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Assessing and Quantifying the Factors Associated with Livelihood Diversification in Tourism Sites: An Insight from Coastal West Bengal, India

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ABSTRACT

Coastal tourism has been reported as an emerging arena of tourism growth worldwide due to availability of *3S* (i.e. Sun, Sea and Sand). This study try to evaluate the impact of coastal tourism on the rural livelihoods of Mandarmani and Tajpur area of West Bengal, India thorough face-to-face survey on 23 villages located within the vicinity of tourism sites. Tourism generally makes a positive impact on the local economy though this tourism area experienced disparity in economic sustenance based on its site and situation. Total of 412 questionnaires have been administered to 23 villages at random to household heads. The result shows the more involvement of beach facing villages minimise the poverty with high to very high livelihood diversification. For the assessment of controlling factors to livelihood diversity, multi-linear regression analysis has also been adopted and education, asset index, access and availability of credit has been found as major controlling factors for livelihood diversification in the study area. Such baseline information will be vital for the policy planning to the stakeholders in future.

Introduction:

Economy of rural India based on agriculture which contributes about 18.20 per cent of Country's GDP and provides over 60 per cent of employment of the population (Arjun, 2013). During last 15 years, the GDP growth rate maintaining a constant declining rate from 18.81 per cent in 2005-06 to 18.20 per cent in 2013-14 (Planning Commission of India, 2014). In the recent years, agriculture livelihood pattern in India in India is changing and non-agricultural economic activities played a vital role to make contribution in Country's overall GDP. Climate change scenario, global temperature rising and other environmental hazards triggered this situation more vulnerable (Blaikie & Coppard, 1998; Liu *et* al., 2008; O'Brien, 2009; Smith *et* al. 2001) and compel rural households for alternative source of livelihood and diversified income options.

A wide range of impacts may be direct or indirect, maybe positive or negative that matter to local people can be identified by livelihood perspective (Ashley, 2000). Livelihoods are the activities, the assets and the access that jointly determine the living gained by and individual or household (Ellis, 1998). According to Niehof (2004) "livelihood is a multi- facetted concept, being what people do and what they accomplish by doing it, referring to outcomes as well as activities". Therefore, livelihoods are the peoples' strategies of making a living or it is simplest sense it is a means of gaining a living (Kaag et al, 2008; Chambers & Conway, 1992). Through the processes of livelihood diversification, the households construct a diverse portfolio of activities and social support capabilities for survival and in order to improve their standard of living (Ellis, 2000; Gautam & Andersen, 2016; Khatun & Roy, 2012; Ofolsha & Mansingh, 2015). It is an important strategy to the rural people for coming out of poverty. The inability of rural dwellers to solely dependency on

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subsistence agriculture as a means of survival influence them to undertake a range of different activities is an attempt to escape from rural poverty, withstand economic shocks and enhance livelihood options (Asley, 2000; Dolan, 2004; Ellis,1998; Smith *et* al. 2001). This is the diversification, occurs in response to economic necessity (Block & Webb, 2001; Dzanku, 2015). Another type of diversification occurs due to economic choice (Dolan, 2004; Ellis, 1999) where diversification occurs in order to accumulate capital or to invest in other activities. Ellis (1999) also argued that continuity of motivations, restrictions and causes leads diversifications and can change through time (Adiya et al. 2014).

Tourism became an important growing sector in developing countries as it directly and indirectly creates jobs for skilled semi-skilled and unskilled local workers (Abebwa & Dwim. 2013; Marcuiller & Xia, 2008; Ghimire, 2014). Employment in accommodation establishment, shops, restaurants, night clubs, bars, government tourism administrations, transport and tour companies are direct sources of tourism employment (Knotogeorgopoulos, 1994; Lea, 2006). Community planning and economic development in state and regional setting thus depend on the economic impact of the arrived tourists in destination places. As tourism in the region upheld the economic activity, therefore community has to understand its relative importance (Mbaiwa, 2005; Mbaiwa, 2008; Philemon, 2015). Overnight stay at tourism destinations directly increased the yields of tourism industry and change in destination's people purchasing power (Ahebwa & Duim, 2013).

Study Area

The present study has been conducted on Mandarmani – Tajpur coastal tourism belt of West Bengal, India as the growth and development trajectories of costal tourism is found very high and the consequences of such tourism growth is immense (Fig 1). Therefore, it is very crucial and beneficial to quantity the extent of livelihood diversification in Mandarmani-Tajpur and its surrounding villages and determines the factors affecting the extent of livelihood diversification. Impact of tourism on livelihood diversification is very relevance for the Mandarmani and Tajpur tourist destinations. In present day, Mandarmani - Tajpur are the important tourism destinations of Purba Medinipur District of West Bengal after Digha. The scenic beauty of the beach, clam and lonely environment, food product etc. attracts tourists to visit these places. Back to few years, these places were inhabited by few fishing communities. Mandarmani and Tajpur have emerged as new coastal tourism destinations in the tourism map of West Bengal.

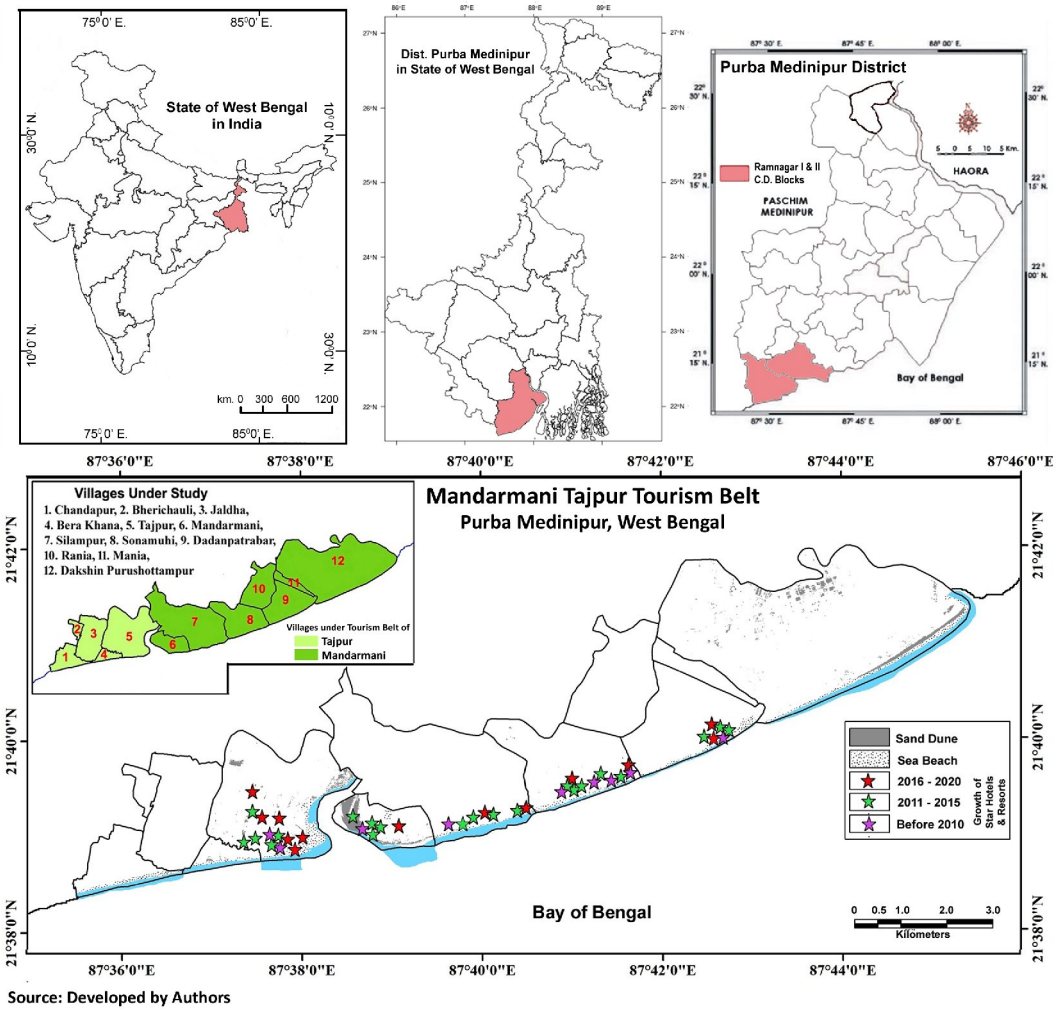
Mandarmanni and Tajpur are newly emerged coastal tourism destinations of Purba Medinipur district of West Bengal, India. Mandarmani and Tajpur are the respectively third and second resorts from Digha in the chain of resorts in Purba Medinipur district. Madarmani tourism belt (87°38'49''– 43'19''E; 21°39'30''- 40'15''N) spreads over the mouzas of Mandarmani, Silampur, Sonamuhi, Dadanpatra between Jaldha and Pichuaboni inlet and Tajpur tourism destination (87° 37' 00'' – 87° 38' 48''E; 21°38'48''- 21° 39'16''N) comprising of two mouzas of Tajpur and Bara khan is located in the western side of Jaldha inlet. Before the establishment of tourists resorts Mandarmani and its surrounding villages were the villages of fisherman community. Temporary settlement of fishermen is set up in Dadanpatrabar and Mandarmani; the tradition of practice for last 35-40 years. Fishermen from the Orissa, Medinipur both Purba and Pachim and south 24 Parganas come here for trading activities. The Tajpur mouza was known for its fishing activities and salt production before the tourism development. Temporary settlements of fishing community began to develop in scattered form in two mouzas of Tazpur and Barakhanas (Pahari, 2013).

The specific objectives of this research are to (a) find out the extent of livelihood diversification among the village households lies within 4 km from coastline and rest part of above 4 km of coastline and (b) determine the factors affecting degree of livelihood diversification. As the study is fully based on the primary data, it will provide experiential signals regarding the factors determining the transformation of rural livelihoods in Mandarmani–Tajpur costal area. This study will assist the policy makers, NGOs and other govt. agencies to frame policies for the development of rural economy.

Data and Methodology

Sample Size selection

The study was based on the household- level primary survey conducted during December 2017– October 2018 and data were collected face to face interview using pre-tested semi-structured questionnaires during 2017–2018. The collected information included demography, land ownership, primary and secondary occupations of household members, migrations and remittances, assets ownership, labour force, on farm



Source: Developed by Authors

Fig. 1 : Location of the Study Area

activities, off-farm activities, non-farm activities, credit and savings, agricultural prices, income from different sources and living conditions to name major ones. Sample size selected on basis of Morgan's table for sample size selection based on the following formula given by Krejcie & Morgan (1970) which is as follows:

$$S = x^2 NP (1-P) / d^2 (N-1) + x^2 P (1-P)$$

where, S = required sample size, x^2 = the table value of chi square for 1 degree of freedom at desired confidence level (0.10=2.71, 0.05= 3.84, 0.01= 6.64, 0.001= 10.83), N= the population size, P = the population proportion (assumed to be 0.50) and d = the degree of accuracy expressed as a proportion (0.05).

In this study, 412 households have been taken from 23 villages under Mandarmani-Tajpur belt. 226 household samples have been collected from 12 villages located within 4 km buffer from coastline and rest 186 sample households taken from other 11 villages. The samples have been collected at 95% confidence level and 5% margin of error. Each village were divided into three segments and equal number of residents 'responses were collected from every segments randomly as samples (Appendix Table 1). Income is the main decisive determinant of livelihood for any society (Gebreyesus, 2016). In this study livelihood diversification has been calculated with the help of income share from different sources.

Livelihood Diversification Index

The Simpson Index was used in this study for determining the livelihood diversification because of its computational simplicity and wide applicability (Khatun & Roy, 2012; Philemon, 2015). The formula for Simpson is given below:

$$SID = 1 - \sum_{i=1}^{n} P^2$$

where, n is the total number of income sources and Pi is representing income proportion of the its i^{th} income source. Its value lies between 0 and 1. The S.I value ***0*** indicates full concentration where only single type of income opportunity is there and approaching to ***1*** reveal the declining of Pi share where the number of income sources increases. SID value 1 suggests full diversification.

Based on the SID values, villages have been categorised into five classes (Ahmed *et* al., 2018) which are as follows:

- No diversification (SID < = 0.01)
- Low level of diversification (SID = 0.01 - 0.25)
- Medium level of diversification (SID = 0.26 - 0.50)
- High level of diversification (SID = 0.51 - 0.75)
- Very high level of diversification (SID > 0.75)

Determinants of Livelihood Diversification

Simpson Index of livelihood diversity index (SID) ranges between 0 and 1. An Ordinary Least Square (OLS) estimate is not suitable to find the determinant parameters because OLS cannot expurgate the variables. To identify the major determinants for livelihood diversification, multiple regression analysis will be the best approach (Khatun & Roy, 2012) using the following equation (1):

$$D = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + ... + \mu \quad ..... (1)$$

Multiple regression analysis has been done with the help of stepwise regression approach where a

Table 1. Description of Explanatory Variables associated with Livelihood Diversity

Variables		Explanation
y	SID	Simpson Index of Livelihood Diversity
X_1	Income (in Rs.)	HHs Average yearly income in Rupees
X_2	Average Schooling Year of HH Head	How long the HHs head used to go to school
X_3	Age of HH Head	Age of the Head of the Surveyed HHs (in years)
X_4	Experience Level in Current Job	Duration of association with the present job
X_5	Dependency ratio	Percentage of HH members below 16 years and above 60 years
X_6	Education	Level of education achieved
X_7	Family size	Average number of family member in a HHs
X_8	Ownership of Land (Hec.)	Cultivable Land per working members in the HHs (in acre)
X_9	Distance to nearest Market	Reciprocal of distance from nearest Market
X_{10}	Distance to nearest Town (Contai)	Reciprocal of distance from nearest Town
X_{11}	% of area irrigated	Area of the study village under irrigation facility
X_{12}	Land man ratio	HHs possess land under Irrigation (in per cent)
X_{13}	Asset Index	Dimension Index of all the assets (except land) owned by a HHs
X_{14}	Percentage of HH availing Credit	Credit/ Loan taken from Govt./ Private institutes
X_{15}	Percentage of HH having Membership in SHGs / Co-operatives	Membership in SHG, co-operatives and other social organizations
X_{16}	Percentage of HH got Training	HHs member has received any formal training on livelihood skill

Source: By the Authors

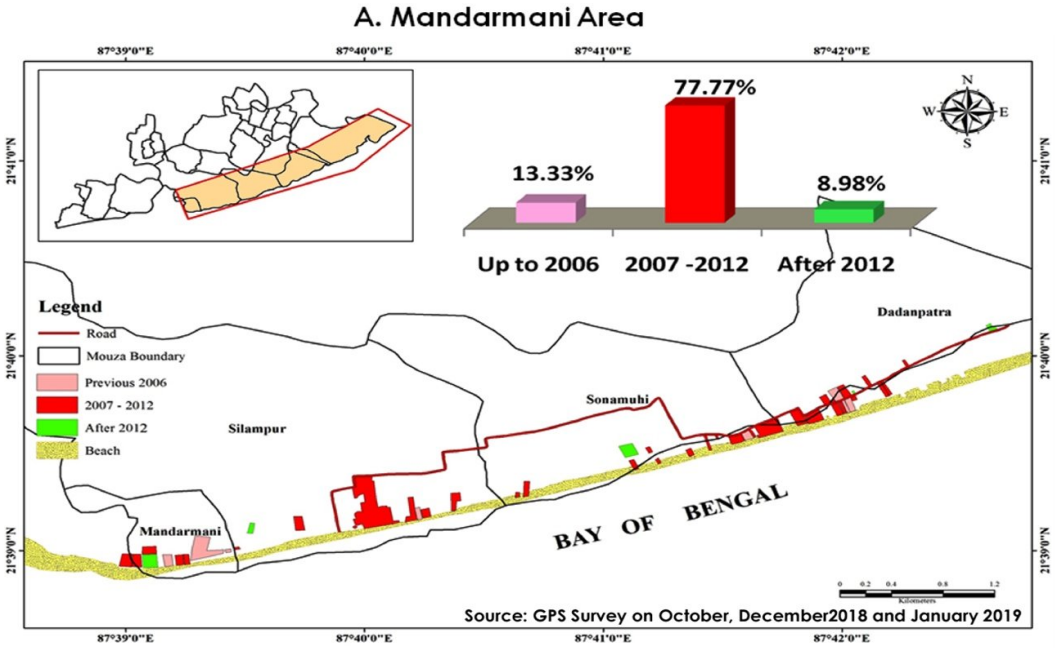
model can be build a model by adding or removing predictor variables with the help of T-test. The variables to be supplement or impassive are selected constructed on the test statistics of the projected coefficients. While the technique does have its benefits, it requires skill on the part of the researcher so should be achieved by people who are very acquainted with statistical testing. In essence, unlike most regression models, the models created with stepwise regression should be taken to require a keen eye to detect whether they make sense or not.

Results and Discussion

Spatio-temporal Growth of Pattern of Hotels

Accommodation industry is an important sub-sector in tourism activities (*Philemon, 2015*). Hotels and resorts provide the accommodation facilities in any tourism destination. In this section, the spatial-temporal growth pattern has been discussed. From early discussion, it is clear that the tourism development in Mandarmani and Tajpur area is a new thing. Growth of tourism industry started just one decade ago. In Mandarmani area the tourism industry, mainly the hotels and resorts are spatially distributed over the four Mouzas, namely; Mandarmani, Silampur, Sonamuhi, and Dadanpatrabar in a linear pattern along the coast (Fig. 2A). In Tajpur area, the hotels and resorts are spread over the two mouzas, namely; Tajpur and Jaldah whereas Tajpur mouza shown a lot more concentration of hotels and resorts (Fig. 2B). The field survey and literature review reveal that the development of hotels and the resorts was started in 2001.

Tarangamala, was the first hotel established in 2001 and Sindhukanya, was the second hotel established in 2002. These were built for the purpose of fishing though rapidly the scenario changed (Pahari, 2013). To examine the temporal growth pattern, all the hotels and resorts have been classified into three classes, i.e. hotels and resorts grew up to the years of 2006, from 2007 to 2012 and after 2012 according to their year of establishment. In Mandarmani area, 13.33 per cent hotels and resorts were established within the year of 2006; 77.77 per cent hotels and resorts were established within the time span of 2007 to 2012; and after 2012 only 8.89 per cent hotels and resorts were established. So, a decline growth is observed after 2012. In context of both spatial and temporal growth, up to the year of 2006, most of the hotels developed along the Mandarmani and Dadanpatrabar coast. Within the time period of 2007 to 2012 rapid growth has been observed along the coast of Silampur, Dadanpatrabar and Sonamuhi village. After 2012 only few hotels were established in Madarmani and Sonamuhi village coast (**Fig. 2**). Due to action taken by the Digha Sankarpur Development Authority (DSDA) to maintain the environmental sustainability and follow



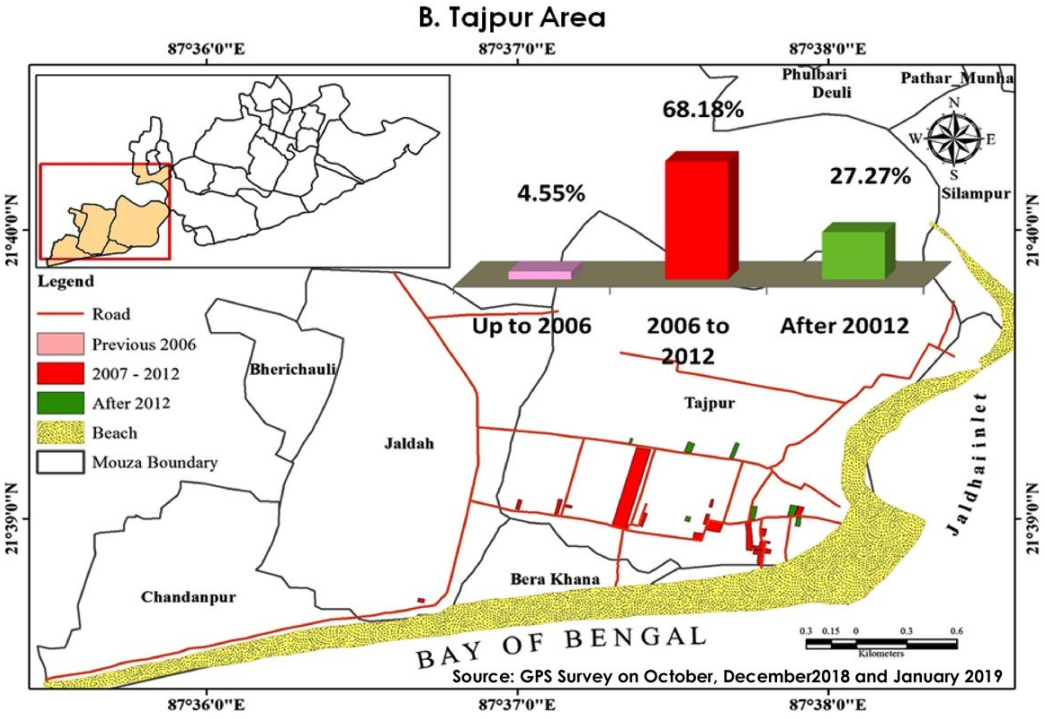


Fig. 2 : Growth of Hotels in Mandarmani (A) and Tajpur (B) Region

the CRZ norms, the authorisation for the development of new hotels and resorts within 500 meter of High Tide Line (HTL) has been completely outlawed in Mandarmani and Tajpur tourism belt. The study reveals that at Tajpur area, most of the hotels and resorts were developed during the time period of 2007 to 2012 i.e. 68.18 per cent and 27.27 per cent hotels and resorts were developed after 2012. So, this result shows a rapid development within 2007 to 2012 which later declined.

Livelihoods of Mandarmani-Tajpur and its surrounding villages

As mention earlier, the main occupation of the inhabitants of Mandarmani and its surrounding villages were fishing and agriculture. As closer to sea coast they had only two options of livelihood, one is fishing and aquaculture and another is agriculture.

The result shows that livelihoods of the inhabitants of these villages were concentrated in agriculture and fishing activities in ten years ago. But after the establishment of tourism industry new options like Tourism related activities, transportations (driving of Toto rickshaw, auto rickshaw) etc. have been emerged as a livelihood options. During survey in 2017-2018, the impacts of tourism have been seen clearly from the data where tourism related livelihood options make a clear impact of people in the study area. Highest percentages of households have engaged in tourism related activities as second livelihood options in villages like Mandarmani (20.0 per cent), Dadanpatrabar (18.47 per cent) where the hotels and resorts were developed since coastal tourism developed (see Table 1 from Appendix). When earlier sketch has been done, a negligible percentage of households were engaged in tourism related activities in these places in ten years ago. This development indicates that the villages are in transition between a little diversification to highly diversification in livelihoods.

Agriculture and fishing activities has been found as main occupation or livelihood option in Tajpur and its surrounding villages as well. In Tajpur, percentage of households having the agricultural livelihood was 44.83 per cent in 2018 which was 55.17 per cent in 2008 along with the percentage of household employed in fishing and aquaculture was decreased from 22.41 per cent to 15.52 per cent during last ten years. But the percentages of households engaged in tourism

related activities, has been found to 8.62% in 2018 although 10 years ago no households were engaged in this livelihood. The proportion of households engaged in transport related activities has been found 12.07 per cent although it was 1.72 per cent in 10 years ago. Same observation has been found for Bherichauli and Chandrapur village where a small percentage of households engaged in tourism related activities i.e. 1.82 per cent and 1.90 per cent in 2018. The impact of tourism on livelihoods is not remarkable to these villages as in Mandarmani region.

Level of Livelihood Diversification

The proportion of income from different livelihood sources in total household income has been shown in the figure 3 & table 2 (Appendix) for Mandarmani-Tajpur and its surrounding villages. This figure also revealed the level of diversification using the Simpson Index of Diversification (SID). Very high level of livelihood diversification has been found in the villages of Mandarmani (0.78), Silampur (0.75), Dadanpatrabar (0.75), Lachandrapur (0.78), Tajpu (0.75) and Bherichauli (0.75). Except Lachandrapur village, all the villages lie within 4 km. buffer to coast line of Bay of Bengal. High level of diversification is found in Purbabar (0.72), Rania (0.63), Kalindi (0.69), Dera (0.69) and Jhalda (0.57). Agriculture along with fishing and aquaculture remains main sources of livelihood in terms of income share for all the villages.

Appendix Table 2 shows the annual average household incomes of the villages which are very low in case of all villages surround to Mandarmani destination. Highest average annual household income was found at Dhunia baraj (260400 INR) and lowest average annual household income was found at Bishnupur (88400 INR). Households of Mandarmani have the average annual income of INR 89040. Fishing/ aquaculture and agriculture contributed 34.5 per cent and 5.12 per cent of total household income whereas tourism related activities contribute 27.22 per cent of household income. Other sectors like governments and privet job (7.55 per cent), transportation (8.36 per cent) and business (10.97 per cent) are also present in this village. In Dadanpatrabar, average annual household income found of INR 121050. Agriculture (37.67 per cent) and fishing or aquaculture (21.81 per cent) was the main contributors for livelihood. Tourism has

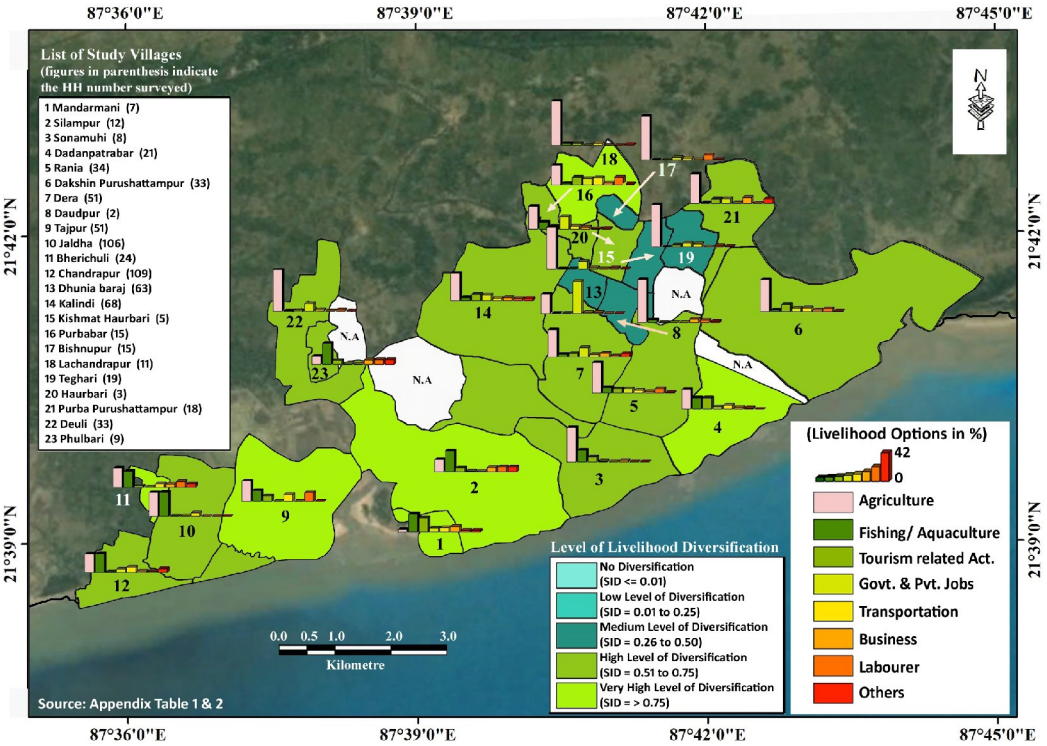


Fig. 3 : showing livelihood option with share (in per cent) and Livelihood Diversity of the Villages in Mandarmani-Tajpur and its surrounding villages

emerged as another important contributor which contributed 21.81 per cent of total income. Annual household income in Silampur has been found of INR 89486. Although, agriculture (23.56 per cent) and fishing (39.85 per cent) contributed more than 50 per cent, but tourism related activities (7.85 per cent), Business (8.62 per cent) and labour activities (9.1 per cent) are also present in good percentage. In Kalindi village, agriculture (52.31 per cent) and tourism related activities (12.62 per cent) were the main contributors to total average annual household income which has been found of INR 119598.

In case of Tajpur and its surrounding villages very high to high level of diversification in livelihood has been found in the Tajpur (0.75 – Very High), Bherichauli (0.75 – Very High) and Chandrapur (0.73 –High) except Jhalda which falls under medium level of diversification. Households of these villages derived their annual income mainly from agricultural and fishing or aquaculture activities. In Tajpur, the share of annual household income from agriculture and fishing were 38.57 per cent and 20.61 per cent respectively and remaining proportion of annual household income came from tourism related activities (10.41 per cent), transportation (13.27 per cent), and labour activities (17.14 per cent). In Bherichauli, though main share of household income came from agriculture and fishing (36.86 per cent and 30.46 per cent respectively), high level of diversification of livelihood in term of annual household income due to income from transportation (6.4 per cent), business (5.84 per cent), and labour activities (10.99 per cent). In Chandrpaur, beside the agriculture and fishing, the share of annual house hold income came from transportation (10.24 per cent) and government and privet jobs (6.73 per cent). In Tajpur destination, maximum involvement in tourism has been found in Tajpur among all villages. Highest share of annual income from tourism related activities has been found in Tajpur village (10.41 per cent).

Role of tourism in livelihood diversification

Agriculture and fishing or aquaculture has been found the main sources of livelihood of Mandarmani-Tajpur tourism destination from the discussion of previous portion. But the role of tourism in livelihood activity could not be denied. Although, all the villages earned small proportion of average annual household income from tourism related activities but specially, in case of the villages like Mandarmani (27.27 per cent), Dadanpatrabar (21.81 per cent) and Silampur (7.85 per cent) at Mandarmani tourism destination, the share or contribution of average annual household income from tourism related activities has been found high and well above from areal average income (7.22 per cent) from tourism related activities (Fig. 4). Also, the villages like Dakshin Purushattampur (13.28 per cent), Kalindi (12.67 per cent), Lachandrapur (14.69 per cent), which are situated away from the main tourism destination have important share of income in total average annual household income. Inhabitants of these villages have been directly and indirectly involved in tourism activities such as employed in accommodation establishments, shops, run small hotels and restaurants in beach, selling of tourist's items, transportations etc. The villages like Mandarmani (8.36 per cent) Dadanpatrabar (7.81 per cent), Dakshin Purushattampur (7.03 per cent) Lachandrapur (13.53%) have the high share of annual household income (Table 4). People from these villages were engaged in driving of Toto rickshaw (battery driven e-rickshaw), Auto rickshaw, and Motor van for carrying the tourists from Chaulkhola to Mandarmani sea beach. At Tajpur tourism destination (Fig. 3) among the four villages Tajpur contribute highest share of average annual household income from tourism related activities i.e. 10.41 per cent whereas Bherichauli has 2.78 per cent, Jaldha has 0.63 per cent, Chandrapur has 0.90 per cent share of income from tourism related activities in total average annual household income. Transportation is important part of tourism. The people of these villages were also engaged in driving motor van Toto rickshaw for carrying the tourists from Balisai to Tajpur and also carrying the goods etc.

Driving Factors and Constraints for Livelihood Diversification

In Mandarmani-Tajpur belt, different driving forces of rural livelihood diversification have been identified. Most of the scholars have not determined the driving factors associated with livelihood diversification for any group or any region. These determining factors concomitant with livelihood have been classified into five categories namely human, financial, social, natural, and physical capital. Hence, this study review varied determinants as human, financial, social, natural, and physical capital to assess the driving forces associated with livelihood diversification of the region.

The results of Multi-linear regression model (MLRM) estimation have been given in *table 2*. The adjusted R^2 value as well as F-value looked to be quite rational and all the estimated coefficients, except five, namely age of HHs head, dependency ratio, family size, distance to nearest market and town are statistically significant.

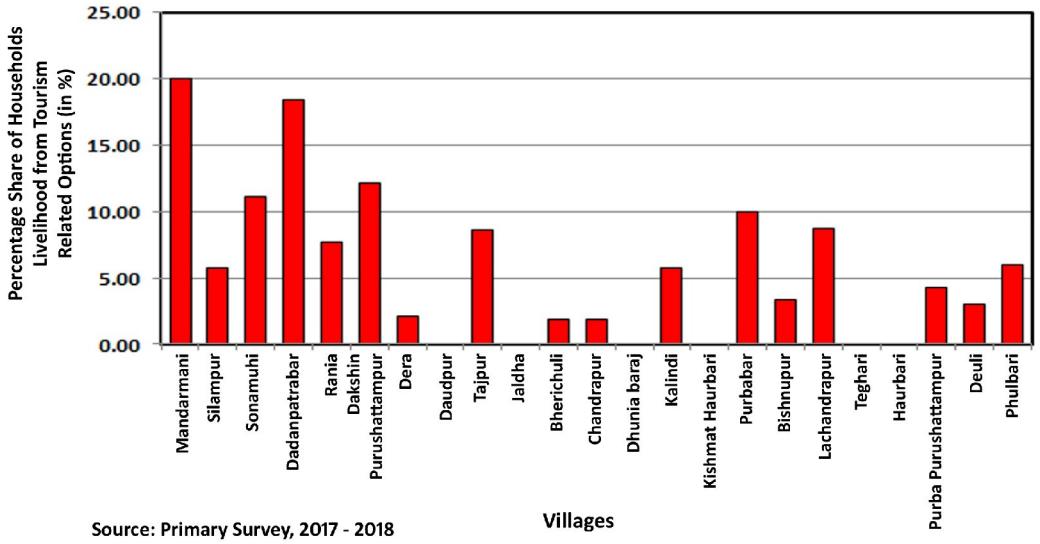


Fig. 4 : Income shares of tourism related activities in average annual household income at Mandarmani and its surrounding villages

Table 2. Model Summery for MLRM

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson	F	Sig
1	.992[a]	.983	.938	.04174	1.128	21.848	0.001

a. Predictors: (Constant), VAR00017, VAR00004, VAR00008, VAR00015, VAR00006, VAR00003, VAR00012, VAR00002, VAR00009, VAR00005, VAR00016, VAR00007, VAR00011, VAR00014, VAR00013, VAR00010
b. Dependent Variable: y (Simpson Index of Livelihood Diversity)

From the table 2 we got the value of R square which is representing 98.3 per cent variability of the taken variables accounting the regional SID. The adjusted R square value (0.938) is lower than the original R square value as it is taking the sample size. Dublin – Watson is an indicator by which we can test hypothesis and having statistical significance. If the value lies within 1.5 to 2.5, there will be no serial correlation. But here, this study signifies the serial correlation as the value stands as 1.128. If we consider the F value, it has found 21.848 for the model. As the variables for MLRM increases, the F value will decreases and adjusted R value will increases. In this model, the value of 'F' is justified for 16 variables as the driving factors for livelihood diversification along with significance value of 0.01 which denote that the model signifies at 1 per cent level.

From stepwise regression model, nine factors out of sixteen has been explained which have significant relation for regional livelihood diversification (see table 2). The role of income has been found with a higher coefficient value (0.730) with more than 7 per cent contribution along with statistically significant at 5% level ($\tilde{n}<0.05$) of significance. Higher livelihood diversification value is clearly relate with higher income characteristics as this is basically due to the other alternative income options lies in the region. As the livelihood options increases, livelihood diversification shows higher impact lowering the vulnerability of livelihood.

Education has been found statistically significant ($p<0.05$) with a positive coefficient (0.627) which indicates that education level increasing the choice of livelihood diversification approaches of the respondents at more than 6% in the study area. This result support that an educated person has the ideas, opportunity and knowledge to diversify his/her farming activity to other non-farm activities to withstand their farming livelihood problems compare to non-knowledgeable respondent.

The value of asset index possessed by a household has

Table 3. Determinants of livelihood diversification in Mandarmani-Tajpur Belt (derived by stepwise regression)

Variables	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
Intercept	-0.4603	0.3121		-1.475	.012*
Income (in Rs.)	0.0130	0.0000	**.730**	-1.672	.029*
Average Schooling Year of HH Head	0.0080	0.0082	.117	.970	.037**
Age of HH Head	-0.0009	0.0037	-.031	-.240	.082
Experience Level in Current Job	0.0063	0.0034	.179	1.868	.011*
Dependency ratio	0.0094	0.0042	.178	2.250	.062
Education	-0.0061	0.0045	**.627**	-1.352	.023**
Family size	-0.0303	0.0437	-.061	-.693	.514
Ownership of Land (Hec.)	0.0136	0.0183	.077	.742	.049**
Distance to nearest Market	-0.0312	0.0159	**-.673**	-1.961	.028**
Distance to nearest Town (Contai)	0.0174	0.0127	**.416**	1.364	.021**
Percentage of of area irrigated	0.0006	0.0006	.076	.962	.373
Land man ratio	-0.0005	0.0005	-.166	-1.023	.035**
Asset Index	0.7381	0.0906	**1.157**	8.150	.010*
Percentage of HH availing Credit	0.0012	0.0008	.131	1.566	.017*
Percentage of HH with Membership in Co-operatives/ SHGs	0.0024	0.0012	**.248**	2.018	.039**
Percentage of HH got Training	0.0092	0.0030	**.528**	3.109	.021**
Adjusted R^2			*0.938*		
F Value			*21.848*		
No. of Observations			*23*		

** denote significance at 1 per cent and ** denote significance 5 per cent levels, respectively.*
Source: Calculated by the Authors

been found a significant and positive effect on the level of livelihood diversification among the respondents by 11.5 per cent. Asset base is one of the restrictive factors towards livelihood diversification in the coastal area of Mandarmani-Tajpur belt. Higher asset index suggests the higher degree of livelihood diversity for the region. As anticipated the association between livelihood diversification and membership of a cooperative society and self-help group (SHGs) as well as HHs got training has been found positive and statistically significant at 5 per cent level (ñ<0.05) of significance which implies that membership in society and training give an impetus for minimising the rural poverty with the approach of higher degree of livelihood diversification.

Household's access and availing credit from formal and non-formal sectors found a positive impact on the level of livelihood diversification. The co-efficient has been found statistically significant at 1 per cent level of significance. As resource-base is very poor and basically depends on agriculture and fishing activities for most of the rural households in Mandarmani-Tajpur belt, accessibility and availability of credit to rural households will improve their livelihood. It has been found from the study that rural households which are basically located near the coastline are using credit in purchasing motor-van, e-rickshaw, and shops for alternative source of livelihood.

Conclusions

From the present study, the level of livelihood diversification and role of tourism in livelihood diversification have been analysed. Mandarmani and Tajpur both are the newly developed tourism destinations. The study revealed that tourism related activities have been emerged as a new livelihood option to the people of the surrounding villages of these two

destinations. There is important involvement in tourism related activities has been seen, although ten years back there was no trace of involvement in tourism activities. In ten years back, main household occupation or livelihood was concentrated within agriculture and fishing or aquaculture activities. Still now, agriculture and fishing were the main occupations of the people of these villages but difference is that there proportion is getting reduced and their place is distributed among the new occupations like tourism related activities, transportations, employment in government and privet jobs etc. the effect of this shifting of livelihoods or occupations clearly seen in the diversification in annual household income. The total average annual household income was very low and comes from different sources. The villages, near to coast and where the hotels and resorts were developed share of annual household income from tourism is more than others. As mentioned earlier that livelihood diversification may be occurred in response to economic necessity or in response to economic choice. The study has shown that average annual household income was very low and ten years ago there were no alternative occupations than agriculture and fishing or aquaculture. There was a necessity for enhancing the livelihood options to the people of these areas. After the development of hotels and resorts, various new occupations have been emerged as livelihood options. Cyclones and storm surges are affecting the construction of hotels and resorts in the coastal region of West Bengal. These are the limiting factors for the hotels and other tourism infrastructures.

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APPENDIX

Table 1. Household's Livelihoods in Mandarmani-Tajpur and its surrounding villages

Villages	Surveyed Households	Temporal Span of Survey	Percentages of household's livelihoods/ occupations							
			Agriculture	Fishing/ Aquaculture	Tourism related activities	Govt. and Private jobs	Transpo -rtation	Business	Labour	Others
Within 4 km buffer from Coast Line										
Mandarmani	7	*	2.00	36.00	20.00	4.00	6.00	14.00	14.00	4.00
		**	14.00	70.00	0.05	0.00	0.00	2.00	10.00	3.95
Silampur	12	*	15.71	35.71	5.71	2.86	0.00	17.15	17.15	5.71
		**	22.86	45.71	0.00	0.00	0.00	4.29	22.85	4.29
Sonamuhi	8	*	62.22	22.22	11.11	2.22	0.00	2.22	0.00	0.00
		**	71.11	26.67	0.00	2.22	0.00	0.00	0.00	0.00
Dadanpatrabar	21	*	39.24	16.99	18.46	6.33	7.59	6.33	3.80	1.27
		**	59.49	26.58	1.27	0.00	0.00	5.06	6.33	1.27
Rania	34	*	56.04	10.99	7.69	2.20	7.69	6.59	7.69	1.10
		**	75.82	14.29	0.00	2.20	0.00	1.10	6.59	0.00
Dakshin Purushattampur	33	*	64.84	3.30	12.09	1.10	6.59	3.30	8.79	64.84
		**	74.73	12.09	0.00	1.10	2.20	2.20	7.69	74.73
Dera	51	*	65.52	4.83	2.07	7.59	5.52	6.90	3.45	4.14
		**	77.24	3.45	0.69	4.83	2.07	4.83	4.14	2.76
Daudpur	2	*	80.00	6.67	0.00	0.00	0.00	0.00	6.67	6.67
		**	80.00	6.67	0.00	0.00	0.00	0.00	6.67	6.67
Tajpur	51	*	44.83	15.52	8.62	0.00	12.07	0.00	18.97	0.00
		**	55.17	22.41	0.00	0.00	1.72	0.00	20.69	0.00
Jaldha	106	*	39.02	54.88	0.00	2.44	3.66	0.00	0.00	0.00
		**	42.68	56.10	0.00	1.22	0.00	0.00	0.00	0.00
Bherichuli	24	*	36.36	34.55	1.82	0.00	0.00	5.45	9.09	12.73
		**	40.00	34.55	0.00	0.00	0.00	1.82	7.27	16.36
Chandrapur	109	*	40.00	34.29	1.90	3.81	7.62	4.76	4.76	2.86
		**	55.24	33.33	0.00	1.90	1.90	2.86	1.90	2.86
Above 4 km buffer from Coast Line										
Dhunia baraj	4	*	83.33	0.00	0.00	10.00	3.33	3.33	0.00	0.00
		**	93.33	0.00	0.00	6.67	0.00	0.00	0.00	0.00
Kalindi	68	*	67.88	3.11	5.70	7.25	5.18	3.11	5.70	2.07
		**	78.24	3.11	0.00	4.66	3.11	4.66	4.66	1.55
Kishmat Haurbari	5	*	75.00	0.00	0.00	15.00	5.00	0.00	5.00	0.00
		**	100.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Purbabar	15	*	40.00	16.67	10.00	15.00	10.00	6.67	0.00	1.67
		**	70.00	20.00	0.00	1.67	0.00	8.33	0.00	0.00
Bishnupur	5	*	90.00	3.33	3.33	0.00	3.33	0.00	0.00	0.00
		**	96.67	0.00	0.00	0.00	3.33	0.00	0.00	0.00
Lachandrapur	11	*	47.37	3.51	8.77	5.26	10.53	12.28	12.28	0.00
		**	68.42	1.75	0.00	5.26	5.26	8.77	10.53	0.00
Teghari	19	*	85.71	0.00	0.00	2.86	4.29	0.00	5.71	1.43
		**	90.00	0.00	0.00	1.43	0.00	2.86	5.71	0.00
Haurbari	3	*	80.00	0.00	0.00	3.33	3.33	0.00	10.00	3.33
		**	90.00	0.00	0.00	0.00	0.00	0.00	6.67	3.33
Deuli	33	*	67.00	2.00	3.00	2.00	6.00	3.00	16.00	1.00
		**	69.00	11.00	0.00	0.00	3.00	3.00	13.00	1.00
Phulbari	9	*	6.00	54.00	6.00	0.00	6.00	4.00	18.00	6.00
		**	20.00	58.00	0.00	0.00	6.00	0.00	14.00	2.00
Purba Purushattampur	18	*	61.43	0.00	4.29	0.00	0.00	10.00	4.29	20.00
		**	72.86	0.00	0.00	0.00	0.00	5.71	2.86	18.57

Source: by Authors, * Show the present Households livelihood options and ** show the status of 10 years earlier.

Table 2. Level of livelihood diversification (Simpson Index) and determining factors of livelihood diversification

Villages	Simpson Index of Livelihood Diversity (SID)	Income (in INR)	Average Schooling Year of HH Head	Age of HH Head	Experience Level in Current Job	Dependency ratio	Education	Family size	Ownership of Land (Hec.)	Distance to nearest Market	Distance to nearest Town (Contai)	% of area irrigated	Land man ratio	Asset Index	% HH availing Credit	% HH having Membership in Co-operatives/ SHGs	% HH got Training
		X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8	X_9	X_{10}	X_{11}	X_{12}	X_{13}	X_{14}	X_{15}	X_{16}
Mandarmani	0.78	89040	9.20	41.00	23.50	31.50	22.00	4.20	2.50	15.00	25.00	17.82	54.00	1.00	35.50	23.50	33.50
Silampur	0.75	89486	4.80	41.00	21.50	31.00	19.00	4.10	3.60	14.00	24.00	0.04	189.26	0.82	78.20	12.50	44.50
Sonamuhi	0.52	127467	7.60	36.00	15.60	29.00	20.00	4.25	4.50	13.00	23.00	0.00	84.71	0.78	45.80	25.80	28.90
Dadanpatrbar	0.75	121050	8.10	35.00	14.50	26.94	20.00	4.10	2.20	10.00	21.00	0.04	55.97	0.95	25.80	45.80	28.20
Rania	0.63	128440	7.90	58.00	32.50	31.11	19.00	4.30	3.20	6.00	17.50	0.00	66.20	0.32	28.90	74.80	38.70
Dakshin Purushattampur	0.60	115613	5.60	43.61	25.80	28.46	16.46	3.93	1.90	10.00	20.00	5.03	243.01	0.38	30.50	81.80	54.20
Dera	0.69	111559	7.20	46.44	23.40	28.43	21.62	3.81	1.50	7.00	16.00	24.78	84.09	0.52	55.80	54.20	47.90
Daudpur	0.33	120800	8.30	38.40	12.50	32.52	27.27	4.46	2.40	7.50	16.50	3.64	17.83	0.23	45.80	45.60	38.70
Dhunia Baraj	0.51	260400	3.90	40.30	24.30	26.28	23.23	3.90	1.90	5.80	15.00	26.78	14.63	0.45	72.50	29.20	51.20
Kalindi	0.69	119598	4.60	41.72	22.10	26.85	21.34	3.88	2.80	4.80	14.00	53.57	137.21	0.69	58.50	32.80	38.50
Kishmat Haurbari	0.34	145143	5.20	41.24	18.90	28.17	26.95	4.55	3.10	6.00	16.00	35.61	20.48	0.38	23.80	39.80	37.50
Purba bar	0.72	150800	7.60	54.98	23.60	23.03	20.48	3.93	3.80	5.00	14.00	11.80	21.37	0.78	33.80	44.20	37.20
Bishnupur	0.28	88400	1.50	44.03	20.50	23.83	17.47	3.36	1.10	6.00	15.50	21.77	12.93	0.21	54.40	48.20	29.80
Lachandrapur	0.78	127579	5.80	43.75	12.90	33.21	17.14	3.32	2.80	5.00	14.00	26.54	53.54	0.81	33.50	57.80	32.80
Teghari	0.35	111943	2.99	51.33	16.40	22.23	18.40	3.99	1.09	5.00	15.50	30.73	26.33	0.39	65.80	41.80	28.90
Haurbari	0.30	101920	0.00	48.27	17.80	25.11	12.53	3.40	0.89	6.00	15.50	34.53	26.00	0.21	12.80	40.80	38.90
Purba Purushattampur	0.64	105429	5.90	45.09	19.50	26.18	18.23	3.68	1.90	8.00	17.50	30.32	55.64	0.68	25.80	32.80	34.80
Phulbari	0.65	58440	6.70	42.46	21.80	28.76	13.22	4.34	2.80	9.00	16.50	57.26	10.59	0.87	45.50	26.80	12.80
Deuli	0.64	81294	6.80	49.50	27.20	24.01	19.62	4.01	2.20	8.00	16.00	27.30	56.12	0.77	65.70	27.50	27.80
Tajpur	0.75	10137	7.80	36.84	18.70	28.39	16.79	3.84	1.80	14.00	24.00	0.00	121.9	0.91	71.50	29.00	38.90
Jaldha	0.57	91301	8.70	38.45	19.80	21.65	18.26	3.75	1.10	11.00	23.00	46.20	71.32	0.59	33.80	9.00	46.50
Bherichauli	0.75	78436	8.80	41.46	20.30	26.97	21.85	3.71	3.40	14.00	23.50	72.19	12.60	0.89	38.90	36.80	25.80
Deuli	0.65	58440	53.8	1.76	3.52	13.42	1.65	3.41	21.1	1.54	18.50	23.50	46.20	0.42	38.90	84.20	28.50
Phulbari	0.64	81294	16.8	55.72	7.53	0	3.76	0	9.55	6.65	19.80	15.80	83.0	0.58	40.50	71.50	44.70
Chandrapur	0.73	76457	9.20	43.50	25.80	27.17	19.50	3.57	2.80	15.00	25.50	45.32	80.44	0.95	45.80	33.90	22.80

Note : INR means Indian Rupee

Source : By the Authors through Primary Survey, 2017-2018