

## A Decade of Community-based Socioeconomic Monitoring in Lakshadweep, India 2001-2011

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**Abstract.** This paper draws on socioeconomic assessments and monitoring carried out at Agatti Island, Lakshadweep India in 2011 and compares it with monitoring carried out in 2001 as well as observations from 1990. The paper synthesizes data to quantify and qualify human dependence on coral reefs in small islands and identify whether this dependence is sustainable in the long term. Data has been collected using a combination of participatory appraisal methods, interviews and surveys of 360 households and 200 individuals. Agatti Islanders are extremely dependent on coral reefs and associated resources for their livelihoods. 90% of the households report that reef gleaning, recreational and subsistence fishing provides a source of income or food. Tourism on Agatti Island grew dramatically from 1988-2010. Data collected in 2011 reveal that outside influences, including those from tourism, increased commercialism of the fishing sector, and globalization are leading to significant changes in cultural norms of Agatti Islanders. Data show evidence of a break down in the traditional matrilineal society. Longlines are used to catch shark and other large reef fish and refrigeration has been introduced, allowing expansion of the fishing sector. The divide between the rich and poor is growing. 94% of Agatti Islanders have not completed high school, resulting in low resilience amongst the poor to diversify their livelihood opportunities. These trends create challenges and reiterate the need for socioeconomic monitoring to inform adaptive management. There is a strong need to develop policies for management of fisheries, sanitation, waste disposal and drinking water. Given the low level of support for MPAs among Islanders, innovative policies and associated support will need to be generated in order to ensure the long-term viability of Agatti Islanders.

**Key words:** socioeconomic assessment, monitoring, management, livelihood, natural resource dependence

### Introduction

Agatti Island is the westernmost island in the Indian Union Territory of Lakshadweep, located at 10° 51'N and 72°E (Dept of Planning and Statistics, 2000). The island has an area of 2.7 km<sup>2</sup>, and is surrounded by 12km<sup>2</sup> of lagoon and 14.4 km<sup>2</sup> of reef bar (Bahuguna and Nayak, 1994) lying in a roughly north to south direction. The local population of 7560 (Census of India, 2011) resides in the northern section of the island (see also Hoon et al., 2002 and Hoon et al., 2012). The traditional fishing and land rights of Agatti Islanders also include the Bangaram lagoon which encompasses the small uninhabited islands of Bangaram, Tinnakara, the Parellis, as well as the sunken reef of Perumal Par (Figure1).

Previous studies conducted on Agatti have described the island and its territories in terms of demography and socioeconomic status of the Islanders, as well as the Islanders' use of the coral reef resources and fishing methods (Department of Fisheries, 1990; Hoon and Seshadri, 1990; Hoon et al., 2002; Hoon, 2003; Hoon et al. 2005; Hoon and Tamelander, 2005). The Islanders remain highly dependent on natural resources. Trends are noted in relation to status of women, household occupations, sources of income and pattern of employment, dependence on and perceptions of natural resources, status of women, and perceptions towards conservation and marine protected areas (MPAs).

### Material and Methods

This paper is based on observations and data collected during three studies in Lakshadweep, each

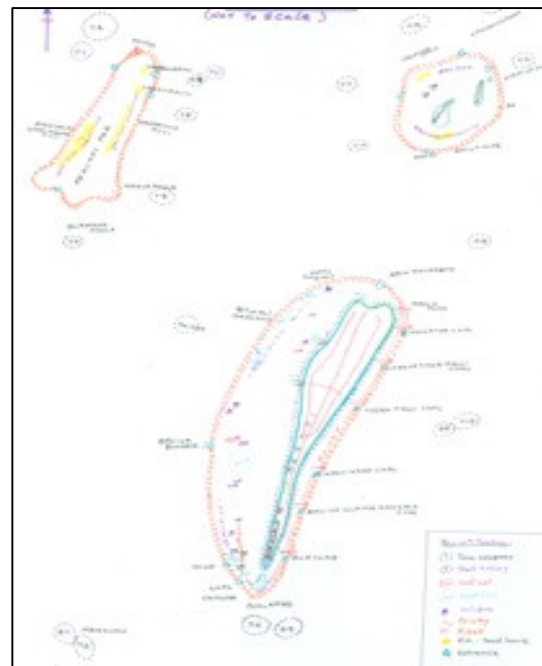


Figure 1. Agatti Island and its Territories

of which focused on Agatti Island (Hoon and Seshadri, 1990; Hoon et al., 2002; Hoon and Babu, 2012). Data were collected using a combination of participatory appraisal methods, interviews, focus group discussions, visualization, and household surveys as described in Bunce et al. (2000) and Hoon et al. (2008). A household survey consisting of a 30% random sample (n=360) was conducted in 2011 to quantify household patterns of employment, sources of income, and dependence on reef resources. An opinion survey was also conducted with 200 individuals to explore perceptions of and attitudes toward MPAs and environmental legislation. Additional interviews were conducted with stakeholders interested in tourism to understand the issues related to tourism. Interviews with fishing stakeholders were conducted to understand the issues related to fishing and to understand what changes have occurred in the past ten years. This data was compared with the data gathered during the 2001 socioeconomic monitoring study and observations made in 1990, to describe the changes taking place in Agatti Island over the past two decades.

## Results and discussion

### *Changing Status of Women and the Joint Family*

The Lakshadweep islands are famous for their *Marumukkathayam* (matrilineal) system where land and property was passed down the female line. Women enjoyed a special status being the land and property owners. Extended families lived together in joint families called *Tharawads*. Men came to live in their wife's house after marriage and were entitled to only a bed in the house (Mannandiar, 1977; Hoon and Seshadri, 1990). This is now changing. Men now use the Muslim *shariat* law to inherit property from their parents.

As recently as 1990, matriarchal joint families were the rule, with women serving as the head of the household (Hoon and Seshadri, 1990). The 2001 socioeconomic assessment noted that the *Tharawad* joint family system was on the decline. 74 percent of the households reported that they lived in houses belonging to their mother (Hoon et al., 2002). This decline has continued in 2011, with only 68% of the households surveyed reporting that they live in houses belonging to their mother. The rest report that they live in a house built by their father, on land inherited from either parent. Nuclear families are growing and there is a boom in house construction (from 870 houses in 2001 to 1200 in 2011, while population rose only about five percent). As the joint families break into nuclear families, the number of

households (and therefore houses) has been growing much more quickly than population. 81% of the respondents cited a male as the head of the family (Hoon and Babu, 2012). This is likely due to the growing influence of mainland India's patriarchal culture influencing Agatti Islanders. Interviews and surveys reveal that males are now considered the decision makers and bring a cash income to the house.

In 1990, women played an important role in post-harvest activities such as processing of tuna and other fish species. Generally, fishermen would bring their share of the catch home and women would help in processing (Hoon and Seshadri, 1990). During the 2002 survey, it was noted that fishermen working in nine-person teams were extending their work to include tuna post-harvest processing also and women were no longer involved. This trend has continued and the survey team in 2011 noted that women are rarely self-employed and play a less significant role in the economic sphere of Island life than in the past. The two main types of work now available to women are domestic work and government office jobs. This is not due to a lack of education or literacy (literacy is 92% according to the 2011 Census of India). The government and private sector are starting to take action to reverse the decline of self-employment by women. The women and child welfare departments and banks encourage women to form self-help groups and start independent income generating activities.

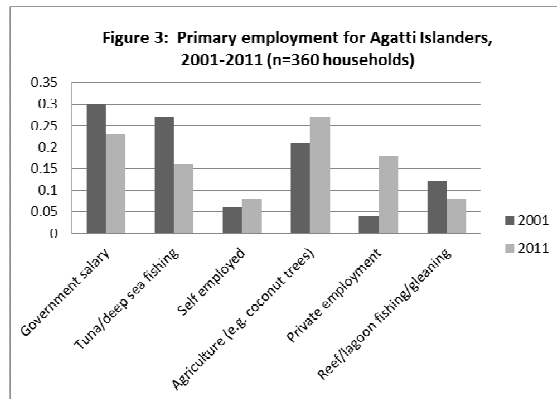
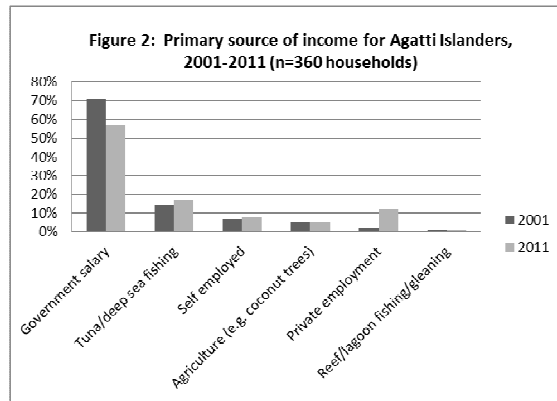
It was also noted that most women now wear a *pardha* (a black robe that covers them from head to foot) when they leave their homes. This trend started in late 1990s and women did not wear a *pardha* in the 1980s (Hoon and Seshadri, 1990).

### *Sources of Income and Pattern of Employment*

The household survey conducted in 2011 shows the current pattern of primary employment of the economically active population and this was compared to the household survey conducted in 2001. **Figure 2** shows the sources of income in 2001 and 2011 and **Figure 3** show the pattern of primary employment amongst the economically active population employment of Agatti in 2001 and 2011. These figures were derived from the 30% household survey data.

The pattern of employment takes into consideration the number of people involved in a certain occupation to derive the household source of income. The traditional sources of income continue to be fishing and coconut cultivation and allied industries. Fish caught from recreation fishing is also

taken into account while calculating annual household income, since it accounts for goods and services received from the marine ecosystem.



As can be seen from both sets of figures for 2001 and 2011, the sources of income are from deep sea fishing, lagoon and reef fishing, coconut trees (agriculture), government jobs, own businesses and private employment in grocery shops, motor cycle repair, tea shops, tourist resorts, Madrassa and contract labour.

The government jobs continue to be the most lucrative income providers. 23 percent of the economically active population generates 57 percent of the annual income of the island. The corresponding figures were 30% and 71% in 2001.

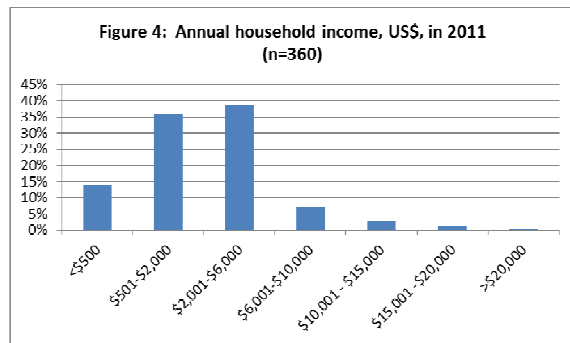
This is followed by tuna and deep sea fishing and self-employment. 16 percent as opposed to 27 percent in 2001 of the households have at least one person employed in tuna and deep sea fishing, which generates 17 percent of the total island income as against 14% in 2001.

Eight percent are self-employed (e.g fish trade agents, cargo, construction contractors, grocery

shops, dive centre, repair workshops) They generate 8% of the annual income. Salaried employment in the shops, tourist resorts or working as contract labour are also sources of income. Eight percent of the households report lagoon fishing or shingle, mollusks, octopus and cowry collection as their main occupation and depend on the reef/lagoon for their annual income; these fishers generate one percent of the total island income. Apart from the artisanal fishery and bait fishing for the tuna fishery, 97% of the households tend to supplement the main source of income with recreational or subsistence reef related activities such as netting, line fishing, cowry and shingle collection as described in Hoon et al., 2002; Tamelander and Hoon, 2008). 80% of the households rear 2-3 goats and chickens as a dietary supplement. 87% of the households are able to fulfill their household needs for coconut oil and coconut for food. Historically, most income came from coconut plantations and the products derived from the coconut tree – copra and coir. Although income derived from coconut trees is now marginal, every islander strives to own a few coconut trees as they are still considered prestigious to own.

*Distribution of Income and poverty*

Figure 4 shows the income distribution across households in Agatti. Every family in Agatti has multiple sources of income. A typical mix is one person has a salaried job, does a business on the side, does some fishing and generates some income from coconuts. If we divide the total income earned by the total population and number of households, we get an annual per capita income of US\$560. This translates to around \$1.50/day, slightly higher than the World Bank's poverty threshold of \$1.25 (World Bank, 2008). Per capita has doubled since the socioeconomic assessment conducted in 2002, (Hoon et al., 2002). However, income is not evenly distributed. Two percent of the households reported an annual household income over US\$ 20,000. At the other end of the spectrum, 14% of the total households had an annual income of less than US\$ 500, of which several had an annual household income of less than US\$200. These households are the poorest of the poor. They do not have an economically active adult male to support them and survive on welfare from the government which provides US\$10 month to households below poverty line. Given the breakdown of the matrilineal system, which has traditionally provided a safety net for family members, these poorest households may be even more vulnerable in the future if current trends continue.



Income inequality on Agatti Island is not immediately discernible through traditional observation since all the people appear the same to dress in a similar manner. Nevertheless, it is important to also note that the society here is far from equalitarian. The 2011 survey team noted that the poor are those who are equipped with very few survival skills. They are illiterate or have primary education, hence cannot get gainful employment. They can also be educated unemployed who have no fishing skills. Elderly men and women, divorced women, widows with small children, and the unemployed fall into the most vulnerable group. They survive on government welfare schemes, old age pensions, rations and the good will of neighbors. Around ten percent of Agatti's households fall in this category. (Hoon and Babu, 2012).

#### Tourism

Tourism operations are controlled by the Lakshadweep Administration through SPORTS (a government controlled tourism promotion and marketing society). SPORTS directly runs the operation or leases each resort out to private entrepreneurs. Outsiders are not allowed to buy land in Lakshadweep. The land owned by the Islanders is leased out to the Department of Tourism, who is responsible for providing infrastructure and re-leases it to interested parties through a global tender.

Agatti Islanders were the first to experience international tourism in Lakshadweep. The first international resort was set up at Bangaram in 1988 and included scuba diving facilities. An airstrip was built at Agatti Island for easier access and to help promote tourism. Tourism, which was thriving from 1990 to 2010 (Hoon et al, 2002, 2005), has been in a state of limbo since early 2012. The Bangaram Island operations, which was the success model in Lakshadweep tourism, has not been operational since 2010 and the Agatti resort started in 1996 had to stop operation in January 2012. Both are in a legal battle with the Lakshadweep Administration. A privately

owned resort started in 2011 with 10 rooms is functioning with a legal stay order. This resort received no clearances from the local administration. In 2010 the local administration also encouraged local entrepreneurs to set up home-stay tourism and dive centers. All the initiatives are still waiting to obtain various clearances to make a clean start.

Lakshadweep is administered like a welfare state. Services such as transport, electricity, diesel for boats are heavily subsidized by the government and education and health services are given free of cost to the Islanders. The rights of the Islanders are protected through the Island entry rules, A non-Islander wishing to visit Lakshadweep has to get an entry permit from the Lakshadweep administration.

One issue is that the land owned by Islanders is at a premium and a few better informed and connected Islanders are speculating in land, by either buying or leasing the many small plots owned by several less wealthy Islanders. The land owners want to work independently with the resort leasers and not have SPORTS as the middleman. They are, however, hampered by the entry permit rules. All tourism activities are at a standstill until the Administration can figure out a way forward which will ensure equity to all the stakeholders and not just a few.

#### Perceptions of Marine Protected Areas

The Lakshadweep administration has not designated any MPAs in Lakshadweep as yet; however, all 200 people interviewed in 2011 understood the concept of an MPA. They said that an MPA was a marine area that should be set aside to allow coral reefs and their associated species to regenerate and Islanders should not use this area for fishing or any other extractive use. 100% of the respondents were aware that corals, turtles and giant clams were protected under the law and that collection was a punishable offence. However only 30% of the respondents believed that MPAs would help improve livelihoods of artisanal fishers.

The respondents were divided on the question of whether MPAs can be managed effectively in Lakshadweep. 49% felt positively and 51% felt negatively. When asked about what they perceived as barriers to effective management, 70% perceived lack of awareness about benefits of MPAs and 40% perceived lack of awareness about management of MPAs as a barrier to effective management (Hoon and Babu, 2012), as shown in Table 1. The respondents also noted that the some fishers had made a channel through the area which had been previously proposed as a MPA. They had destroyed a large number of live coral under the pretext of

reopening an old channel for boat traffic and thereby could not be penalised.

<b>Table 1: Perceived barriers to effective management of MPAs</b>	<b>% of respondents (n=200)</b>
Lack of awareness about benefits of MPAs	70%
Lack of awareness about management of MPAs	40%
Lack of will from central government	23%
Lack of will from local authorities	11%
Financial constraints	4%
others	3%

The respondents felt that management effectiveness for all conservation measures could be increased through joint participation of the Islanders with the management authority. They also felt that management was not effective since the enforcement officers were Islanders themselves and hence were unable to give out fair justice.

### Conclusion

The Lakshadweep economy is highly dependent on the goods and services provided by the coral reef ecosystem. There has been little or no management action to manage these resources.

Market forces are now pushing the administration to increase the tourism and fishing capabilities. While international tourism is declining, the demand for scuba tourism is growing from a market within India, as scuba diving has caught the imagination of Indian youth. New fishing gear such as drift nets and longline have been introduced and are being used close to the outer reef. This is a concerning development since the bycatch is often composed of Schedule One species, animals that have been accorded the highest protection under the Wildlife Conservation Act of India (Upadhyaya and Upadhyaya, 2002).

A clear policy that includes conservation efforts and natural resource management that includes local participation is needed to ensure a sustainable economic future for Lakshadweep.

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