



RESEARCH ARTICLE

SOCIO-ECONOMIC STATUS OF COASTAL COMMUNITY OF SOUTH ANDAMAN, ANDAMAN AND NICOBAR ISLANDS, INDIA

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ABSTRACT

The present study was conducted to evaluate the socio-economic condition of the coastal community residing near the mangrove habitats of South Andaman Islands. A pre-tested questionnaire was used to collect the survey data. Essential information e.g. employment, education, hygiene, family size, income and utilization of nearby mangrove regions were taken into consideration. A total of 120 households were surveyed and it was found that middle age group was highest (58.8%) and young group was lowest (2.5%), represented by 87.5% Hindu. Most of the inhabitants were private job holders (57.5%) followed by professional fishermen (37.5), government (3.75%), and government retired (6.25%). Fishermen were of two type part time (62.5%) and professional fishermen (37.5%). Fishing activity was carried out solely by male gender with no involvement of women. Positive correlation was estimated between the source of income and fishermen type ($r=0.89$) explaining most of the private job holder as part-time fishermen. About 57.5% of respondents monthly income was low (1000-5000/-) while 36.5% and 10% earned medium and high monthly income respectively. Average highest monthly income was generated by fishermen 7200/- and lowest by government employ 5666.7/-. Coastal population were immigrants belonging to various states of mainland India, 55% represented from West Bengal settled before Indian independence (Pre-1942-63.75%). About 16.25% of the population were illiterate, 22.5% acquired primary level, 48.75% secondary level and 12.5% higher secondary level of education. Most of the household were constructed of concrete with asbestos roof (48.75%), supplied with electricity (97.5%) and with proper government drinking water supply (87.5). However it was found that coastal population was utilizing mangrove environments not merely for fishing but also for sanitation (33.5%) and garbage disposal (50%) which was a major constrain. Lack of scientific knowledge about mangrove ecosystem and fishing license, government help for fishing equipments transportation and less number of inhabitants with higher education were the major drawback during the study.

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INTRODUCTION

Mangroves are considered as important elements in coastal ecosystems in the tropics due to their high productivity and its role as nursery grounds for numerous commercially important fin fish and shellfish (Roberston & Duke, 1990; Robertson, 1991; Tzeng & Wang, 1992 and Laedsgaard & Johnson, 1995). Further, developing countries heavily depend on mangrove

ecosystems for livelihood economy as well as commercial fishery which are their traditional trend (Herald and Odum, 1970, Mumby et al., 2004, Nagelkerkan et al., 2000). Moreover these ecosystems have a very large unexplored potential for salt production, pharmaceutical products, fishery resources, fuel and fodder. In Addition to this, various studies (Mainoya et al., 1986; Adegbehin 1993; Primavera et al., 2004; Lopez-Hoffman et al., 2006) asserted that some countries use mangrove wood for building boats, furniture, wharf pilings, telegraph poles, construction scaffolding, railway girders and mine timbers and

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wood fibers such as rayon and paper, traditional medicines and toxicants. Besides activities such as conversion of forest area to aquaculture and agriculture, construction of port and harbour, extension of human inhabitation, over-grazing, urbanization, industrialization, and chemical pollution etc are reported as the major causes of mangroves ecosystem destruction around the world (Blasco & Aizpuru 1997; Naskar 2004; Upadhyay *et al.*, 2002). Due to these threats about 33% of Indian mangrove areas have been lost within the past 15 years of which, east coast lost 28%; west coast 44% and Andaman and Nicobar Islands 32% (Jagtap *et al.*, 1993; Mandal & Naskar, 2008).

Mangroves of Andaman Islands are well known for their rich fishery resources and so far 290 species of fishes has been reported from the mangrove ecosystem of Andaman and Nicobar islands (Devi and Rao, 2007). Islands mangrove forests are one of the best in the world gifted with very high floristic richness, complexity index and high biomass but the rapid development and population inflow in these islands are placing pressure on their survival (Singh and Garge 1993). Studies on socio-economic aspects of island fishermen community are restricted to work carried out by Roy and Doriaraj (1994) in two villages of South Andaman and on fishermen of Andaman Islands by Roy and Doriaraj (1998). Analyzing the socio-economic status of coastal community who interact with these ecosystems very closely is vital in order to understand the pressure exerted on the mangrove ecosystems.

Therefore objectives of the present study were to understand the demographic, economic and social condition of coastal communities of study area. The results of the present investigation can be utilized for establishing strategies for the weaker section of the coastal community and thus can eradicate any harm to the fragile mangrove ecosystems of these serene islands at present and future as well.

MATERIALS AND METHODS

The survey was conducted from October 2012 to September 2013 in eight mangrove habitats along the coastal region of South Andaman district of Andaman and Nicobar Islands (Fig. 1) where fishing operations were carried out regularly. The data for the present study was collected through personal interviews, pre-tested questionnaire (Annexure-I), discussions and observations (Datta and Kunda, 2007; Bhattacharya, 2011; Mohammed, 2012; Rahman Khan *et al.*, 2013; Ali *et al.*, 2014). Door to door visits were made personally to collect the accurate information without any error. The survey was restricted to the population residing within 1 km radius of the Mangrove stretch in the study area. The entire human population within 1km radius in the vicinity of the mangrove stand was taken into consideration since population was less. A total of 120 households were interviewed and analyzed to scrutinize the socio-economic status of the human population in the coastal mangrove habitats of South Andaman. The data was grouped into three categories Demographic, Economic and Social (Rahman Khan *et al.*, 2013).

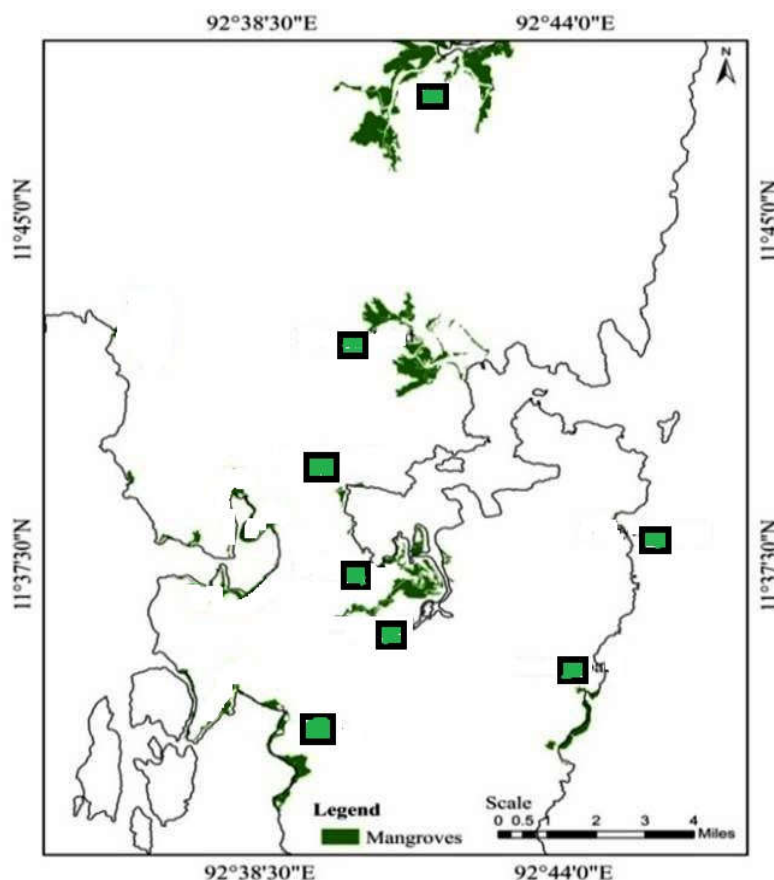


Fig. 1. Study area

1) Demographic

a) Family size (2-3- small, 4-6-Medium, 7-10- large and above 10- very large) and b) Age structure (10-20-Young, 21-40-Middle, 41-60-Old and above 60-Very old) were studied to understand the family structure of the population (Jahangir, 2005; Rahman Khan *et al.*, 2013; Ali *et al.*, 2014).

2) Economic

a) Source of income (private sector, fishing sector, government sector and government sector (retired)) b) Monthly income (Rs 1000-5000/- (low), 5001-10,000/- (medium) and above 10,000/- (high)) c) Crafts (motorized, traditional and No craft) d) Gears (cast nets, hook and lines, Gill nets, Scoop nets, longlines, traps, Crab rods and Crab nets) e) Fishing and Utilization of resources (Two types of fishermen a) Professional fishermen b) Part time fishermen (also includes occasional fishermen) and f) Fishing License were studied to delineate the economic status of the population in the study area (Jahangir, 2005; Rahman Khan *et al.*, 2011 and Ali *et al.*, 2014).

3) Social

The social status of the population was studied by analysing a) Sanitary facility b) Garbage dumping c) Drinking water d) Electricity e) Housing condition f) Religion g) Education h) Place of Origin and i) Settlement category (Rahman Khan *et al.*, 2011). Island Government categorized the settler's into three categories viz. 1) Pre-1942 settlers (a) comprised of freedom fighters who had been transported to these Islands for taking part in the uprising of 1857, b) convicts transported to these Islands for committing serious offences c) Govt. servants, professional and businessmen who came to the Islands and settles here before 1942. 2) Post-1942 settlers (Those who are or whose predecessor were bought to these Islands and settled and settles hereby the Central Govt under various schemes of settlement and rehabilitation) and 3) 10 years settlers (Mainland population settled recently for various reasons) (Andaman and Nicobar administration). The entire data was compiled and analyzed using MS-Excel 2007 (Mohammed, 2012 and Ali *et al.*, 2014) and statistical analysis was performed using SPSS software version 16.

RESULTS

DEMOGRAPHIC

Family size

The family sized during the study period composed of two to twelve members (Table 1).

Most of the families were composed of 4 to 6 members (59%), manifested as medium family, followed by small families composed of 2 to 3 members (28%), very few formed large family composing of 7 to 10 members (12.5%) and negligible number of families (1.2%) composed above 10 members marked as very large family (Table 2).

Age structure

The age of the respondent ranged from 18-85 years during the study (Table 1). Majority (58.8%) were belonged to middle age (21-40 years), 26.2% old, 12.5% very old and 2.5% in the young group (Table 2).

ECONOMIC

Source of income

Part time fishermen were dominated in the population (61.25%) than Professional fishermen (38.75%) and the fishing activity was restricted to males with no involvement of females except contribution in selling activity (Table 3). Income from private sector (50%) was more than other earnings followed by fishing activity (38.75%).

However, few were government employees, of which 6.3% were retired from government jobs and the rest (3.8%) in service.

Monthly income

The monthly income ranged from Rs. 1,000 to above 10,000/-. An income ranging Rs 1,000 to 5,000/- (low level) prevailed among the respondents (57.5%) followed by medium income ranging Rs 5,001 to Rs. 10,000/- (32.5%) and very few (10%) earned high income ranging above Rs. 10,000/- (Table 4). Average monthly income was found to be highest from fishing (Rs. 7200/-) and lowest from government job (Table 3). The government job holders were mainly labour class and work for daily wages, hence the income generated was low.

Crafts and Gears

Eight various kinds of gears were operated in the study area viz. cast nets, hook and lines, Gill nets, Scoop nets, longlines, traps, Crab rods and Crab nets. Most of the respondents possessed only cast net (40%) due to its ease, efficiency and low cost compared to the other gears (Table 4). Moreover cast nets were found in combination with other gears by nearly all the respondents except few, i.e., 8.2% possessed only hook & line and 2.8 % gillnets. Traps, scoop nets and crabs net were obsessed by very few respondents in combination with other gears and were operated rarely. However longlines were a frequently used gear but possessed by very few (2.5%) in combination with other gears. While along with cast nets, hook & lines and crab rod were frequently used gears and possessed by most of the respondents. Two types of crafts viz. Traditional and motorized were observed during the present study. However most of the respondents do not possess crafts (67.8), 18.8% have traditional, 8.8% both traditional and motorized whereas 5% motorized (Table 4).

Fishing and utilization of the resources

Fishing activity in study area was carried mainly for two purpose i) primarily to sell ii) primary for own consumption. 62.5% of the respondents were fishing for own consumption (62.5%) and only 37.5% earn income (Table 4). Eleven different varieties of fishes were preferred by the respondents.

Table 1. Descriptive statistic (Age, family size and income)

Descriptive Statistics	Range	Minimum	Maximum	Mean	Std. Deviation	Variance
	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic
Age in years (Age)	67.00	18.00	85.00	40.6125	1.56469	13.99502
Family size in number	10.00	2.00	12.00	4.7625	.20688	1.85038
Income in Rupees (monthly)	4.90E4	1000.00	50000.00	6.4237E3	7.49659E2	6705.15093

Table 2. Demographic characteristic of respondents

Characteristics	Percentage
Family size	27.50
	58.75
	12.5
	1.25
Age distribution	2.5
	58.75
	26.25
	12.5

Table 3. Average monthly income of responds from various sectors

Source of income	Average monthly income
Private	5973.81/-
Fishing	7200/-
Govt-retired (rtd)	6000/-
Govt	5666.7/-

Table 4. Economic characteristic of respondents

Characteristics	Percentage (%)
Monthly income	57.5
	36.5
	10
Source of income	37.5
	52.5
	6.25
	3.75
Craft	18.8
	5.0
	67.5
	8.8
Gear	40.0
	1.2
	8.8
	2.5
	6.2
	20.0
	2.5
	1.2
	1.2
	10.0
	1.2
	2.5
	1.2
	1.2
Use of mangrove region as fishing ground	67.5
	20
	12.5
Purpose of fishing	37.5
	62.5
Fishermen type	37.5
	62.5
Rainy season is the best fishing season	72.5
	25
	1.25
	1.25
Low tide is the best fishing time	60
	12.5
	21.25
	6.25
Fish preferred	40
	3.8
	2.5
	3.8
	1.2
	12.5
	6.2
	12.5
	6.2
	2.5
Fishing license	8.8
	26.25
	70
	3.75

Table 5. Social characteristic of respondents

Characteristics		Percentage (%)
Use of mangrove regions for sanitation	Very often	11.25
	Often	21.25
	Rarely	67.5
Use of mangrove regions for waste dumping	Very often	5
	Often	8.75
	Sometimes	36.25
	Rarely	50
Drinking water	Govt supply	87.5
	Hand pump	5
	Well	7.5
Electricity	YES	97.5
	NO	2.5
House condition	Concrete	7.5
	Concrete with asbestos roof	48.75
	Tin sheet	3.75
	Bamboo	40
Religion	Hindu	87.5
	Christian	11.25
	Muslim	1.25
Education	Illiterate	16.25
	Primary (I to V)	22.5
	Secondary (VI to X)	48.75
	Higher Secondary (X & XII)	12.5
Place of origin	West Bengal	55
	Andhra Pradesh	7.5
	Orissa	2.5
	Uttar Pradesh	13.75
	Ranchi	16.25
	Kerala	1.25
	Bihar	1.25
	Tamil Nadu	2.5
Settlement category	Pre-1942	63.75
	Post-1942	32.5
	10 years	3.75

Table 6. Statistical analysis (Correlation between fishermen type and source of income)

			Fishermen type	Source of income of respondent
Spearman's rho	Fishermen type	Correlation Coefficient	1.000	.891**
		Sig. (2-tailed)	.	.000
		N	80	80
	Source of income of respondent	Correlation Coefficient	.891**	1.000
		Sig. (2-tailed)	.000	.
		N	80	80

** Correlation is significant at the 0.01 level (2-tailed).

Table 7. Statistical analysis (Correlation between age and family size)

		Age in years (Age)	Family size in number
Age in years (Age)	Pearson Correlation	1	.227*
	Sig. (2-tailed)		.043
	N	80	80
Family size in number	Pearson Correlation	.227*	1
	Sig. (2-tailed)	.043	
	N	80	80

* Correlation is significant at the 0.05 level (2-tailed).

Mullets were the most preferred (40%), followed by trevally (12.5%), prawns (12.5%) and (8.8%) snappers (Table 4). Fishery was utilized and marketed fresh, other means such as drying, salting or smoking were not practiced. 67.5% of the respondents utilized mangrove regions as fishing ground very often, 20% sometime and 12.5% rarely (Table 4).

Fishing License

Even though the government help was provided to the respondents with valid fishing license, fishing without a valid fishing license (70%) was a common feature in the mangrove areas, while few (26.25%) with license and 3.75% applied for license (Table 4).

Government help included supply of fishing equipments in discount, replacement of damaged fishing equipments by means of natural disaster. However some respondents with valid fishing license purchase fishing equipments from local market instead of government supply due to the difficulty and extra expenditure in transportation.

SOCIAL

Sanitary Facilities

Sanitary awareness of the respondents were found to be higher during the present study and was evident from the fact that most of them used own toilets (67.5%) and rarely or hardly ever use these regions for this purpose. However the rest of the respondents were found utilizing these regions as toilets (11.25% very often and 21.25% often) (Table 5).

Garbage disposal

In addition to fishing and sanitation mangrove regions were also utilized for garbage dumping. 50% of the respondents rarely utilized mangrove regions for dumping garbage while 36.25 % of the respondents dumped waste materials sometimes, 5% very often and 8.75% often (Table 5).

Drinking water facilities

Drinking water facility was found to be better in the study area. Most of the respondents were facilitated with government water supply (87.5%), 7.5% depend on wells and rest 5% on bore well (Table 5)

Electricity Facilities

In the study area electricity facility was found to be proper with majority 97.5% of the households supplied electricity and very few (2.5%) without (Table 5).

Housing condition

The housing condition reflects the capability of a person, better the living standard better will be the buildup of house. In the present study four categories of houses were found viz. concrete, concrete with asbestoses roof, tin sheet and bamboo (Table 5). The results indicated that 48.75% of houses constructed of concrete with asbestos roof, 40% of bamboo, 7.5% concrete and 3.75% tin sheets.

Religion

Hindus represented about 87.5% of the respondents, 11.25% were Christians and (1.25%) negligible were Muslims (Table 5).

Educational status

Education is one of the essential means to improves the living standard of person furthermore it equips one with commonsense and wisdom to mingle in the society. 48.75 % of the respondents have acquired secondary education, 22.5%

primary, 12.5% higher secondary and 16.25% were illiterate. All the children were attending school that indicates respondents concern for their education, in order to have better career and improve their living standard (Table 5).

Place of Origin and Settlement category

They study area is an island ecosystem where people from different states of India were settled during different time phase. Thus the place of origin and settlement category is one of the major elements to understand the social status. In the study area respondents were found to have their roots in nine different states, West Bengal (Bengali), Andhra Pradesh, Orissa, Uttar Pradesh, Jharkhand (Ranchi), Kerala, Bihar (Bihari) and Tamil Nadu. The results point out maximum of 55% respondents from West Bengal origin followed by those from Ranchi (16.25%), Uttar Pradesh (13.75%) and Andhra Pradesh (7.5%). Respondents from Orissa (2.5%), Tamil Nadu (1.25%) and Kerala (1.25%) were negligible (Table 5).

In study area respondents were settled during different years and the Islands government categories settlers into three categories as Pre- 1942, Post- 1942 and 10 year settlers. Majority of respondents belonged to Pre- 1942 category (63.75%), followed by Post-1942 (32.5%) and few (3.75%) belonged to 10 year category (Table 5). The results suggest that majority of population inflow in the coastal area of the study area was during Pre- 1942 and less during the recent years.

DISCUSSION

The mangrove habitats are utilized by humans for various purposes and the most important among them is the fishing. In Andaman also, mangrove habitats are mainly used for fishing but in a lesser margin compared to the mainland due to less population in the serene island environment. The Andaman enjoys a combination of various marine habitats such as mangrove, rocky, sandy and coral reef. These habitats together play an important role in an Island ecosystem like Andaman and Nicobar where rich biodiversity occur. A congenial relationship between the human inhabitants and the other fauna and flora is very much required for better conservation and utilization of the resources. The present study has also shown that the inhabitants in the coastal area within the mangrove stretches are keeping relationship with the habitat in many ways including fishing. Fishing activity was carried out on part-time basis in the South Andaman mangroves regions which gave very little pressure on the ecosystem. Majority of the part time fishermen were private job holders compared to government sector because the government job holders couldn't find much time and also they earn a good income than the private job holders. Whereas the private job holders earn less income and mostly have flexibility of timings in their job, hence they venture for fishing as a part-time job. This was supported by a strong positive correlation between fishermen type and source of income ($r=0.89$) (Table 6). Positive correlation revealed that Part time fishermen were mostly from private sector than the other sector.

Ali et al. (2014) reported majority of fishermen of Lohalia River, Bangladesh as illiterate and dominance of 21-40 age

groups. A similar observation of 21-40 age group dominance was reported from the present however majority acquired basic education. Mohammed (2012) also found a high percentage of literacy among the fishermen of Khartoum state of Sudan. It was interesting to note that very few respondents were willing to see their children as fishermen in rare circumstance of unemployment and hence was sending their children school for better future. Similarly Rahman Khan *et al.* (2013) also found most of the fishermen children attend schools in fishing community of Tista River, Bangladesh. Roy and Dorairaj (1994) in their study on socio-economic of fishermen stated 4-6 members and 3001-4001/- as the average family size and income. Bhattacharya, (2011) found 6-7 member as average family size, domination of temporary huts and fishing activity was carried out by both male and female in fishermen community. Present study found domination of family size of 4-6 members, 1000-5000/- income and fishery activity carried out by male only. Further results of the correlation analysis of age and family size revealed positively correlation ($r=0.227$) (Table 7). As a result of such positive relation it is clear that in study area older respondents were having large family size, thus states younger generation are aware of family size in order to look after the family properly. Utilization of mangrove regions as fishing ground was reasonable however use of such fragile ecosystem as sanitation ground and for dumping waste was alarming during the study period. Ali *et al.* (2014) found most of the toilets in Bangladesh as improper due to the lack of government help. Bhattacharya (2011) reported poor sanitation in fishermen community of Sundarbans, West Bengal. Cast net was found most suitable gear in the study area due to its ease and efficiency compared to the other gears. Crafts were not owned by most of the respondents and hence craft seems not to have much importance in the study area. Since the entangled mass of mangrove pneumatophores cause difficulty in boat riding, however traditional boat without a motor was used by some and motorized by very few. Government help was extended to the respondents with valid license however few were not utilizing help due to transportation problem. Mulletts were the most preferred fish in the study area it could be due to the domination of Bengali population who generally prefer brackish water fish than marine. Most of the respondents strongly agreed rainy season as the best fishing season. This was an agreement with Hogueane *et al.* (2012) stating that rainfall, in the coastal basin, can increase the productivity of the coastal waters, and hence the coastal fisheries.

Conclusion

The results of the study revealed socio-economic condition and utilization of mangrove regions by the coastal population in the study area. It is suggested that the government authorities and other agencies have to focus on educating the people on essential elements of society such as hygiene, basic education, health, importance of fishing license and mostly on the role and importance of mangrove ecosystem.

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Annexure I

Date: - _____ Time: - _____

Details of the respondent

1. Name:- _____
2. Age:- _____
3. Sex:-Male/Female
4. Religion:-Hindu/Christian/Muslim/Others
5. Education:-Illiterate/Primary/Secondary/ Higher Secondary
6. No. of people in Family: ___ Men: ___ Women: ___ Kids: Boys ___ /Girls ___
7. No. of people involved in fishing: Active/Passive
8. Type of fisherman: Part-time fishermen/Professional fishermen
9. Occupation:- Fishing/ Govt/ Govt Rtd/ Private/ Others
10. Monthly Income: _____
11. Use of mangrove regions for sanitation :- very often, often, sometimes, rarely
12. Toilet Available: Yes/no
13. Source of drinking water: Govt supply, well, hand pump, others
14. Type of house: Concrete/ Concrete with asbestos roof/ wooden or Bamboo hut /Other
15. Electricity connection : Yes/No
16. State of origin: Andhra/Tamil Nadu/Kerala/ West Bengal/Ranchi/Up/Bihar/other _____
17. Settlement Year:Pre-1942/ Post-1942/10years
18. Willing to chose fishing as profession for their children: Yes/No _____
19. Schooling for kids: Yes/No
20. Use of mangrove regions as fishing ground: very often/ often/ sometimes/rarely
21. Crafts used: Traditional/ Motorized/ Traditional and motorized/no craft
22. Gears: Cast net/Gill net/ Hook and line/ Scoop net/crab rod/crab net/Trap/other
23. Fish Utilization: Fresh/salted /Dried/Smoked/Pickled
24. Purpose for Fishing: Sell/Own consumption/Bait/Recreation
25. Most preferred fish Local name: _____
26. Rainfall is the best fishing season: strongly agree/ agree/ neither agree nor disagree/ strongly disagree
27. Low tide is the best fishing time: : strongly agree/ agree/ neither agree nor disagree/ strongly disagree
28. Any govt or other agencies help is available: No/Yes
29. Availability of fishing license
30. Any extra remark: _____
