Liquidity Coverage Ratio (LCR) and Net Stable Funding Ratio (NSFR). As per Basel III, banks are required to hold more reserves by January 2015, with common equity requirements raised to 4.5 percent from 2 percents at present. It introduced an additional reserve of 2.5 percent known as CCB which brings the total Tier-I Capital reserves to 7 percent. The new regime introduced CCCB which varies between 0 to 2.5 percent id meet the demand of the nation's economy in comparison to Gross Domestic Product (GDP). Basel III proposes a leverage ratio of 3 percent of the total assets and requires liquidity ratio to be maintained at 100 percent, also NSFR is to be maintained by banks, and at not lower than 100 percent.

It was always perceived that the implementation of the Basel III accord, in a developing country like India would be a real challenge. The key issues for the bank management are at deciding the best solution that allows them to comply with Basel III with a least cost. Given the pressures risk managers, finance managers, and Basel III program managers face to implement Basel III; it is intended to study the compliance of the Indian banks towards Basel III requirements. Given the above, the present study covers Basel III compliance given the transitional schedule of Basel III, covering a period of 2013-2019. As per the RBI report and the response of bank employees some banks have recently moved towards Basel III guidelines and are still in the process of following standard approaches, though not covering advanced approaches. Thus all banks are at their own pace of meeting the requirements under Basel III. This demands the need to study the compliance of Basel III by the Indian banks.

Agro Tourism: For Sustainable Agricultural Development in CanaconaTaluka.

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Abstract

Tourism is considered as a growth engine across the globe. Many countries have dramatically changed their economies by developing their tourism potential. Tourism generates huge direct and indirect employment opportunities and helps to increase the circulation of money in both the hands of the skilled and unskilled labourers. Presently, the concept of beach tourism, pilgrimage tourism is replaced by a new concept such as agro-tourism, eco-tourism, cultural and traditional tourism. Promotion of such tourism gives more benefits to both the tourists and local people.Canacona faces a rapid decline in agricultural productivity as agricultural land started converting into non-agricultural land due to the pressure of increased population and industrialization. Farmers, who are continuing their occupation, face problems like non-availability of agricultural labourers, heavy labour charges, problems from wild animals, uncertain rain and so on. Due to such problems, agricultural productivity is declining slowly. Agriculture is becoming more unsecured in Canacona, slowly farmers are leaving agriculture and started doing petty jobs for their livelihood. Thus, there is need to start some allied agri-business to support their farming and create allied income source from farming. To raise the prospects of Canacona farmers, to stop migration of agricultural labourers from rural area and to give new horizon for beach tourism, agro-tourism can be considered as the best solution.

Keywords: Agro-tourism, sustainable, agriculture.

Introduction

Tourism has become a crucial industry in Goa and wins over domestic and foreign tourists from all over the globe. Being a paradise for international as well as domestic tourists due to its scenic beauty with lush green mountains, blue waters and white sands, winding rivers and picturesque villages with local flora and fauna, Goa attracted 7.78 million tourists in 2017, 8.01 million tourists in 2018 and a 7.01 million tourists in 2019. Agro-tourism is the new value-added agricultural activity, which is to be performed on rural culture for the attraction of tourists. It helps to improve the employability and direct and indirect income of small and marginal farmers of rural communities by protecting the environment, traditions, culture and social values. Agro-tourism will help to sustain tourism by providing multi-activity to the local people. Here, guests collect information about the type of land, crops, local products, traditional food, local routine, local festivals, culture and traditions These activities bring tourists closer to the nature and rural activities in which they can participate, be entertained and feel the pleasure of touring. Canacona, faces a rapid decline in agricultural productivity as agricultural land started converting into non-agricultural land due to the pressure of increased population and industrialization. Farmers, who are continuing their occupation, face problems like non-availability of agricultural labourers, heavy labour charges, problems from wild animals, uncertain rain and so on. Due to such problems, agricultural productivity is declining slowly. Agriculture is becoming more unsecured in Canacona, slowly farmers are leaving agriculture and started doing petty jobs for their livelihood. Thus, there is need to start some allied agri-business to support their farming and create allied income source from farm.

Objectives of the study:

This study is undertaken with the following objectives:
1. To examine the importance of agro-tourism development in CanaconaTaluka.
2. To specify a suitable framework for the of agro-tourism centres in CanaconaTaluka.
3. To identify the problems of the agro-tourism.
4. To make suggestions for establishment and operations of agro-tourism.

Importance of study

CanaconaTaluka with a total geographical area of village is 3334.4 hectares is one of the six subdivisions that constitute the South Goa district. Agriculture is the primary occupation of Canacona, paddy being the primary cultivation along with cash crops such as cashew nuts, coconuts, areca nuts, jackfruit and bananas. Canacona faces a rapid decline in agricultural productivity as agricultural land

started converting into non-agricultural land. Farmers who are continuing their occupation face many problems such as non-availability of labourers, heavy labour charges, problems from wild animals, uncertain rain and so on. Few farmers migrated from rural to urban areas for their children's education, to avail medical facilities or in search of a job, which will give them substitute income during off-season. This type of decline in agricultural productivity found all over Goa in general and in Canacona more particularly. As a result, the share of agriculture in the state's net domestic product is one of the lowest in the country, i.e. below 8 per cent, which may further expected to decrease. To have self-sufficiency in agricultural products, Goa needs to diversify into new agricultural products through various methods such as organic farming and agro-processing units. All such methods require more investment in agriculture with modern technology and techniques. Educating the farmers and bringing the change in their activities to sustain the agricultural production is the present need. To raise the prospects of Canacona farmers, to stop migration of agricultural labourer from rural area and to give new horizon for beach tourism, agro-tourism will be one of the best solution.

Scope and methodology of the study

The scope of the study is to examine the benefits of agro- tourism activities in Canacona. The study will try to find out the probable problems attached to agro-tourism in CanaconaTaluka. The focus will be probable agro-tourism centres and facilities needed in CanaconaTaluka to add this type of allied activities. This study, agro-tourism is based on secondary data. The data collected from the related articles, research papers, and Indian Council of Agricultural research reports. Some data has been obtained from the Economic Survey of Goa, Websites of the Government of Goa, Ministry of agriculture and tourism department.

Why to promote agro-tourism in Canacona

Agro-tourism will encourage CanaconaTaluka farmers to establish small and viable agro-business activity. It will offer several potential benefits to the farm operators. It can help supplement income generation activity while providing an opportunity for maximum utilization of their assets. All household members also will assist in this activity. Canacona has a great potential of agro-tourism due to the beautiful natural sites, available water facilities, existence of nearby transport and basic infrastructures. Agro-tourism can take in many forms. In Canacona we find roadside stands which sell seasonal farm-fresh produce to the travellers. Agro-tourism ends farmers' isolation and offers the opportunity to make new friends and build stronger links to the community. Social skills and a scenic, clean, attractive farm are crucial for success in agri-tourism and can make the farms more ideal location for tourists.Canacona, is the hub of tourist attractions, as along with famous International Palolem beach it has rich natural beauty. Karmalghat is God gifted special feature of nature. Canacona consists of beautiful green farms, dams, forest, falls, forts, wildlife centuries, eco-spots, rivers, fishing centres, ancient temples, churches, treetops etc. But all these places are visited by very few tourists. It is observed that tourism in Canacona is restricted only to beach tourism, which does not give any benefit to the rural farmers of Canacona. Along with farm, Canacona has a very good potential for activities like trekking, paragliding, dolphin sighting, boating, and mountain climbing and Water Sports such as Kayaking, Paddling, Dolphin Rides, Water Scooters etc.By developing agro-tourism, we can increase the involvement of local communities, especially the poor, in the tourism value chain and can contribute to the development of local economy and poverty reduction. This can include the local supply of products such as fruits and vegetables, labour, and tourism services. There is increasing evidence that more sustainable tourism in rural areas can help to reduce the poverty.

Benefits of agro Tourism

1. Agro tourism will reduce Migration: Presently, youth from CanaconaTaluka are migrating to cities in search of employment, and other income-generating sources. Due to high cost of living in the cities, they are not able to save much of the amount that they earn monthly. Agro-tourism promises to provide employment opportunities for local communities as a family business and can reduce the gap of income between the rural and urban areas and harmonies dignity to the farming profession, which will help to sustain agriculture of CanaconaTaluka.

2. Reduce the negative impact: Beach tourism generates many negative impacts on the environment, which damages our nature, tradition and culture. Agro-tourism conserves the traditional cultures prevailing in the natural rural areas by maintaining the ecological balance

3. Additional source of income: The constant decrease of farm incomes and the loss of jobs in rural areas have led to a human and financial capital drain from many CanaconaTaluka, leaving many

farming families and businesses under economic stress. Agriculture alone will not provide the economic stability for Canaconkars. But, the integration of tourism and agriculture activities will open up new outlooks and can play a key role as new employment partners for rural communities thereby improving the economic status of Canacona farmers.

4. Preservation of nature: Agro tourism forms a potential "Alternative to routine tourism" which is "Farm-based" and harmonious with nature leading to economic and cultural transformation between rural and urban sectors.

5. Reduces burden on beach tourism: Diverting the tourists to agro centres would help to use existing natural resources more effectively and will reduce the burden on beaches, which will further help for ecological balance.

6. Overall development: Agro tourism will provide interactive opportunities to the villagers with national and international tourists' right in their own villages thereby understanding the language, style and behaviour of the home and foreign tourists.

7. Development of infrastructure facilities: To start agro -tourism centres in Canacona, infrastructural facilities such as road connectivity, transport, electricity, water facilities, hotels, shops will increase. More focus will be given to enrich the heritage and culture of the region, which will bring about overall transformation in CanaconaTaluka.

Problems of the agro-tourism in Canacona

In spite having favourable climatic and natural condition for development of the agro-tourism activities, there are certain problems in Canacona to commence such type of allied activities. They are:

1. Lack of awareness and knowledge about the agro-tourism activities in Canacona.
2. Absence of Polished communication skill in farmers.
3. Inadequate road connectivity, telecommunication and other infrastructural facilities.
4. Ignorance and disinterest of Canacona farmers regarding Agro tourism.
5. Less knowledge about city life, safety, health and hygiene.
6. Canacona farmers have small size holding, and little or no access to credit or irrigation.
7. Canacona farmers are depending more on monsoon for agriculture.

Facilities required for successful Agro-tourism system

To develop an agro-tourism in their farm, the farmers must have the following basic infrastructure and other facilities in their farm:

Transport: Reaching the remote agro-tourism places is the biggest challenge due to connecting roads and poor transportation facilities in CanaconaTaluka. Therefore, there should be better road connectivity.

Sanitary facilities: Safe and clean accommodation with necessary washrooms and toilets facility is the present norm of tourism. This facility should develop in farmhouse with rural look or an alliance with nearest hotels.

Networking: Networking public and private stakeholders at the state, municipal and panchayat level to assist the agro-tourism operator at remote places is necessary. This networking will help to get policy support, infrastructure and publicity to agro-tourism units at a local level.

Capacity building of farmers: Farmer should be educated about tourist's etiquette, maintenance of facilities, hospitality, polished communication style and public relation.

Safety of tourists: Agro tourism centres will locate in remote villages where there is inadequate medical, networking facilities. Sometimes, threat from wild animals and theft also. Therefore, there is a need of emergency team, which is ready to help tourist 24 x 7.

Basic Amenities: Continuous electricity, water supply and uninterrupted telephone network should be made available in such places.

Entertainment facilities such as swimming, valleys, facilities for fishing should be at a closer distance.

Rabit and goat domestication centres, Honey beekeeping, organic farming, poly house, cattle shade etc will help farmers to increase their income and added attraction to the guests.

Offer authentic rural Indian / Goan food for breakfast, lunch and dinner.

Offer to see and participate in all the agricultural activities and rural games.

Arrange folk dance programme such as Fugdi, Dhaalo and local traditional (kunbi) dance.

Offer to see local Jatras, Eramel, Shigmo, Gulal, Shishyaranni etc. with authentic information.

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Make available some agro-produce like flowers such as mogra, jayo, vaaghchapkp and vegetables for purchase to the tourist

Ideas about culture, dress, arts, crafts, festivals, rural traditions should be explained with possible demonstration.

Offer wild forest fruits such as Syzygiumcuminis or 'Jambhalam', Carissa carandas or 'Kantam', ZizyphusRugosa or 'chunnam', Physalis or 'Chirputtam', Garciniaindica or 'Kokam', sweet potato, corns, groundnuts, sugarcane and other agro-products as per availability.

Show local varieties of birds, animals and give authentic information about them.

Curiosity about village culture should be evoked among the tourists.

To provide authentic information regarding the railway and bus time table and local pilots for the convenience of tourists.

Offer pollution and hassle-free, clean environment to the tourists, which will be the key factor.

Who can take initiative of Agro-tourism?

The individual farmer can start agro-tourism who have minimum land, farmhouse, water resource and mental preparedness to entertain the tourists for additional income. Apart from the individual farmer, Gram panchayats agricultural co-operatives institute, Non-Government Organisations, Higher Education Institutions may take initiative to start their centres in their operational areas with the help of villagers and farmers. Promotion of Agro-Tourism must involve some more important stakeholders such as the Ministry of Agriculture, Ministry of Transport and Rural Development, Ministry of the State Governments. To promote domestic tourism, thrust areas should identify by the state government with the help of Local Panchayat. Because, such activity individual farmer may not be able to start. Initiative of Government is very much essential for efficiency in this activity.

Factors to consider while choosing Agro-tourism centre

Tourists from urban areas are interested in enjoying the nature and rural life. Therefore, farmers should develop their centres in such areas where there is a beautiful natural background to attract frustrated tourists for urban and busy life. Such centres should give tourists peace of mind, creativity, encouragement and excitement. They are be treated with enough care, safety and affection. While choosing Agro-tourism location, following factors should consider.

1. Abundance of water: Chapolim dam, Kuskem, Gaondongirim, Bumprah, Bamanbudo, khotigao, kuske, (twin water fall) Loliyem, khola (shiva waterfall,) Poiguinim, (gogel water fall) are the places having enough water. For farming and allied activity. Choosing nearby farm, khazen land will be the best agro-tourism centre.

2. Places of ancient importance: historical place like Cab de ram(fort), Mallikarjun temple, Parshuram temple, Partagal Math, Ancient paik and Vat margi at Poinguinimand Lollem village can be given added value for choosing such agro heritage tourism centres.

3. Nearby to a holy place: In CanaconaTaluka there are altogether more than 40 temples and 8 churches. Choosing the agro-tourism centres nearby such holy places will also be helpful.

4. Distant from city: Places like khotigao, Gaondongirim, Shrithal, khola, (panchayat) are far away from the city life, having natural landscape, cultivated land, valleys, falls, real village life, have the potential to attract tourists.

5. Accessibility by bus or train: Places such as Polem, Gulem, Loliyem, Shelim, Char rasta, Galjibag, Delem, Bhatpal, Poiguinim, Dhapat are easily accessible by both road and rail. These areas are rich with natural resources required for agro – eco tourism. So developing centres in these places is relatively easy.

6. Locally developed places like Gulem, karmalghat is very famous for its seasonal cultivation of indigenous greens like tender bamboo shots (kom or kil), wild leguminous shrub called taukullo, ghosali, bhenddo, fagla, pipri, dhavibhaji, dhudhifulam, lutichibhaji, and a host of others, Wild amaranthus (kuddukibhaji) 'alu' and 'tero', an edible fungus, the mushroom (almi), bushy marsh fern (akur).

7. Proximity of Eco-tourism centres: Some tourists are interested in eco-tourism along with agro-tourism. Therefore, eco-tourism centres of Canaconalike ,Khola- kakulem.Beach, Talpan- for fishing, Leopard valley – Butterfly beach, Devabag, Polem, Galgibag- Developed turtle –protected.,Talpon, Xendrem Beach, Cupa cave, MaddiTalap, BamanGuda, Kurke waterfall, Bhupra- keri waterfall, Sadolshe beach have to keep in mind while selecting agro-tourism centres.

Keys to ensure success of Agro-tourism

Agro-Tourism is allied activity, which is to be done for increasing income of Canacona farmers by using naturally available resources. Therefore, farmers must have a commercial mindset and some marketing techniques for the success. For the success in the agro-tourism, farmers should take care of the following.

1. Should allow tourists to see and participate in the agricultural activities and experience the farming.
2. Should provide pollution and noise-free sites for travel and tourism at rural background.
3. The cost of food, accommodation, recreation and travel should keep minimum or lowest.
4. Should satisfy the curiosity of tourists about sources of food, plants, animals, and other natural resources available in the area.
5. Should provide information about the rural handicrafts, languages, culture, tradition, and lifestyle.
6. Give a wide publicity of agro-tourism centre by new papers, television and other social media.
7. Develop networking with the schools, colleges, NGOs, clubs, unions, organisations etc.
8. Train the staff or family members for reception and hospitality as mouth publicity is the best.
9. Understand about the customers' wants and their expectations and serve as per the customer feedback.
10. Behave sincerely with the guests and serve them Best, keeping in mind "AthithiDevoBhav".

Conclusion

Canacona has a great potential for the development of agro-tourism. Favourable natural conditions, different types of Agri products, variety of rural traditions, festivals and a large number of eco-tourism centres provide a strong foothold for developing agro tourism activities. Today, National as well as International tourists want to enjoy rural, natural and pure life for peace of mind. In Canaconataluka, agricultural occupation is still existing, but in a declining stage. To sustain agriculture, in Canacona, to stop migration from rural to urban area, and to increase the income by ensuring employment to all the rural household, agro-tourism can be the Best Solution. However, there is a problem of limited awareness about this agro-business activity among the local farmers. The other problem is the initiative and finance. These problems are to be solved jointly by local and state government for a brighter and stronger future of CanaconaTaluka.

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Green Marketing - Step towards Sustainable Development - A Study of South Goa.

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Abstract

The disturbed eco system and the sudden changes in theclimatic conditions is due to the ignorance and carelessness of the people. Today,society becomes more concerned with the natural environment; businesses have begun to modify their behavior in an attempt to address society's new concerns. It has become the need of the hour where people from all occupations start becoming environmentally conscious and preserves the natural resources for the upcoming generation.Green marketing is a marketing philosophy that promotes production and selling of eco-friendly products with protection of ecological balance.Green marketing raises the voice against production, consumption, and disposal of such products that anyway harm consumers, the society, and the environment.

Presently, environmental problem is growing everywhere and creating environmentaldegradation. Therefore, consumers feel that they have to support Green marketing to protect the environment. It is noted that, awareness abouf green marketingis more between Educated and urban people of South Goa.Green marketing can be the perfect solution to protect our environment. Green marketing can bring the drastic change in the business to bring environment sustainability by protecting our environment.

Key words:

Green marketing, consumer awareness, sustainable environment, environment protection.

Introduction:

Green marketing philosophy promotes eco-friendly production and selling of products with protection of ecological balance. Green marketing includes multiple activities and encourages production of pure products, pure technology, conservation of energy, preservation of environment and least use of natural resources,

In 21st century, Global warming, ozone depletion, environmental hazards, environment impact assessment have become common terminology. Today, society is more concerned about natural environment because ill effects of environmental degradation which all of us face. Degradation of environment is arising out of mass production, mass consumption and mass marketing of environmentally unfavorable products. Green marketing is the business strategyfor preservation and conservation of the natural environment.Its focus ison ecological issues, sustainability issues, and socio -economic benefits by considering environmental responsibilities through the green business.

Shopping malls, departmental stores and specialty stores, are flooded with useful as well as useless products. Use of heavy technology and large-scale production threatened welfare of people and ecological balance as large-scale industry creates huge pollutions: Thus,heavy production, consumption and disposal of many products affect environment in an adverse manner.Excessive pollution has aggravated the nature and the nature starts behaving in unnatural ways. Economic growth through production and consumption threatens peaceful life of human being on the earth. Green marketing is a strategy to protect consumer welfare and environment through production, consumption, and use of green products.

Green marketing have following Objectives:

1. Promotion of production and consumption in a sustainable fashion.
2. Fair dealing with.society by supplying toxin free product and reducing ozone-depleting substances.
3. Producing renewable materials which are able to be recycled and not "throwaway'.
4. Protection of ecological environment, commitment to educate people about sustainability and the environment.
5. Green marketing is concerned with avoiding waste, cutting down on water consumption, or reducing the amount of waste that goes into landfills.
5. Using alternative energy sources and producing more fuel-efficient manner.

Green marketing emphases on protection of long-term welfare of consumers and society by production and use of pure, useful, and high quality products without any adverse effect on the environment. Mass media have started their campaign for protecting the earth from further

deterioration. Thus, efforts of people, social organizations, firms, and governments in this regard can be said as green marketing efforts.

Objectives Of The Study:

1. To understand the concept of Green marketing.
2. To find out the awareness of consumers about green marketing in South Goa
3. To suggest strategies for promoting green marketing.

Study Methodology:

Both primary data and secondary data has been used for this study. Primary Data is collected using structured questionnaire distributed randomly to 1000 respondents from South Goa.The analysis is done on simple percentage basis.Secondary Data is collected from various published articles from journals, survey reports, textbooksand internet websites.

Need Of The Study:

In India, around 25% of the consumers prefer environmental friendly products and appears that Green marketing has emerged as the interestarea for businesspersons as well as individual and industrial consumers. Manufacturer have recognized environmental concerns as a source of competitive advantage, consumers become more conscious about environment protection. However, not much research regarding green marketing is done in Goa. So, attempt is made to find out whether such type of awareness about the green products among South Goa consumers is there or not. The attitude of Goan consumers towards green products and the relationship between the education andgreen awareness is also tried to find out. This study made an attempt to suggest strategies for promoting green marketing.

Analysis Of The Study:

To find out the awareness about degradation of environment we asked the respondents, and 67% respondents agreed that last two decades our environment is degraded due to many reasons.

Table 1. showing awareness about degradation of environment

Awareness of degradation	Respondents	%
Yes	670	67
No	330	33
Total	1000	100

Source: primary survey

When asked different reasons for such degradation, 55% respondents stated that, degradation is due to mass scale of production, 37% stated it is because of uneconomic use of resources and rest of the respondents said it is due to the growth of population. Further, Respondents showed their concern that, such degradation we have to stop as early as possible, otherwise we have to be ready to face severe problem from nature. Further, we asked respondents about green marketing.

Table 2. showing awareness about the green marketing

Awareness of green marketing	Respondents	%
Yes	562	74
No	108	26
Total	670	100

Source: primary survey

74% respondents had an idea about the green products andmarketing practices in Goa. However,26% respondents were not aware about the initiatives taken for promoting green marketing practices by either state govt. or central government.Respondents who were aware about green product, they said newspaper, televisionadvertisement andfriends arethe sources of information regarding green products.

In order to find out the linkage between educational qualification and awareness about green product, we have collected the data and we found that educational qualification helped respondents to get more awareness about green marketing.

Table 3.Educational Qualification and Awareness about Green Marketing

Educational qualification	No. of respondents	%
Illiterate	81	8
Up to 10th std	286	29
Graduation	473	47

Post graduation	128	13
Research	32	3
Total	**1000**	**100**

Source: primary survey

From this table we can observe that, around 63% respondents are up to the graduation, post graduation and research level and all of them are aware about green marketing, 29% respondents fall in the group of up to 10th std. It shows that 11% (74-63) of these category respondents also aware about green marketing. Only those consumers are illiterate and have low level of education are unaware about the concept of green marketing. Therefore, we can consider that there is a positive linkage between education and awareness about green marketing.Education helps people to read different articles, understand better the newspaper and TV advertisement and analyze about green marketing in more focused manner.

Table 4. Awareness about green marketing among various category consumers.

Occupation	No. of respondents	%
Students	169	30
House wives	65	11
Self employed	34	6
Government/private service	246	44
Professional	48	9
Total	562	100

Above table depicts that, respondents belonging to service category shows highest awareness, followed by students community. There is less awareness among house wives. The total per cent of self employed and professionals shown in table though is less, the awareness is 91% and 100% respectively.

Table No. 5 Income and Awareness about Green Marketing

Income level	Respondents	%
Up to 10,000	87	15
Up to 25000	112	20
Up to 50000	150	27
Above 50000	213	38
Total	562	100

It is interesting to note from the above table that, the awareness is largely linked with income level of the consumers.38% people who fall in the group of above 50000 income group have higher awareness about green marketing and green product. This awareness % is declining depending on the decrease of income of consumers.One interesting point that, there is awareness about green marketing among students, but they don't buy green product due to high cost.

TableNo.6Willingness to buy Expensive green Products.

Educational qualification	No. of respondents	Willingness to buy products	% to no. of respondents
Illiterate	81	-	00
Up to 10th std	286	23	8
Graduation	473	324	68
Post graduation	128	65	51
Research	32	21	66
Total	1000	433	43

Of the total respondents,only 43% are willing to buy expensive eco friendly products. Those who are not educated are not at all interested to buy green products paying more money. Consumers who have studied till 10th std are also not much attracted towards green products though they aware of green product. Graduate and postgraduate consumers are ready to afford green products to percentage but not to 100%. It indicates that evenif consumers are more educated and have relatively more money to spend,they are not necessarily spend more for green products.Therefore, there is no linkage between higher education, money and interest towards buying product. It is learnt from consumers that they are willing to buy green products if it is available within the price range.

In study, we have observed three types of consumers. First category consumers buy green but are not involved in any environmental activities. Second category people who buy only

green products, ready to spend their time for environmental activities and also happily promoteand protect the environment. Third category consumers buy green products but do not have the time and energy for environmental activities In general. It was found that the percentage of people who buy only green products is very low and thus need for better promotions of green marketing.

Findings Of The Study:

1. 67% people aware about environmental problem in India is growing causing environmental degradation.

2. 74% people feel that to protect environment they have to support Green marketing.

3. Majority of the Respondents got awareness about green product, from Newspapers and Television advertisement.

4. Educated and urban consumers more aware about the green marketing.

5. Respondents belonging to service category shows highest awareness; followed by student's community.

6. There is a relation of Green Marketing awareness and income level of the consumers.

7. Illiterate and less educated are not at all interested to buy green products paying more money

8. Highly educated and rich are not necessarily spend more for green products.

9. Significant relationship is visible between educational qualification and occupation with respect to awareness about Green marketing.

Suggestions To Promote Green Marketing:

The following suggestions are suggested to green marketer to carry out green marketing activities effectively.

1. Effective advertisements should be done for bringing more awareness about green marketing.

2. The prices of the green product should be affordable to all.

3. To attract more consumersquality product should be manufactured.

4. Salespromotion techniques should use widely.

5. Motivate consumers for green product by providing discounts, free shipment.

6. Green marketing activities should be Ethical.

7. Green consumers should be awarded for purchasing green products at the initial stage.

8. Government level Awareness programme will contribute more.

Conclusion:

The environment problem is growing rapidly. The increasing economic development, rapid growth of population and growth of industries is putting a strain on the environment, infrastructure and the natural resources. Industrial pollution, soil erosion, deforestation, rapid industrialization, urbanization and land degradation are all worseningthe problems. Only green marketing can be the solution to protect our environment. Green marketing can bring the drastic change in the business.Companies should come forward to highlight their commitments to reduce adverse climate impacts of their products and services. They should create the awareness among the consumers about the benefits of green product. Consumers should ready to pay little more for green product to maintain a cleaner and greener environment. It is better to realize to all of us that the Resources of the Earth are depliting very soon.

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An overview of the alternative tourism potentials of Canacona, Goa–India

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Abstract

The state of Goa attracts tourists from all over the world as it renowned for its trifecta of sun, sand and sea. However, within the state of Goa, only certain coastal pockets, especially in coastal North Goa have been developed or rather over-developed from a tourism perspective while other scenic areas are overlooked. In order to ensure sustainable tourism, more emphasis should be placed on holistically developing alternative tourism in Goa. Canacona: the southern most taluka of Goa is geo-ecologically highly diversified. Apart from beaches, Canacona is also known for its lush green forest, waterfalls, wildlife, mangroves, backwaters, and rich cultural landscape. In the last two decades, attempts are made to promote Beach Tourism; hence, an attempt has been made in this paper to present an overview of the potential of promoting alternative tourism in Canacona more aggressively in order to divert the concentrated flow of tourists to beaches in Canacona.
Keywords: Goa, Tourism, Environment, Alternative tourism, Sustainability

Introduction

The state of Goa has a unique environment due to which it has created a special place on the tourist map of the World. The growth, expansion and development of tourism largely depend on Physical, Cultural/Social and Economic factors (Nadaf, 2020).

Tourism as an economic activity in Goa hardly existed before the 1960s. There were limited tourist facilities, either in the form of accommodation or other amenities. After its independence, the government initiated a program for rapid expansion of accommodation facilities and related tourist services, and beach tourism was adopted as a key sector for Goa's development. As a result, Goa became a major international tourist destination. The tourism industry has contributed significantly to the economic development of the territory, but also to the transformation of Goa's coastal areas, especially in North Goa. Instead of being an industry which brought in economic benefits to the local community, Goa was being exploited by those who saw in tourism a source of immense profit. This led to locals resisting further development of mainstream tourism due to environmental degradation, urbanization of coastal villages, issues of garbage, overcrowding of beaches, exploitation of workers, criminalization of tourist hotspots, abuse of women and children and the emergence of making Goa popular as an alcohol, sex and drug destination. (Soloman, 2009).

In the year 1980, about 3,32,534 domestic and 34,288 foreign tourists visited the State of Goa which increased to 7,76,993 domestic and 1,04,330 foreign tourists in 1990. Year 2000, attracted 9,76,804 Indian tourists and 2,91,709 international tourists. Further in 2010, the number of visitors sharply increased to 22,01,752 domestic tourists and 4,41,053 foreign tourists. According to provisional figures provided by the Department of Tourism, Government of Goa, the state received 8.06 million tourists in 2019, and until August 2020 the state had barely received 1.16 million tourists due to impact of Covid-19.

It is evident from the above figures that the Goan beaches are over-crowded and many beaches are carry tourists beyond their carrying capacities mostly in North Goa. Hence, to avoid the overcrowded North Goa scene, the South Goa, especially Canacona began getting attention in the past few decades. In Canacona, tourists could find pristine and scenic beaches in an idyllic rural setting. As the taluka of Canacona grew more popular, select locations mushroomed which attracted the on-flow of tourists. This resulted in traditional occupations being abandoned as youth and younger generations turned their focus on tourism and allied activities for income. In-migration of large unskilled workforce to cater to the rising industry also started becoming a cause for concern for the locals. (Gokhale, Sawant, & Ugavekar, 2014).

A response to the above could be alternate tourism, which could be ecotourism or cultural tourism or creative tourism. Alternative tourism "is a process which promotes a just form of travel between members of different communities. It seeks to achieve mutual understanding, solidarity and equality amongst participants" (Holden, 1984)

According to UNESCO (2006), "Creative Tourism is considered to be a new generation of tourism. The first generation was beach tourism, in which people come to a place for relaxation and leisure; the second was cultural tourism, oriented toward museums and cultural tours. Creative Tourism involves more interaction, in which the visitor has an educational, emotional, social, and participative interaction with the place, its living culture, and the people who live there. They feel like a citizen. This third generation requires that managers also evolve, recognizing the creativity within their city as a resource, and providing new opportunities to meet the evolving interests of tourists".
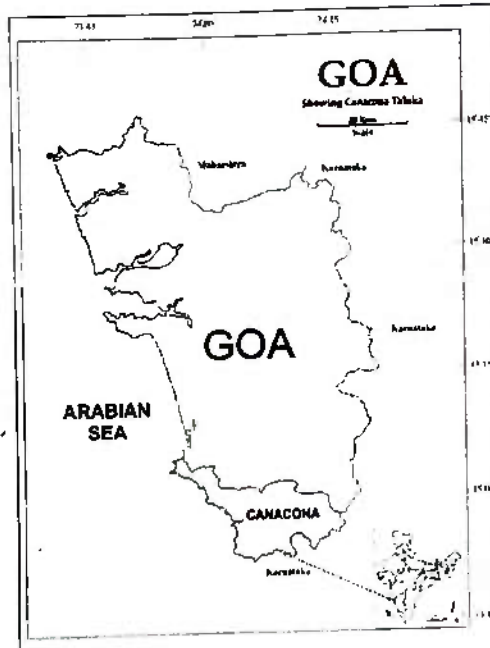
Study Area

Figure 1

Canacona, the southernmost sub-district of South Goa district in Goa, is taken as the study area. It is surrounded by Quepem taluka in the North, North-east by Sanguem taluka, Karnataka in the South and the Arabian Sea in the west. A taluka is an administrative unit hierarchically above the local city, town, or village, but subordinate to a larger district of the state, and thus contains a number of villages (Noronha, Siqueira, Sreekesh, Qureshy, & Kazi, 2002). The total length of its majorly rocky coastline is 42 km, from Cape de Rama in the north to Polem in the south which has highly varied coastal landforms. The world-famous sandy beaches of Agonda, Palolem, and Patnem which attract a huge number of tourists are located in Canacona (Figure 1).

Objectives
1. To identify the existing major tourist places of Canacona.
2. To identify the potential of Canacona as an alternative tourist destination.

Methodology
The reliance of this study is largely on field based observations which include site visits and interactions with local stakeholders and residents; and secondary sources of data which include print and electronic media, journal proceedings, published research articles.

Results and Discussion
Canacona, the popular tourist destination because of its serene beaches, has been hosting thousands of tourists, both domestic as well as foreign for decades. (Herald, 2020)
Currently, the taluka of Canacona is well known for the following places of interest:
1. Shri Mallikarjun temple, Shristhal: It is located 40 km from Margao and is believed to have been constructed during the middle of 16th century by ancestors of the Kshatriya Samaj. Apart from its religious significance, the temple is well known for its massive wooden pillars with intricate carvings. There are 60 deities around the temple.
2. Beaches: Agonda beach, Galgibaga beach, Patnem beach, Cola beach, Butterfly beach, Talpona beach, Rajbagh beach, Palolem beach to name a few. Of these Papolem beach is well known and most developed. It is located about 37 kms from Margao. Just west of Chaudi, it is one of the

most enchanting beaches in Goa which was relatively deserted up until a few years ago, however in the past decade, commercial tourism is picking up. This beach is in need of priority management by the state government and local authorities.

3. Cabo De Rama Fort - Cabo de Rama was built by the district Soonda rulers who commanded from this respective fort. After the defeat of the local kings, the fort passed into the hands of the Portuguese during the year 1763.

4. Cotigao Wildlife Sanctuary - The Cotigao Wildlife sanctuary was set up in 1968 to protect the exposed stretch of woodland on the Goa-Karnataka border, which was home to a number of species of animal and bird life, as well as some rare, old trees. It is 86 sq.km large and home to flying squirrel, slender loris, Indian pangolin, mouse deer, four-horned antelope, Malabar pit viper, hump-nosed pit viper, white-bellied woodpecker, Malabar trogon, velvet-fronted nuthatch, heart-spotted woodpecker, draco or flying lizard, golden-back gliding snake, and Malabar tree toad, to name a few. Lucky wildlife enthusiasts have also reported spotting leopards and tigers.

5. Waterfalls – Kuskem, Bamanbudo, Sadolxem, Bhupar.

According to research carried out by the National Centre For Sustainable Coastal Management, Ministry of Environment, Forest and Climate Change Chennai on 'Carrying Capacity of Beaches of Goa for Providing Shacks & Other Temporary Seasonal Structures in Private Areas' on behalf of the Government of Goa, it was observed based on the principle of 10 sq m per visitor (footfall) that the carrying capacity had been exceeded at Palolem beach and recommendations were made to not allow any shacks or deck beds. Yet, a visit to the location in person revealed that multiple permanent establishments have sprung up to cater to the on-flow of tourists. A search on Google with respect to lodging and accommodation or restaurants also displays a high concentration not only on the main beach, but within a close radius from the beach. In the same document, ecologically sensitive areas were identified at Poinguinim (sand dunes), Galgibag and Agonda (Olive Ridley turtle nesting grounds), Talpona and Galgibag (mangrove vegetation).

Multiple online and print media sources have reported over the years that locals of coastal Canacona are firmly opposed to any new projects being undertaken even with respect to tourism. In reality, these privately-owned large scaled tourism projects rarely benefit the locals who have to sacrifice their community land and resources for the benefit of few individuals. Canacona is also home to various tribes of Goa such as the Velips and Kunbis. Often, they are the most vulnerable and least beneficial from multiple tourism projects. Promotion of their customs and culture, lifestyle and cuisine will benefit these tribes immensely and help in their financial emancipation.

According to online websites, there seems to be no dearth of visitors to Goa in spite of the 2020 pandemic. EcoTourism EXPERT website quoted Ports Minister Michael Lobo attributing the fact that Indian domestic tourists could not leave the country to vacation as the reason behind them coming to Goa in large droves. (Gaitonde, 2020)

The pandemic has made people rethink leaving the country simply for tourism purpose as the risk it entails is too high. Indians are looking inside the borders of the country, for new undiscovered places to visit. With social distancing being the new normal, the mass tourism model approach that Goa seemed to promote for the past decades will no longer work. Plus, promoting the same services in the same setup will no longer work due to the severe environmental impact mass tourism has had on the ecology of Goa.

The time could not be better for the state of Goa to turn to alternative tourism opportunities. Especially the taluka of Canacona which has still not been saturated by mass tourism has a chance to take a new direction in the form of ecotourism, cultural tourism, heritage tourism, culinary tourism, all under the umbrella of alternative tourism.

A quick search on TripAdvisor.in throws up a list of 15 places to visit in Canacona, with the top suggestion being Palolem beach with 2,500 reviews, and down the list are the names of other beaches namely Cola, Butterfly, Talpona, Galgibaga and Kakolem. On the list are also a few waterfalls, some yoga retreats and the Cabo de Rama fort. This clearly indicates that tourism in Canacona is skewed towards the coast and within the coast too, it is highly concentrated at a select few locations. Most of the starred and budget hotels and inns are heavily concentrated in and around the vicinity of Palolem and Galgibaga. There is high potential to develop homestays in the interiors of the taluka. Currently, a lot of the homestays being advertised online are in fact commercial motels or inns. Visitors demand more individual and authentic experiences and depend more on technology to

plan their holidays. More widespread access to internet globally has displaced the providers of tourism services to consumers and facilitated the self-guided and independent trips, even to the most remote tourist destinations. (Triarchi & Karamanis, 2017)

Marketing the local landscape, lifestyle and cuisine will also serve as an incentive for the youth and future generations to not migrate out of their villages in search of employment. This will also help reverse the negative image that Goa has gained in the past decades and ensure that the economic benefits of tourism are gained by the locals as well as curb the rising in-migration of unskilled labor in the taluka to cater to jobs in the tourism industry. (Gokhale, Sawant, & Ugavekar, 2014)

To ensure that the villages of Canacona maintain their pristine nature and yet be able to cater to the inflow of limited but quality tourists will have to be a combined effort of the local citizens as well as the government. Government policies and advertisement campaigns will have to proactively promote these new avenues of tourism if Canacona wishes to avoid becoming a replica of North Goa.

Numerous instances of tourists littering waterfalls and scenic sites have angered the locals. A news report by the Times of India on 18 September 2017 mentioned that due to excessive littering at Bamonbudo near the border of the taluka, Bhupar in Gaondongorim panchayat and Kuskem in Cotigao, the villagers had erected boards to notify a ban on liquor and alcohol as well as deploying police at the ecotourism sites. (India, 2017) In recent times, instances have been reported of locals barricading access roads to waterfalls and secluded nature spots or deflating tires of vehicles of visitors to vent their rage and frustration over the degradation and disrespect to their area. While promoting alternative eco-friendly tourism, it is also critical to educate or spread awareness to the tourists, domestic and international, the importance of leaving the surroundings in the same or better condition than they found it.

Conclusion

It is evident from the above discussion that development of alternative tourism is vital in Canacona as the younger generations have lost touch with traditional occupations. Ecotourism and cultural tourism will not only relieve stress on the coastal areas but will also ensure that the hinterlands develop. This will also ensure that locals customs and traditions are preserved and promoted. Finally, the economic benefits to the locals will be immense as such types of tourism cannot be duplicated.

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Role of Coastal Vegetation in Protecting Coastal Erosion

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Abstract

Oceans and coastal areas have played asignificant role in the advancement of human civilizations. Coastal areas of the World are known for their dynamism and vulnerability.Nature has blessed India with 11,085 kmsof coastline and 4975 sq. kms of mangrove cover. About 15.5 percent of India's population lives in the coastal areas.The coastal areas are subjected to large scale erosion. To protect the world from problems like sea level rise, flooding of coastal areas etc. protection of coastal is vital. Hence, this paper makes an attempt to study the role of Mangroves in protecting coast against erosion.

Keywords: Coastal Zone,Climate Emergency, Mangroves, Coastal Erosion, Structural measures,

Introduction:

Since the antiquity of man, oceans have served as a linkage between humans and lands. They have bonded us together. Coastal areas of the World are known for their dynamism and vulnerability. Coastal areas have gained great prominence in the age of Climate Emergency and Global Warming. Oceans and coastal areas are vital eco-systems because of the following reasons:

1. Oceans have a great control on the Climate
2. Oceans are the treasure of rare natural resources
3. Coast acts as a natural buffer zone between lithosphere and hydrosphere
4. Coast supplies needed nutrients to the Sea
5. Coastal areas encourage large-scale tourism
6. Ocean acts as deep sea dispersal of land refuses
7. Seas and Oceans control trade and commerce
8. Coast acts as a natural defence of the country
9. Coast houses more than 1/3rdpopulation of the world

Coasts are the dynamic junction of water, air, and land. Winds and waves, tides and currents, migrating sand dunes and mud flats, a variety of plant and animal life all combine to form our ever-changing coasts. Their dynamic nature results in their great diversity. Most of us envision a coast as a broad stretch of sand with frothy surf breaking along the shore; in fact, many types of coasts are found ranging from sandy beaches to rocky shores to coral reefs to coastal wetlands (Watson, 1997).

Status of Indian Coast:

The shoreline of India stretches from Gujarat to Kerala in the Arabian Sea and Tamil Nadu to West Bengal in the Bay of Bengal. Indian Coastline has been experiencing erosion problem and around 45.5% percent of our coastline is affected by it in varying magnitude (Commission, 2016).

According to the Census Report of India - 2011, the mainland coastal districts of India account for 187.6 million population which accounts to about 15.5 percent of the total populace of the country and around 4.4 lakh people inhabit the Island territories of India. For the effective management of Coastal Zone, it is essential to determine the exact length of the coast. But unfortunately, there is confusion with regards to the length of the coastline in India. In the past, many attempts have been made to determine the length of coast by organizations like Survey of India (SOI), National Hydrographic Office (NHO), RashtriyaBarhAyog(RBA), and respective Coastal State/UT. Following table 1 shows the length of coast as determined by RBA in 1980.

Table 1

Sr. No.	State/UT	Coastal Length in Kms
1	Gujarat	1600
2	Maharashtra	512
3	Karnataka	280
4	Goa	84
5	Kerala	560
6	Tamil Nadu	980
7	Pondicherry	20
8	Andhra Pradesh	960

9	Odisha	432
10	West Bengal	280
	Total	5708

Source: Central Water Commission, New Delhi December, 2016

Following Table 2 depicts the length of coast determined by National Hydrographic Office (NHO) and Survey of India in 1970 and 2011.

Table 2

State/UT	NHO &SoI (1970)	NHO (2011)	% Change
Gujarat	1,214.70	2,125.82	75.01%
Maharashtra	652.60	896.98	37.45%
Karnataka	280.00	309.59	10.57%
Goa	160.50	181.48	52.39%
Daman & Diu		63.10	
Kerala	569.70	597.43	4.87%
Lakshadweep	132.00	121.92	-7.64%
Tamil Nadu	906.90	1,064.98	17.43%
Pondicherry	30.60	42.11	37.61%
Andhra Pradesh	973.70	1,272.55	30.69%
Odisha	476.40	667.12	40.03%
West Bengal	157.50	662.90	320.89%
Andaman and Nicobar	1,962.00	3,078.52	56.91%
Total	7,516.60	11,084.50	47.47%

Source: Central Water Commission, New Delhi December, 2016

It is evident from the above table 2 that there is a large variation in the calculations of length of coast. In 1970, NHO and SOI calculated the total length of the coast of both main land coastal states and Islands at 7516.60 kms and when it was recalculated in 2011, the length of the coast increased to 11,084.50 kms showing an increase of 47.47 percent. There was a contrasting difference in the coastal length of West Bengal. Between both the calculations, there was a difference of 320.89 percent. Gujarat state showed an increase by 75 percent. Similarly, except Lakshadweep, all the states had shown increase in the coastal length. It is interesting to note that the length of coast of Goa in official records is indicated as 105 kms whereas; NHO has determined the length of Goa's coast at 181.48 kms.

Coastal Erosion:

The coastal ecosystem belongs to the group of semi-terrestrial ecosystem. The coastal ecosystem is one of the rare ecological provinces, where many-sided interactions among Hydrosphere, Lithosphere, and Atmosphere are radically balanced.

The Coastal Ecosystems are characterized by numerous sub-ecosystems such as mangroves, backwaters, wetlands, sand dunes, estuaries etc.

The coast of India is highly diversified and it is persistently exposed to whims and fancies of the Sea which has resulted into enormous damages to the coast.

Table-3

State/UT	Sandy Beach %	Rocky Coast %	Muddy Flats %	Marshy Coasts %
Gujarat	28	21	29	22
Maharashtra	17	37	46	-
Karnataka	75	11	14	-
Goa	44	21	35	01
Kerala	80	05	15	-
Tamil Nadu	57	05	38	-
Andhra Pradesh	38	03	52	07
Odisha	57	-	33	10
West Bengal	-	-	51	49
Total Mainland	43	11	36	10

Source: Central Water Commission, New Delhi December, 2016

It is evident from table-3 that about 43 percent of the coast of mainland India is sandy, 11 percent rocky, 36 percent muddy and 10 marshy. The coast of Goa, Gujarat and Andhra exhibit all four types of coasts, indicting highly diversified shoreline.

Due to both natural and human induced factors, the coast of India is subjected to large scale erosion. It is already stated that about 45.50 percent of the coast is experiencing massive erosion. Many efforts have been made to arrest the erosion of coast. Following are some of the engineering methods adapted to seize the coastal erosion in different parts of India.

1. Seawall
2. Revetment
3. Off-shore breakwater
4. Groins/groynes/spurs
5. Offshore-Reefs
6. Artificial Headland
7. Beach Nourishment
8. Sand dune restorations

It has been observed that the structural measures adapted to control coastal erosion create negative impact on the coastal ecosystems because they interfere with the costal processes. Hence, the most effective way to protect coast from erosion is by developing coastal vegetation cover such as Mangroves and ipomoea. The mangroves have passed a potent test in protecting the coast even during the time of powerful Tsunami

Mangroves: the bio-shield:

The word 'mangrove' is derived from two Portuguese words 'mangue' & 'grove' which means 'tree' and 'stand of trees' respectively. Mangrove is a salt-tolerant shrub which typically grows in inter tidal zones, saline or brackish waters of tropical and sub-tropical regions of the Planet Earth. Mangrove plant has the capacity to extract fresh water from the saline water and many species of mangroves can remove excess salts through special salt glands.

Nature has gifted the coastal states of India with mangrove forest. Mangroves are biologically the most diverse ecosystems. In the age of Global Warming and Climate Change, mangroves are vital because they have the capacity to store more carbon per unit area than any other ecosystem on Earth. Following table-4 portrays the distribution of mangroves in India.

Mangrove Cover in Indian Coastal States and Union Territories (1987-2019)

State/UT	Assessment Year (Area in km^2)															
	1987	1989	1991	1993	1995	1997	1999	2001	2003	2005	2009	2011	2013	2015	2017	2019
A & N Islands	686	973	971	966	966	966	966	789	658	635	615	617	604	617	617	616
Andhra Pradesh	495	405	399	378	383	383	397	333	329	354	353	352	352	367	404	404
Daman & Diu	0	0	0	0	0	0	0	0	1	1	1	2	1.63	3	3	3
Goa	0	3	3	3	3	5	5	5	16	16	17	22	22	26	26	26

Gujarat	427	412	397	419	689	901	1031	911	916	991	1046	1058	1103	1107	1140	1177
Karnataka	0	0	0	0	2	3	3	2	3	3	3	3	3	3	10	10
Kerala	0	0	0	0	0	0	0	0	8	5	5	6	6	9	09	09
Maharashtra	140	114	113	155	155	124	108	118	158	186	186	186	186	222	304	320
Orissa	199	192	195	195	195	211	215	219	203	217	221	222	213	231	243	251
Puducberry	0	0	0	0	0	0	0	1	1	1	1	1	1	2	2	2
Tamil Nadu	23	47	47	21	21	21	21	23	35	36	39	39	39	47	49	45
West Bengal	2076	2109	2119	2119	2119	2123	2125	2081	2120	2136	2152	2155	2097	2106	2114	2112
Total	4046	4255	4244	4256	4533	4737	4871	4482	4448	4581	4639	4663	4628	4740	4921	4975

Source: Forest Survey of India, Dehradun. India State of Forest Report-(2015-17) (2017)
& (2019)

Of the 195 countries of the world, Mangrove forest is found concentrated in 113 countries with an estimated area of 14.79million hectares. The largest area was reported in Asia(5.55 million hectares), followed by Africa (3.24million hectares), North and Central America (2.57 million hectares) and South America (2.13 millionhectares). Oceania reported the smallest area ofmangroves (1.30 million hectares).More than 40 percent of the total area ofmangroves was reported to be in just four countries:Indonesia (19 percent of the total), Brazil (9 percent),Nigeria (7 percent) and Mexico (6 percent). Since1990, the area of mangroves has decreased by 1.04million hectares, but the rate of change more thanhalved over the reporting period, 1990–2020 from47 000 hectares per year in the period 1990–2000 to21 000 hectares per year over the last ten years.(UNEP, 2020)

It is evident from table-4that from 1987 to 2019, the area under mangrove cover has increased in India from 4046 sq. kms 4975 sq. kmsshowing an increase of 929 sq. kms (22.96 %)which is a good sign. The maximum area under mangrove cover is in West Bengal i.e., 2112 sq. kms followed by Gujarat 1177sq. kms, Andaman and Niocbar Islands 616sq. kms and Andhra Pradesh 404 sq. kms.

Mangroves and Coastal Protection:

In the coastal areas, coastal vegetation is vital for sustaining slope stability. Anthropogenic actions such as tourism, infrastructural development, dressing of sand dunes, deforestation of mangroves has exposed to erosion of coastal zone.

In protecting the coast from destruction as a result of cyclones, storm surges, tsunamis, high tides, and rough sea waves; mangroves cover act as first line of defense mechanism, which is highly effective and also economical. Apart from protecting the coast from erosion, it can also help in land accretion. There is no need to grow mangroves because they naturally grow in inter tidal zones.

About 46 percent of the Indian coast is either muddy or marshy hence; mangroves can be the best option for controlling erosion. Similarly, about 43 percent of the Indian coast is sandy which can be protected by planting native vegetation such as Casuarina, Oak, ipomeas etc for stabilizing the surface. Protection the coastal vegetation is important for the long-term protection of coast.

In some cases, re-vegetation fails because environmental conditions do not favor the growth of species at the particular site or there is ignorance as to how to plant properly given the same conditions. It is also possible that anthropogenic influences have completely altered the natural processes in the area. The most obvious indicator of site suitability,,for particular vegetation is the

presence of vegetation already growing. This can be extended by other factors such as the slope, elevation, tidal range, salinity, substrate and hydrology (*Clark, 1995; French, 2001*).

Conclusion:

Owing to Climate Emergency and Global Warming, coastal areas are constantly experiencing change in shape, size and productivity. Coastal areas are one of the most thickly populated places on the globe and they play an important role in the socio-cultural and economic development. Hence, protecting coast from misuse and abuse is paramount importance. Various attempts have been made to protect coastal areas using structural and non-structural measures. Most of the structural measures have created adverse impacts on the coastal areas.Mangrove vegetation has the capacity to trap residues flowing in the rivers and off the land, thereby helping to stabilize the shoreline and arrest erosion from waves and storms.Hence, coastal vegetation is the best answer to protect our coastal areas from both natural and anthropogenic actions.

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Milk Cooperative Societies-Some Issues of Sustenance A Case Study of Canacona Goa

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Abstract

One of the fundamental functions of milk cooperative societies is to infuse the confidence among the members to continue to involve in milk/dairy activities. Milk producers become member and agree upon the principle of cooperation. With their cooperation members then ship the milk produced to the milk procure centres which is functioning as nerve centre of the milk union. In Goa milk producers' cooperative societies limited, popularly known as "GOA DAIRY" offering services to the people at large.In the name of loanMilk Federation, Goa Dairyhandle the processes, and marketing of the products under the brand name of its own

Milk cooperative society is one of the preferred avenues through which milk producers take active part under the cooperative principle and the laid down guidelines of the milk federation. The issues ofsustenance are many including lively hood of the rural people,nutritional requirement, economic standard, employment, etc. expect a needed back up for the sustainable development in the state. The study is primarily based on empirical observation as well as primary data obtained from the concerned cooperative societies at different levels. Same was processed to extractpercentages,ratios, analysis to explore inconsistencies, Milk cooperative societiesin the villages of Canacona taluka display variation in their logistic support to function, the informal interaction with concerned members of the cooperative societies, staff and stake holderswere useful to understand and address the issues to the best possible extent in the study area.

Key words; milk cooperative societies, its members, issues, schemes)

Introduction

Milka prominent part of the human diet naturally being used, as per the need of the personover the ages. The Use or consumption of milk differ among persons,irrespective of the age,gender, status etc. On an average a individual expected to consume minimum of 100ml milk to be fit, as well as to fulfil body requirements as a source of protein, calcium, fatty acids, micronutrients, vitamin A, vitamin D and vitamin12 etc. Apart from these, the reasons to consider the to make it accessible to the general public role of milk producers, milk cooperative societies remain significant. Milk producers'cooperative societies which procure milk from the enrolled members known as DhoodhUtpadakSahakari Sangh (DUSS)and distribute milk to the consumers in various urban and rural markets.

Significance

Milk producersand milk cooperative societies act as a fundamental unit at the grass route level to support livelihood, improve economic conditions etc. The three-tier model/structure i.e., at village level, district level and state levelunits i.e. cooperative society, milk union and milk federation respectively working together on cooperative principles. Milk being collected from the registered members of the society, beprocessed and produced the products ranging fromButter, butter milk, Ghee, milk powder, Cream Milk Powder, Condensed Milk, Toned Milk followed by cheese, curds, yoghurt etc under the brand name.

Study Area

Canacona taluka is the southernmost taluka of South Goa district, Goa. The latitudinal extent approximately lies in between 14 53' 00" to 15 00' 00" N and the longitudinal extent extends from 73 50' 33" to 74 00' 00" E, comprising 352Sq Km which constitutes nearly 9.50%of the total geographical area of the state. Share border with Karnataka state in south and eastern part of the study area, Arabian sea on the west,Quepem and Sanguem talukas on the North. There are about 138 small hamlets of small and medium size in all 7 village panchayats functioning as revenue circles.nearly 60%of the population concentration is in 30% of geographical area that too central and extreme western part of the study area. On the whole it has east west slope ranging from 600 metres to sea level with in-between isolated plateaus and river volutes.

Reasons And Limitations

The rural localities in the study area hoping for anensured,regular source of lively hood, thatare suitable and sustainable. In-spite of geographical limitations, hinterland localities have an advantage to rear the animals, inherited knowledge and skilled workforce, looking for the logistic support to get into dairy farming in the villages.The insufficient and inadequate information of the village and district level milk cooperative societies, and the time constraint have restricted the scope of the study on the selected issues.

Hpothesis

1) Milk producers' cooperative societies do offer logistic support to its members.
2) Milk Procure centres have uniform quantity of milk, accessible distance and number of members.
3) Incentives and services offered to the milk producers were sufficient.

Study Area With Taluka And District Boundries

Source, Copy right, Government of Goa/India.

Objectives

1. To study the factors/issues affecting milk cooperative societies In Canacona taluka.
2. To assess the schemes offered to milk cooperative societies in Canacona taluk.
3. To find out significance ripple effects of milk societies on economic output.

Data Base

The study is primarily based on empirical observation as well as primary data obtained from the concerned cooperative societies. Directorate of planning. statistics and evaluation government of Goa, and Goa at a glance for the needed information. to explore inconsistencies in the study area,

Methodology:

The data was classified and processed to workout percentage as well as ratios to find out the inequalities, same was categorized and interpreted. The informal interaction with concerned members of the cooperative societies, staff and the stake holders have enabled to understand the difficulties concerned with. The studyreveals that the milk producers'cooperative societies display variation in their logistic support to function satisfactorily,

Issues of Milk Cooperative Societies

Milk producers' cooperative societies in Goa as well as in Canacona taluka do experience similar problems as elsewhere.The problems in the study area are of unique nature where-in the laid down parameters to start the milk cooperative societies may not get fulfilled. The quantity of milk, number of registered members,seems to be in-adequate in case of milk cooperative societies in Canacona.One of the persistentdifficulties is that milk producers do not have nearby procure centre to ship the produced milk, the milk producer has to cover a distance up to 11 Kms to reach the milk

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procure centre up and down twice in a day. This kind of scene is a usual one in many of the milk cooperative centres in the state. The difficulties of this nature itself are enough to demotivate the people/persons. Some of the issues include

1) Milk collected per day in litres. 2) Duration of centreaverage collected milk/day.
3) Assistance given for milk producer. 4) Milk procured in milk cooperative societies.
5) Mode and duration of payment. 6) Distance requires to get milk.

Milk Collected Per Day In Litres

The Table no 1 shows milk centres and average quantity of milk procuredlitres/day. Shree VedakandevisahakaaridudhCotigaon(1000 litres/day) highest, WhereasAgenda(94 litres/day). Shree mallikarjun dairy centre Nagarcem, Sidhivinayak and Shree Laxmi Narayan sahakaaridudh(between 200-456litres/day). Theprice/litre milk is in proportion to the composition of fat content, if the fat composition is more, so price/litre is more or vice versa. The average price/litre of milk in Cotiago, GaondongrimandPoinguinimcentreswas higher than other centres i.e., (27.50 to 28.00 rupees). One of the reasons for the better prising could be linked with their location. These places are located in a favourable vegetative area andare accessible to the fresh green fodder to cows,buffalos andthereby milk quality is much high. The other milk procures centres viz Devabag, NagarcemandAgondahave limitations of their own. Another significant feature of these centres has noticed in that the milk collected in the morning session has less fat content compared to the milk collected in the evening session.

Duration Of Centre

Members In Milk Producers Co Op Societies In Canacona Taluk 2018 Tab No 1

Serial No	Name Of The Centre	Nos Of Milk Producer (In %)	Average Milk (Liters)Produced In A Day (In %)	Highest Prise Per Liter	Average Price Per Liter	Working Hrs In A Day Mor /Evng
1	Sri Sidhivinaynk. Sahakari Dhoodh Gaondongrm	10 (5.40%)	290(12. 54 %)	30.16	27.50	1HRS Each
2	Sri Vedakan Devi.Sahakari Dhoudh Cotiguon	24(12.97 %)	1000(43.27 %)	31.46	28	2.5 HRS Each
3	Sri Lakshmi. Sahakari Dhoodh Puinginim	30(16.21%)	200(8.65 %)	29	28	2 HRS EACH
4	Sri Bhumipurush. Sahaari Dhoo Devabhag	33(17.82%)	466(20.16 %)	26.15	26	1.30HRS Each
5	Sri Mallikarjun. Sahakaridh Nagersem	38(20.54 %)	26111.29 %)	28	26.75	1.30HRS Each
6	Agonda. Sahakari. Dhoodh	50(27.02%)	94(4.06 %)	26.25	25.55	1.30HRS Each
7	Canacona Total/Avge	185 100%	2311100 %	171, (AVG 28.50)	161.8 (AVG 27.00)	9.4,(AVG 1.56)

Above Table shows the duration of different milk collection centres, of the seven,six Milk procure centres open in two sessions i.e.,twice in a day morning and evening except Agonda milk collection centre which opens only in morning. All centre opens early in morning for two hours as per the convenient timings at 6.30 AM to 7.30 AM, and closes at 8.30 AM to 9.30 AM. In the evening all Five centres function for one hour,(Agonda opens at 2.30 PM to 3.30 PM)2.30 PM to 5.00 PM. Each milk collection centre open time has been decided by the respective stake holders. The time/duration of centres is different because of milk producers in each centre.InCotigao milk procure centre greater number of milk producers accordingly their work hours are more, Whereas Agonda milk procure centre few milk producers and because of that it opens only in morning session.
The Table no 1display members of the dairy centres in each of the milk cooperative societies in some of the village panchayats of Canaconataluka. In Agonda dairy centre nearly 38 members(30 males,8 females).Nagarcemcentre about 50 members (45 males,5females).Yedacentre 24 members (22 males,2 females). In Devabaugh23 members (18 males, 5 females). Nagarcem has the highest

members in the milk cooperative society and Gaondogrimhas lowest members. In other words, active participation of male and female members could be seen in all centres.

Milk Procured In Milk Cooperative Societies In Canacona Taluka.

The Table 1 shows the procured milk/day by the milk cooperative societies. Procured milk composed of bothcows and Buffalos. Bhumipurushmilk collection centre of Devabaugh466 litres (340litres cow,126 litresof Buffalo) of milk, followed by Agonda94 litres (46 litres cow,48 litres of Buffalo) milk. Sidhivinayakcentre 290litresonly cow milk, Shree Mallikarjun dairy centre Nagarcem315 litres (55 litres of cow, 260 liters of Buffalo) milk. Shree laxmi Narayan Shikari 200litres (188 litrescow,12 litres of Buffalo) milk. Shree Yedkandevisahakaari 1000litres of cow milk. Some of the interesting differences one may notice that Cotigaomilk procure centre receives morelitres of milk againstAgonda milk society which procure least. At same time we can see that Gaondogrim and Cotigao have no Buffalo for rearing. It shows that the collection of cow milk was more than Buffalo. This means people rear more cows in their respective areas.

Average Collected Milk/Day

Table no 1 contain the total milk collected/day in the centres of the seven milk cooperative societies Shree Yedkan Devi Sahakaridudhprocure (1000 litres) milk/ day whereas the Agonda(94 litres) procure less.Bhumipurush466 litres/day followed by Shree Mallikarjun Nagarcem 261 litres/day, Sidhivinayak 290 litres and Shree Laxmi Narayan SahakaariDudh 200 litre/day. The kind of variations in the milk procurement among the milk cooperative societies expect a micro level study to ascertain.

Assistance Given For Milk Producer

Table No 1 displays the assistance and incentives given to the milk producers through the well-established milk cooperative societiesofCanacona taluka. According to panchayat, Gaondongrim, Poinguinim, Devabaugh, Agonda, Shristhal and Cotigao. As we can see from above table about 16.66% of panchayats get the assistance of only finance,66.66% members in the cooperative centres got assistance for food and fodder. About 33.33%members got Veterinary facilities and 50% members got assistance forequipment. The registered members of the milk cooperative societies feel that the offered facilities are inadequate thanthe requiredwhich is not good sign. Only 16.66% of milk cooperative centres/panchayats have got additional funds for the construction purpose.

Guidelines Laid Downfor Milk Producers' Cooperative Societies

Requirements to become member of the milk producers' cooperative societies.

1 Rs 110 to be paid to become primary member of the society.

2 Rs 1000 to paid as a share amount to the cooperative society.

3 Supply of milk for three months to become member.

4 A minimum of 500 litres/three months of milk to give to society.

Mode And Duration Of Payment

Table no 1 shows the mode of payment at milk procure cooperative societies, by and large payment made in the form of cash and there are only 2 dairy who pay in both cash and cheques. On an average in every milk procure centre once in 15 days. In Agondaand Cotigaonmilk procure centrespayment made in cash/cheque. Whereas rest of the centres payment made only by the way of cash which need to improve.

Distance Requires To Get Milk

The above Table shows that the distance required to ship milk from house to milk procure cooperative centre shows the minimum(½ Kilometres) and maximum (11 Kilometres) distance to be coverd to reach by every milk producer in all six centres.Shree Laxmi Narayan sahakaaridudhhas highest distanceto travel to reach (11km) followed by Shree YedakandevisahakaaridudhAgonda(8km). The reason behind the more distance is that, no other milk procure centre nearer to them. Because of that they have to travel this distance Devabaugh (4 Kms). Shree Laxmi Narayan sahakaaridudh, Shree Yedakandevisahakaaridudh has minimum (½ km)Shree mallikarjun and Agonda(5kms). Some of the milk procure centres are in the nearby localities.

A Sustainable "Amul Model"

The milk cooperative societies are in forefront in uplifting the economic status of villagers in general and the women folk in particular. As women are basically involved in dairying while the men are busy with agriculture.This has also provided definite source of income dairy development is one of

the preferred avenues for the sustainable development, especially rural centers which includes nutritional requirement, to improve economic standard, employment opportunity, support villagers to remain active throughout the year.

Services Renderd By Co-Op Societies To Its Members In Canacona 2018

SI Nos	Society Name	Fin Aid, Asstanc	Fodder	Vetrn Faci	Equi	Storagr Faci	Membership Rules 3mths/ Rs1000	Mod Of Payments Cash	M O Pay Cheq	Distance To Socity Minimum	Max Dist To Socy Maximum
1	S Vinak	No	Yes	No	No	No	3M	Cash		2KMS	4KMS
2	S Vedakn	Yes	Yes	No	Yes	No	Both	Cash	CHQ	1/2KMS	8KMS
3	S Laxmi	No	No	Yes	No	No	3M	Cash		½ KMS	11 KMS
4	S Bhumi	No	Yes	No	No	No	3M	Cash		2KMS	4KMS
5	S Mallik	No	No	No	Yes	No	3M	Cash		5KMS	5KMS
6	Agonda	No	Yes	No	Ies	No	3M	Cash	CHQ	5 KMS	8KMS
	State Tot/Avg									15 (AVG 2.5)	40 (AVG 6.66)

The three-tier model known as 'Amul model' (Milk coop societies, Milk union and Milk federation) has strengthen the idea of sustainable development. The fact that rural development involves more than agriculture, milk cooperative societies do have capacity of jobs creation, to benefit the poor at low cost through the multi-dimensional impacts.

Government Initiatives To Milk Cooperative Societies: Government has an ambitious plan to develop Dairy Sector and to make Self-sufficient in milk production in the near future. Keeping this in view, the Government has come forward with a Scheme where in incentives on 1 Incentives towards milk and feed based on milk poured by Dairy Farmers to the Dairy Milk Co-operative Societies. 2 A Composite Subsidy/Incentive of 40% (which includes 32.28% as incentive on amount / proceeds of milk poured in the Dairy Co-operative Society and 7.72% as incentive on cattle feed) which be paid to the farmers. 3 Pashupalan Scheme "Calf to Cow Scheme" is successfully implementedAssistance for rearing of Cross Bred calves and improved buffalo calves from birth to 27 months. 4) Farmer should be a member of Local Dairy Society/ Bhachat Gat. 5) Purchase of animals from outside State shall get subsidy paid to the farmers under the scheme was backed subsidy.

Conclusion

Spatial distribution of *milk producers' cooperative societies in Canaconataluka* display contrast picture within the seven milk cooperative societiesmore so with distant collection centres present. The pattern of spatial distribution differs in many counts. The empirical observations in these cooperative centres reveal further inequalities and *insufficient facilities*. In some cases, milk producers forced to deviate from the same to the extent give-up the dairy related activities because of inadequate infrastructure in the villages. The schemes are there to start where as operating difficulties need to be addressed in order to ensure the projected goals well in the schemes of milk/dairy sectorto develop.

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Climatic Disasters and Displacement of People in India

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Abstract:
Climate change is a buzz word owing to the changing situation of environment across globe. Emission of greenhouse gases (GHG) in atmosphere since industrial revolution is exhibiting rising trend pushing ecological stability at peril. Change in the complex web of climatic parameters due to excess heat is causing extreme climatic events with higher frequency and magnitude. Since climatic disaster doesn't see any political boundary, developing world is the most unfortunate to be at the receiving end not only in terms exposure to the fury of nature but also lack of preparedness to withstand and mitigate. Large scale displacement and migration of climatic extremity victims, the ultimate sufferers, need to be rehabilitated without allowing them to suffer continuously.

Key words: Climate change, climate migrant, displacement, natural disasters

Introduction

In the ever changing nature, extremities of various kinds have been witnessed throughout the history of the planet. Such extremities, may be climatic or geophysical or anthropogenic, have potentiality to bring drastic changes in the way life is set. As defined "disasters, whether natural or anthropogenic, are sudden adverse unfortunate extreme events or hazards which cause great damage to human beings as well as plants and animals" (Singh Savindra, 2019). Natural disasters especially of climatic nature are more extensive owing to less atmospheric hindrances as well as complex reactionary repercussions. With ever increasing human population and consequent expanse of economic exploitation of natural endowments, platform is set for more rapid change in climatic parameters beyond the nature's range of adjustment and thereby causing frequent high magnitude disasters. The climate change is defined as "variations and shifts in weather conditions over space and time of different scales and magnitude resulting into change of climatic type."(Singh Savindra, 2019). Change in climatic pattern induces forced deformation in environmental system leading to chain reactions continuing until the system stabilizes. In this reactionary phase, the victims are forced to displace and become environmental/climatic migrant to ensure safety of their life and are prone to uncertain future mostly beyond the scope of his potentiality. Environmental migrant is defined as "a person who for reasons of sudden or progressive changes in the environment that adversely affect their lives or living conditions, are obliged to have to leave their habitual homes, or choose to do so, either temporarily or permanently, and who move either within their territory or abroad" (IOM 2017c). With rapid urbanization and industrialization, climatic migrants are becoming most common scene in climatically fragile areas of developing world for no fault. The lack of infrastructure is such regions further aggravate the situation and forces the authorities to leave them unprotected.

Rational of the study

India, being one of the most populous country and disaster risk region, is focal in the disaster management scenario. The incidences' of varied disasters especially of climatic origin are very common in India thereby exposing nearly 18 % of world population to be victim. The current study is primarily concerned with incidences of such nature aiming to bring an understanding of the vulnerability of people to climatic disasters. Here an attempt is made to identify type of climatic disasters, their frequency as well scale of displacement of people caused.

Objectives

1. Identification and occurrence of climatic disasters in India with their scale and frequency
2. Understanding and relating displacement of people with the occurrence of climatic disasters to appreciate future trends of preparedness

Methodology

The study is based on the secondary data available online published by national and international organizations. Obtained data is utilised to analyse through statistical and graphical methods to fulfil the objectives of the study.

Displacement of people by climatic extremities -World

Body Mass Index Changes Due to Covid 19 Lockdown related inactivity, and its implication on Health

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Abstract:
The Body Mass Index (BMI) means when an individual's Body weight and Body height is measured inorder to check the actual tissue mass,in other words whether the person is lean or fat. BMI is an Index and it is decided by the activity level, the type of food or diet, patterns of one's lifestyle and even hereditary factors. It has been observed that in recent times more due to Covid 19, there is reduced amount of physical activity, stress and change in food patterns .This tremendously impacts the BMI over a period of time. Due to reduced physical activity there is weight gain and excess fat deposition in visceral area, abdomen, thighs, etc which hampers the efficiency of movement. This vicious circle if it is not broken then it can lead to inefficiency, lifestyle related health and fitness issues to carry on daily chores.

To study the co-relation betweenCovid 19 Lockdown inactivity and related changes in BMI profile. A total of 40 staff members of Shree Mallikarjun and ShriChetanManju Desai College, Canacona –Goa were selected at random .The study measured Height and Weight of subjects both Pre and Post Covid 19 Lockdown (March to November 2020). The BMI was calculated and changes were observed and the results of this study appear that there is a significant increase (2.34 Kgs) of in Body Weight and a direct proportionate increase (4.01 %) in BMI. The increase in BMI and Body weight that occurred due to inactive lifestyle because of Lockdown could cause a gradual negative effect on the overall Quality of life and overall productivity of the Nation as a whole.

Keywords: BMI, Fitness, Overweight, Obesity and Health

Introduction:
The Body Mass Index (BMI) means when an individual's Body weight and Body height is measured in order to check the actual tissue mass, in other words whether the person is lean or fat. BMI is an Index and it is decided by the activity level, the type of food or diet, patterns of one's lifestyle and even hereditary factors. It has been observed that in recent times more due to Covid 19, there is reduced amount of physical activity, stress and change in food patterns .This tremendously impacts the BMI over a period of time. Due to reduced physical activity there is weight gain and excess fat deposition in visceral area, abdomen, thighs, etc which hampers the efficiency of movement. This vicious circle if it is not broken then it can lead to inefficiency, lifestyle related health and fitness issues to carry on daily chores.

Rational of Study:
The Body Mass Index (BMI) is a very commonlyused Index, especially because since the variables or parameters needed to measure it are Height and weight, these parameters are universally accepted and in a common mans domain.Using a simple formula and applying the set World Health Organization (WHO) norms one can easily identify the category between Thin, Normal or Obese.Further these categories or Norms are sub classified from severe to mild, based on in betweenvalues. Being Normal is always the best option since either above weight or underweight will have its own disadvantages towards a healthy living.Knowing one's BMI goes a long way since it acts as an early indicator to adverse health complications. The study will provide an insight about lifestyle changes due to inactivity, stress, food shortage etc, due to lockdown.

Objectives of Study:
i) To measure the weight changes and its subsequent effect on BMI profile
ii) To highlight the outcomes on the health due to these changes
iii) To bring to light the importance of Fitness
iv) To monitor BMI and Weight control

Hypotheses:
a) Hypothesis Ho– (Null)There is no significance difference in the of pre Covid 19 mean weight and post Covid 19 mean weight.(p value >0.05 (NS) *)

b) Hypothesis H1- (Alternate) There is significance difference in the pre Covid 19 mean weight and post Covid 19 mean weight. (p<0.05 (S)**)

Methodology:

A total of 40 staff members of Shree Mallikarjun and ShriChetanManju Desai College, Canacona – Goa were selected at random .The study measured Height and Weight both Pre and Post Covid 19 Lockdown (March to November 2020).between the age group 25 to 55.

Formula used to calculate BMI :

Observations,Findings and Analysis:
$$BMI = \frac{weight\ in\ kg}{(height\ in\ meters)^2}$$

Table 1

Comparison of scores between Pre Covid test and Post Covid test

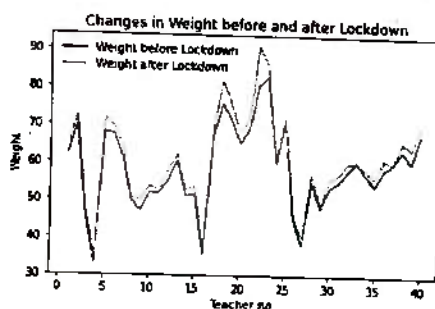|	N	Mean Weight	+- SD	BMI	df	T test	P value
Pre -Covid	40	58.46Kgs	11.28	22.44	39	- 14.11	0.0000 ** -16 (2.2 e)
Post -Covid	40	60.80Kgs	12.17	23.34	39		
Increase by		2.34Kgs	0.89	0.9			
Percentage increase		4.00 %	7.89 %	4.01%			

*Source: Generated by the Author (p<0.05 (S)**)*
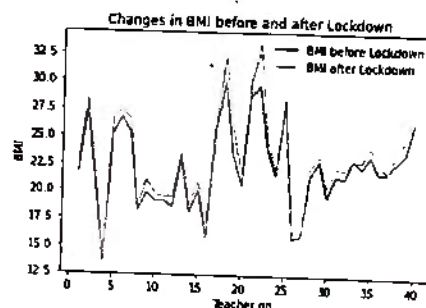

Fig 1

Fig: 2

Table 2, Refer to the table below to see the different categories based on BMI

Category	BMI range - kg/m2	Pre Covid	Post Covid
Severe Thinness	< 16	3	1
Moderate Thinness	16 - 17	1	3
Mild Thinness	17 - 18.5	2	0
Normal	18.5 - 25	23	24
Overweight	25 - 30	11	8
Obese Class I	30 – 35	0	4
Obese Class II	35 - 40	0	0
Obese Class III	> 40	0	0
		40	40

Source: Generated by the Author

This is the World Health Organization's (WHO) recommended body weight based on BMI values for adults. It is used for both men and women, age 18 or older(WHO, Global Recommendations on Physical Activity for Health, 2010).
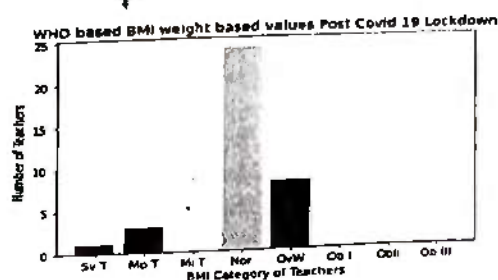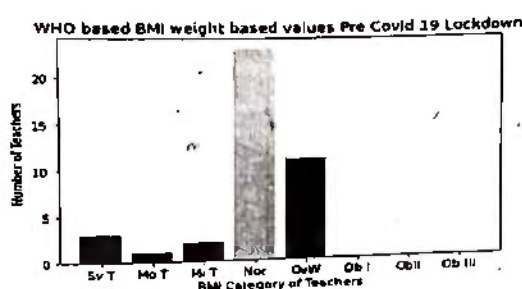
Fig :3

Fig: 4

i) The Hypothesis Ho– (Null) is rejected and Hypothesis H1- (Alternate) is accepted since $(p<0.05$ (S)**) with a t score of 14.11 is significant.

ii) The mean weight pre-Covid lockdown was 58,46Kgs, increased to a mean weight of 60.80 Kgs ,an increase of average 2,34 Kgsapproximately 4 % of Total weight.

iii) The StdDev pre-Covid lockdown was 11.28 ,increased to a 12.17 ,an increase of 0.89 , approximately 7.89 %.

iv) The BMI pre-Covid lockdown was 22.44, increased to a 23.34, an increase of 0.9,approx. 4.01 %.

v) From the 40 teachers, there has been a shift towards higher BMI categories after Lockdown.

Statistical purpose mean weight is equally and directly proportional to BMI Fig 1 and Fig 2 .

Conclusions and Recommendations:

The results of this study appear that there is a shift towards higher BMI categories after Lockdown indicating that in-spite of shortage of food stuff there has been increase (2.34 Kgs) of in Body Weight and a direct proportionate increase (4.01%) in BMI. A sedentary lifestyle change due to inactivity of "Stay at home" hasled to weight increase and in some cases,Overweight. Being Overweight or Obese has its own set of complications, some of them are:

- Heart attack and Coronary Heart diseases.
- Blood Pressure problems like hypertension.
- Cholesterol issues like High LDL (Bad Cholesterol) and low HDL (Good Cholesterol)
- Diabetes
- Osteoarthritis
- Stroke induced by Diabetes and Hypertension.
- Kidney and Liver failure
- Gall bladder stones
- Osteoporosis and other bone density problems.
- Cancer
- Insomnia and breathing problems
- Psychological problems like anxiety, depression, loss of interest, motivation etc
- Loss of mobility,efficiency and productivity, basicallyquality of life.
- Worst of all cases, an early death.

The above list has loads of reasons why weight control and constant BMI checks are to be taken seriously, the target of Normal category from 18.5 to 25 is what the Nation needs and is the need of the hour.

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COVID 19 and Bioinformatics: Mini Review

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Abstract:

Recently the world is facing the pandemic situation of Corona Virus Disease 2019 (COVID19). Owing to the current scenario, global health professionals have accelerated the search for the vaccine and new drug against the novel coronavirus. Among the several approaches, application of bioinformatics tools in search of vaccine and drug development has been instrumental and cost effective. The current mini review has focussed on the role of bioinformatics in understanding the structure and molecular docking of COVID19 for drug design.

Keywords: Coronavirus, bioinformatics tools, molecular docking

Introduction

The outbreak of nCoV-19 worldwide caused more than 65 million positive cases as on December, 2020. Significant efforts have been undertaken to discover new drugs and vaccines. These efforts lead to success in developing the vaccines in recent days. It is now a possibility to get these vaccines in few months, according to the officials. Still there is no specific drug or vaccine available for the nCoV-19[1]. The field of bioinformatics has been a great help in data analysis, identifying various molecular mechanisms, the structure and probable functions of concern proteins and other biomolecules as well as identifying the target molecules for drugs.

Bioinformatics has been used in many studies in concern with nCoV-19 such as the genomic organization of virus, determination of structure and function of proteins involved in disease formation, estimation of the spread of disease, detection rate of the disease, the impact of social distancing, etc.

1. Structure and function of target proteins and other biomolecules:

The molecular docking is one of the key experiments and requires huge databases. Shi et al. (2020)[2,3] have already developed a molecular docking based webserver (D3Targets-2019-nCoV) specifically designed to perform the screening experiments to detect the antiviral drugs against nCoV-19. It has two major functions, a) for predicting drug targets for drugs or active compounds b) for identifying the compounds against potential drug targets via docking. It is accessible freely to the public (https://www.d3phar-ma.com/D3Targets-2019-nCoV/index.php). The server compiles 45 proteins, 77 conformations, 735 ligand-binding sites and 470 ligands[2,3].

The discovery of 3D structures of SARS CoV-2 proteins[4] was a major step in search for new drugs[1]. The proteins like papain-like protease (PLpro), spike protein and 3C-like protease (3CLpro) are among the most studied and are essential for replication and entry of nCoV[5]. The spike protein is responsible for binding to the receptor on the host cell and helps in the process of fusion of host and viral membranes[6]. The interactions between a small molecule and a protein at the atomic level can be studied using molecular docking experiments. Such experiments would predict the ligand-receptor complex structure using computation methods[7]. There are several such docking algorithms which be used to determine the functionality of the drugs[8] (Table 1).

Table 1: Some sampling algorithms (Modified after Meng et al, 2011[8])

Algorithm	Characteristics
Matching algorithms Incremental	Geometry-based, suitable to VS and database enrichment for its high speed[9,10,11]
Incremental construction	Fragment-based and docking incrementally [12,13,14]
MCSS	fragment-based methods for the de novo design[15,16]
LUDI	fragment-based methods for the de novo design[17]
Monte Carlo	Stochastic search[18,19]
Genetic algorithms	Stochastic search[20,21,22]
Molecular dynamics	For further refinement after docking[23,24,25]

2. Drug design:

Docking Experiments involves (i) prediction of homology model of the protein, (ii) docking experiment to find molecules that can bind the target protein and (iii) validate and confirm the promising molecule for further studies.

The docking experiment using a) COVID-19 protease as a receptor and b) systematically selected chemicals among antiviral and antibiotics drugs as ligands may give some evidence to produce new drugs[6]. The experiment has shown the structural differences between the proteases of SARS and COVID-19. Probably, these structural alterations are not allowed the enzyme to respond to anti-SARS protease inhibitors. The efforts also have been taken to find more effective inhibitors for COVID-19 treatment[6].

Docking experiments can also be used in identifying the plant secondary metabolites that inhibit nCoV-19 proteases. Several online databases are being used to gather the structure of various secondary metabolites and docking experiments are performed. In one such experiment, Curcumin show the potency against nCoV-19 proteases and suggested that it can be used further for drug development[26].

The efforts for the drug design and testing the known drugs against the COVID-19 is creditable[6]. All the tested drugs till date have potential to attach with the SARS-CoV-2 protease enzyme that plays a role in viral replication. Several bioinformatics platforms have been used before actual clinical trials of newly discovered drugs, to estimate the results of the trials.

The methods such as MM-PBSA (molecular mechanics Poisson–Boltzmann surface area), MM-GBSA (molecular mechanics generalized Born surface area), alchemical thermodynamic integration (TI), free energy perturbation (FEP) have been extensively used for the drug discoveries. The application of molecular dynamics (MD) simulations are also very crucial to understand the stability of binding sites of the ligand and other interactions[27,28].

PyMOL is another software tool used to find the residual rotamers and with the help of AutoDock application, it was found that the Hydrochloroquine can be used to prevent the COVID 19 protease[29]. The integration of three computational tools viz., Glide, FRED, and AutoDock Vina were preferred while performing the docking experiments[30], before selecting the high affinity binding drug. There are several such drugs have been identified using different computational applications targeting various proteins [31,32].

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