



162-13-029 - Conserving giant clams through a community reserve in the Lakshadweep islands

## **Darwin Initiative – Final Report**

# **‘Conserving Giant Clams through a Community Reserve in the Lakshadweep Islands’**

1 April 2005 – 30 April 2008

***Reference # 162-13-029***

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### Darwin project information

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UK Partner Institution(s)	LEAD International
Host Country Partner Institution(s)	Bombay Natural History Society (BNHS)
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Project Leader Name	Dr Simon Lyster
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Report Author(s) and date	<p>Andrea Deri, LEAD International, UK</p> <p>Deepak Apte, Bombay Natural History Society, India            Idrees Babu, Bombay Natural History Society, India            Karamathulla Shahib, Bombay Natural History Society, India</p> <p>24 July 2008</p>

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## Acknowledgement

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An extraordinary group of colleagues and friends helped the project team discuss, expand and implement ideas. Without their attention, time, assistance and commitment this project would not have achieved its outstanding results. See also [Annex 7: Supporters](#).

## 1 Project Background

The aim of the project – ‘*Conserving giant clams through a community reserve in the Lakshadweep islands*’ - was to help set up the a new marine protected area in the Lakshadweep archipelago to

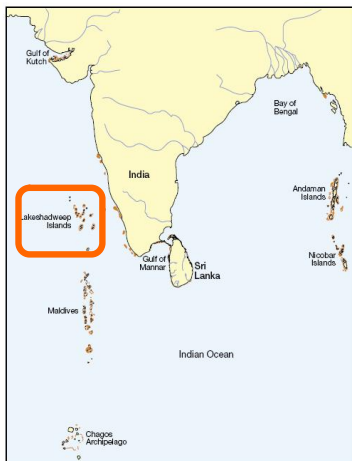
- conserve a globally threatened population of giant clams,
- assist the recovery of a degraded reef and depleted bait fish stocks, and
- enhance the livelihood prospects, in a sustainable way, of traditional fishing communities.

The project is located on the Lakshadweep islands, the smallest of India's seven<sup>1</sup> union territories (*Figure 1*). Agatti is 450 kilometres from the city of Cochin, in the state of Kerala on mainland India (*Figure 2*).

With unanimous support of over 1,940 islanders (55% of the adult population), a new protected area, the ‘Agatti Conservation Reserve’ is proposed in the lagoon of the Agatti atoll (*Figure 3.*) which will be India's first co-managed marine protected area.

**Figure 1: Lakshadweep Islands, India<sup>2</sup>**

8°N - 12°3'N latitude; 71°E- 74°E longitude  
Population: 60,650<sup>3</sup> (2001)



**Figure 2: Agatti is the western most island of Lakshadweep<sup>4</sup>**



<sup>1</sup> Seven union territories includes Delhi <http://goidirectory.nic.in/stateut.htm>

<sup>2</sup> Souter, D., Linden, O. 2005. Coral Reef Degradation in the Indian Ocean. Status Report 2005. CORDIO. IUCN. CIDA. Finland. Pages 68 <http://www.cordio.org/>

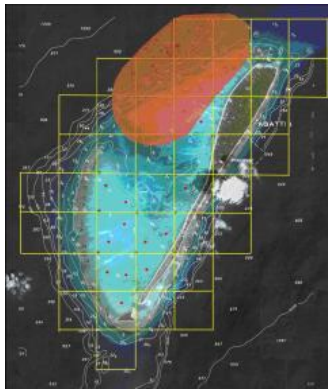
<sup>3</sup> Census of India [http://www.censusindia.gov.in/Tables\\_Published/SCST/dh\\_st\\_Lakshadweep.pdf](http://www.censusindia.gov.in/Tables_Published/SCST/dh_st_Lakshadweep.pdf)

<sup>4</sup> Lakshadweep Official Website / Tourism <http://www.lakshadweeptourism.com/html/IQ200frm.htm>

The Lakshadweep archipelago is the only atoll formation in India, one of the least researched coral reef systems in the Arabian Sea and is severely under protected. Because of Lakshadweep's status as a scheduled tribe region, access to the archipelago is strictly controlled. Permits are compulsory for all outsiders. The entry restrictions are designed to protect the unique culture of the archipelago, where matrilineal Muslim traditions prevail and women have significant status in the community.

**Figure 3: The Agatti atoll<sup>5</sup>**

The proposed protected area marked in red.



#### **Agatti island**

Land area:	2.60 km <sup>2</sup>
Length:	7,576 m
Widest point:	568 m
Average height above sea level:	1.5 m

Population:	7,072 (2001) <sup>6</sup>
Households:	870
Population growth rate (decennial):	23.58% <sup>7</sup>

#### **Agatti lagoon**

Total area:	17.50 km <sup>2</sup>
Proposed marine protected area:	10.00 km <sup>2</sup>

### **Title of the proposed marine protected area**

The title of the proposed marine protected area appears as 'marine community reserve' in the original Darwin Initiative project proposal. A revision is needed to comply with the legal requirements related to conservation areas in India.

According to the Indian Wildlife (Protection) Act, 1997 a protected area that is owned by the Government of India and co-managed by the government and the local community should be treated as and called 'conservation' reserve.

'Community' reserve can only be designated where the local community owns the land and takes full responsibility for the management as well. In Lakshadweep, local residents may own land but all waters are under the jurisdiction of the Government of India (as are all territorial waters).

The proposed protected area in Lakshadweep is therefore called a 'conservation reserve' for the following reasons:

- boundaries encircle 10 km<sup>2</sup> of sea, which is government territory
- the local community is interested, committed to and has the capacity to co-manage the area with the government

The proposed 'Agatti Conservation Reserve', however, is not a marine reserve by the international definition of reserves as it does not have any no-take zones. The proposed 'Agatti Conservation Reserve' allows an islander the extraction of marine resources (e.g. fish, octopus) for subsistence purposes.

<sup>5</sup> Google Earth

<sup>6</sup> Lakshadweep Official Website <http://lakshadweep.nic.in/agatti.html>

<sup>7</sup> Decennial growthrate during 1991-2001; Lakshadweep Official Website <http://lakshadweep.nic.in/agatti.html>

## 2 Project support to the Convention on Biological Diversity (CBD)

The project results, especially the proposed 'Agatti Conservation Reserve', assist the Indian Government in meeting its obligations under the Convention of Biological Diversity, specifically articles 7, 8, 10, 12 and 13 ([Annex 3](#)), with particular emphasis on CBD themes of marine and coastal biodiversity, biodiversity and tourism, sustainable use and biodiversity, and indicators. The majority of the activities (80%) fall under the domain of two articles:

### Article 8. In-situ Conservation (40%)

- Establish (systems of ) protected areas with guidelines for selection and management;
- Promote protection of habitats;
- Restore degraded ecosystems and recovery of threatened species;
- Ensure compatibility between sustainable use of resources and their conservation;
- Protect traditional lifestyles and knowledge on biological resources.

### Article 12. Research and Training (40%)

- Establish programmes for scientific and technical education in identification, conservation and sustainable use of biodiversity components;
- Promote research contributing to the conservation and sustainable use of biological diversity, particularly in developing countries.

The Bombay Natural History Society (BNHS), the host country institution, in collaboration with LEAD International, is planning to set up a network of co-managed marine protected areas in Lakshadweep over the next ten years, based on the project results, skills and research findings. Setting up new marine protected areas (MPAs) and networks of MPAs will help India to meet its obligations under the biodiversity convention (CBD) agreed at the 7<sup>th</sup> Conference of Parties: *'By 2010, terrestrially / and 2012 in the marine area, a global network of comprehensive, representative and effectively managed national and regional protected area system is established ...'*<sup>8</sup>.

The project fulfilled all three CBD objectives:

#### Objective 1: Conservation of biological diversity.

The project:

- Proposed a new marine protected area to conserve giant clams and other coral reef values
- Raised awareness of the importance of conservation in fishing communities
- Developed local capacity to conserve marine biodiversity

#### Objective 2: Sustainable use of the components of biological diversity.

The project:

- Catalysed the development of a new approach to local marine resource management
- Initiated adaptive resource management through the cooperation of various stakeholders including research organisations, resource users and policy makers

#### Objective 3: Equitable sharing of benefits.

The project:

- Strengthened local capacities to improve livelihood options by better marketing and sharing biodiversity benefits.

<sup>8</sup> CBD COP7, 2004, Kuala Lumpur, Goal 1.1. <http://www.biodiv.org/decisions/default.aspx?m=COP-07&id=7765&lg=0>



As giant clams are protected by the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) the project indirectly supported the implementation of CITES.

Giant clams are also listed in the World Conservation Union (IUCN) Invertebrate Red Data Book as conservation dependent and data deficient species, and are protected under Schedule I of the Indian Wildlife (Protection) Act, 1972 and included in the Indian EXIM Policy.

Two of the nine globally known giant clam species are found in Lakshadweep:

- Small giant clam (*Tridacna maxima*)
- Scaly giant clam (*Tridacna squamosa*)

There was no direct consultation with the host country Biodiversity Strategy Office. However, the National Biodiversity Authority of the Government of India is aware of this project, and the host country (Indian) partner is in touch with the authority. The National Biodiversity Authority has provided a recommendation letter for a proposal which was submitted to the Whitley Fund for Nature to continue and replicate this project on other islands and received funding (7.2).

### 3 Project Partnerships

The collaboration between the UK partner (LEAD International) and the local partner (BNHS) and Lakshadweep's community members was excellent and mutually inspiring. The productive partnership has leveraged significant amount of additional resources (7.2) and elevated the project profile progressively over and beyond the life of the project.

As a result, BNHS marine conservation work has a higher profile and is more internationally acknowledged, and BNHS and the local staff in Lakshadweep have established new academic, business and civil society partnerships. (4.1.)

This project could not have achieved its outstanding results without the generous contribution of the many individuals and organisations listed in Annex 7.

The Indian and international partners mentioned in the proposal played important roles in the project:

- Lakshadweep Administration, Department of Science and Technology, Department of Environment and Forests, and the Department of Tourism and SPORTS<sup>9</sup> of the Union Territory of Lakshadweep have played significant role in the project throughout its lifetime by political and various in-kind support.
- India's Ministry of Environment and Forests will be responsible for the declaration of the proposed 'Agatti Conservation Reserve' as soon as it is recommended by the Administrator of Lakshadweep and the Department of Environment and Forest, Union Territory of Lakshadweep. (4.2.)
- WWF-India was expected to be a partner leading on environmental education for school and college students. The partnership has not developed to a functional level. Environmental education materials for teachers and students have been under development by Dr. Arun R. Joshi, M.A., PhD, Member of Board of Higher Education, Maharashtra, Member of Executive Committee of BNHS, Coordinator for National Education for WWF India, Deepak Apte, BNHS and Andrea Deri, LEAD International.
- The Indian Navy and Indian Coast Guard supported the project by providing necessary clearances.

<sup>9</sup> SPORTS: Society for Promotion of Nature Tourism and Sports

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- The Smithsonian Institute, Washington DC, USA and the Natural History Museum, London, UK have helped the Indian principal investigator with taxonomy and peer-review of the giant clam species conservation plan.

The UK project staffs has made an exceptional and successful effort to strengthen the Indian partners' capacity to secure further funds for similar work in Lakshadweep and other parts of India through the following:

#### *Networking*

A wide range of professional and funding agencies and individuals were contacted to explore and establish joint activities, and raise the project profile. LEAD Fellows and the LEAD Network in general provided invaluable support in networking and providing professional advice ([Annex 7](#)).

As a result of LEAD International's successful and extensive networking and capacity development efforts, the Indian partners were able to:

- receive £30,000 funds from a UK donor, the Whitley Fund for Nature to continue conservation, capacity development and research activities in Lakshadweep by replicating the Darwin Initiative project's successful approach to setting up co-managed marine protected areas in Lakshadweep's other lagoons, and to initiate further conservation reserves in Bangaram, Kavaratti and Suheli.
- directly access a wide range of professional and funding agencies
- participate in new future projects (e.g. ICRAN)
- participate in new training opportunities (e.g. Al Gore's climate change training workshop in Delhi)
- participate in new types of leadership training and sustainable community development (e.g. HSBC Future Generation Development Programme)
- co-author and publish project results in international fora (e.g. Reef Encounter, Resilience 2008)
- exchange information on coral reef conservation including education with the following UK partners of Darwin Initiative projects:
  - Coral Cay Conservation Ltd, London, UK
  - Field Studies Council, Shrewsbury, UK
  - Harriott Watt University, Edinburgh, UK
  - Royal Society for the Protection of Birds, Sandy, UK
  - As LEAD International is also the UK partner for a Darwin project on coral reef conservation (162-14-057, Bali, Indonesia<sup>10</sup>) the partners had a unique opportunity of peer-learning.

#### *UK professional development visits*

Two UK study tours were designed in Year 2 and Year 3 to offer the Indian partners with opportunities to establish solid professional rapport with strategic UK and international partners in conservation and sustainable development. These study tours helped the Indian partners to communicate project results e.g. presentation at a Darwin Initiative workshop in October 2006 and at the Cambridge Conservation Forum in July 2007 ([Annex 5: Presentations](#)), and establish relationships for fundraising. As a result of these contacts, the Indian partners were able to access additional funds and a range of opportunities to support the sustainability and legacy of the project. ([4.7.](#))

<sup>10</sup> Conserving Coral Reefs through Community Ownership and Enterprise in Indonesia' <http://www.lead.org/page/139>

## 4 Project Achievements

See [Annex I](#). Report of progress and achievements against final project logical framework for the life of the project.

### 4.1 Impact: achievement of positive impact on biodiversity, sustainable use or equitable sharing of biodiversity benefits

Significant and far-reaching positive changes in human and institutional capacities, attitude, behaviour and governance have been achieved ([4.2](#)) which are the prerequisites of lasting impact in all three areas of interest of the Darwin Initiative (biodiversity improvement, sustainable use of biodiversity and benefit sharing).

As a result of the project, a new biodiversity conservation institution has been initiated, India's first co-managed marine protected area, which provides a new model for sustainable use and fair benefit sharing of biodiversity values through active, informed and direct (versus representative) public participation.

The two year process of planning and setting up the new marine protected area has greatly enhanced the biodiversity management capacities of almost 2,000 stakeholders ([4.2](#)), motivated them to continue learning about sustainable and fair use of biodiversity, and empowered islanders who are designated as scheduled tribes ([1](#)) to develop an equal partnership with the government for co-managing their vulnerable and endangered marine resources. The widely screened documentary film 'Our Islands'<sup>11</sup> (featuring members of the Agatti community and the story of setting up the proposed MPA) and the workshop evaluations offer testimonials about the impact of this project on community members. Here are two examples:

*'We have learned a lot about marine protected areas. Our self-confidence has increased because the training has helped us find our slumbering inner strengths (skills and knowledge).'*

*'Islanders want to learn about the reef, its use and the threats it may face in the future. I feel that with the help of this training I can do a lot of community work and get islanders' support for our lagoon's conservation.'*

The project had unprecedented impact on many project partners. The project has opened up new professional development avenues including fast promotion for several Indian partners. For example:

- The project has considerably strengthened the leadership skills of young islanders ([Annex 7](#)). Two exceptional young leaders who were essential to the project success - Idrees Babu K.K. from Kalpeni and Ameer M.C. (locally known as 'Sameer') from Kavaratti - have been acknowledged as trusted leaders by the community and all project members, stakeholders and visitors. The improved leadership skills of young islanders present a promising opportunity for them to shape Lakshadweep's conservation and sustainable development scenarios (see also 'Impact' in [4.6](#), [4.7](#).)
- The local project team members, staff and volunteers, have gained confidence in managing community-based conservation (and development) projects, which will improve the quality of future conservation projects and strengthen the islands' resilience.
- The large number of volunteers ([Annex 7](#)) indicates that this project is perceived as an attractive initiative which provides participants with a sense of achievement, career development opportunities and great fun. Through their participation in various project activities, islanders have developed a sense of local ownership, evidence that the project is meeting local needs.
- The profile of Agatti's community has been elevated and it has attracted a small grant from HSBC for livelihood development funding ([7.2](#)).

<sup>11</sup> 'Our Islands', Biroba Films, 2007. download from <http://www.lead.org/page/302>

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- The project had immense positive impact on the career of Deepak Apte, the project's principal investigator, who has been promoted during the project to Assistant Director of BNHS. He was appointed as a member of Task Force on Tuna Fishery Development by the Administrator of the Union Territory of Lakshadweep where Deepak Apte contributes to the government's fisheries development initiative with expert advice in close cooperation and consultation with Idrees Babu, Senior Research Fellow, BNHS. Deepak Apte has also been co-opted to the newly formed (22 July 2008) sub-committee on marine species conservation of the Ministry of Environment and Forest, Government of India. The sub-committee identified giant clam as flagship species for the next five years for species recovery and discussed the proposed 'Agatti Conservation Reserve'.

## 4.2 Outcomes: achievement of the project purpose and outcomes

### Project purpose

The purpose of the project was to conserve the globally threatened giant clams and other components of the marine biodiversity through setting up a co-managed marine protected area in Lakshadweep using a participatory approach. The proposed marine protected area was designed to improve the local biodiversity through improving local capacities and the governance of natural resources, and offer a model for replication through

- Restoring the threatened population of giant clams
- Assisting the recovery of depleted fish stocks (especially live bait species)
- Enhancing the livelihood prospects of traditional fishing communities
- Generating lessons learned to replicate the process on other reefs in Lakshadweep

### Outcomes

The project is a real success story. It not only accomplished what it promised, but it also created a solid foundation for sustainability ([4.7](#)).

Outstanding achievements include:

- The 'Agatti Conservation Reserve', a new marine protected area has been proposed by the Agatti Village Panchayat<sup>12</sup> with a commitment to co-managing natural resources. The proposal was officially submitted to the Honorable Administrator of Lakshadweep in January 2008 with the unanimous support of the island community ([Annex 8](#)). The unanimous support from government officials and community members of Agatti island is documented in the reports of community consultations and household surveys and testimonials in the documentary film 'Our Islands'. The 'Agatti Conservation Reserve' proposal is now under consideration of the Administrator of the Union Territory of Lakshadweep who has the authority to recommend the reserve for gazetting by the Indian Government's Ministry of Environment and Forest.
- Local community members feel more empowered and informed to take active role in co-managing - a novel way of management in India - their natural resources as a result of a two year long comprehensive participatory planning process for the proposed 'Agatti Conservation Reserve': 55% of Agatti island's adult population was engaged (1,941 people: 44% men, 56% women; consultation period: April 2006-March 2008)
- Attitude towards biodiversity conservation has changed: Agatti's local community is keen to start voluntary implementation of the recommendations of the 'Agatti Conservation Reserve' management plan while the formal endorsement of the MPA is taking place.
- The Indian partners' access to information and potential funding has significantly increased through the large professional and social network of individuals and organisations that supported the project ([Annex 7](#)).

<sup>12</sup> 'Panchayat' is an elected local government in India; an important decision making body that represents local community interests at the appointed government bodies.

### 4.3 Outputs (and activities)

#### Planned outputs

1. Research: ecological and biological data on giant clams
2. Develop the capacity of local communities to manage the protected area
3. Management plan for the protected area
4. Tourism guidelines for the protected area
5. Dissemination of project results and lessons learned

#### All planned outputs have been delivered

*Research* – Comprehensive research was conducted on giant clams and other components of Lakshadweep's marine biodiversity. This was the first project to study the ecology and biology of giant clams in India. The results will be useful for managers of the protected area in understanding the conservation needs of the giant clams.

Agatti was selected as the site for the co-managed marine protected area as a result of a thorough habitat survey involving 24 islands' coral reefs within 11 lagoons during the first and second year of the project. In the third year, 4 islands from 3 lagoons were monitored for information on trends in the giant clam population. (see details in [4.5](#).)

The foundation for further wide-ranging socio-economic research – almost 100 community consultations and 163 household surveys – has been laid. (see details in [4.6](#).)

*Capacity development* – An innovative and effective capacity development programme involved thousands of adult and young people, all stakeholders, in the co-management of marine resources. The programme developed local capacities at an individual, organisational and institutional level. (see details in [4.6](#).)

The team is particularly proud of the young local leaders – women and men – who emerged, discovering and strengthening their leadership skills during this project. They modelled a new approach to conservation, a key strategy to increase Lakshadweep's resilience to global changes.

*Management plans* – Three management plans were developed to support the management committee of the proposed 'Agatti Conservation Reserve': MPA Management Plan (submitted to the Darwin Initiative in Year 2), Eco-Tourism Guidelines (see Annex 10, separate volume), and Giant Clams Species Conservation Action Plan (see Annex 9, separate volume).

*Training manuals* – Three training manuals were developed to support the implementation of the proposed 'Agatti Conservation Reserve': Eco-Tourism Training Manual, Setting up an MPA in Agatti, and Managing the Proposed MPA in Agatti.

*Dissemination* – A diverse portfolio of products and services are in place to share lessons learned and disseminate project results on other islands of Lakshadweep and beyond: documentary films, an informative project website, training manuals, handouts, posters, postcards, stickers, presentations, data-bases, scientific publications, and TV, radio interviews for the general public. The local project team, in collaboration with committed professionals based in Lakshadweep, Mumbai and London, has also developed a special project report for islanders in Malayalam language. ([5](#).)

#### Challenges

The project did not face any major problems during its three years of support by the Darwin Initiative.

#### 4.4 Project standard measures and publications

See [Annex 4](#) and [Annex 5](#).

#### 4.5 Technical and scientific achievements and co-operation

##### Giant clam research staff<sup>13</sup>

1. Mr. Deepak Apte: Assistant Director and Principal Scientist, BNHS
2. Mr. Idrees Babu: Senior Research Fellow, BNHS
3. Mr. Karamathulla Sahib: Junior Research Fellow, BNHS
4. Mr. Jafer Hisham: Senior Research Fellow, BNHS (April 2005 - December 2006)
5. Ms. Avani Patel: Senior Research Fellow, BNHS (December 2006 - May 2007)
6. Mr. M. Shamsad, Field Assistant (October 2005 – December 2007)
7. Mr. Nasarulla, Field Assistant (October 2005 – June 2007)
8. Mr. Hussain P.A., Field Assistant (October 2006 – March 2008)
9. Mr. Suthirtha Dutta, Consultant (June 2007 – February 2008)

##### Methodology

###### Field surveys

###### Fixed-width line transect for *Tridacna maxima* and *Tridacna squamosa*

- We used fixed width line transects or belt transects of 100m x 10m for counting *Tridacna maxima* and *Tridacna squamosa*. The islands' lagoons were divided into 1 km<sup>2</sup> grid and transects were randomly placed. For each transect, the start and end points were marked with permanent markers, and their GPS locations recorded. This allowed monitoring of the same transects for the three consecutive years from 2005 to 2008.
- Line transects<sup>14</sup> are based on the theory of walking/swimming along a pre-determined route to record the species on or near the line. Once an area has been selected for the population estimate, the next step is to lay transects in randomly selected habitats. As the line transect is based on a strict assumption of a straight line, it is crucial that the marked transect is more or less straight, so that there is no error in estimation of perpendicular distances and sighting of objects. Transects should be well spaced out; distances between two parallel transects should not be less than 200m. Transects can be placed in random and stratified (according to habitat).

###### Point intercept line transect for coral cover

- To assess the benthic communities in the potential giant clam area, the line and point intercept transect method<sup>15</sup> was used. Transects were laid along the substratum, data was collected along the transects where the 0.5 metre points intercepted by benthic components under the line. Data on corals was collected at the genus and live form levels.

###### Data processing

###### Population structure of the giant clam (*Tridacna maxima*) in the Lakshadweep Archipelago

- Inter-island variation in growth rates of *T. maxima* was tested for significance through ANOVA.

<sup>13</sup> Profile of project team members: <http://www.lead.org/page/277>

<sup>14</sup> Field Methods for Bird Surveys Salim Javed & Rahul Kaul, published by Bombay Natural History Society, 2002

<sup>15</sup> English, S., Wilkinson, C., and Baker, V. 1997. Survey Manual for Tropical Marine Resources. Australian Institute of Marine Science, Townsville. 390 pp.



- Variations in age/size structure of the *T. maxima* population in each island from the overall age/size structure, pooled over all islands in Lakshadweep archipelago, was tested for significance by the G-test.
- Giant clam *Tridacna maxima* follows an asymptotic growth curve and tip to tip shell length can be considered as a surrogate of the clam age.
- Individuals were classified into 20 mm interval size classes (<40mm, 40-59mm, 60-79mm...280-299mm, >300mm), and the age/size structure of the population was studied from 165 transects across 24 islands in 2005, 121 transects across 22 islands in 2006, and 55 transects across 4 islands in 2007.
- Proportion of each size class in the giant clam population of every island was averaged over the study years to compare the age/size structures across islands.
- Data was pooled over all islands to obtain the overall age/size structure in the Lakshadweep archipelago.

## Key Findings

The giant clam (*Tridacna maxima*) is a key indicator species in coral reefs due to its selective ecological requirements. Monitoring the population can be used as a tool to monitor changes in the lagoon ecology.

### Distribution

- *T. maxima* primarily occurs in shallow waters in Lakshadweep and is mostly distributed inside the lagoons. The open reef population is very small and occurs only down to 40 metres depth.

### Mantle colour

- Moderate intensity brown pigment is dominant in the *T. maxima* population of Lakshadweep, probably because of its suitability as camouflage in the ambient habitat. Other primary and accessory colours varied across islands and to some extent with age and water depth.

### Habitat

- *T. maxima* prefers live coral substrate with dead coral tops as an ideal anchor site. Our research revealed an exclusive use of *Porites lutea* (>80% relative use). *Porites* flats are the most favoured sites for the recruitment of juveniles.
- Habitat use vs availability: 64% of the samples fell into the low density class (90-100/ha), 22% into the medium density class (100-200/ha) and only 14% into the high density class (>300/ha). The bulk of the habitat available for the species is sub-optimal, and optimal habitats are scarce.
- The giant clam *T. maxima* prefers the dead flat tops (with live coral on all sides) and to lesser extent the walls of the coral *Porites lutea* within a narrow range of water depth (0.2 - 0.8m) in the lagoon. Such specific habitat requirements leave very little potential space (~3% crude estimation) for the species in the lagoon.
- *T. maxima* are niche selective species. This species is specialized to a narrow range of reef canopy with ~90% of the population utilizing a range of 0.2–0.6 m from the sea floor.

### Density

- *T. maxima* occur in low densities in Lakshadweep. Agatti has the highest density: 227.84 clams/ha in 2005, declining to 188.40 clams/ha in 2007. Amini has the lowest density: 20.84 clams/ha in 2005, declining to 13.66 clams/ha in 2007.
- The overall density of recruits during 2005–07 was 11.97/ha (95%CI 8.05-17.79). Survival rate of recruits in the first year obtained by bootstrapping was 62%. Recruitment was highly correlated ( $r=0.8$ ,  $p<0.001$ ) with herbivory measured as indices of herbivorous fish abundance.

### Size/age distribution

- The size class distribution, a surrogate of the age distribution of the species, is a bell-shaped curve with medium-sized individuals dominating the population.
- The population structure was skewed from normal distribution towards greater size classes, probably due to the rapid growth of juveniles (<160mm) and extremely slow growth of adults (>200mm) leading to higher proportions of mid-sizes.

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- Age/size distribution varied considerably across islands with Bangaram, Tinakkara, Minicoy and Amini (but not Agatti, Bitra, Chetlat, Kadmat, Kalpeni, Kavaratti, Kiltan and Suheli) showing age/size structure similar to the typical population.

#### *Unusually large individuals: new species?*

- The large individuals of the *T. maxima* or *T. squamosa* population is an interesting finding of the present study. Large clams are not uncommon, especially at Cheriyam, Bangaram, Bitra and Suheli. Genetic studies will reveal the species identity.

#### *Growth*

- *T. maxima* in the Lakshadweep archipelago grows at a slow annual rate of 8–11 mm in the juvenile stage; growth becomes slower and stochastic with age.
- *T. maxima* juveniles showed an annual growth of 10–12mm per year. The growth rate reduces significantly post sub-adult stage.

#### *Role of herbivory*

- Convict surgeonfish (*Acanthurus triostegus*), the single most dominant browser inside the lagoon, plays an important role in maintaining the microhabitat for new giant clam recruits, which is the most crucial part of the life cycle of *T. maxima*.

#### *Embedment*

- Deeper embedment is crucial for the survival of adults, especially in light of high wave surge during the monsoon.

#### *Threats*

- *T. maxima* are highly vulnerable to rises in sea temperature during events like El Niño. This is primarily due to the presence of zooxanthellae inside the body of *T. maxima*.
- *T. maxima* are regularly consumed in Amini, Chetlat, Kiltan and Bitra islands. There is no evidence to suggest it is currently consumed on other islands.

#### *Ecology*

- Being boring clams, *T. maxima* plays important role as bioeroders in lagoon ecology.
- Giant clams play a crucial role in lagoon ecology by releasing zooxanthellae packed faeces, thus releasing large amount of organic matter into the lagoon water.
- *Cymatium pileare*, *Cymatium muricinum* and *Vexillum plicaria* are predators of *T. maxima* in Lakshadweep.

#### *Mortality & recruitment*

- Mortality in juveniles has a large influence on the population. The mortality rate of the giant clam *T. maxima* between 2005 & 2006 was 0.16. Anchorage failure contributed 15% to the overall mortality.
- *T. maxima* are a low recruit species. Recruitment is seen mostly near lagoon entrances, suggesting that the clams require strong currents.
- *Tridacna maxima* showed a mortality rate of 0.189 ( $\pm 0.069$ ) and a slow recruitment rate of 0.012 ( $\pm 0.005$ ) resulting in a negative intrinsic growth rate.
- *T. maxima* recruitment is adult density dependent and needs around 60 to 100 adult clams per hectare for successful recruitment.

#### *Status*

- The *T. maxima* population in Lakshadweep can be considered to be in a critical state due to its low recruitment, high mortality, low adult density and niche selectivity.
- The population models for Kavaratti and Agatti predict a decline of 35% over the next 10 years. The Bangaram and Tinnakara populations are, however, comparatively stable.

#### **Peer-review**

- A comprehensive 'Species Conservation Action Plan' is under peer review by Dr. Jerry Harasewych, Curator, Division of Mollusca, Smithsonian Institute, USA. This document includes comprehensive studies on ecology, population dynamics and conservation of the giant clam *Tridacna maxima* (Roding, 1798) in the Lakshadweep archipelago (*Annex 9.: separate volume*)



## 4.6 Capacity building

### **Capacity development staff<sup>16</sup>**

1. Ms. Andrea Deri, Senior Consultant, Capacity Development, LEAD International
2. Mr. Deepak Apte, Assistant Director, BNHS
3. Mr. Idrees Babu: Senior Research Fellow, BNHS
4. Mr. Karamathulla Shahib: Junior Research Fellow, BNHS
5. Mr. Jafer Hisham: Senior Research Fellow, BNHS (April 2005 - December 2006)
6. Ms. Anitha Sharma, Consultant, India (December 2006-April 2007)
7. Ms. Haseena: Community Facilitator
8. Ms. Tajunnisa: Community Facilitator
9. Ms. Hajera: Community Facilitator
10. Ms. Sabeena: Community Facilitator
11. Mr. Salahuddin: Community Facilitator
12. Mr. Shooker: Community Facilitator
13. Mr. Ayooob: Community Facilitator
14. Mr. Anwar Sadique P. K. : Community Facilitator

### **Design**

Capacity development was a central component of this project. It was designed with the following objectives and principles, and implemented through a wide range of activities:

#### Objectives

- Strengthen local capacities to design and adopt management practices that are effective for both conservation and sustainable use of biodiversity in Lakshadweep
- Develop local leadership to sustain, further and replicate develop project results

#### Principles

- Offering mutual learning opportunities versus ‘one-way skill and knowledge transfer’
- Utilizing all forms of learning: formal, non-formal, informal
- Catering for various learning style preferences
- Integrating all types of knowledge systems (including local or ‘indigenous’ and scientific)
- Providing multiple perspectives to the issues at hand

#### Activities

- Capacity development activities took place through a wide range of activities according to the learning objectives and principles above (*Figure 4*).
- The training workshops introduced participants to active learning. This was a new experience for most them, as only conventional ‘frontal’ teaching method is used at the schools and professional development courses in Lakshadweep. Active learning included experiential learning, cooperative learning, field studies, computer assisted simulations, story telling, media and drama education.

#### Geographic focus

- Year 1: Exploratory phase, capacity development was offered on several islands.
- Year 2 & 3: Having selected Agatti as the site for the first co-managed conservation reserve, capacity development activities focussed on Agatti.

<sup>16</sup> Profile of project team members: <http://www.lead.org/page/277>

**Figure 4: Capacity development activities**

Activity	Venue	Implemented by	Participants
Training workshops including 'training of trainers'	Agatti, Kavaratti, Kadmat, Bangaram	LEAD International	65 islanders
Joint problem solving exercise with international expert team (HSBC: Next Generation Programme <sup>17</sup> )	Agatti	LEAD International BNHS, HSBC, Future Considerations <sup>18</sup>	100 islanders
Certified training course on SCUBA diving	Kavaratti, Agatti	Dolphin Dive Centre, Kavaratti	2 islanders and the Indian project manager
Training on field survey methods: ecological monitoring and research	Kavaratti, Agatti, Minicoy, Kiltan, Chetlat, Amini, Kadmat, Kalpeni, Bitra	BNHS	80 islanders
Documentary film making: 'Learn as you go'	Agatti, Kavaratti	Biroba Films	15 islanders
Informal awareness raising programmes	All 11 inhabited islands	Local project staff*	2,000 islanders
Study tours	UK	LEAD International	2 BNHS local staff members Indian project manager
International scientific conferences (see details in <a href="#">Annex 5: Presentations</a> )	Australia, Belgium,  Sweden	BNHS  LEAD International	BNHS local staff member and project manager  LEAD International staff member
Community meetings, consultations, awareness programmes	Agatti	Local community facilitators* Indian consultant	1,800 islanders
Household surveys	Agatti	Local community facilitators* Indian consultant	163 islanders
Film shows	Agatti, Bitra, Kavaratti	Local project staff*	2,000 islanders
Painting competitions	Kavaratti, Agatti	Local project staff*	200 children
Mentoring through regular phone & e-mail communication		LEAD International BNHS	Project staff

\* employed by BNHS

<sup>17</sup> <http://www.leadindia.org/pdf/hsbcchallenges.pdf>

<sup>18</sup> <http://www.futureconsiderations.com/what-we-do.html>

## Selection criteria

The project's local staff members (islanders) participated in all capacity development activities.

Training workshop participants were selected on their ability and commitment to share their learning experience with fellow islanders. The local project staff invited the training workshop participants.

Community facilitators<sup>19</sup>, members of the Agatti island community, were selected to form two teams – a team of women and a team of men, which were both required to:

- represent the village wards of Agatti
- represent key community stakeholders
- communicate effectively with community members
- work with dedication to set up and manage the MPA
- attend a series of training workshops in 2007 and 2008
- engage community members in planning for the MPA
- document community members' ideas and questions about the proposed MPA

## Content

### General

A wide range of general biodiversity, conservation, resource management, sustainable development, climate change, environmental interpretation and cross-cultural communication topics was covered by the three training workshops under the following titles:

- Eco-tourism in Coral Reefs, 3–29 December 2005, Kavaratti, Kadmat, Agatti
- Marine Protected Area establishment, 21 February–13 March 2007, Agatti
- Marine Protected Area management, 2–10 March 2008, Agatti

### Specific

The status of Agatti's environment and society was addressed through our own local research, i.e. the results of the giant clam research (4.5.) and findings of the community consultations and household surveys on socio-economic issues.

### Key findings of the community consultations and household surveys

#### Social sciences in conservation

- The results of household surveys and community consultations made the local project team realise the importance of social sciences in conservation; treating social ('soft') sciences as equal with ecology and other ('hard') life sciences.
- Participants realised that biodiversity conservation and natural resource management need to go beyond ecology and conservation biology; success means understanding and managing human relationships, and their interest in using natural resources.

#### Threats to the lagoon

- Solid waste pollution, including plastic, was mentioned as the main threat to the Agatti reef.
- Increased turtle population, loss of sea grass, weather (climate) change, coral mining and sand collection, reduced numbers of lagoon fish and cowry, overharvesting of reef resources, changes in sea currents, reduced depth of the lagoon and pollution coming from boats were also mentioned.

<sup>19</sup> Profile of community facilitators in Agatti: <http://www.lead.org/page/271>

#### Protection of the lagoon

- Solid waste management was seen as the most important, highest priority action to protect the Agatti lagoon. Solid waste management requires government and/or private investment.
- Awareness raising programmes, cooperation, stopping coral shingle collection (for construction) and conservation measures were also listed. The importance of learning and cooperation illustrate the island community's values and traditions which provide a supportive context for community-based conservation.

#### Threats to livelihood

- Decreasing marine resources were perceived as the main threat to the islanders' livelihood. This is a clear indication that the islanders' livelihood still directly depends on their immediate natural resource base. Unemployment, big storms (climate change), direct human damage to the reef, increased turtle population, increased human population and mainland fishing boats were also mentioned.
- Agatti fishermen do not welcome the increasing turtle population, as turtles become entangled in and destroy their fishing nets. Agatti's increased turtle population is not yet understood. Research by Wildlife Institute of India is in progress.

#### Livelihood improvement

- In spite of being a traditional fishing community, islanders in Agatti were open to improving their livelihoods by participating in businesses other than fishing. It may imply a high level of entrepreneurship, willingness to explore 'uncharted territories', taking risk and the islanders' response to the depletion of marine resources. Islanders are quick to adapt, in this case by looking for alternative livelihood options.
- Awareness raising, conservation, better value for tuna, sustainable fishing, tourism, killing or removing turtles, getting government jobs, controlling the growth of the human population and following the traditional ways were also mentioned.
- The notion of raising awareness and conservation as a strategy to improve livelihoods is evidence of the impact of our project.

#### Learning preferences

- Film is the most popular way of learning in Agatti. Seminars (listening to expert lectures) also scored high. In decreasing order, books, posters, discussions, slide-shows, pamphlets and people's own observations were also listed.
- The results reflect the community's strong oral traditions, reverence of elders and experience, and collective, passive learning from an accepted authority. Films seem to fit this learning preference perfectly. The community's preference for film could be attributed to India's attraction to and tradition of making films.

### Manuals

As schools in Lakshadweep do not have their own curriculum and learning resources specific to the islands (they all follow the curriculum of Kerala, mainland India), the project staff made a special effort to develop locally relevant materials.

- Three training manuals were developed in close cooperation with the local project staff and community facilitators to make sure they were locally relevant. These manuals were developed during the training workshops.
- The fourth manual – environmental education for teachers and students – will be soon available for testing.
- They are available only in English.

### Assessment

There was no formal assessment at the end of the training workshops. Participants were asked to provide self-assessment of selected skills and knowledge areas before and after the workshops in the formal evaluation (evaluation forms and active approaches) of each training event.

## Accreditation

Participants received a certificate of participation from LEAD International and BNHS for successful completion of the training workshops. The training activities were not accredited.

## Impact

The training workshops developed local capacities to further biodiversity work, and workshop participants have already demonstrated their competence in setting up a new marine protected area (MPA) by:

- Engaging over 1,940 community members and getting their concrete recommendations on how to manage the proposed MPA
- Providing a summary of recommendations based on the community consultations
- Providing input to the management plan of the proposed MPA
- Expressing interest in participating in the management of the proposed MPA
- Expressing interest in contributing to the replication of the process and setting up MPAs in other islands of Lakshadweep as funding permits

Two of the training workshop participants and co-facilitators – Idrees Babu and Karamathulla Shahib - are members of the local project staff; they continue their biodiversity conservation work in Lakshadweep as part of BNHS' long term field station ([4.7.](#)).

Some of the participants of the eco-tourism training workshops in Kavaratti, the members of the Sandy Beach Cultural and Ecotourism Society<sup>20</sup>, lead by Ameer M.C., have launched an innovative enterprise to increase local community members' and visitors' awareness of marine biodiversity and conservation issues. They have built a glass-bottom boat<sup>21</sup> and started offering guided tours around Kavaratti's coral reef. Almost 1,000 visitors – many local women – have enjoyed these one hour tours and learned about local conservation issues since the launch of their business (November 2007). Members of Sandy Beach Cultural and Ecotourism Society keep daily records of their sightings for long term monitoring purposes.

This business is a great example of sustainable, non-extractive use of local biodiversity values, and demonstrates how local small business can contribute to conservation through innovative, high impact capacity development programmes and equitable sharing of biodiversity benefits.

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<sup>20</sup> Sandy Beach Cultural and Ecotourism Society <http://www.lead.org/page/300>

<sup>21</sup> Glass-bottom boat tours at Sandy Beach: <http://www.lead.org/page/301>

## 4.7 Sustainability and Legacy

The most enduring achievements of the projects will be the 'Agatti Conservation Reserve', the increased local capacity to manage biodiversity, the research results and continuing collaboration between the partners.

In order to sustain project results after the Darwin grant ends, the following organisations have invested in future project activities at local, national, and international levels after the project ends:

### **LMRCC:** Lakshadweep Marine Research and Conservation Centre (local)

LMRCC is new, local NGO established in January 2008 by ten young local leaders from various islands of Lakshadweep. These young leaders are current and former project staff members and volunteers who, inspired by this Darwin project, have taken their professional future in their own hands and made a long-term commitment to continue conservation, research and sustainable development activities for the benefit of their fellow islanders in Lakshadweep. LMRCC continues engaging the network of the Darwin project's local volunteers. LMRCC receives support from the Department of Fisheries of the Union Territory of Lakshadweep. Webpage: <http://www.lead.org/page/348>

### **BNHS's** long-term field station in Lakshadweep (national)

Encouraged by the outstanding results of this Darwin project, the BNHS management committee has agreed to start a long-term monitoring and research station in Lakshadweep. The field station will:

- employ two local project staff members
- make project resources (books, reports, films, databases, etc.) available for all islanders
- continue research on giant clam and climate change to support in-situ conservation
- scale-up and replicate the Agatti conservation experience in other islands.

Many islanders (including panchayath members) from other islands of Lakshadweep such as Chetlat, Kalpeni, Kadmat and Minicoy expressed their interest in similar conservation activities, and invited the project team to facilitate similar community-based biodiversity conservation projects (resulting in a co-managed MPA) on their island too. It is important that the trained and experienced community facilitators are hired in all future community-based conservation activities.

The Administration of the Union Territory of Lakshadweep, including the Department of Environment and Forest, and the Department of Science and Technology, continues to be a supportive partner. They provided the necessary permissions for BNHS long-term field station.

### **LEAD & HSBC** Next Generation Development Programme (international)

LEAD International has established a unique partnership with a global financial institution, HSBC, a bank known for its dedication to sustainable development, and biodiversity conservation in particular. A team of 12 young HSBC leaders ('highflyers') from eight countries visited Agatti in February 2008 as part of their leadership development training. Their visit was designed to contribute to the implementation of the economic portfolio of the proposed 'Agatti Conservation Reserve's Management Plan.

Prior their arrival the HSBC team received a concrete task which had been jointly developed by the local project staff (from Lakshadweep), LEAD and HSBC to make sure all partners would benefit from both the results and the process. Their task was to assist a local Women's Self Help Group (SHG) and local fishermen to proactively maintain and improve their income generation capacity and livelihood. The HSBC team made recommendations on how to improve their existing operations (e.g. marketing, branding, governance, training), and how to develop their business further from tuna resources with specific focus on processed tuna.

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The HSBC team contributed to Agatti's sustainable livelihood development, and plans to continue strengthening local management capacities.

This unique corporate social responsibility project is a good example of how the private sector can contribute to biodiversity conservation. A carefully designed task and the close collaboration with local people and other stakeholders (NGOs, research organisations, government) are critical success factors.

Beside HSBC, the Indian private sector, such as NABARD (National Bank for Agriculture and Rural Development) and other financial institutions (e.g. Syndicate Bank, ICICI Bank), have expressed interest in supporting sustainable development projects in Lakshadweep.



## 5 Lessons learned, dissemination and communication

### Lessons learned

1. **Engaging local community members in research** about their environment and socio-economic systems helps them acknowledge the value of adaptive learning and adopt adaptive management at an early stage. It is essential, however, that local people are involved in all phases the research: the design, the data collection and the interpretation and evaluation of results .
2. **Active learning** methods were new and inspiring to most people. Participants appreciated the opportunity of experiencing new learning methods such as fieldwork, using and creating visuals, computer-assisted decision making simulation, scenario development, discussing controversial issues, thinking about the past and future, etc. A combination of conventional (passive) and new (active) learning experiences develops confidence and facilitates innovation – important ingredients of resilience.
3. **Film** has proved to be a powerful way of engaging people in Agatti: either responding to a screened film or engaging in making a film. Our research has confirmed that film is the preferred way of learning in Agatti. Participatory film-making and documentary film production can multiply the impact of conservation projects in Lakshadweep, and perhaps beyond.
4. **Co-management** of resources – especially local, common-pool resources – works best when there is a wide participation of community members, government, academia, civil society organisations and the private sector. They must prioritise needs together and share the rights and responsibilities of planning and implementation. This is time consuming but more sustainable than management by a single stakeholder.
5. **The private sector** can provide significant contribution through their expertise and their financial resources, proven by our cooperation with HSBC’s emerging managers. Involving the private sector’s expertise (different perspectives, long view, planning for alternative scenarios, etc.) can support local people to pursue alternative and sustainable livelihood options. Matching biodiversity and livelihood improvement goals harnesses community support and brings about the most sustainable development, as our project has shown.
6. **Nested (cross-scale) management system** – the cooperation and coordination of local (local project team, Lakshadweep), national (BNHS, Mumbai) and international (LEAD International, London) project management could be very effective in delivering ambitious projects in a short amount of time, leveraging significant resources, securing resources for project sustainability and increasing resilience. However, this high performance cross-scale management system can be maintained only when the strengths and boundaries are clear, autonomy is granted within their sphere of influence, and there is mutual trust, recognition of achievement, respect and reciprocal support.
7. **Climate change**, and the islanders’ vulnerability to climate change – especially sea level rise and increasing sea surface temperature – needs to be addressed as soon as possible. The level of awareness of climate change and its immanent threats to Lakshadweep is very low.
8. **Replication** of the successful Agatti MPA process is highly desirable. Based on the encouraging results and unanimous support to date our strategy could work in other islands in Lakshadweep or beyond in a similar context.



## Dissemination and communication

Project results have been disseminated through a wide range of media to address different audience.

- The primary audience of our dissemination efforts has been the islanders of Lakshadweep as we wanted to strengthen project results and facilitate replication.
- The secondary audience is a wider group, non-islanders, including the Indian and international conservation community and the general public to raise awareness, share lessons learned and facilitate replication.

Short films (5–25 minutes) have proven to be highly effective in disseminating information to both the primary and secondary audiences. According to our research in Agatti in 2007–8 and our experience in other islands, film is the most the popular way of learning. Films – combined with ‘seminars’ – play a powerful role in consolidating and disseminating project results, raising awareness and identifying needs for future projects (see also [4.6: Learning preferences](#)).

Dissemination to international agencies, professional organisations happened through e-media by e-mailing URLs to download information. LEAD International took the lead on international communication, and sent out information about the project in LEAD’s e-newsletters and list-serves to over 2,000 individuals, members of the global LEAD Network, and conservation professionals ( [Annex 5, Figure 9, 10.](#) ).

The dissemination effort will continue after project completion. The cost will be born by partners who manage to secure funding.

### 5.1 Darwin Initiative identity

The project was recognised as a distinct project, on its own merits, with a clear identity. Due to BNHS staff longer (local staff full time) presence in Lakshadweep during the project period, and the fact that BNHS was known to many, local community members, however, often referred to the project as the ‘BNHS’ project.

All local partners (BNHS, local project staff, main stakeholders) are familiar with the Darwin Initiative, and aware that the project was funded by the Darwin Initiative.

The Darwin Initiative (DI) has been acknowledged in several ways in the project:

- The DI support was acknowledged in all presentations.
- The DI logo was used in all project results, resource materials and presentations.
- Annual reports of the Darwin Initiative, DI pens, badges, postcards, and stickers were distributed at all training events to all participants.
- A banner with the project title and the logo of the Darwin Initiative, LEAD International and BNHS was displayed during all training events and major community consultations.

## 6 Monitoring and evaluation

The project proposal – specifically the logframe and milestones – was used to monitor progress and make sure the project was on track. Monitoring tools included regular e-mail and phone contact between the UK and Indian host in Mumbai, and local partners in Lakshadweep.

The half-year and annual project reports provided opportunities for evaluation and making sure the project was on the right track. Project partners used face-to-face meetings – i.e. the UK partner's visit to India and the Indian partners' visit to the UK – to reflect on project results and adjust plans accordingly.

All training workshops included a formal evaluation at the end (written and discussion).

Baseline information was collected for giant clams and other marine biodiversity components in Year 1. This baseline data has been and will be used to gauge annual environmental changes.

All evaluations so far – including independent reviews of the annual reports – have been complimentary; the project has accomplished its objective.

In order to monitor the development of some key social aspects of the Agatti community as the 'resource user' partner of the proposed co-managed 'Agatti Conservation Reserve', the project will use the following results of the individual household surveys of the socio-economic research (2007/8) as baselines (among other indicators to be established).

Social baselines for monitoring the success of the 'Agatti Conservation Reserve':

- Most important threats to reef
- Most important threats to livelihood
- Reef protection
- Livelihood improvement

The project team has conducted an internal evaluation, including a SWOT<sup>22</sup> analysis after Year 2 and 3. The SWOT analysis was part of the strategic planning process to sustain project results. There was no external evaluation, and there is no plan for it.

### 6.1 Actions taken in response to annual report reviews

Both annual report reviews (Year 1 and 2) appreciated the commendable work done by the project team. The reviews congratulated the project and did not raise any questions or issues. LEAD International shared and discussed the reviews with the project partners.

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<sup>22</sup> SWOT: Strengths, Weaknesses, Opportunities, Threats

## 7 Finance and administration

### 7.1 Project expenditure

The project has used the Darwin grant effectively and efficiently. There remains a variance of 1%.

**Figure 5** Overall project budget, expenses and balance

	Budget Original (Stage2)	Budget Final	Actual Expenses	Variance	Variance %
Staff					
Rent					
Office					
Travel & subsistence					
Printing					
Conferences					
Project promotional material					
Professional diving services					
Training workshops					
Small LEAD consultancies					
Production costs of manuals					
Photography					
Small Consultancies					
<b>TOTAL</b>					

Explanation of variation in expenditure +/- 10% of the budget:

- Rent (10%) due to renting two offices in Lakshadweep: Agatti, Kavaratti. Main project activities took place in Agatti, the location of the proposed new marine protected area. The office in Kavaratti was necessary to maintain visibility, high profile and access to political support and regular communication and cooperation with the offices of Lakshadweep Administration.
- Printing (11%) due to less printing in Year 1 than anticipated for the training manual.
- Project promotional material (16%) due to the underspend in Year 3. The Indian host's USA trip was shorter than expected because of a hurricane threat
- Small consultancies (31%) due to the underspend in Year 1;

The Darwin Initiative Secretariat has approved the following changes in the budget:

- From Year 1 to Year 2 carry forward £3,209.00 (3 April 2006, Margaret Okot)
- From Year 3 to Year 4 carry forward £1,000 by 30 April 2008 (31 March 2008, Lisa Spencer)

**Figure 6** Staff budget and expenditure breakdown

	Yr1	Yr2	Yr3	Yr4	Total
Project Director (UK)					
Project Manager (UK)					
Head of Training (UK)					
Finance Officer (UK)					
IT & Communication (UK)					
Project Manager (India)					
Trainers (India)					
<b>TOTAL Staff Budget</b>					
Actual Staff Expenditure					
Variance					

## 7.2 Additional funds or in-kind contributions secured

The project attracted 83% matched funds (cash and in-kind contribution) and almost 3,500 person days volunteer contribution to augment the DI grant. Many of the in-kind contribution, however, can not be really expressed in financial terms, e.g. community contribution.

### Summary

Total Darwin grant:	£149,961
Total matched funds:	£124,896 (Figure 7 + 8 + 9)
Matched funds / DI grant	83%

### Details

Matched funds committed in Stage 2 proposal:	£101,909
Matched funds from committed sources:	£ 60,806 (Figure 7 + 8)
Matched funds from non-committed sources:	£ 64,090 and 3,498 person-days (Figure 9)

**Figure 7** Matched funds from committed sources (other than Darwin Initiative funding committed in Stage 2 proposal)

	Yr1	Yr2	Yr3	Committed	Actual Matched
Staff (Indian Trainers only)					6,089
Rent					21,683
Office					
Travel & subsistence					6,806
Printing					3,460
Conferences					4,140
Project promotional material					
Professional diving services					3,846
Training workshops					
Small LEAD consultancies					
Production costs of manuals					1,282
Photography					
Small Consultancies					
<b>TOTAL</b>	<b>£11,926</b>	<b>£13,606</b>	<b>£13,677</b>	<b>£39,209</b>	<b>£47,306</b>

**Figure 8** Matched funds from committed sources (additional to Figure 7)<sup>23</sup>

Source	Committed	Actual Matched
India's Ministry of Environment and Forest, cash		
WWF-India two trainers + related infrastructure, in-kind		
Indian environmental educator in lieu of WWF-India		
Indian Navy and Coast Guards surveys, in-kind		
LEAD International office space, in-kind		
Smithsonian Institute, USA; Natural History Museum, UK; desk-space, in-kind		
<b>TOTAL</b>	<b>£62,700</b>	<b>£13,500</b>

<sup>23</sup> Appears only in the text of Stage 2 proposal, not in the budget.

**Figure 9 Not-committed contribution: additional funds and in-kind contribution secured**

Source	Amount (INR)	Amount (£)	Notes
ICICI Bank			Cash for three cameras and underwater cases
Alder Pharmaceuticals			Cash for books
Department of Science and Technology, Administration of Lakshadweep, India			In-kind by waving fees for the production of three documentary films: 1. Lakshadweep promotional film 2. 'Our Islands' 3. Climate change
Centre for Environmental Education, Video Resource Centre, India			Cash for 'Traveling Film Festival on Environment in Lakshadweep' including screening and discussing environmental films on three islands: Kavaratti, Agatti, Bitra
Duke University			Cash for film on sea turtle; received after March 2008
BNHS			Cash for community consultations in Agatti in Year 3: honorarium for 8 community facilitators (12 months, £32/month/facilitator, 8 facilitators)
Regional Environmental Centre for Central and Eastern Europe			In-kind contribution: 'Green Pack' – Education for sustainability resource kit for teachers
Oil and Natural Gas Corporation Ltd (ONGC), India			Cash for documentary film on climate change and coral reef.
Whitley Fund for Nature			Setting up a network of co-managed MPAs in Lakshadweep. Received in July 2008
HSBC			Cash for Agatti community for sustainable livelihood improvement and capacity development activities. Received after in July 2008
<b>TOTAL</b>		<b>£64,090</b>	

**Figure 10 Not-committed contribution: Person-days volunteered for the project**

Source	Person-day	Notes
Biroba Films, India	14	Director: production of 'Our Islands' film
HSBC Next Generation Development Programme	130	13 HSBC managers (10 days, 13 person)
UK consultant	312	Additional time (12 days/month, 26 months)
LEAD Fellows	30	6 LEAD Fellows; 5 days/person
Lakshadweep's citizens	3,000	50 volunteers; 20 days/person/year; 3 years
Peer-reviewers of Agatti Management Plan and Species Conservation Plan	12	Time of 2 reviewers; 6 days/reviewer;
<b>TOTAL</b>	<b>3,498</b>	

### 7.3 Value of Darwin Initiative funding

The Darwin Initiative has enabled the UK and the host country partner to implement a new conservation institution – the first co-managed marine reserve - in India.

Although the Indian Wildlife (Protection) Act 1972 has made a provision for co-managed protected areas, they have been implemented only in terrestrial ecosystems. DI funds has made it possible to implement the first co-managed marine reserve in India, and set standards for establishing similar protected areas in the future. DI has enabled the partners to experiment with new ideas and apply innovative approaches to conservation.

The project has been extremely cost effective and offered great value for money due to its:

- considerate and efficient use of the Darwin Initiative support
- large group of volunteers and their contributions
- more than projected additional funds and in-kind support ( [7.2](#) )

For example, having saved on the UK project staff travel expenses in India, local project staff members from Lakshadweep could visit the UK for professional development. The UK expenses were kept to a minimum by in-kind support from LEAD International staff members with housing, transportation, etc.

# Annex 1 Report of progress and achievements against final project logical framework for the life of the project

1 April 2005 – 30 April 2008

Project summary	Measurable Indicators	Progress and Achievements	Actions required/planned
<b>Goal</b>			
To draw on expertise relevant to biodiversity from within the United Kingdom to work with local partners in countries rich in biodiversity but constrained in resources to achieve <ul style="list-style-type: none"> <li>- The conservation of biological diversity</li> <li>- The sustainable use of its components</li> <li>- The fair and equitable sharing of the benefits arising out of the utilisation of genetic resources</li> </ul>			
<b>Purpose</b>			
Conservation of globally threatened giant clams and other marine biodiversity, through a participatory approach in the establishment of the 'Agatti Conservation Reserve' in the Lakshadweep Islands, India.	<p><b>1</b> Conservation reserve designated for certification by yr 3</p>	<p><b>1a</b> - Unanimous support from government officials and community members of Agatti island</p> <p><b>1b</b> - Agatti Panchayat (elected island government) submitted the Administrator of Lakshadweep a formal proposal (Jan 2008) to establish the 'Agatti Conservation Reserve'</p> <p><b>2c</b> - 'Agatti Conservation Reserve' proposal is under official consideration by the Administration of the Union Territory of Lakshadweep</p>	<p><b>1a</b> - Lakshadweep Administration recommends Indian Government's Ministry of Environment and Forest the designation of 'Agatti Conservation Reserve'.</p> <p><b>1b</b> - Official notification by Indian Government of intention to designate the Agatti Conservation Reserve under the Wildlife (Protection) Act 1972</p>
	<p><b>2</b> Evidence of recovery of</p> <p>2a - giant clams*</p> <p>2b - fish stocks within the reserve and the lagoon*</p> <p><i>*measurable five yrs after the reserve's designation</i></p>	<p><b>2a</b> - Survey reports for giant clam (yr1&amp;yr2 &amp;yr3) are available for Agatti (MPA) and Kavaratti (reference) and other reefs in Lakshadweep;</p> <p>Giant clams have been identified by Ministry of Environment and Forest, Government of India as one of the five flagship species for conservation and recovery for the next five years (not finalised)</p>	<p><b>2a</b> - Surveys for giant clam continue annually for Agatti, Kavaratti and other selected reefs</p> <p><b>2b</b> - Bait fish stock assessment</p> <p><b>2c</b> - Optimum bait fish/tuna catch ratio</p>

Outputs		
Plan	Indicator	Progress (including means of verification)
<b>Output 1.</b> Research: Ecological & biological data on clams gathered & analysed	Baseline data by yr 1, annual monitoring data in subsequent years	Completed Baseline surveys & subsequent annual survey reports are sent to Darwin Initiative: <ul style="list-style-type: none"> <li>– Species Conservation Action Plan: Final Report</li> <li>– ‘Agatti Conservation Reserve’ Management Plan:Yr2 Annual Report</li> </ul>
<b>Output 2.</b> Local community capacity developed for management of the conservation reserve	125 local people trained in management of Community Reserve by yr 3	Completed Ongoing and post-project training monitoring & evaluation reports, and training materials are sent to Darwin Initiative: <ul style="list-style-type: none"> <li>– Eco-tourism Training Manual: Yr1 Annual Report Annex 9</li> <li>– Community Facilitators Training Manual I.: Yr2 Annual Report Annex 5</li> <li>– Community Facilitators Training Manual II. Available on request</li> </ul> Results of capacity development by output indicators <ul style="list-style-type: none"> <li>– 40 local people trained in sustainable tourism and survey methods</li> <li>– 10 Community Facilitators were trained in 32 training sessions on setting up and managing a marine protected area. Community Facilitators have the capacity and training materials to work with the local community to manage the proposed ‘Agatti Conservation Reserve’ and replicate the process in other islands of Lakshadweep</li> <li>– 3 locally relevant training materials were developed in close collaboration with local community members</li> <li>– 2 local project staff members participated in international professional development events on managing conservation areas</li> </ul>
<b>Output 3.</b> Management plan for reserve being implemented	a – Reserve management plan by yr2 b - Appointment of reef & fish wardens & task force by yr3	Completed a - Community Reserve Management Plan peer-reviewed, disseminated, copy sent to Darwin Initiative: <ul style="list-style-type: none"> <li>– ‘Agatti Conservation Reserve’ Management Plan:Yr2 Annual Report Annex</li> </ul> b – Reef & fish wardens & task force will be appointed when the ‘Agatti Conservation Reserve’ is officially endorsed by the Administrator of Lakshadweep  Results of capacity development by output indicators: <ul style="list-style-type: none"> <li>– 1,940 local people (55% of Agatti island’s adult population) were engaged in participatory planning and co-managing the ‘Agatti Conservation Reserve’</li> </ul>
<b>Output 4.</b> Tourism plans for reserve developed	Island carrying capacity mapped and tourism plan produced by yr 2	Completed Island carrying capacity is mapped, guidelines for planning are produced, copy sent to Darwin Initiative: <ul style="list-style-type: none"> <li>– Guidelines for Sustainable Tourism in Agatti</li> </ul>





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<p><b>Output 5.</b> Dissemination of project results and lessons learned</p>	<p>Final Project Report produced, findings presented at international conferences, video documentary screened.</p>	<p>Completed</p> <ul style="list-style-type: none"><li>- Final project report produced, submitted to Darwin Initiative</li><li>- Project website: <a href="http://www.lead.org/page/89">http://www.lead.org/page/89</a></li><li>- Promotional and documentary films are downloadable from project website</li><li>- 'Our Islands' documentary film is screened on all ships between mainland India and Lakshadweep</li><li>- List of national and international events where the project was presented: Final Report Appendix III. Publications, Presentations</li><li>- Project findings disseminated to the LEAD Network of 2,000 sustainable development practitioners in over 85 countries</li></ul> <p>In progress</p> <ul style="list-style-type: none"><li>- Paper on research findings published peer reviewed journals including The Journal of Malacology, The Journal of Bombay Natural History Society, and The Veliger</li></ul>
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## Annex 2 Project's final logframe, including criteria and indicators

Project summary	Measurable indicators	Means of verification	Important assumptions
<p><b>Goal</b></p> <p>To draw on expertise relevant to biodiversity from within the United Kingdom to work with local partners in countries rich in biodiversity but poor in resources to achieve</p> <ul style="list-style-type: none"> <li>- the conservation of biological diversity,</li> <li>- the sustainable use of its components, and</li> <li>- the fair and equitable sharing of the benefits arising out of the utilisation of genetic resources</li> </ul>			
<p><b>Purpose</b></p> <p>Conservation of globally threatened Giant Clams and other marine biodiversity, through a participatory approach in the establishment of a community-based marine protected area (community or conservation reserve) in the Lakshadweep Islands, India</p>	<p>1. Community-based reserve designated for certification by yr3</p> <p>2. Evidence of recovery of a - giant clams* b - fish stocks within reserve and lagoon*</p> <p><i>*measurable five yrs after the reserve's designation</i></p>	<p>1. Official notification by Indian Government of intention to designate area as a Community Reserve under the Wildlife (Protection) Act 1972</p> <p>2. Baseline survey report and subsequent annual survey reports for a - giant clam b - fish catch</p>	<p>1. The government is willing to declare the area as a conservation reserve</p> <p>2. External environmental conditions (hurricanes, floods) do not alter significantly the biodiversity of the proposed area and do not delay the process of setting up a marine protected area.</p>

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Outputs			
1. Research: Ecological & biological data on clams gathered & analysed	1. Baseline data by yr 1, Annual monitoring data in subsequent years	1. Copies of baseline surveys & subsequent annual survey reports sent to Darwin Initiative	1. Authorization of research by appropriate authorities
2. Local community capacity developed for management of community-based reserve	2. 125 local people trained in management of Community Reserve by yr 3	2. Ongoing and post-project training monitoring & evaluation reports, and training materials	2. Community actively participates
3. Management Plan for Reserve being implemented	3. a) Management Plan for the Reserve by yr 2 b) Appointment of reef & fish wardens & task force by yr 3	3. Community Reserve Management Plan published, and copy sent to Darwin Initiative	3. Community willing to implement the Management Plan
4. Tourism plans for Reserve developed  5. Dissemination of project results and lessons learned	4. Island carrying capacity mapped and tourism plan produced by yr 2  5. Project Report produced, findings presented at international conferences, video documentary screened, website developed	4. Tourism Plan and copies of all other publications sent to Darwin Initiative	4. Tourism sector & local community respond positively
<b>Activities</b> 1a MoU signed  Field station functional in 1b Kavaratti 1c Agatti	Activity Milestones (Summary of Project Implementation Timetable)		
2 Training project staff	1.4.2005 - 31.8.2005 <b>Completed</b>		
3 Gathering baseline information on clams & Annual monitoring	1.4.2005 - 30.4.2008 <b>Completed</b> 1.4.2006 - 30.4.2008 <b>Completed</b>		
	1.6.2005 – 13.3.2006 <b>Completed</b>		
	1.11.2005-31.3.2006; 1.12.2006-31.3.2007; 1.11.2007-31.12.2007 <b>Completed</b>		

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4a Identifying Reserve 4b Designating Reserve	1.4.2006 - 31.7.2006 <b>Completed</b> 1.1.2008 – 30.4.2008 <b>In progress</b>
5. Community capacity building & consultations & household surveys	1.6.2006 – 31.3.2008 <b>Completed</b>
6. Conservation Reserve management plan a Preparing b Implementing	1.1.2007 - 30.4.2007 <b>Completed</b> 1.5.2007- 30.4.2008 (selected volunteer efforts) <b>In progress</b>
7. Measuring Agatti's carrying capacity to support tourism	1.4.2006 - 7.31.3.2007 <b>Completed</b>
8. Local Governing Council and Assessment Task Force established	In progress

## Annex 3 Project contribution to Articles under the CBD

### Project Contribution to Articles under the Convention on Biological Diversity

CBD Number and Article	%	Description of relevant activities of CBD article
<b>8. In-situ Conservation</b>	<b>40</b>	<ul style="list-style-type: none"> <li>– Establish systems of protected areas with guidelines for selection and management;</li> <li>– Promote protection of habitats;</li> <li>– Restore degraded ecosystems and recovery of threatened species;</li> <li>– Ensure compatibility between sustainable use of resources and their conservation;</li> <li>– Protect traditional lifestyles and knowledge on biological resources.</li> </ul>
<b>12. Research and Training</b>	<b>40</b>	<ul style="list-style-type: none"> <li>– Establish programmes for scientific and technical education in identification, conservation and sustainable use of biodiversity components;</li> <li>– Promote research contributing to the conservation and sustainable use of biological diversity, particularly in developing countries (in accordance with SBSTTA recommendations).</li> </ul>
<b>‘Other’</b> <i>(see details below in italics)</i>	<b>20</b>	
<i>7. Identification and Monitoring</i>	<i>5</i>	<ul style="list-style-type: none"> <li>– <i>Identify and monitor components of biological diversity, particularly those requiring urgent conservation;</i></li> <li>– <i>Identify processes and activities that have adverse effects; maintain and organise relevant data.</i></li> </ul>
<i>10. Sustainable Use of Components of Biological Diversity</i>	<i>10</i>	<ul style="list-style-type: none"> <li>– <i>Protect sustainable customary uses;</i></li> <li>– <i>Support local populations to implement remedial actions;</i></li> <li>– <i>Encourage co-operation between governments and the private sector.</i></li> </ul>
<i>13. Public Education and Awareness</i>	<i>5</i>	<ul style="list-style-type: none"> <li>– <i>Promote understanding of the importance of measures to conserve biological diversity and propagate these measures through the media;</i></li> <li>– <i>Cooperate with other organisations in developing awareness programmes.</i></li> </ul>
<b>Total %</b>	<b>100%</b>	

## Annex 4 Standard Measures

Code	Total to date (reduce box)	Yr1	Yr2	Yr3	Total	Details
<b>Training Outputs</b>						
1a	Number of people to submit PhD thesis					
1b	Number of PhD qualifications obtained					
2	Number of Masters qualifications obtained					
3	Number of other qualifications obtained	3			3	Indian project staff: SCUBA PADI Advance Open Water Diving
4a	Number of undergraduate students receiving training	2		100	102	Indian students from mainland and USA
4b	Number of training weeks provided to undergraduate students			1	1	Training camp for marine biodiversity awareness
4c	Number of postgraduate students receiving training (not 1-3 above)					
4d	Number of training weeks for postgraduate students					
5	Number of people receiving other forms of <b>long-term</b> (>1yr) training not leading to formal qualification( i.e not categories 1-4 above)	3	2	2	7	Indian project staff: project management
6a	Number of people receiving other forms of <b>short-term</b> education/training (i.e not categories 1-5 above)	40	40		80	Indian volunteers received training for fieldwork (giant clam and coral survey)
6b	Number of training weeks not leading to formal qualification		3		3	
6a	Number of people receiving other forms of <b>short-term</b> education/training (i.e not categories 1-5 above)	3			3	Indian staff received training on community-based conservation, environmental education and eco-tourism
6b	Number of training weeks not leading to formal qualification	4			4	
6a	Number of people receiving other forms of <b>short-term</b> education/training (i.e not categories 1-5 above)	35			35	Indian youths received training on eco-tourism
6b	Number of training weeks not leading to formal qualification	4			4	
6a	Number of people receiving other forms of <b>short-term</b> education/training (i.e not categories 1-5 above)		4		4	Indian staff received training on co-management, community-based conservation and facilitating community engagement
6b	Number of training weeks not leading to formal qualification		5		5	
6a	Number of people receiving other forms of <b>short-term</b> education/training (i.e not categories 1-5 above)	1000	500		1500	Indian students received awareness raising trainings on various environmental and conservation issues, including biodiversity and the role of reefs in their livelihood
6b	Number of training weeks not leading to formal qualification	1	1		2	
6a	Number of people receiving other forms of <b>short-term</b> education/training (i.e not categories 1-5 above)		8		8	Indian youths received training on co-management, community-based conservation and community facilitation

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Code	Total to date (reduce box)	Yr1	Yr2	Yr3	Total	Details
6b	Number of training weeks not leading to formal qualification		8		8	Indian tourguides received training on eco-tourism
6a	Number of people receiving other forms of <b>short-term</b> education/training (i.e not categories 1-5 above)		15		15	
6b	Number of training weeks not leading to formal qualification		1		1	
6a	Number of people receiving other forms of <b>short-term</b> education/training (i.e not categories 1-5 above)		2000		2000	Indian community members from 10 islands participated in awareness raising sessions and training on co-management, including biodiversity and conservation issues, and the role of reefs in their livelihood
6b	Number of training weeks not leading to formal qualification		20		20	
7	Number of types of training materials produced for use by host country(s)	1	1	2	4	Training manuals: – Eco-tourism – MPA Management I – MPA Management II – Environmental Education
<b>Research Outputs</b>						
8	Number of weeks spent by UK project staff on project work in host country(s)	4	5	4	13	
9	Number of species/habitat management plans (or action plans) produced for Governments, public authorities or other implementing agencies in the host country (s)		1	1	2	– Agatti MPA Management Plan – Giant Clam Species Management Plan
10	Number of formal documents produced to assist work related to species identification, classification and recording.	1	2	2	5	Posters – Cowries – Schedule I Mollusca – Giant clam I-II – Indian Spiderconches
11a	Number of papers published or accepted for publication in peer reviewed journals					
11b	Number of papers published or accepted for publication elsewhere	1	1	2	4	
12a	Number of computer-based databases established (containing species/generic information) and handed over to host country		7	1	8	
12b	Number of computer-based databases enhanced (containing species/genetic information) and handed over to host country					
13a	Number of species reference collections established and handed over to host country(s)		7		7	
13b	Number of species reference collections enhanced and handed over to host country(s)					

<b>Dissemination Outputs</b>		
14a	Number of conferences/seminars/workshops organised to present/disseminate findings from Darwin project work	
14b	Number of conferences/seminars/ workshops <b>attended</b> at which findings from Darwin project work will be presented/ disseminated.	9
15a	Number of national press releases or publicity articles in host country(s)	4
15b	Number of local press releases or publicity articles in host country(s)	3
15c	Number of national press releases or publicity articles in UK	
15d	Number of local press releases or publicity articles in UK	
16a	Number of issues of newsletters produced in the host country(s)	
16b	Estimated circulation of each newsletter in the host country(s)	
16c	Estimated circulation of each newsletter in the UK	
17a	Number of dissemination networks established	
17b	Number of dissemination networks enhanced or extended	
18a	Number of national TV programmes/features in host country(s)	'Our Islands' documentary is screened on various islands regularly.
18b	Number of national TV programme/features in the UK	
18c	Number of local TV programme/features in host country	3
18d	Number of local TV programme features in the UK	
19a	Number of national radio interviews/features in host country(s)	2
19b	Number of national radio interviews/features in the UK	1 (Hungary)
19c	Number of local radio interviews/features in host country (s)	
19d	Number of local radio interviews/features in the UK	
<b>Physical Outputs</b>		
20	Estimated value (£s) of physical assets handed over to host country(s)	
21	Number of permanent educational/training/research facilities or organisation established	1
22	Number of permanent field plots established	165 transects
23	Value of additional resources raised for project	£124,896 + 3,498 person-days



## Annex 5 Publications

### Figure 11 Publications

(\*) all publications and other material that are included with this report

Type *	Detail	Notes	Publishers	Available from	Cost £
manual	Andrea Deri et al: Eco-Tourguide Training Manual (TOT), 2005	manuscript	LEAD, BNHS		free
manual	Andrea Deri et al: Setting up an MPA in Agatti, Training Manual, 2007	manuscript	LEAD, BNHS		free
manual	Andrea Deri et al: MPA Management in Agatti, Training Manual, 2008	manuscript	LEAD, BNHS		free
manual	Andrea Deri et al: MPA Management Plan for the 'Agatti Conservation Reserve', Discussion Document, 2007	manuscript (peer-reviewed)	LEAD, BNHS		free
manual*	Deepak Apte et al: Giant Clam Species Conservation Action Plan, 2008	manuscript (under peer-review)	BNHS		
manual*	Andrea Deri et al: Guidelines: Sustainable Tourism in Agatti, 2008	manuscript	LEAD, BNHS		free
manual	Dr. Arun R. Joshi, Andrea Deri: Environmental Education, In-service Teacher Training Resource Kit, 2008	manuscript (work in progress)	BNHS, LEAD		free
report	The story of 'Project Giant Clam' in Lakshadweep	manuscript (Malayalam, to be finalized by August 2008)	LMRCC, LEAD		free
newspaper	Aditya Ghosh: Country's first marine reserve planned: Islands of Lakshadweep can become a model of community-based conservation, 4 May 2008		Hindustani Times, India		
electronic news	India's first marine reserve Sea Web's Asia Pacific Ocean News May 2008 June 2008, Vol. 1, No. 1	Summary of Aditya Ghosh's article in Hindustani Times	Sea Web	<a href="http://www.seaweb.org/programs/asiapacific/SeaWeb-Programs-Asia-Pacific-E-newsletter-Library.php">http://www.seaweb.org/programs/asiapacific/SeaWeb-Programs-Asia-Pacific-E-newsletter-Library.php</a>	free
article	Andrea Deri, Deepak Apte, Idrees Babu: Coral reefs in the Lakshadweep Archipelago: 'Agatti Conservation Reserve'. Reef Encounter #36, June 2008		International Society for Reef Studies	<a href="http://www.fit.edu/isrs/documents/ReefEncounter36June2008.pdf">http://www.fit.edu/isrs/documents/ReefEncounter36June2008.pdf</a>	free
article	Deepak Apte: Lakshadweep: The Treasure Island, 2005. Green Governance		BNHS	<a href="http://www.bnhs.org">www.bnhs.org</a>	
article	Deepak Apte: Blue Planet, 2006. Green Governance		BNHS	<a href="http://www.bnhs.org">www.bnhs.org</a>	
article	Deepak Apte: Giant Clams, 2006. Green Governance		BNHS	<a href="http://www.bnhs.org">www.bnhs.org</a>	
article	Idrees Babu: Ornamental Fish as a Community Enterprise, 2006. Green Governance		BNHS	<a href="http://www.bnhs.org">www.bnhs.org</a>	
article	Avani Patel: Lakshadweep present and future: Growing or dying with climate change?, 2006. Green Governance		BNHS	<a href="http://www.bnhs.org">www.bnhs.org</a>	
film	Project Giant Clam, 2006	5' in English	LEAD, BNHS	<a href="http://www.lead.org/page/302">http://www.lead.org/page/302</a>	
film	Our Islands, 2007	25' in English, Malayalam	LEAD, BNHS	<a href="http://www.lead.org/page/302">http://www.lead.org/page/302</a>	
film	Climate change	In progress, release: 2009	ONGC, BNHS		

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film	Sea turtles	In progress	Duke University, BNHS	
poster	Cowry		BNHS	<a href="http://www.lead.org/page/284">http://www.lead.org/page/284</a>
poster	Octopus		BNHS	<a href="http://www.lead.org/page/284">http://www.lead.org/page/284</a>
poster	Schedule I Mollusca		BNHS	<a href="http://www.lead.org/page/284">http://www.lead.org/page/284</a>
poster	Project Giant Clam I		BNHS	<a href="http://www.lead.org/page/284">http://www.lead.org/page/284</a>
poster	Project Giant Clam II		BNHS	<a href="http://www.lead.org/page/284">http://www.lead.org/page/284</a>
poster	Indian Spiderconches		BNHS	<a href="http://www.lead.org/page/284">http://www.lead.org/page/284</a>
postcards	12 postcards of seascapes and marine species of Lakshadweep		BNHS	<a href="http://www.lead.org/page/285">http://www.lead.org/page/285</a>
sticker	Save Giant Clam		BNHS	<a href="http://www.lead.org/page/287">http://www.lead.org/page/287</a>

Project team members actively looked for formal and informal opportunities of presenting project results to promote the project as well as to receive feedback. Some of the most significant formal presentations are shown in *Figure 12*.

**Figure 12 Presentations**

Event	Date	Location
Natural and Cultural Heritage of Coastal Zones, Cambridge Centre for Landscape and People, University of Cambridge	July 2008	Cambridge, UK
Resilience Conference 2008	April 2008	Stockholm, Sweden
Department of Environment and Forests	April 2008	Lakshadweep
Bombay Natural History Society	April 2008	Mumbai, India
HSBC Next Generation Programme	February 2008	Mumbai-Cochi-Agatti, India
Administrator, UT Lakshadweep	February 2008	Lakshadweep
M.S. University	February 2008	Baroda, Gujarat, India
Ruparel College	January 2008	Mumbai, India
STAPCOR	January 2008	Kadmat, Lakshadweep, India
Department of Science and Technology	December 2007	Lakshadweep
Hungarian National Radio ( Env. Channel)	December 2007	Hungary
Ramnarain Ruia Collage	December 2007	Camp at Lakshadweep
Smithsonian Institute	August 2007	Washington D.C., USA
Cambridge Conservation Forum Marine Group	July 2007	Cambridge, UK
Malacology Division, Natural History Museum	July 2007	London, UK
LEAD International	July 2007	London, UK
International Malacological Congress	July 2007	Antwerp, Belgium
Geer Foundation	June 2007	Gujarat, India
Bombay Natural History Society	April 2007	Mumbai, India
Green Peace	February 2007	Delhi, India
Alternative School for Economics	January 2007	Budapest, Hungary
South-Asia Reef Resilience Workshop	January 2007	Sri Lanka
LEAD International	October 2006	London, UK
Darwin Initiative Workshop	October 2006	London, UK
University of Mumbai	Sept 2006	Mumbai, India
Darwin Initiative 162-14-057	August 2006	Bali, Indonesia
Bombay Natural History Society	April 2006	Mumbai, India
IMPAC Marine Park Congress	October 2005	Australia
CCI	June 2005	Madurai, India
Ministry of Environment and Forest	May 2005	Kanyakumari, India
Bombay Natural History Society	April 2005	Mumbai, India

## Annex 6 Darwin Contacts

<b>Ref No</b>	162-13-029
<b>Project Title</b>	Conserving giant clams through a community reserve in the Lakshadweep islands, India
<b>UK Leader Details</b>	
Name	Dr. Simon Lyster, Chief Executive, LEAD International
Role within Darwin Project	Project Leader
Address	LEAD International Sundial House 114 Kensington High Street London W8 4NP UK
Phone	
Fax	
Email	
<b>Other UK Contact</b>	
Name	Andrea Deri, Senior Consultant, LEAD International
Role within Darwin Project	Overall project management, capacity development, community development, tourism, socio-economic research, international coordination and networking, additional fundraising, communication (including website development)
Address	LEAD International Sundial House 114 Kensington High Street London W8 4NP UK
Phone	
Fax	
Email	
<b>Partner 1</b>	
Name	Deepak Apte, Assistant Director
Organisation	Bombay Natural History Society
Role within Darwin Project	Project management in India, principal investigator of giant clam research, capacity building for field studies, local and national advocacy, clearances, additional fundraising
Address	Bombay Natural History Society Hornbill House, S.B. Singh Road, Mumbai 400 023 India
Phone	
Fax	
Email	

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<b>Partner 2</b>	
Name	Idrees Babu K.K., Senior Research Fellow
Organisation	Bombay Natural History Society
Role within Darwin Project	Leading the local coordination and implementation of all project activities in Lakshadweep
Address	Bombay Natural History Society, Kavaratti Field Station Kavaratti, Lakshadweep, India
Phone	
Email	

## Annex 7 Supporters

We would like to acknowledge and thank all those who supported this incredible journey with their professionalism, ideas, creativity, long-term view, hospitality, friendship, support, long hours of hard work and enthusiasm. The list below is inevitably missing people who played very important roles: we apologise for the oversight, and wish to express our gratitude for their generous contribution.

Community members of Lakshadweep

Panchayats of Agatti and other islands, Union Territory of Lakshadweep, India

Project staff members

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## **Annex 8 Letter of Support for the 'Agatti Conservation Reserve'**



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**Annex 9 Giant Clam Species Conservation Plan (separate volume)**

**Annex 10 Guidelines: Sustainable tourism (separate volume)**