

ANNUAL REPORT 2013 - 2014

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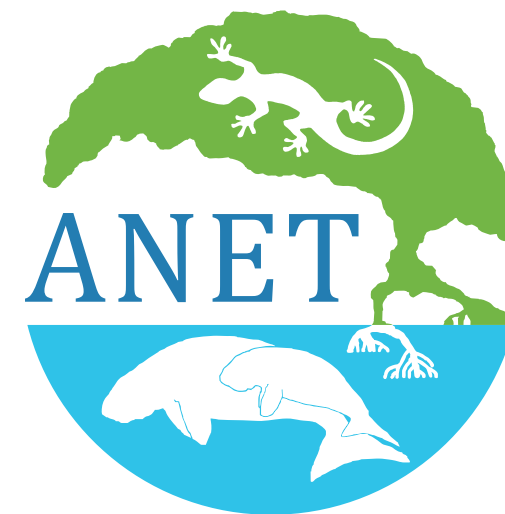
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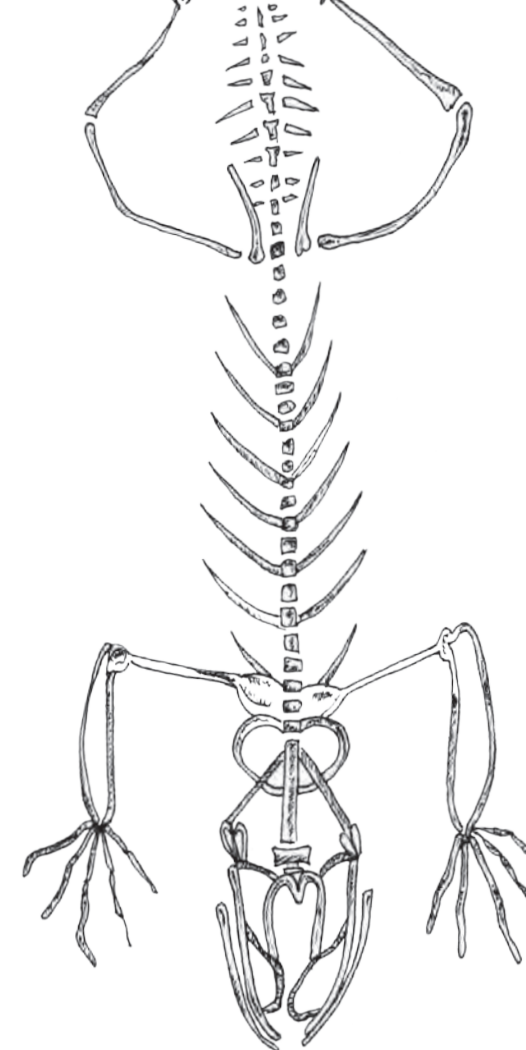
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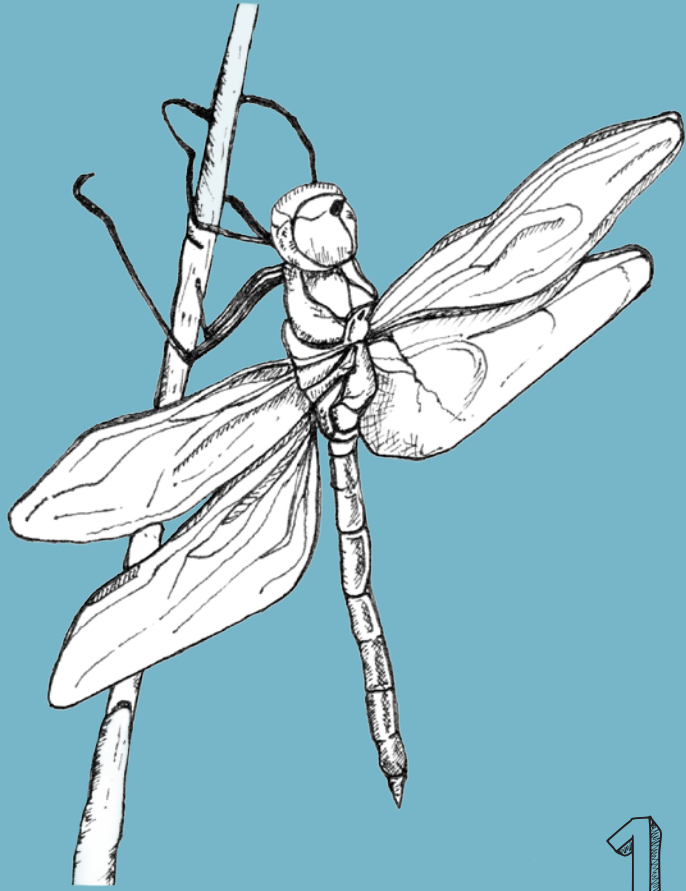
The Andaman & Nicobar island's Environmental Team
Centre for Island Ecology

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1 | DIRECTOR'S NOTE

To share it with researchers, students and educators from around the world - sitting at the dining table with one or at the most two people for company we imagined and discussed what it would be like to work, exchange ideas and have heated debates with an assortment of individuals with varied interests and expertise - An interdisciplinary Centre for Island ecology.

A service, for field biologists and other researchers - beyond just a base to work out of, it provides an environment conducive to collaboration, enriched by repositories of resources and information. A supporting team of individuals to advise and assist in planning, logistics, permissions and most importantly experienced and skilled field staff whose indigenous knowledge of this land and waters provides a cushion even in the most grueling field conditions. Above all, an institution that strives to constantly take the potential for scientific inquiry to the next level.

The season 2013 - 2014 at ANET has witnessed many 'firsts' and has personally been very dynamic on every front. I find us at a juncture, where one cannot help but reflect and plan, all at once. The possibilities, energy and momentum make me dizzy!

Only four years ago, our vision and dream was to share ANET (a space that I saw tremendous potential and inspiration in) - that was after all, the intent of it's founders.

A center, for learning that would not only hold this science and information within, but work towards translating and effectively communicating it for students, communities and travellers - spreading the knowledge and ensuring it does not get confined to scientific journals and the fragment of society who access them.

A resource, to the state and national administration, where relevant research and information from the field is fed back into our management system, in order to help in informed decision making for the future of the islands.

It is the sum and ripple effects of all this, that I believe can lead to lasting conservation and sustainability of the Andaman and Nicobar islands.

Back in 2009, we were a team of five with basic infrastructure to maintain. Without a financial model it would have been impossible to sustain what we already had, let alone work towards a larger vision. The three years that followed were a commitment to learn and implement on the go; financial planning, fund raising, human resource management, capacity building, constructing, stumbling, nervous breakdowns and

laughing fits, teaching, co-ordinating, socializing, isolating, collaborating, convincing, growing but all along constantly believing.

Today, ANET is more than what we dreamed of in the monsoon of 2009. Of course, this success clubbed with the high energy, creativity and expertise of our team, of now 15, has significantly expanded our vision and reach.

... we are now at the beginning; pushing the boundaries of science and exploration. Revolutionizing education. Delving deep into public policy and development planning. Highlighting the art-science interface. Sailing towards an infinite horizon.

Tasneem Khan
Asst. Director ANET



2 | INTRODUCTION

THE ANDAMAN AND NICOBAR ISLANDS:

The Andaman and Nicobar Islands in the Bay of Bengal form an archipelago of approximately 527 islands, islets and rocks. This underwater mountain range manifests itself above the water as a chain of emerald islands of exceptional beauty and conservation importance. The Islands' immense biological diversity and high degree of endemism is a result of ocean boundaries enclosing a wide range of ecosystems - open oceans, shallow seas and reefs, sandy beaches, rocky shores and sea caves, mangroves and wetlands, littoral forests, giant lowland evergreens and hill top forests. These ecosystems and habitats are living classrooms and laboratories.

BACKGROUND:

The environment is everywhere, but the means to study it are not. Being the only interdisciplinary, multi-institutional field station for island ecology in the Bay of Bengal, ANET brings the basic tools from electricity to expertise - to the places where science needs to be done, and cultivate a base of place-specific knowledge that fosters discovery.

The Andaman & Nicobar islands' Environmental Team (ANET) - Center for Island Ecology was founded by Zai and Romulus Whitaker in 1990 and is a subsidiary of the Madras Crocodile Bank Trust. ANET is an institution with a long-term vision for the Andaman and Nicobar Islands and aims to push the boundaries of science, education, policy and arts by fostering a platform for interdisciplinary engagement.

3 | TIMELINE



1990 | CENTER FOR HERPETOLOGY

RESEARCH

Output | Strong foundation lending to research and education



CENTER FOR ISLAND ECOLOGY | 2000

RESEARCH

Strong foundation lending to education | Output



2010 | CENTER FOR ISLAND ECOLOGY

RESEARCH + EDUCATION

Output | Collaboration with research institutes, Infrastructural growth, Human resource, Potential for a wider vision



INTER-DISCIPLINARY CENTER FOR ISLAND ECOLOGY | 2013

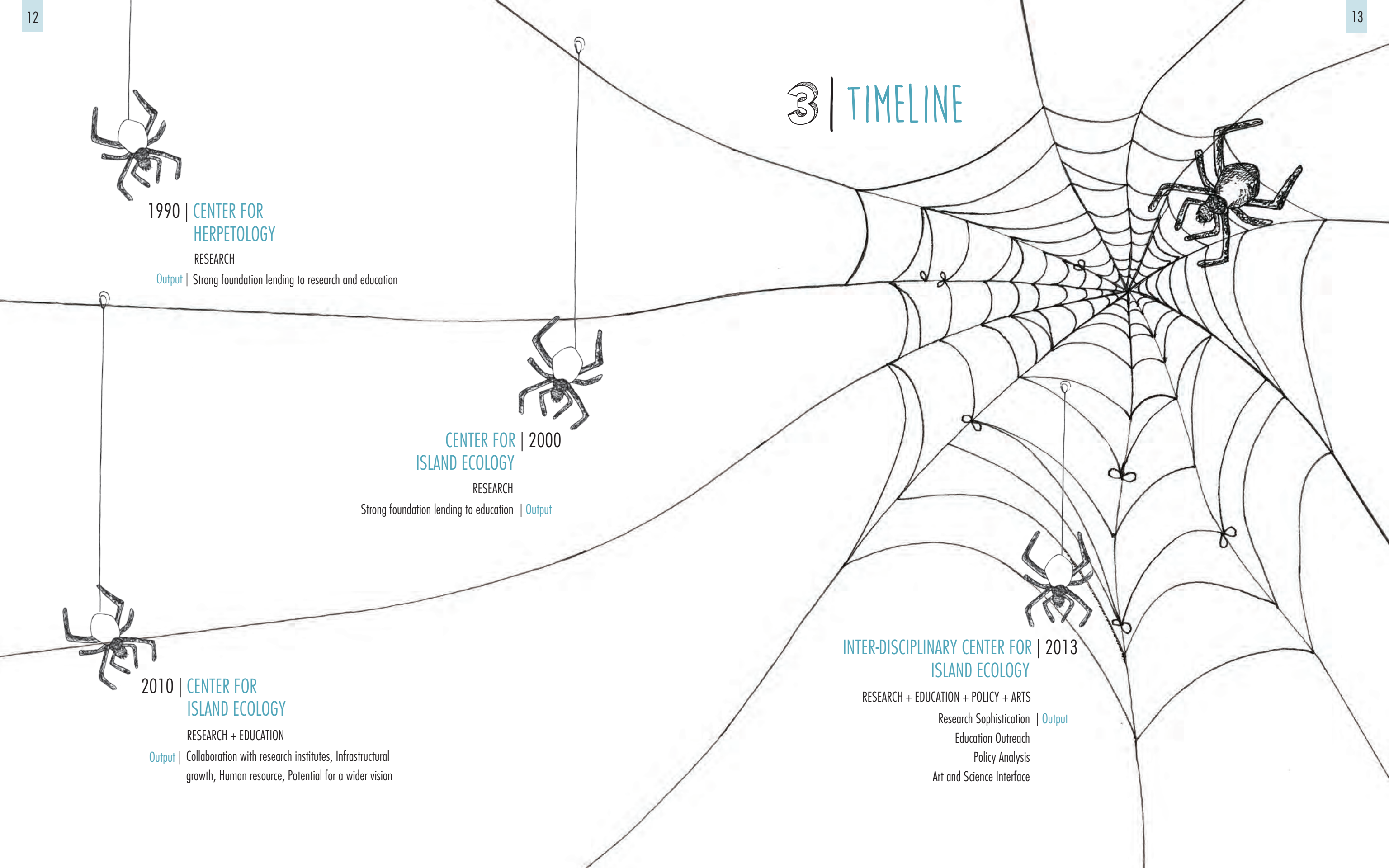
RESEARCH + EDUCATION + POLICY + ARTS

Research Sophistication | Output

Education Outreach

Policy Analysis

Art and Science Interface



4 | DEVELOPMENT PHILOSOPHY

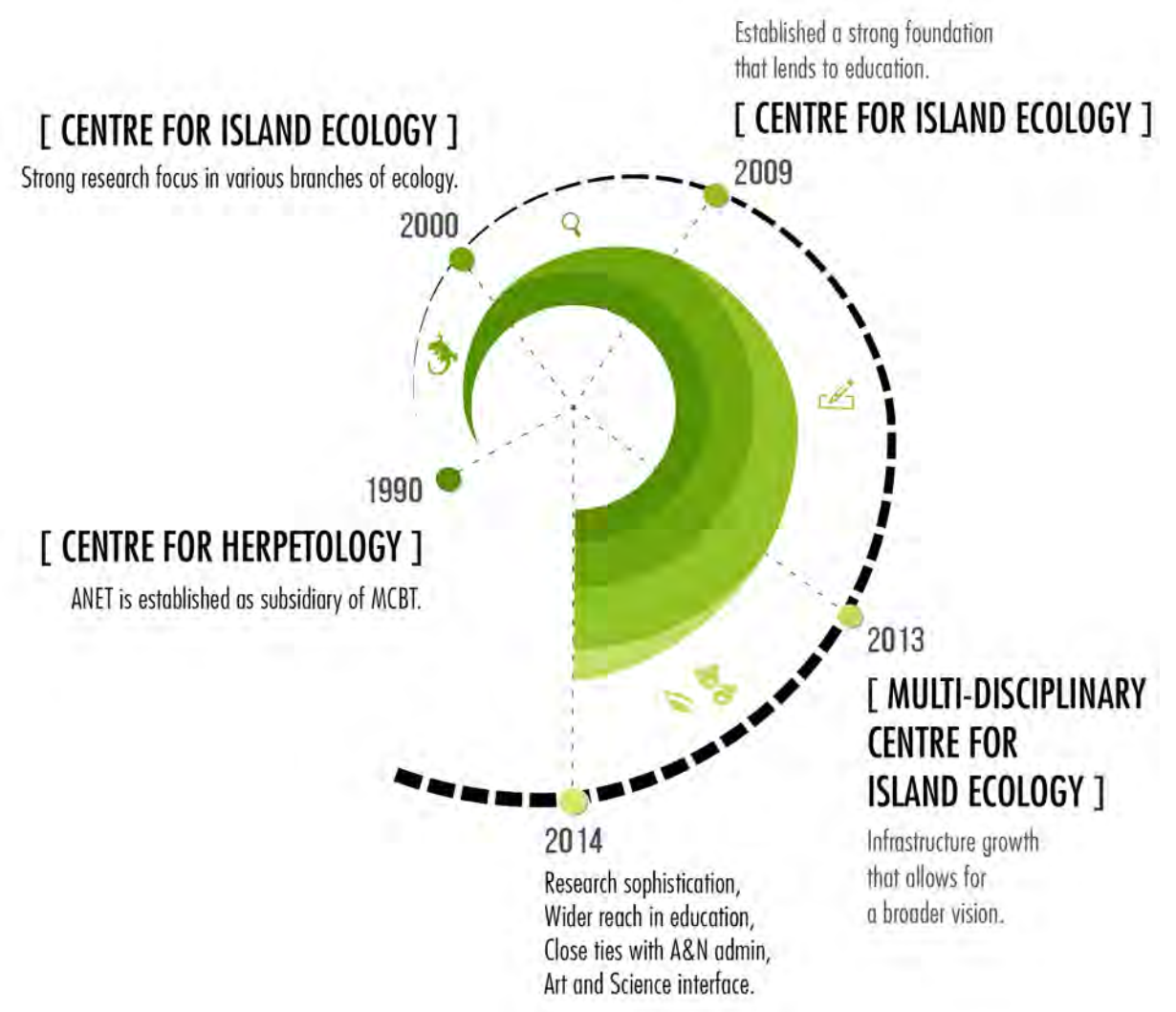
The years 2009 - 2013 were focused on becoming financially independent from its parent institution MCBT. ANET achieved this through strengthening its education division by opening its doors to multiple high schools, undergraduate and masters programs and tailoring field study courses for them. The revenue earned was invested into strengthening human resources and infrastructure, which by 2014 has enabled the institution to boost its core objectives of research, education and conservation to the next level.

In four years ANET has not only been able to stabilize itself financially but also been able to collaborate with multiple renowned institutions and spawn new areas of work. Over the years, ANET has been supported externally through multiple national and international donors and institutional grants. ANET has always delivered project goals with an impeccable record and set standards for itself. Transparency and accountability are at the core of its philosophy and applies to administrative functions, fieldwork, research practice, policy analysis and community engagement.

These developments have led to the formation of a stable ground to re-envision the possibility for an advanced institution that revolutionizes the practice of conservation, science, education, social engagement and policy.

To achieve this transformation it is crucial to synergize the creation of financial capital, building infrastructure and human resources. The boost delivered through these assets will launch ANET into the next re-envisioned stage.

The communication and information flow at ANET extends beyond the community of scholars. Common interests in the local environment provide an opportunity for dynamic interplay between travellers, local stakeholders, the state administration, scientists, anthropologists, historians, geographers, natural resource managers, artists, policy makers, and citizens.



Research in herpetology



Research in Island Ecology



Education



Policy advisory



Art & Design



5 | VISION

ANET is in the process of re-envisioning its scope and role in the Andaman & Nicobar Islands and aims to develop into a world class institution. The future showcases ANET as an Interdisciplinary Centre for Island Ecology. Through this ANET intends to initiate, conduct and support cutting edge science research, education, policy research and intervention, applied conservation and arts practice.

Reaching this potential by 2016 requires strategic planning, in order to achieve sustained growth as well as financial stability. This will require ANET to create a sufficient corpus for careful investment towards sophisticated infrastructure, human resources & technology as well as channel grants to support multiple projects, researchers and students.

- To further enhance the synergies between research and education.
- To promote appropriate access by scientists and students to terrestrial and marine systems.
- To increase the value to society of the science done at ANET, and ensure public understanding of that value.
- To facilitate responsible access to the environment.
- To provide logistical support for a wide range of activities including individual research projects; networking of research on larger scales; science, technology, engineering, training and public outreach.
- To foster a community of scholars that promotes the exchange of ideas, collaboration and the integration of knowledge. This will facilitate the flow of information between the scientific community and decision makers about environmental issues.
- To facilitate reliable long-term research and ecosystem monitoring.
- For field research in a wide range of disciplines, including the environmental sciences, ecology, and evolutionary biology, anthropology, sociology, oceanography, environmental law, bio-mimicry, education and more.
- To provide all researchers the opportunity to refine their skills or gain new learnings through ANET's knowledge sharing initiatives and in-house training workshops.
- To provide researchers with a field facility with an edge.

ANET will increasingly provide opportunities to weave together the work of many scientists and researchers across fields of study in order to see patterns and understand processes that would not be apparent from any single study or data stream. While it is often the logistical considerations that attract scientists to our facility, the organization endeavours to provide a significant and evolving body of knowledge that becomes a powerful platform for supporting additional research. Scientists can use this body of information to contextualize individual studies, extend the work of others, combine separate studies in order to detect complex processes and take advantage of long-term studies to investigate processes that cannot be observed on short time scales.

These synergies also emerge from the integration of research and training. Young researchers, students, interns and field staff identify new questions; develop an understanding of the natural history, research, and technical skills needed to enable future research; and develop the science skills that allow for a highly productive workforce and scientifically literate citizenry.

LOGISTICAL SUPPORT

Improving our facilities and services so that scientists and students can work effectively in the field.

The support we envision will include;

- Additional housing.
- Research laboratory space.
- Maintenance of equipment and control sites.
- Vehicle and boat support.
- Organizing, planning and recces.
- Guiding and facilitation for all clearances.
- Skilled/trained field assistants.
- In-house speciality courses available to researchers, students and staff.
- Lab and field equipment.
- Equipment that enables exploration of unique environments such as diving support, canopy towers, satellite field stations and a research vessel.
- Curating and guidance to align projects across subjects and institutions.
- Visual communication team to provide researchers with support in developing suitable material to communicate their work to varying audiences.



THE IMPORTANCE OF HUMAN CAPITAL AT ANET

When we speak of capital, most assume it to be financial or infrastructural. The strongest and most significant asset of the Andaman and Nicobar islands' Environmental Team however is, our 'human capital'.

The value of our human resources is intangible and cannot be directly perceived by someone viewing ANET from a distance. However, human talent and initiative is the single most important productive factor responsible for the growth, momentum, vision and work culture at ANET today.

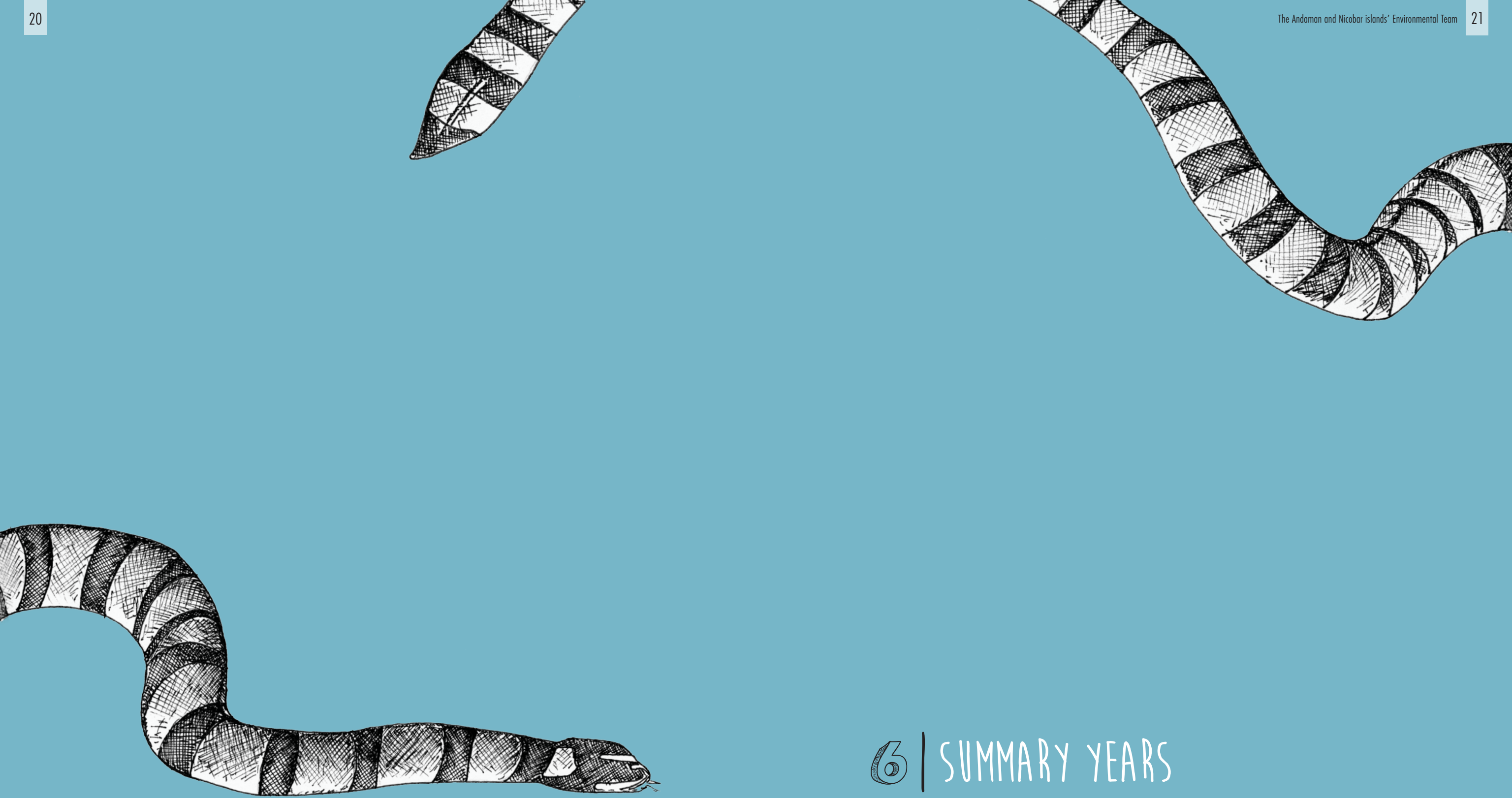
Clear team values, vision, experience, and expertise, in combination with the nature of work, location and emphasis on every team members development has created a force and think tank of highly motivated individuals.

Building human capital and its capability is a pre-requisite for growth of an organization and ANET is committed to being a space for science, education, training and lifelong

learning. This approach and inclusive attitude has ensured that every member from the helmsman of our dungi, the cook, field assistants and management engage in:

- Upgrading their skill set continuously.
- Transferring their knowledge and skills to others.
- Participating in organisational growth in order to tailor new work opportunities to align with their individual development, within every phase of ANET's vision.

We believe that the commitment, energy, creativity required to fuel ANET's future vision will come from this; human capital or as we'd like to call it - the team.



6 | SUMMARY YEARS

2009 - 2010

KEY DECISIONS

Need for financial self-sufficiency and setting up a revenue model.

Tapping the potential to host education programs at ANET

MILESTONE

Education division at ANET

REVENUE | INR 7,44,846

Invested into

PROJECTS

- Mangrove regeneration pilot study
- Amphibian documentation
- Reef and socio-economic monitoring
- Leatherback monitoring (CES | ANET)
- Posters (Environment Education for local schools)

DEVELOPMENT

- Cottage furnishing
- Library Update
- ANET E-mail ids and Blog
- Website concept and design draft
- Merchandise, Bags
- Dungi repair
- ID and labelling of property trees

EDUCATION

Module Development: Island Ecology

Programmes held

- St. Mary's College, Maryland: Marine ecology
- FERAL: Marine biology
- Pangaea (The Mike Horn Expedition)

First Steps

This enabled the development of additional infrastructure and human resources for the following season 2010 - 2011.

2010 - 2011

KEY DECISIONS

- Salary review and additional human resources
- Dive centre at ANET
- Re-focus on Research

MILESTONES

- Administrative and field staff team with defined roles
- Access to do advanced marine research and education
- Institutional collaboration with National Centre for Biological Sciences (NCBS)

Research efforts and additional infrastructure adding impetus to education

PROJECTS

- SOCMon - Socio Economic Monitoring of Richie's Archipelago
- Leather back monitoring (CES | ANET)
- Educational material development on endemics and habitats
- Dog faced watersnake behavior study
- Season Watch: Monitoring of tree phenology
- Distribution and habitat associations of frogs in pristine forests and altered habitats (Wandoor)

EDUCATION

- TGMP 1 & 2: Herpetology camp
- MAIS: Domains of discovery
- SPIS: Island ecology & diving
- I-Quest: Nature camp
- FERAL: Marine Biology
- Cathedral high school
- NCBS: MSc Marine Ecology

INFRASTRUCTURE

- Additional Cottages
- Greenhouse and Waste management system
- Jeep
- Underground electrics

Resources, Accommodation and Field Staff to facilitate more research

REVENUE | INR 22,05,707

This enabled development of additional infrastructure and potential for institutional collaboration for the following season 2011 - 2012.

2011 - 2012

KEY DECISIONS

- Constitution of Research Advisory Board
- Additional Staff

MILESTONES

- Institutional collaboration with Dakshin Foundation
- In house research projects begin

INFRASTRUCTURE

- Water Storage Tanks
- Weather Station Installation
- Boat Overhaul
- Two new researcher cottages and two staff cottages

Institutional collaborations, supporting infrastructure and staff expands the scope and capacity to host multiple research projects simultaneously

PROJECTS

- Long-term monitoring of forest tree communities (NCBS | ANET)
- Piloting moth monitoring study
- Use of mangrove nurseries by coral reef fish: effect of habitat complexity (NCBS | ANET)
- Effectiveness of marine national parks in creating pillboxes; use as a fisheries management tool (NCBS | ANET)
- Tree phenology, Season Watch
- Leatherback Sea Turtle Monitoring (CES | ANET)
- Pollination and phylogenetic patterns in island-gingers (Zingiberaceae), a study on the Andaman and Nicobar Islands
- Profiling fisheries for sustainable solutions in the Andaman and Nicobar Islands (DAKSHIN | ANET)
- Technical advisors and image contribution for Mahatma Gandhi Marine National Park

EDUCATION

- FERAL: Marine Biology
- TOS: Island Ecology
- TGMP: Herpetology camp

REVENUE | INR 34,77,916

This enabled purchase of a new boat, building of additional researcher cottages for the following season 2010 - 2011.

2012 - 2013

KEY DECISIONS

Expanding base operations into clearly defined divisions led by individuals with defined roles - New Administrative officer and Education officer at ANET

MILESTONES

Infrastructure:
 - New Boat
 - Rainwater Harvesting
 Collaboration with NCF

DEVELOPMENT

- Sheltered parking area for vehicles
- Fuel shed (for safe storage)
- Fire-safety inspection, equipment installation and training for all staff
- Composting unit
- NCF cottage
- Rain water harvesting system installation
- Purchase of second hand dunggi

Institutional collaborations, supporting infrastructure and staff expands the scope and capacity to host multiple research projects simultaneously

PROJECTS

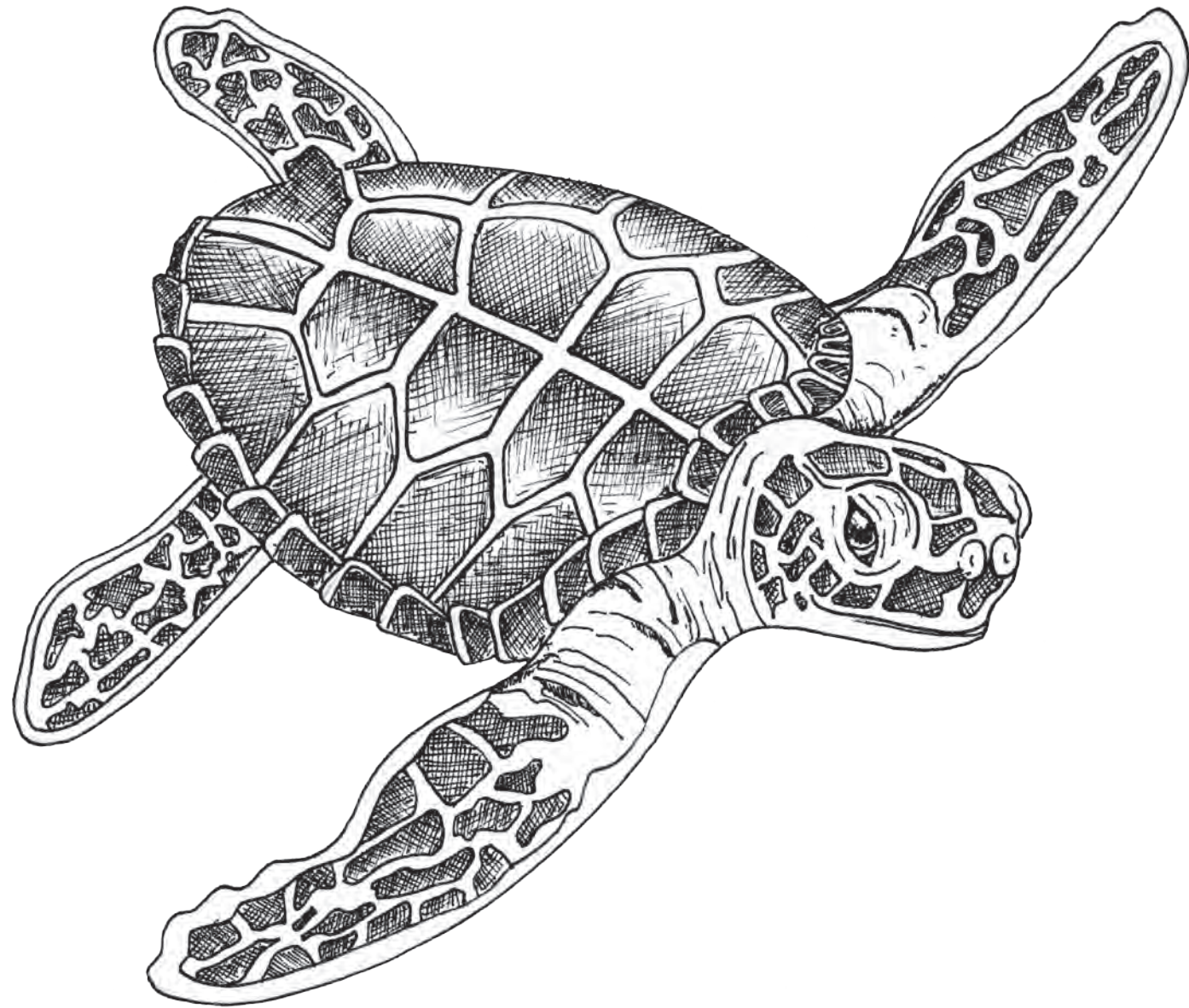
- Long-term monitoring of forest tree communities, biomass and dynamics in the Andaman Islands (NCBS | ANET)
- Long term monitoring of leatherback sea turtles in Little Andaman Island (CES | ANET)
- Community monitoring of fisheries in the Andaman and Nicobar Islands - Profiling Socio-Ecological Dynamics of Fishing Communities of South Andaman (Dakshin | ANET)
- Reef Recruitment (CES)
- Conserving grouper species and sustaining the grouper fishery of the Andaman Islands (Dakshin | MCBT)
- Evaluating the impact of introduced spotted deer (*Axis axis*) on forest floor herpetofauna of Andaman Islands (WII/MCBT)
- Assessing resilience in coral reefs for conservation planning in the Andaman Archipelago (NCF)
- Recovery of *Dugong dugong* of the Andaman and Nicobar islands (NCF)

EDUCATION

- FERAL : Marine Biology
- Cathedral School
- NCBS: MSc Program
- Nature Diaries
- InMe
- The Orchid School.

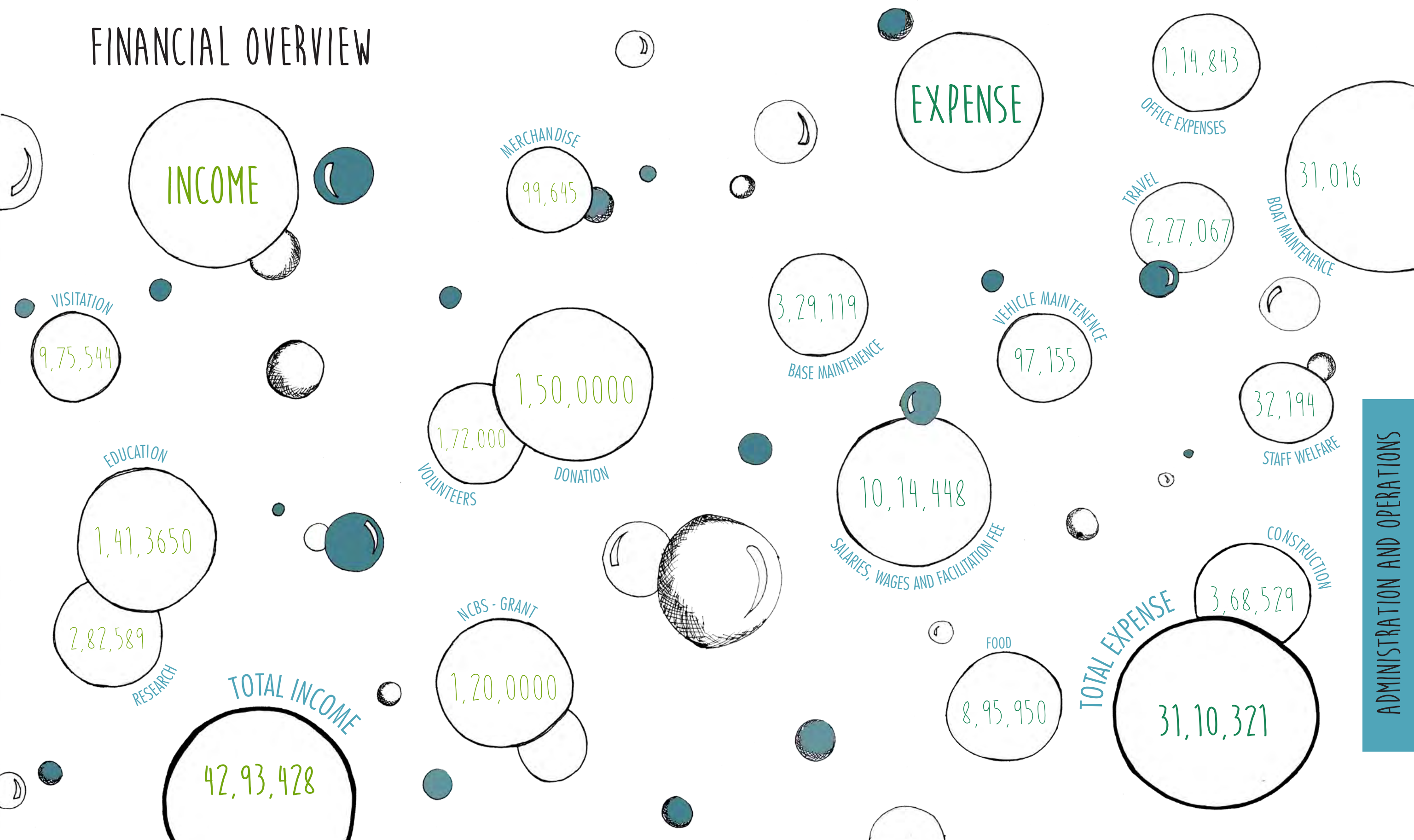
REVENUE | INR 30,10,661

This enabled additional team members, internship programs, active engagement with ANI administration for the following season 2013 - 2014.



7 | FINANCIAL YEAR 2013 - 2014

FINANCIAL OVERVIEW





NAGOO RAVI | With ANET since 2009
Reliable | Resourceful | Helpful

Ravi is the go to man and fixer for almost anything in prot blair. With two taxis and a phenomenal personal network Ravi is set to solve any problem.



SAW JOHN | With ANET since 1994
Reliable | Mischievous | Quiet

One of the longest serving ANET member with a vast knowledge of the natural history of the islands. John is responsible for co-ordinating all field research and has an unparalleled knack of multi-tasking.



MRINAL BHOWMICK | With ANET since 1986
Reliable | Mischievous | Quiet

Having been a part of ANET since its inception, Montu is the invisible man behind the smooth running and maintenance of the research station.



NAVEEN EKKA | With ANET since 2001
Talented | Creative | Jolly

He is responsible for the excellent food at ANET and is always eager to learn something new. Naveen is widened his range of skills to diving and driving.



UMEED MISTRY | With ANET since 2009
Creative | Passionate | Silent

A PADI staff instructor, award winning photographer, with a background in Marine Sciences, he has played a critical role in developing ANET's education vision, teaching students and training our in-house dive team.



BABU KUTTY | With Lacadives since 2012
Perfectionist | Dedicated | Dependable

Boat Captain and Rescue diver with an in depth knowledge in areas ranging from diving, electricals, mechanics and carpentry.



SAW STANLEY | With ANET since 2012
Creative | Cheerful | Positive

Field assistant with solutions to any problem a field biologist might come upon. Hardworker who is always enthusiastic but never lets it interfere with sound judgement.



SABIAN HORO | With ANET since 2012
Diligent | Reliable | Adaptable

Always ready for a new adventure on or off the field. Currently working on the turtle project and base maintenance.



BISHAL | With ANET since 2014
Enthusiastic | Meticulous | Avid learner

One of the youngest members of the ANET team working on the mangrove and long-term tree Monitoring Project.



JOHNSON KONGARI | With ANET since 2013
Ever-ready | Resourceful | Efficient

Johnson has quickly become an indispensable part of the kitchen staff. A quick learner, you'll often be amazed by his technique of chopping 150 times per minute.



SAW AGU | With ANET since 1998
Brave | Skilled | Resourceful

The captain of Khli (the ANET dingy), quiet, hardworking and brave, Agu has been with ANET primarily on sea turtle surveys and monitoring programs. One of the survivors of the Tsunami, it is a rare and precious moment to listen to and be enthralled by his tale.



SANJAY TIRKEY | With ANET since 2011
Comedian | Entertainer | Masterchef

Our in house comedian and one man show, Sanjay is a riot! He can turn out a fabulous spread for 80 people while dancing, singing, hula-hooping and having an intellectual debate all at the same time.



ANAND JAMES | With ANET since 2012
Steady | Patient | Rigorous

James is often known to be more diligent and meticulous than the researchers he assists. His mild manner and commitment to anything he sets out for is admirable. James has assisted on herpetological surveys for four years and is now working on forest tree mapping and monitoring.



TASNEEM KHAN | With ANET since 2009
Committed | Passionate | Untiring

Tasneem sees no end to the possibilities and scope of ANET. She is a photographer and diver, with a background in zoology. Promoting interdisciplinary work, while developing education opportunities is her major driving force.



SAW THESOROW | With ANET since 2009
Jack of All Trades | Hercules | Unassuming

Fishing, captaining a boat, diving, building, carpentry, electricals, cooking and playing the guitar are all things that come easy to him. A leading field assistant at the Leatherback turtle monitoring camp, he is a great companion on any journey.



JOCELYN PANJIKARAN | With ANET since 2012
Enthusiastic | Meticulous | Strong

With her finger on the pulse of ANET, Jo understands, manages and anticipates every last detail of the base operations. Cheerful and always ready for an adventure, she brings balance to work and play.



SAVITA VIJAYKUMAR | With ANET since 2013
Thorough | Creative | Limitless

Her ability to process multiple situations and projects simultaneously and identify linkages across fields makes Savita the ideal person to develop ANET's policy research and public relations. A doer, not only ensures that everything on her list is complete, but also everyone else's!



SMITA MADHUSOODAN | With ANET since 2012
Creative | Energetic | Adaptable

Education officer at ANET with passion to teach and learn with an intangible love for nature. Her keen eye and technical skill in structural design has helped ANET in our building endeavours.

RAINWATER HARVESTING SYSTEM




NEW TOILET AND BATHROOM BLOCK



COTTAGE EXTENSION

INFRASTRUCTURAL DEVELOPMENT

-  Kitchen re-modelling
-  Tent for volunteers
-  New toilet and bathroom block
-  Cottage extension
-  Treehouse | Art studio
-  Rainwater harvesting system
-  Well



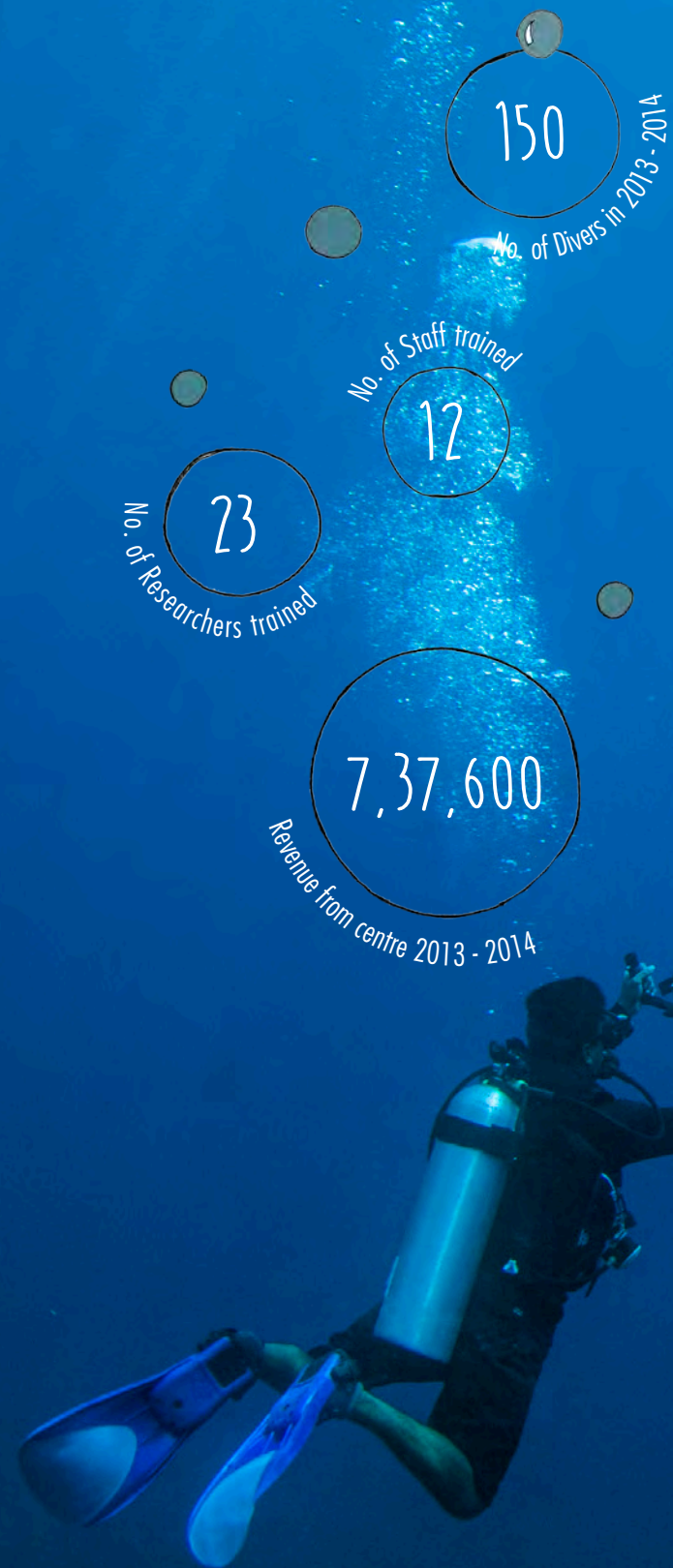
GARAGE EXTENSION

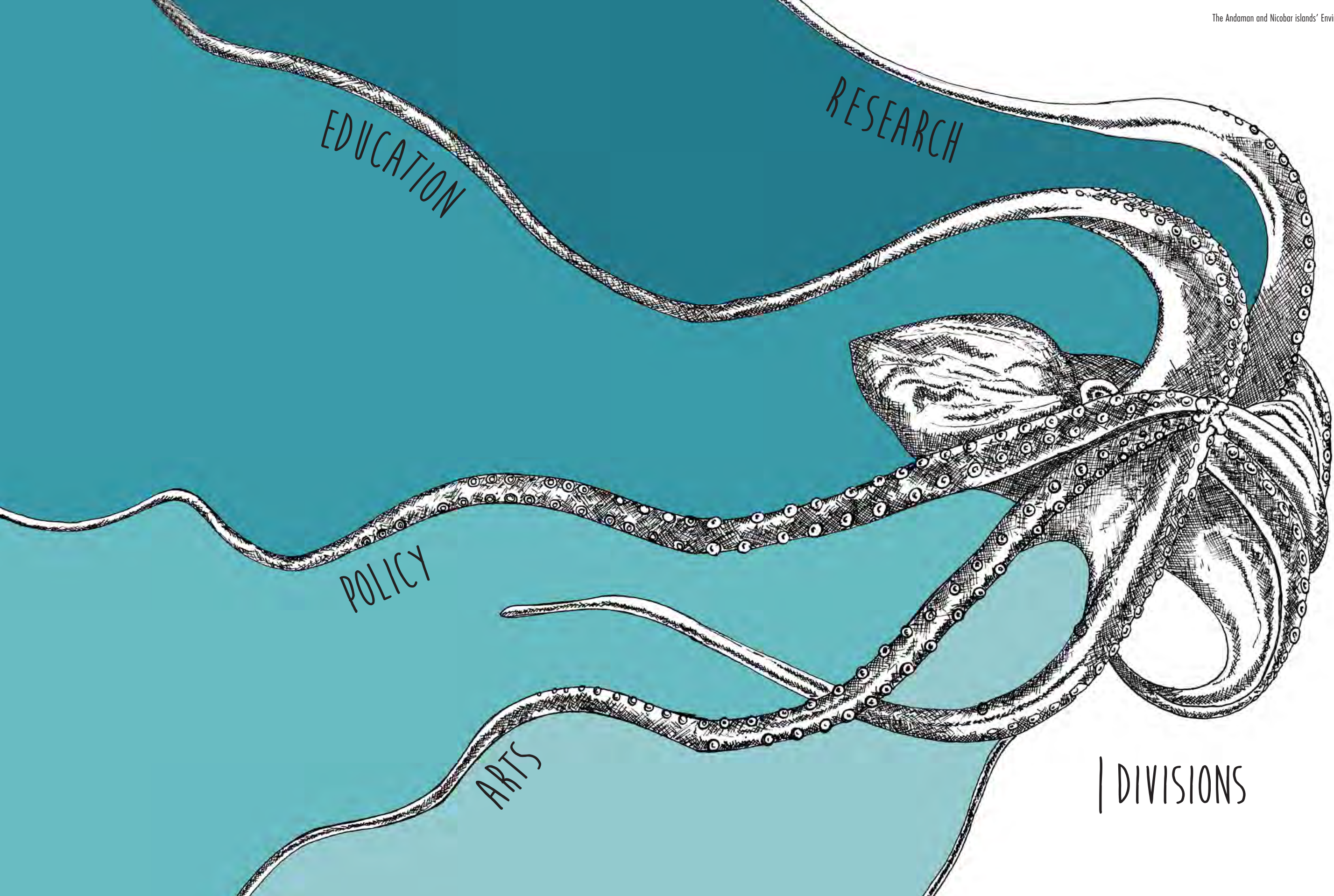
DIVING

The dive facility started at ANET in 2010.

The primary need was to enhance education programs and spawn new projects in the areas of marine sciences. The growing interest in marine research required an appropriate support facility.

ANET partnered with Lacadives, an existing dive operator to ensure professional training and dive services. Over the past four years the dive facility at ANET has trained numerous students, departmental staff (Forest department & Marine Police force) and researchers from the islands, mainland India and across the world. As a biological field station with access to marine and coastal habitats it is critical for ANET to provide a quality dive operation. The partnership with Lacadives enabled ANET to develop a strong footing in Marine research and education while training all in house staff to run a safe, dive facility with a very high standard of training .





| DIVISIONS



RESEARCH

The last 6 years have seen a distinct growth, from exploratory work, applied conservation and documentation to a broad range of work covering ecology, genetics, island biogeography, socio-ecology and marine sciences.

ANET currently serves as a field station for researchers and works in collaboration with multiple research and conservation institutions of India:

- National Centre for Biological Sciences.
- Centre for Ecological Sciences, IISc.
- Nature Conservation Foundation.
- Dakshin Foundation.
- Wildlife Institute of India.

Currently there are 14 scientific research projects being facilitated at ANET, covering the areas of:

- Marine ecology
- Island Biogeography and Genetics.
- Applied conservation.
- Forest ecology.
- Satellite telemetry studies.
- Socio-ecology.
- Floral-faunal interactions.
- Herpetology.
- Solid waste management.






RESEARCH ADVISORY BOARD

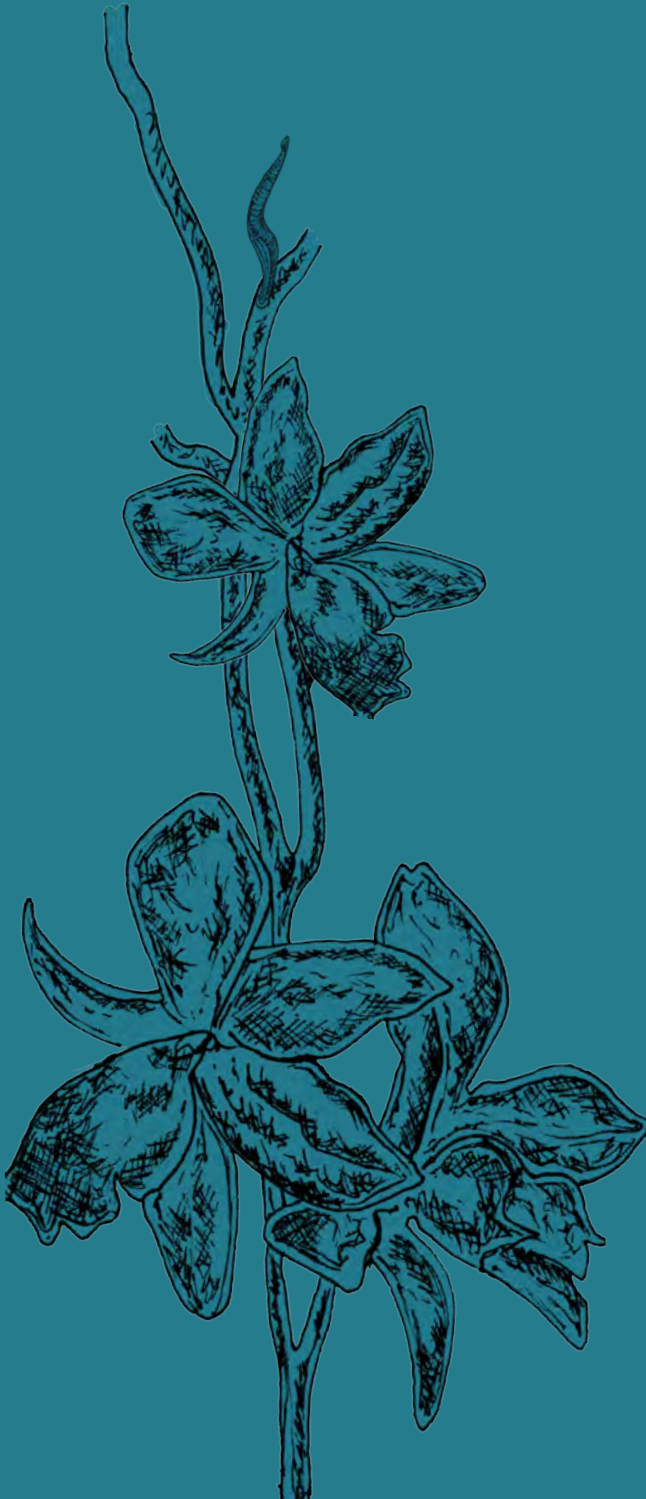
The Research Advisory Board (RAB) of ANET will assist the Directors and staff of ANET to review, oversee and monitor research at and supported by the Andaman and Nicobar Environmental Team (ANET).

GOALS

- To offer inputs into the creation of a medium and long-term vision for research at ANET.
- To help design and oversee implementation of long-term monitoring plans for different ecosystems at ANET.
- To periodically, and as requested, comment on proposals, to ensure the quality and direction of research projects.
- To be available to mentor students, volunteers and researchers working at ANET.
- To help coordinate research projects and outputs to facilitate coherence and priorities of the research programme.
- To ensure the documentation and compilation of research at ANET.
- To help plan the development of research and logistic facilities at ANET.

MEMBERS

- | | |
|---|---|
|  Dr. Kartik Shanker |  Ms. Tasneem Khan |
|  Dr. Naveen Namboothri |  Mr. Ajai Saxen |
|  Dr. Uma Ramakrishnan |  Mr. Manish Chandi |
|  Dr. Suresh Babu |  Dr. Rohan Arthur |
|  Dr. Aaron Lobo |  Rom Whitaker |



AFFILIATE INSTITUTIONS



NCBS

The National Centre for Biological Sciences (NCBS), Bangalore, is part of the Tata Institute of Fundamental Research. The mandate of NCBS is fundamental research in the frontier areas of biology. With research ranging from the study of single molecules to ecology and evolution, NCBS aims to understand biology at each of these levels to advance an integrated view of life processes. Collaboration at every level within NCBS, within the country and internationally, is a part of the research philosophy. NCBS has provided ANET with significant financial support since 2011.



DAKSHIN

Dakshin Foundation is a non-governmental organisation with a goal to promote ecologically and socially appropriate approaches to conservation and management in coastal, marine and mountain ecosystems in India. Using interdisciplinary approaches to research including natural and social sciences their mission is to build a knowledge base to inform and advocate conservation and natural resource management, while promoting and supporting sustainable livelihoods, social development and environmental justice. The organisation aims to build community capacities for conservation and enhance community stakes and rights in environmental decision-making, towards strengthening networks and supporting advocacy campaigns. Dakshin's current geographical focus areas include coastal areas of mainland India, the Andaman & Nicobar and Lakshadweep islands and the Western Ghats.



CES

The Centre for Ecological Sciences, founded in 1983 with the support of Ministry of Environment and Forests offers exciting opportunities for research in a variety of areas in ecology. Over the past 25 years, and more, CES instilled a tradition of rigorous enquiry in diverse areas of ecology, evolution and behavior. Their projects are often integrative and use multiple approaches, from theoretical and laboratory studies to field-based research, to explore research questions. CES focuses in the areas of scientific research and plays an active role in conservation.



NCF

The Nature Conservation Foundation is a not-for-profit institution set up in 1996 with a mandate to contribute to the rational conservation of India's diverse habitats and species with high quality scientific research and innovative on-ground solutions. NCF has long-term research and conservation programmes in several regions across the country including the trans-himalaya, north-east India, the Western Ghats, the oceanic islands of India, among others. NCF's Oceans and Coast programme has a dedicated presence in the Andaman and Nicobar Islands and the Lakshadweep. The programme seeks to combine basic ecology with socio-economic studies and anthropology to understand patterns of change in coupled human-ecological marine and coastal systems in India and to use this understanding to influence their rational management.

LONG-TERM ECOSYSTEM MONITORING NETWORK PROJECT (LEMoN India)

NCBS | ANET

Dr. Mahesh Sankaran, Dr. Jayashree Ratnam, M. O. Anand, Swapna N, Anand James, Saw John and Tasneem Khan.

Project Duration: 2012 - Ongoing



| TEAM PHOTO

Through this network we have established 1 ha permanent forest plots to enable long-term monitoring of forest tree communities, biomass and dynamics. This is part of the Long-term Ecosystem Monitoring Network (LEMoN India, lemon.ncbs.res.in) which we hope would eventually be a country wide effort spread across different forest types and across environmental gradients in order to understand factors regulating long-term forest dynamics and potential responses of these systems to future climate change. Two such permanent forest plots that have been set up are now being monitored on Alexandria and Rutland, South Andaman Islands. We intend to establish the third plot on Little Andaman Island by year 3 of the project.

Primary goals:

- To characterize forest structure, species diversity, biomass, carbon stocks and nutrient cycling patterns across broad climatic and edaphic gradients.
- To understand how climate change may potentially influence community composition, forest dynamics and carbon storage in the long term.

Site Selection an Status:

The plots are placed in relatively undisturbed stands of forest that are homogeneous and well representative of the native habitat, areas within the Alexandria and Rutland Islands were selected to establish two one hectare plots. The choice of the two islands was driven by the difference in levels of herbivory between them, which will ultimately enable us to study the impact of herbivores on recruitment, growth, survival and dynamics of the vegetation community. Plot establishment has been completed at both sites and monitoring of Rutland with 1610 trees, 25 seed traps and 25 seedling plots and Alexandra with 995 trees, 25 seed traps and 25 seedling plots. The season 2014 - 2015 will expand the field work to complete plant identification at both sites, initiating monthly measurements of soil and stem respiration, data collection on plant functional traits, soil sampling to characterize the physical and chemical properties of soil and initiating periodic measurement of climatic variables.

EVALUATING THE IMPACT OF INTRODUCED SPOTTED DEER (*Axis axis*) ON FOREST FLOOR HERPETOFUNA OF ANDAMAN ISLANDS

Independent Project | ANET

Nitya Prakash Mohanty, Harikrishnan S., K. Vasudevan, K. Sivakumar, M. Chandi

Project Duration: 2012 - Ongoing



| CAMERA TRAPPING

Introduced species are a major threat to native biodiversity, especially in isolated systems like islands. An introduced mammalian herbivore, the spotted deer (*Axis axis*) is a potential threat to native herpetofauna of Andaman Islands, in the Bay of Bengal. Introduced in 1930s, the deer alter the forest structure by browsing. This could in turn affect the microhabitat of forest floor herpetofauna and negatively impact arthropods up on which the herpetofauna feed. The study is intended to demonstrate the effect of spotted deer on forest floor reptiles and amphibians, if any. The pathways of interaction between the deer and herpetofauna will be identified, if a significant effect is found. This would

lead to a better understanding of the mechanism through which introduced herbivores could affect native taxonomic groups. The perception of stakeholders towards the introduced deer and their opinion on potential conservation action against the deer is also being evaluated.

Objectives:

- To assess spotted deer and herpetofaunal densities in the islands.
- To demonstrate the reduction of herpetofaunal density with increase in deer density.
- To formulate strategy for control of the deer in the Islands
- Dissemination and awareness.



IMPACTS OF CLIMATE CHANGE INDUCED BLEACHING ON CORAL REEFS OF THE ANDAMAN: DO POPULATION DEMOGRAPHY AND MARINE PROTECTED AREAS ENHANCE RECOVERY OF CORAL REEFS?

CES(IISc) | DAKSHIN

Dr. Naveen Namboothri

Project Duration: 2011 - Ongoing



A recent increase in sea surface temperature has reported to have caused a mass-bleaching event on coral reefs of the Andaman group of islands (Krishnan et al. 2011). Coral reefs of the region that are reported to have successfully survived previous mass bleaching events (such as the 1998 bleaching event) have now undergone substantial bleaching. It is imperative, not just from an environmental perspective, but also from an economic perspective that we sustainably utilize, conserve and manage our coral reef resources. Islands of Andaman support a growing fishery and tourism industry and also harbors some of the few relatively undisturbed and biologically diverse coral reef ecosystems of the world. However, the recent bleaching event of May 2010 has led to considerable mortality of these reefs and it is important that we understand

the responses of these ecosystems to climate change and what the critical factors are that determine their recovery. The project specifically aims to quantify recruitment processes of coral reefs of the South Andaman group of islands, comparing recruitment processes across different reef patches and co-relating recruitment levels with adult coral densities. The project also additionally aims to understand relationships (trade offs) between coral settlement and actual recruitment into the populations. The project has successfully reached its second season. This season, more than 10 additional sites were sampled and recruitment tiles have been set up at more than 15 sites across different reef patches of the South Andaman reefs.



PROFILING FISHERIES FOR SUSTAINABLE SOLUTIONS IN THE ANDAMAN AND NICOBAR ISLANDS

DAKSHIN | ANET | MCBT

Sahir Advani, Savita Vijaykumar, Dr. Naveen Namboothri, Dr. Kartik Shanker

Project Duration: 2012 - Ongoing



The Andaman and Nicobar Islands have rich marine resources that support a range of fisheries across the length of the islands. Over the last 50 years, people from different parts of India have settled in these islands and this has led to a diversity of both traditional and more modern fisherfolk communities in this region. Each community employs different fishing gear to target distinct groups of marine resources. The islands are thus characterised by multi-faceted fisheries, each demanding its own unique management approach.

These islands have witnessed boom and bust cycles of multiple fisheries, predominantly catering to external markets. The collapse and subsequent closure of the shellfish and bêche-de-mer fisheries were important events. The latter fishery catered solely to foreign markets, and even today a significant proportion of the landed fish stocks are exported to Southeast Asia. The promotion of newer technologies such as the live fish trade, shark fin fisheries, long lining and the unchecked growth of specialised fishery like grouper trade, now threatens to dominate most of the islands' fisheries. Updated and in-depth information is however, not available on the status and impact

of each of the diverse fishing practices on the marine ecosystem and livelihoods of various fisher categories.

This project aims to profile the social, economic, ecological and political aspects of this fishery. With this information we plan to highlight the need for better management and monitoring of these fisheries.

The focus of research in this field season has been on:

- Studying the lucrative grouper fishery of these islands.
- Interviews with the fishers, middlemen, and exporters.
- Underwater Visual Censuses of grouper populations on fished sites.
- Reproductive biology of the leopard coral trout (*Plectropomus leopardus*).
- Documentation of historical export trends, trade linkages between local and foreign markets for fish commodities.
- Researchers are also engaging in talks with the Fisheries Department and the local administration to discuss the transition to sustainable fishing practices.

MONITORING OF LEATHERBACK TURTLES AND THEIR HABITATS IN THE ANDAMAN AND NICOBAR ISLANDS

DAKSHIN | CES | ANET | MCBT | DoEF

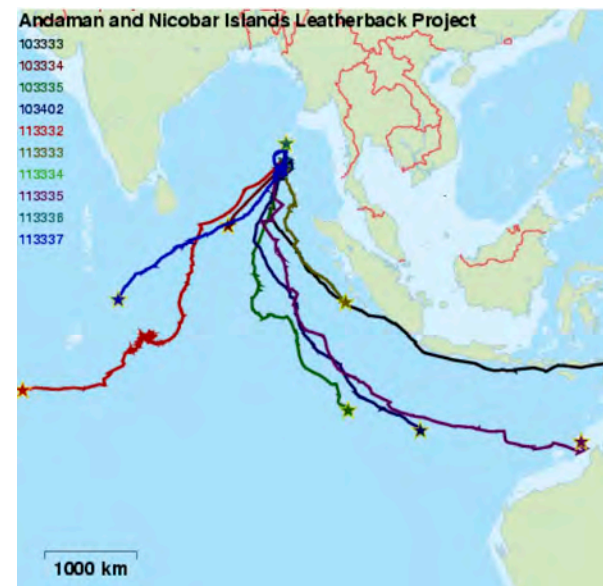
Kartik Shanker, Naveen Namboothri, Manish Chandi and Adhith Swaminathan

Project Duration: 2008 - Ongoing



The leatherback is listed as Critically Endangered by the IUCN and under Schedule I of the Indian Wildlife Protection Act (1972). There is great concern over the drastic declines in the nesting populations of this species throughout the world, especially the Pacific. Very little is known about the status of leatherback populations from the Indian waters, barring the recent work by the Andaman and Nicobar Environment Team (ANET) on Great Nicobar Island, and the collaborated efforts of ANET, the Centre for Ecological Sciences (CES), Indian Institute of Science, and the Madras Crocodile Bank Trust (MCBT), and Dakshin Foundation on Little Andaman Island. Many of the prime nesting sites of the Andaman and Nicobar islands were badly affected by the December 2004 earthquake and the subsequent tsunami. South Bay beach has been monitored for the last 7 years, and for the last four seasons a camp has been established on

the West Bay beach for monitoring where efforts have been concentrated since 2010. In addition, the habitat component has also been monitored by collecting data on the profiles of the nesting beaches in South and West Bay to understand the effect of physical changes to leatherback nesting. In 2010, a satellite telemetry study of leatherback turtles was initiated with support from the Indian Space Research Organisation (ISRO) and the Space Technology Cell, Indian Institute of Science, Bangalore and since then ten satellite transmitters have been deployed and the results of the study are available online at www.seaturtle.org. Over the years, the monitoring programme has also had a strong focus on developing networks for conservation in the region and a long-term education and outreach programme to sensitize government authorities and local communities on conserving sea turtles and their habitats.



MAP OF LEATHERBACK TURTLES TAGGED WITH SATELLITE TRANSMITTER BETWEEN 2010 - 2014

TAGGING DATA

Year	Leatherback	
2007 - 2008	6	
2008 - 2009	9	
2009 - 2010	2	
	South Bay	West Bay
2010 - 2011	6	23
2011 - 2012	0	20
2012 - 2013	0	12
2013 - 2013	2	19

Year	Total No. of Nests		Percentage of Nests Predated	
2007 - 2008	25		32	
2008 - 2009	39		20	
2009 - 2010	7		28	
	South Bay	West Bay	South Bay	West Bay
2010 - 2011	58	91	24	58
2011 - 2012	36	148	50	30
2012 - 2013	45	77	40	20
2013 - 2014	64	153	54	33

LEATHERBACK NESTS AND PREDATION PATTERNS



TOWARDS SPECIES RECOVERY: RESEARCH, MONITORING AND STAKEHOLDER INVOLVEMENT IN CONSERVATION OF DUGONGS IN THE ANDAMAN AND NICOBAR ISLANDS

NCF, Mysore

Erika D'Souza, Vardhan Patankar, Dr. Rohan Arthur, Dr. Núria Marbà and Dr. Teresa Alcoverro

Project Duration: 2011 - Ongoing



In 2010, the Ministry of Environment and Forests placed the dugong as a top priority animal under the Species Recovery Programme. In February 2012, the Department of Environment and Forests, Port Blair launched a five year programme in collaboration with the Nature Conservation Foundation, Mysore to provide research inputs into this initiative. As conceived, the programme is being conducted in 2 phases. Phase I (18 months) is dedicated to documenting the past and present distribution of dugongs and seagrass meadows in the Andaman and Nicobar archipelago, assessing threats to the animal and

its habitat and understanding interactions between the Dugong and seagrass meadows. In addition, this phase will see the development of a community based monitoring and informant protocol for dugongs and their habitat. The project fieldwork commenced in March 2012.

Field work towards achieving the objectives of Phase I of the project have been completed. We are now in the process of analysing the data and preparing the final report.

UNDERSTANDING THE EFFECTS OF SEDIMENTATION ON THE VERTICAL ZONATION OF CORAL COMMUNITIES IN THE MAHATMA GANDHI MARINE NATIONAL PARK, WANDOOR, SOUTH ANDAMAN ISLANDS.

NCBS | ANET

Student: Chetana B Purushotham

Advisors: Dr. Naveen Namboothri, Dr. Suhel Quader

Project Duration: November 2013 - July 2014



Among the factors known to influence the distribution of corals and other organisms on coral reefs, sedimentation is presently thought to be one of the most important. Sedimentation as a local process becomes crucial in influencing the recovery of corals from larger disturbances, natural or anthropogenic such as cyclones, predator outbreaks and ocean warming. The broad impacts of sediments, on corals in particular, manifest either in a reduction in their settlement and growth rates, by altering crucial bio-physical requirements or in tissue damage through abrasion and smothering by direct contact. The proposed study aims to examine how these impacts can influence the patterns of coral structure and distribution at the community scale. We proposed to carry out this study in the fringing reefs of the Mahatma Gandhi Marine National Park in Wandoor, South Andaman Islands. The community composition of corals was quantified and compared between sites along a gradient

of sedimentation to examine any effects on the patterns of various community attributes such as species and life form composition and distribution of size classes. Using satellite imagery and snorkeling surveys in the national park, two islands - Tarmugli and Boat islands, with distinct point sources of sediment discharge into the fringing reefs were identified. Sediment traps were deployed for a period of 30 days, across sites that varied in depth and their distance from the point sources of sediment. This was done on both islands along with the photo quadrat sampling for coral community structure (species richness, abundance, size classes).

15 sites were covered per island, across 3 depth classes (5m, 10, and 15m) with increasing distance from the point source of sediment up to 2 kilometres.

Analysis and writing for this thesis is underway.

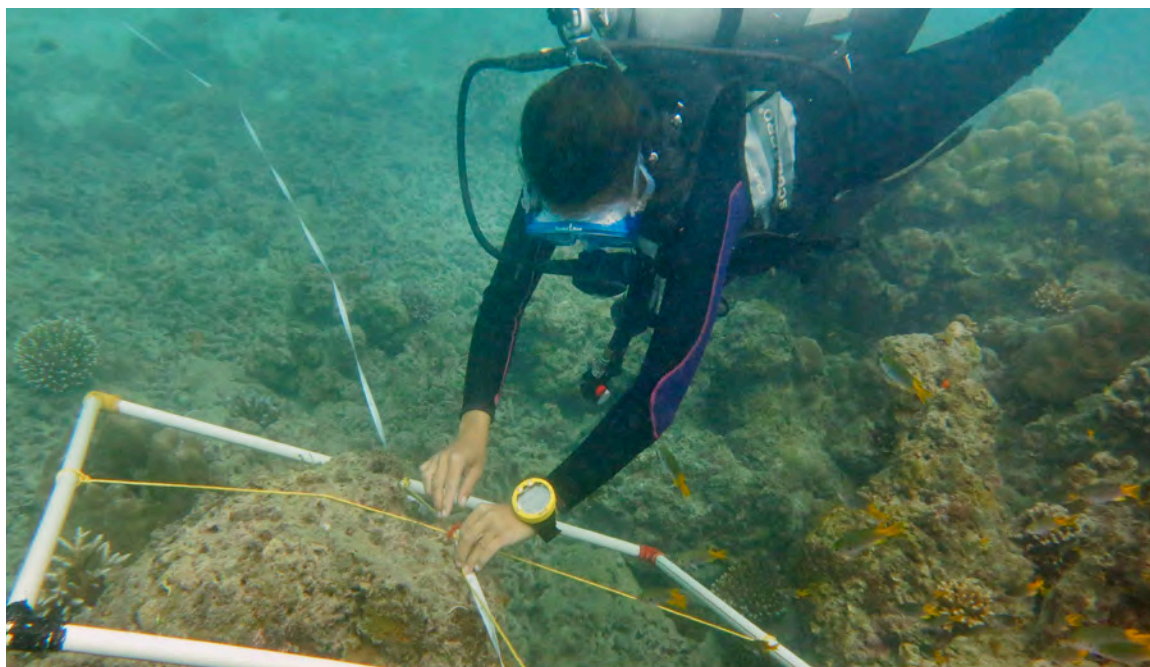
UNDERSTANDING CORAL EARLY LIFE HISTORY PROCESSES IN THE MAHATMA GANDHI MARINE NATIONAL PARK

NCBS | ANET

Student: Katya Saini

Advisors: Dr. Naveen Namboothri, Dr. Rohan Arthur

Project Duration: November 2013 - July 2014



The recovery of coral reefs after disturbances, and their continued existence depends on the vital process of coral recruitment, which is essentially the introduction of new, young corals into the population. The levels of recruitment prevalent in the Andamans, and specifically what species of corals are recruiting, are essential indicators of the status and health of the reef, but are currently unknown here. This study aims to understand the early life-history processes of corals, particularly recruitment, settlement and survival. The study site selected was Mahatma Gandhi Marine National Park and its surrounding areas in Wandoor, South Andaman Islands.

Ob

- Identify the different substrates available for recruiting coral, and the extent of each of these in the study area.
- Identify the coral genera, measure each individual, and quantify the total number of coral recruits occurring on each

of these substrates.

- Evaluate the survival of coral recruits on different kinds of substrates, by comparing the individuals of different size classes on each substrate.
- Attempt to identify some of the factors affecting variability in coral recruitment across the different reefs.

Live coral cover and substrates available for coral recruitment, is estimated using a photo-quadrat sampling method. (1m² quadrats, at 5m intervals along a 30m transect line at a standard depth of 10m). Each individual coral recruit and its substrate were also photographed. Furthermore, to assess whether juvenile corals preference for specific substrates, focused sampling methodologies were employed.

Analysis and writing for this thesis is underway.

GENE FLOW IN BATS OF DIFFERENT ECOLOGY AND MORPHOLOGY: A COMPARATIVE STUDY FROM THE ANDAMAN ISLANDS

NCBS | ANET

Student: Rohit Chakravarty

Advisors: Dr. Arjun Sivasundar and Dr. Balaji Chattopadhyay

Project Duration: November 2013 - July 2014



The Andaman archipelago in the Bay of Bengal consists of five large islands and numerous small islands flanking the large ones. Along with the neighbouring Nicobar group of islands, this forms the largest archipelago in the Bay of Bengal. An estimated 22 species of bats are known to occur on these islands. A comprehensive baseline data has been generated on species diversity and distribution of roosts by the Zoological Survey of India and Aul (2002). However, with the exception of Aul (2007) from the Nicobar Islands, no other ecological study in this archipelago has focused on bats.

This study aims to explore gene flow in five widespread species of bats - *Cynopterus sphinx*, *Hipposideros pomona*, *Rhinolophus yunanensis*, *Taphozous melanopogon* and *Eonycteris spelaea*. Knowing the movement capabilities of an organism allows us to make inferences about the level of connectivity among populations, risks associated with local extinctions and the evolutionary potential of populations and the species as a whole (Newton

et al. 2003). Additionally, exploring genetic structures of island populations may help in bringing up species that are new to science and are restricted to a small geographical area.

A total of 394 samples from 9 species, were sampled across 8 islands.

Currently, genetic analyses are being performed from DNA extracted from individual samples of the five species that dominate our dataset - *Cynopterus sphinx*, *Hipposideros pomona*, *Rhinolophus yunanensis*, *Taphozous melanopogon* and *Eonycteris spelaea*. DNA sequences obtained from samples from different populations of the same species will be compared for their similarities. Morphometric data obtained on field is also being analyzed to check if certain populations differ in their body size parameters. Preliminary analysis with the morphometric data has already shown significant differences among southern and northern populations of *Cynopterus sphinx*.

TAKING BACK THE LAND: FACTORS AIDING OR CONSTRAINING REGENERATION OF DAMAGED MANGROVE FORESTS

Independent Researcher | ANET

Bhanu Sridharan and Tasneem Khan

Project Duration: 2013 - Ongoing



The objective of the study is to understand natural regeneration in mangrove forests affected by the 2004 tsunami and earthquake, in the Andaman Islands.

The project specifically looks at:

- The changes brought about by the tsunami and earthquake, through literature surveys, geological survey reports and local community interviews.
- Creating a baseline of the plant species affected by the 2004 event, and the species colonising damaged mangrove patches.
- Assessing the specific impact of these changes through measuring abundance and species composition of flora in damaged and intact forest patches in different parts of the Andaman Islands.
- Measuring microhabitat characteristics that may affect regeneration of different plant species.
- Setting up long term monitoring programme to understand natural regeneration after such catastrophic events.
- Identify direct and indirect uses of mangrove forests as a whole and specific mangrove plants through interviews with local communities.

Using geological studies from the Andamans and interviews with local residents, two major impacts of the 2004 earthquake and tsunami have been identified. The Andaman Plate has shifted with the earthquake, causing South Andaman plate to subside by approx. 5m, while the North Andaman Plate has uplifted by nearly 1m.

Two sites in the South Andaman region, in the Lohabarak Area, and Rutland Island have been surveyed to map areas of damage, tree species that experienced mortality and species that are colonising damaged areas. The Lohabarak area has also been mapped to understand inundation sources, species zonation and topography. Permanent plots have been set up for long term monitoring of vegetation cover, saplings, soil-water chemistry, tree phenology, invertebrate abundance and human disturbance.

Monitoring will continue over the next three years with the help of volunteers. A manual is currently being developed, detailing the methodology to allow for volunteers and students to participate in the process of long term ecological monitoring.

SEA - KRAIT MONITORING

ANET

Saw John /Erina Young/ Tasneem Khan / Anand James / All volunteers

Project Duration: November 2012 - Ongoing



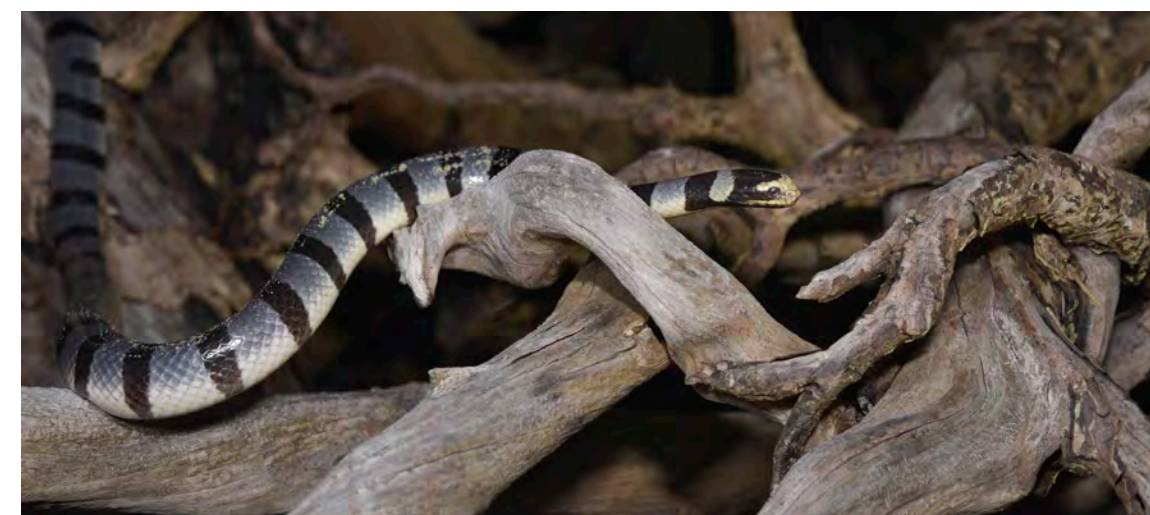
Sea snakes are amongst the most recently evolved groups of reptiles. They are said to have evolved from lizards about 135 million years ago, sharing many features with them (Heatwole 1999).

At the New Wandoor beach on the South Andaman Island two species of Sea Kraits are known to occur: *Laticauda colubrina* (yellow-lipped sea krait) and *Laticauda laticaudata* (blue-lipped sea krait).

The last known study conducted on these species at the Andaman and Nicobar Islands was over 15 years ago. With there being such sparse information on these snakes, ANET has decided to collect data in order to fill gaps in the understanding of the activities of these snakes. A better understanding of habitat usage and behavioural patterns would allow for focused scientific questions to be further researched and effective conservation methods for these species.

New Wandoor is a beach located about 29 kms from Port Blair and about 2 kms from ANET and on the border of the Mahatma Gandhi Marine National Park. The 2004 tsunami up-rooted a large number of Mahua trees along the beach creating a short-term habitat of root systems and dead wood. These complex structures seem to be a preferred resting and possibly nesting site for these snakes.

Data collection occurs every night. The beach is scanned along two transects. The parameters of data recorded are environmental conditions (atmospheric temperature and humidity, sand temperature humidity, sea state), temporal data (encounter time, tide, the phase of the moon), behavioural patterns (movement, location | position, substrate), morphometric characteristics (size, sex, maturity). A set protocol has been developed in order to assist observers and recorders.





EDUCATION

The ecosystems and society around us are central to ANET's learning philosophy. They function as dynamic classrooms and living laboratories, fostering an ingrained understanding of the islands natural history. Through placed based learning we are able to provide contextual learning experiences, empowering students with alternative perspectives. Here, ecological literacy is embedded into every subject and experience.

Time at ANET is most often highly motivational for students. Students interact with scientists, policy makers and communities with invaluable traditional knowledge while they have the freedom to explore, and move along the continuum from passive learners to active researchers.

This approach to learning and dissolving the boundaries between 'subjects', has profound effects on students

in the long run - ingraining in them the critical skill of inquiry while understanding causality, interconnectedness and sustainability. This is designed and intended not to restrict their views to that of environmental education, but in fact boost and benefit students across academic backgrounds, interests and professions.

CURRENT PROGRAMS AND MODULES

- Experiential learning excursions.
- Middle and high school introduction to coastal ecology
- Undergrad and post-grad: marine ecology, science and society, specialty courses.
- Workshops conducted: design in nature, science and visual communication.

CERTAD

'Engage' the Learning Expedition

The field component of 'Why on Earth', A Place Base Learning Studio by, Srishti

The Srishti School of Art, Design and technology with ANET conducted an exploratory learning expedition in the Andaman Islands, as part of a three month (semester long) Learning Studio on Place Based Learning for 2nd year design students from Srishti.

Objective | To develop free and open platforms for learning, design locally contextual educational activities for children, design innovative and interactive teaching tools and archive stories about land, water and people of the ANI.

ANET in collaboration with the **Center for Education Research Training and Development (CERTAD)**, Bangalore; hosted a field trip for 24 second year 'Visual Communication' undergraduate students of Srishti School of Art, Design and Technology, Bangalore, between the 2nd and 8th of March, 2014.

In order to develop teaching aids and learning tools for 'Place Based Learning' in the ANI, the 24 participants and facilitators were provided intensive immersion sessions into the island's ecology, multi-cultural dynamics, socio-political contexts and exposed to various conservation initiatives versus development issues.

Based on our broad vision of mainstreaming environmental awareness, strengthening islanders connect with their land, the themes selected were;

- Identifying patterns
- Meta-history of learning
- Fear to belonging
- Isolation to interconnectedness
- Information to reasoning
- Truth to perspective.

Each immersion session was a day long field activity, followed by creative studio sessions to compile observations, findings, stories, concepts and ideas.

Output | Interactive games, Flip books, Field activities etc.

These materials have been taken to completion in Bangalore, by Srishti faculty and visiting ANET associates. In the coming academic year, we intend to produce and put in circulation the best of these materials, as part of ANET's education initiatives with the Department of Education for all island government schools.



LIGHT AND LIFE ACADEMY

The Light and Life Academy in Ooty is an institute committed to the education of the art and science of photography. In collaboration with ANET and facilitated by Underwater Photographer Umeed Mistry - a pilot module in Underwater, Travel and Nature Photography was conducted for 37 students.

Objectives

- To balance and widen the art of landscape photography with a finer understanding of the environment one captures.
- To understand and experiment with the dynamic changes in coastal landscapes - light, water, form, life and accessibility.

Process

The photographers were provided with a detailed overview of the various island systems along with the visual potential each held. This provided a background for students to practice the

planning and preparation required for outdoor shoots in varied environmental conditions.

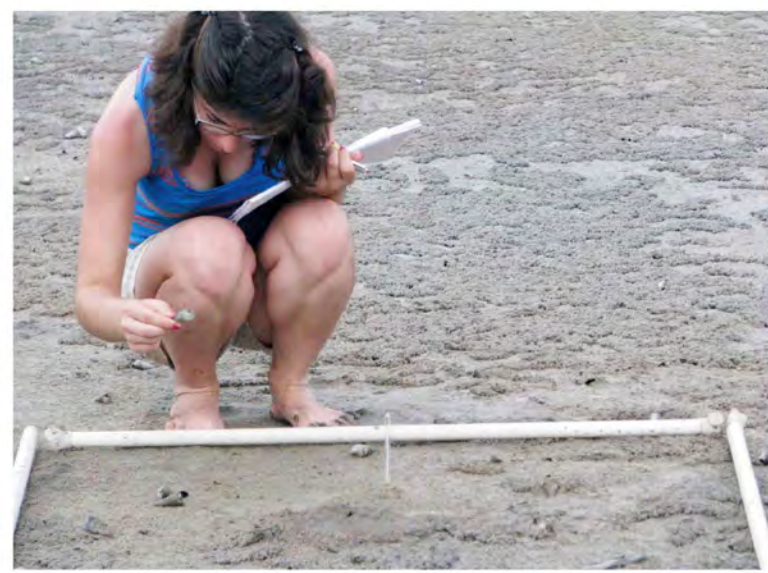
Students that opted for an introduction to underwater photography, would require to combine the science of diving with that of photography. This included PADI open water diving certifications.

The art and technical aspects of photography in shallow water; capturing life above and below was taught and practiced within the mangrove and intertidal zones.

Outcomes

The groups after their stay at ANET also travelled to other parts across North, Middle and South Andaman on their photo expedition. The students put together a portfolio on Andaman Islands on returning to Ooty.





ISLAND EDUCATION INITIATIVES



| THEATRE EXERCISES

1 | ANET AND THE ROTARY YOUTH LEADERSHIP ASSOCIATION (RYLA)

Organized by Rotary Youth Leadership Association (RYLA) as part of their 'wildlife week', 50 participants from the islands and mainland were hosted at ANET. A daylong program was designed to expose students to the pristine, yet threatened ecosystems of the Andaman Islands. Two exploratory walks, led through coastal

landscapes provided the ideal setting for appreciation, inquiry and interactions. The activities included a walk through the dynamic intertidal ecosystems of mangroves, rocky and sandy beaches, where the participants were sensitized to the adverse effects of coastal pollution.

2. ANET's "ART AND NATURE" WEEKEND WORKSHOPS - FOR STUDENTS FROM PORT BLAIR

We find that various forms of artistic expression - from theatre to fine art can be effective mediums to teach and learn multiple aspects of island ecology.

ANET's Nature and Art workshop on 'Mangrove systems and Theater' (12 students)

After taking the strangely unique and beautiful landscape of the mangroves, its completely saturated earth, with roots emerging all around and a distinct odour permeates the air. The participating students were made aware of the plentiful life teeming around them, and witness the interactions and dependence of living beings in the habitat. They documented and observed the ecosystem that supports over thirty species of mangrove plants and numerous creatures; marine, terrestrial, aerial and arboreal, with fascinating adaptations. Birds feeding or roosting, perfectly camouflaged monitor lizards, hordes of juvenile fish, mollusks of all shapes and sizes clinging to exposed roots.

Based on sights, sounds, feel and (sometimes taste) of things in the mangrove forests, this workshop encouraged students to observe and explore ways to embody the various sensations. Taking on various characters, the flowing fresh water, the rise and fall of tides or the postures and swaying movements of branches with wind. The workshop began with an ice-breaking session to rid the group of any inhibitions. The short skit that resulted had potential to be used to reach out to a larger audience, connecting with people at various levels.

ANET's Nature and Art workshop on 'Ecosystem edges and Mapping' (14 students)

This activity began with students taking a small hike to capture the essence of South Andaman Island from ridge to reef, where the winding path through the rainforest teaches them volumes about the various life forms on the island. The path passes through agricultural land, forest patches, water bodies, littoral forests, wetlands, and the intertidal zone. Students were taught to orient themselves accurately and map the changing topographical features of the islands they observed during the walk. It makes all the theory fall into place - layers of the forest, where light falls, how and why and serves as a first-hand account of diversity and zonation. Every few meters students managed to see a range of wildlife endemic to the islands. Learning about the forests and the rich biodiversity they hold reiterates that 'Nature is our teacher and the real world is the optimal learning environment'.

The activity was centered on the students learning the process of mapping, this included knowledge of reading a map and drawing one out, i.e - area with its elements depicted and connections highlighted. This is a handy tool in studying the environment, geography and sociology.

During the course of this excursion, observations made were documented through notes, sketches, compass-use, GPS, kestrel, natural navigation using the sun and devising their own key - each student at end the day had a map on a scroll of their own!



ANET's Nature and Art workshop on 'Coral Reefs and Story telling' (22nd December & 5th January)

The coral reefs of ANI's east coast form one of the largest continuous reefs in South Asia, and make the islands some of the most visited dive destinations in the world. During ANET's storytelling workshops they also transform into perfect settings for amazing adventure stories. The daylong storytelling workshop began with an immersion into the underwater world through the PADI certified - Discover Scuba Dive. Students explored the coral reefs and sand-flats that fringe the islands just off the Mahama Gandhi Marine National Park.

The aim of the workshop was to introduce participants to the coral reef diversity in the islands and telling a story inspired by the experience. Through this process they develop imagination and translate that thought through oratory or writing skills. The first dive is an explosion of the senses, swimming with fish and over colourful corals, crabs and clams - students learn about this surreal ecosystem. Once they return back to shore the art of storytelling opens up a way to explore and express the various nuances of the experience. This process of sharing is present in beginnings of cultural history; people have been passing on knowledge through the speaking and listening process of storytelling. Apart from achieving a command over language and other oratory skills, storytelling techniques and processes can support exploration in other subject areas as well (science, social studies, performing arts etc.)

3| TALK AT DISTRICT INSTITUTE OF EDUCATION TRAINING (DIET), GARACHARMA.

National Science Day was observed in institutions across the islands on the 28th February 2014. DIET at Garacharma on the occasion organized a program and invited ANET and Dakshin foundation to give a talk to the young teachers on Environment Education and 'place based education' in schools.

ANET and Dakshin foundation, together introduced the concept of place-based education to the gathering as "Education in the Andaman and Nicobar Islands - A contextual approach." In addition to place-based education, the third edition of Treasured Islands was also unveiled. The collaboration behind the preparation and execution of the textbook was introduced in the process giving them contextual background of the organizations. Snippets of the textbook were also presented with the activities.



MAIS

THE MALLYA ADITI INTERNATIONAL SCHOOL, BANGALORE

Domains of Discovery: A middle school

Learning Excursion

2nd to 8th February, 2014



The 8th graders of Mallya Aditi International School (MAIS), Bangalore visited ANET as their Domains of Discovery (DOD) - a learning project undertaken by the school. The DOD program collaborated with ANET's - Island Ecology Expedition Program, tailored to suit the school's requirement wherein, the class of 30 eighth graders accompanied by a team of six teachers stayed at ANET and participated in the six day experience. The program was led and facilitated by ANET's education division, researchers and staff.

Overview of the program

The six day program was structured such that students explored the ecosystems of the islands through activities, walks and interactions. The class was introduced to tropical island ecology of the Andaman Islands that covered mangroves, tropical forests, sandy and rocky intertidal, and coral reef systems.

Objectives

- Biomes and Ecosystems - habitats, processes, flora, fauna and interconnectedness within coastal and forest ecosystems.
- Environmental conservation.
- Oral history: Stories and lives of settler communities and their livelihoods.
- What, where, how and why of Endemism.
- Adaptations and symbiosis.
- To develop observation and perseverance skills.
- To learn about the process of conducting research.
- To learn practical ways of conserving the environment.
- Interpersonal skills:
 - How to conduct interviews sensitively.
- Journaling and art inspired by nature and experience.
- To inculcate within participants active group participation and social service.

Program design:

- Outdoor immersion.
- Observation through 5 senses.
- Overcoming fears.
- Inquiry: The art of scientific questioning.
- Looking for answers, systematic documentation and reasonable inference.
- Setting up experiments.
- Identifying the value in science and traditional knowledge.
- Sensitive and effective communication.
- Connecting the dots: everything we are studying is interconnected.

PROJECT OVERVIEW

Over the last year ANET together with Dakshin Foundation embarked on a long term project to introduce the concept of 'place based learning' in the islands. This refers to contextual learning where students learn various abstract concepts experientially by engaging with their immediate surroundings. For a teacher, the Andaman and Nicobar Islands offers a multitude of ecosystems that can be used as classrooms and living laboratories to teach a range of subjects.

This effort has largely involved the production, content revision and re-illustration of the text book, 'Treasured Islands.' Originally written by Sunita Rao and published by ANET and Kapavrish in the year 1994 and later in 1999. The book was distributed by the Department of Education and for more than a decade it has remained the only resource material for island specific information for students and teachers.

Identifying it as a useful resource material the Department of Education approached ANET to reprint the book.

ANET in collaboration with **Dakshin Foundation**, Bangalore, took this opportunity to update and revise the design and content for the publication of Treasured Islands III. This was done while keeping it in line with the current CBSE syllabus. An entire class of students from **Srishthi School of Art, Design and Technology** worked on the design and layout which has resulted in a visually stunning print. The contents of this book divided into chapters and activities

are tailor-made for the Andaman & Nicobar Islands, using local references and highlighting the features of the archipelago, its ecosystems, inhabitants, key issues and events. Through a detailed survey, the book has been presented to teachers across the Andaman school groups for their feedback. In total a representative sample size of 49 schools from across nine zones was shortlisted based on various criteria including student strength, medium of instruction, location, concentrating on middle school level. The emerging suggestions will be incorporated into book and during implementation phases.

The next phases to follow are:

- Translation and publication.
- Development of supplementary material and teaching aids.
- Teacher training workshops.
- Implementation of Place Based Education through Treasured Islands III.



INTRODUCTION TO KNOWLEDGE SHARING

The wide range of experts that visit, work at and pass through ANET, play a significant role in our endeavour to provide a continuous exchange of knowledge, ideas and skill. Regular evening sessions are organised by ANET to provide for this

dialogue; presentations, workshops, films, talks, debates and slide shows. This combined with hot samosas and chai, is how we best describe our 'knowledge sharing' sessions.



YASHAS SHETTY

Centre for Experimental Media Arts, Srishti, Bangalore.

Workshop: DIY 'Jugaad' Microscope Workshop.

Yashas's work is situated between the arts and the sciences, creating situations of dialogue between scientists, artists and the larger community. His practice explores working between various disciplines including installation, sound, software and biotechnology. Yashas conducted a workshop for researchers and staff at ANET on how to build a Jugaad Microscope with a webcam with 200px resolution.



JOACHIM MICHAEL SCHMERBECK

Associate Professor, Department of Natural Resources.

Talk : Forest Fires.

Joachim's research work focuses on the interaction of anthropocentric management systems with forest ecosystems. Largely, this explores on vegetation dynamics in relationship to human interference, and how this influences the provision of a wide range of ecosystem services. At ANET, he spoke extensively about the impact and the consequences of forest fires.



SHAI HEREDIA

Filmmaker, Curator Founder - Experimenta

Film Screening: 'I Am Micro', Introduction to Experimenta

Experimenta India is an artist run platform that encourages uncompromising, fresh, compelling and critically urgent experimentation with the moving image in India. Shai, screened her National Award winning film 'I am Micro'. The film is an experimental essayistic film miniature that pays tribute to the medium of film while reflecting on the gradual disappearance of Indian independent cinema. 'I Am Micro' is a heartfelt portrait of a filmmaker struggling to work outside industry economics.



SIDHARTHA SARMA

Associate Professor IISc

Talk: Nuclear Magnetic Resonance Lab

Directed towards understanding protein structure, protein-protein and protein-ligand interactions in the solution state through the use of high-resolution solution NMR spectroscopic methods. The structural and functional aspects of several enzymes and peptide toxins of animal origin are under investigation. A fusion protein system, based on the protein cyt-chrome b5 has been developed specifically for the production of isotopically enriched proteins for these NMR based investigations. In addition to NMR spectroscopy, the laboratory also uses Mass Spectrometry for characterization of natural peptide toxins.



GEETA NARAYANAN

Founder - Srishti School of Art, Design and Technology

Talk: 'Place Based Learning'

Geetha is the Founder Director of the Srishti School of Art Design and Technology and its sister institution, the Mallya Aditi International School. She has dedicated her life to finding and establishing new models of educational institutions that are creative, synergistic and original in their approach to learning. At ANET, Geetha spoke about 'Place Based Learning' - technique of providing contextual learning where students learn various abstract concepts experientially by engaging with their immediate surroundings.



VIDYA ATHREYA

Research Associate, Centre for Wildlife Studies (CWS)

Wildlife Conservation Society(WCS) - Bangalore

Talk: Human animal conflict

Her recent research work has led to a better understanding of leopard ecology when they live among humans in agricultural landscapes. She spoke about the interplay between socio-politics of conflict and the role of cultural tolerance towards wildlife in India. Her work also questions known paradigms of large cats living among humans and she believes that persistence of large carnivores has a lot to do with the acceptance of local people towards these species. She has written extensively on this issue and all the material is online at www.projectwaghoba.in.



RAMANA ATHREYA

Associate Professor at IISER Pune

Talk: Communities of the Eaglenest Wildlife Sanctuary

Ramana Athreya is a birdwatcher and an astronomer at the Indian Institute of Science Education and Research. In 2006, he described a new species of bird, the *Bugun Liocichla* from the Eaglenest Wildlife Sanctuary in western Arunachal

Pradesh, North-east India. During his talk at ANET Ramana spoke about his conservation work involving communities in Eaglenest Wildlife Sanctuary, giving insight on the process of and learnings from setting it up.



OTHER TALKS

Anne Aghion | Filmmaker

Film Screening: Ice People

Commander Menon | Indian Navy

Tour of India's hydrographic survey vessel INS Investigator

Commander M Doraibabu | Indian Navy

Sorte aboard the sail ship INS Sudharshini

Celine Loop | Producer - Overdose

Trailer Screening - Of all 'Overdose' productions

Klas Hyllen | Architect

Tutorial Indesign 101

Adhirath Bali | Designer

Workshop: Effective communication design

Anagh Bali | Architect

Talk: Constructing with bamboo

Yadvinder Mali | Professor of Ecosystem Science

Oxford University

Talk: Global Ecosystem Monitoring (GEM) Project

VISITATION

Jamshed Godrej | Chairman and Managing Director of Godrej & Boyce Manufacturing Company Limited, Chairman of Aspen Institute India, Trustee and President Emeritus of World Wide Fund for Nature - India.

Isher Judge Ahluwalia | Chairperson, Board of Governors, the Indian Council for Research on International Economic Relations (ICRIER).

Meera Shankar | Ex Ambassador to The United States of America, Germany. While serving in the Ministry of External Affairs, she headed two important divisions dealing with the South Asian Association of Regional Cooperation (SAARC) and relations with Nepal and Bhutan.

Lt Gen (Retd) A K Singh | The 11th Lt Governor of the Andaman and Nicobar Islands, Ex-General, Officer Commander-in-Chief, Southern Command.

Micheal Adams | Associate Professor Australian Centre for Cultural Environmental Research and Indigenous Studies Unit, Faculty of Social Sciences. University of Wollongong.

Lois Hetland | Associate professor of art education at the Massachusetts College of Art and Design and research associate at Project Zero, Harvard Graduate School of Education.

Amala Mahadevan | Senior Scientist Woods Hole Oceanographic Institution.





POLICY

As an organization with a mandate for scientific research, we believe that a detailed understanding of the Islands through the sciences can best fuel applied conservation. Effective conservation utilizes adaptive management, indigenous knowledge, innovation, long-term research and monitoring. We understand that balanced decision making draws from a framework that brings together information, solutions and expertise.

Since its inception, ANET has been regularly interacting with the Andaman & Nicobar Administration in different capacities and has built a strong relationship with multiple departments in the Union Territory over the years. As the sole independent environmental institution in the Islands, ANET is presently in a unique position to engage with the administration within the policy framework.

STATE AND NATIONAL LEVEL COMMITTEES FOR POLICY MAKING

As of 2014, ANET is on 20 state and national level committees and sub-committees for policy making in the ANI.

This year we have been further nominated on 2 more crucial committees, they are:

- Administrator's Advisory Council
- Steering committee for the conservation and development of Sippighat.

List of Committees:

- 🐜 State Board for Wildlife for UT for A&N Islands.
- 🐜 Sub-Committee of the State Board for Wildlife for UT of A&N to analyze the need of stakeholders and other relevant aspects for finalizing the spatial framework and management Guidelines for Consolidation of Protected Area in A & N Islands.
- 🐜 State Level Environment Council to advise the Administration on environment policy & planning matters of importance of these Islands.
- 🐜 A & N Coastal Zone Management Authority, Monitoring Committee for forest Working plan for South Andaman Division, Baratang Division, Middle Andaman Division, Mayabunder Division and Diglipur Division.
- 🐜 Committee to monitor the sand mining activity and the environmental safeguard taken by A & N Administration.
- 🐜 A & N State level steering Committee and A & N State level Management Committee Of CAMPA (Compensatory Afforestation Management & planning Authority)
- 🐜 State level Committee to Monitor Compliance of Bio Medical Waste (Management & Handling).
- 🐜 Technical Committee of the project "Development of Interpretation Centre at MGMNP Wandoor under Tsunami Rehabilitation Programme".
- 🐜 Committee for preparation of a time bound Action Plan for removal /eradication of Exotic/invasive alien Species.
- 🐜 Member of the Core Group constituted for preparation of Sectorial Action plan on Green India Mission and sustaining Island eco-system for Andaman and Nicobar Islands climate change action plan.
- 🐜 State level Committee for identification of critical Wildlife Habitat in A & N Islands Committee Constituted for tackling Poaching in A & N Islands.
- 🐜 Member of Chidiyatappu Biological Park Steering Council.
- 🐜 Eco-Development Committee for the stake holders residing in and around MGMNP Periodical impact assessment of Coral population of Jolly Buoy Island and Red Skin Islands.
- 🐜 State Level Body to monitor the implementation of Plastic Wastes management (Management & Handling) Rules.
- 🐜 Core group for preparation of Sectorial Road Map for promotion of innovation in the sector "Scientific and industrial research and development."
- 🐜 National committee; Island Development Authority.
- 🐜 A&N Medicinal Plant Board (society).
- 🐜 Society for Promotion of Vocational and Technical Education (SOVTECH).
- 🐜 Development of Information and Resource Centre for Cutburt Bay Wildlife Sanctuary.
- 🐜 Nominated as a member for 'Group of Experts to review Jarawa Policy of 2004 in Andamans.

CONCEPT NOTES SUBMITTED TO THE ANI ADMINISTRATION

Review and application of CRZ, IPZ (demystifying the notification): Implementing the Island Protection Zone in notification, 2011 in the ANI

Island Resource Network: A Network for Interdepartmental Dialogue, working groups for resource sharing and decision making (the initiative launched in March 2012 by Dakshin Foundation and ANET).

Sippighat wetland development: Ecosystem assessment. To understand the multiple possibilities of land use for all.

current land owners accounting for both immediate and long-term economic needs while maintaining ecological stability.

Development of a Marine Laboratory adjoining MGMNP, as a centre for multi-institutional research and training facility.

Eco-tourism in the ANI: defining 'eco-tourism' for the island group, setting standards and criteria through eco-labelling.

Solar Energy: Identifying potential for use of renewable energy in ANI.



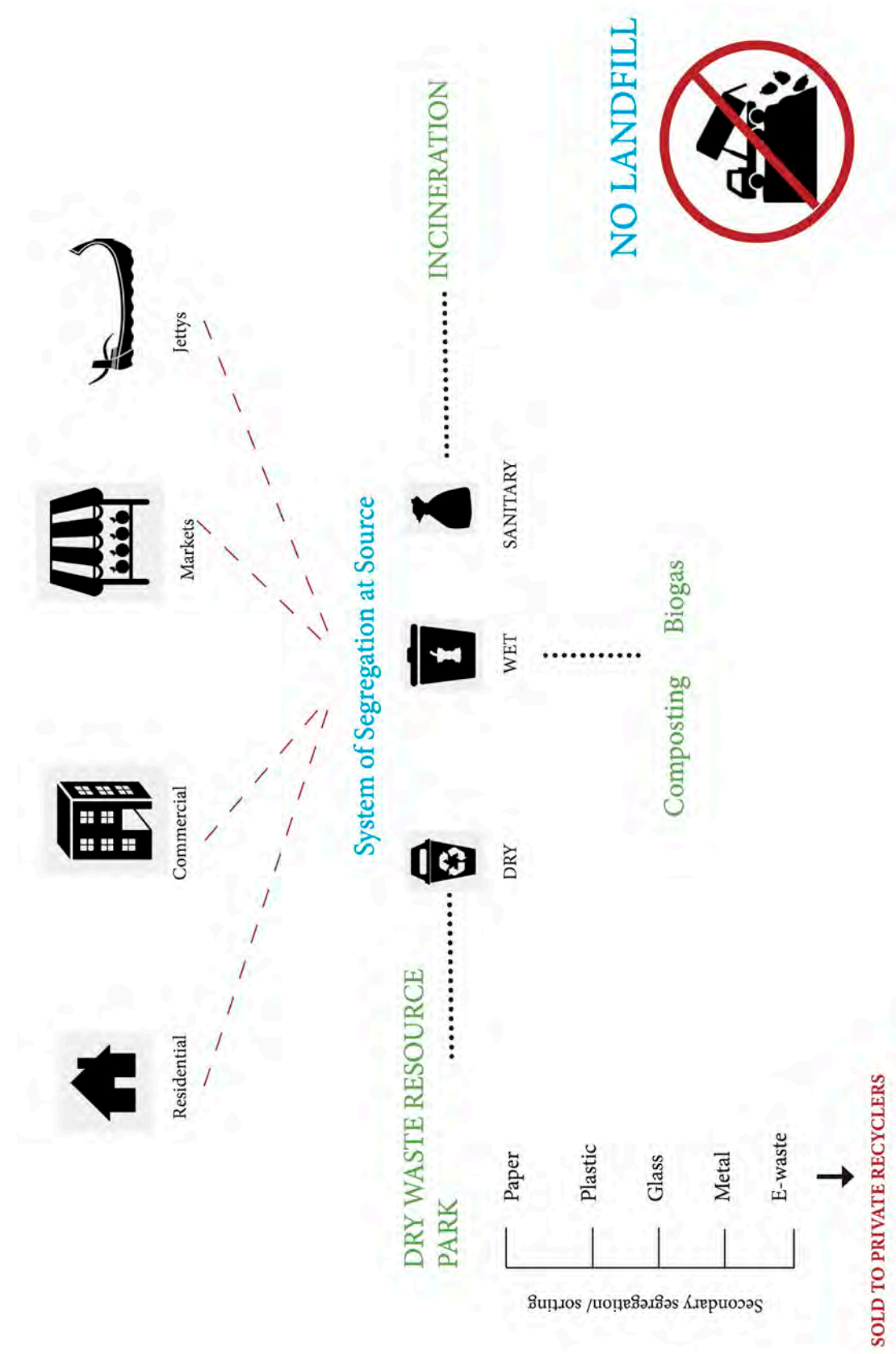


SOLID WASTE MANAGEMENT PROJECT

Port Blair Municipal Council (PBMC)

Urban living, tourism and commercialization generate a large quantity and variety of solid wastes that cannot be assimilated in the city environment. Port Blair (ANI) is no exception, with its growing population generating approximately fifty tons of solid waste every day. Currently the municipality dumps all its waste at Brookshabad a site beside the ocean causing environmental degradation and posing a major threat to public health and safety. Since March 2013 ANET has been closely working with the Port Blair Municipal Council to set up a Solid Waste Management System for the city. This is being developed through close interactions with the Sanitary Inspectors of PBMC, as well as using results from detailed survey and assessment of

the city. This survey documents unique aspect of the city terrain conditions, ward wise profile of citizens, waste generators enumeration and patterns. The model was then customised for Port Blair. Over the next one year the PBMC will implement the new SWM system for Port Blair in a ward-wise manner. This phased approach will allow for correction and fine tuning of the system during the initiation process itself. With the co-operation of all stakeholder the SWM system of Port Blair has the potential to emerge as an exemplary model for other towns in the ANI, and will also showcase Port Blair as the first island city in the country to achieve hundred percent Solid Waste Management.





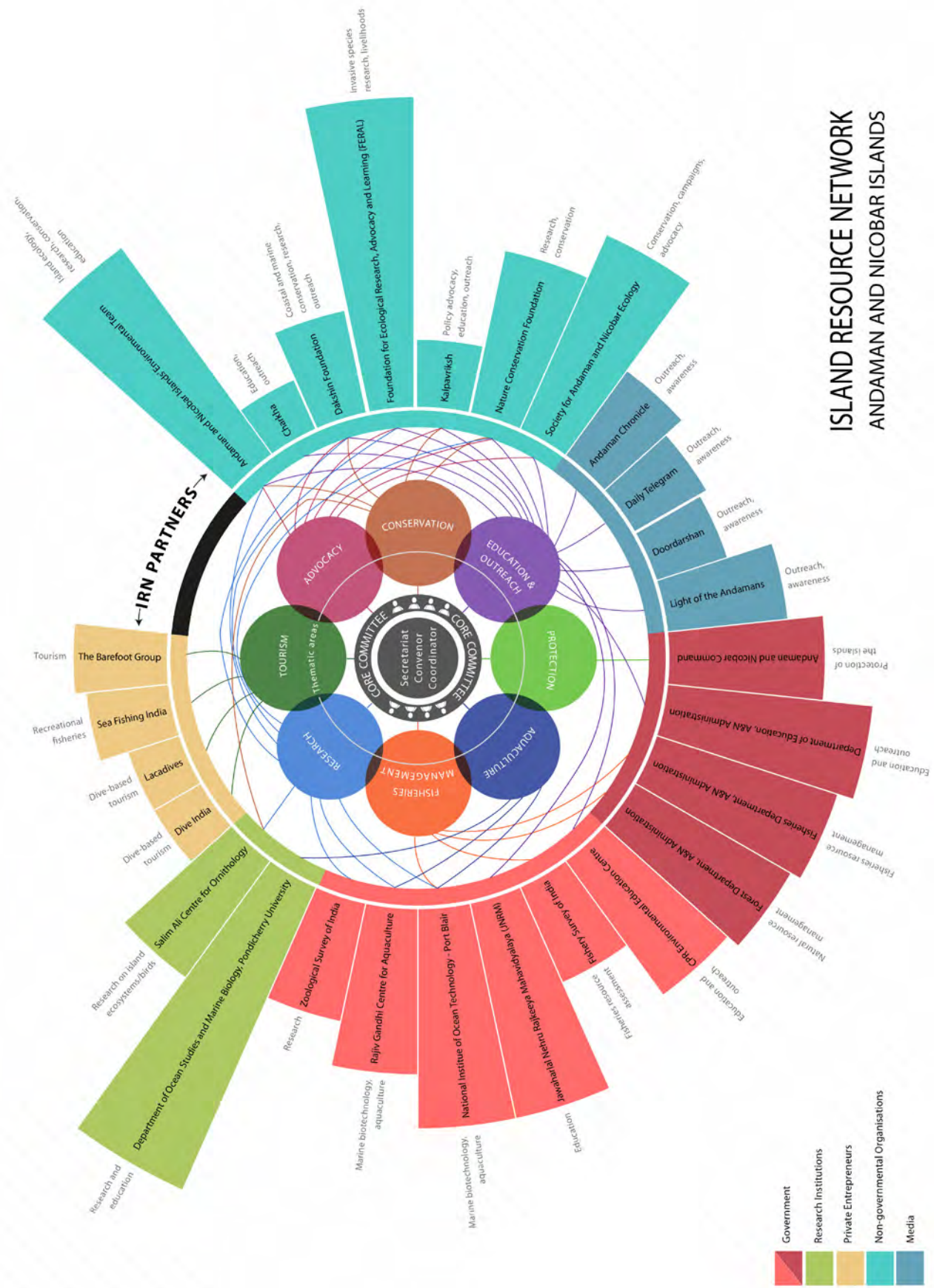
ISLAND RESOURCE NETWORK

Supporting a consortium of experts for the conservation of coastal and marine resources of the Andaman and Nicobar Islands.

The Andaman and Nicobar Islands support an excellent diversity of tropical marine species and ecosystems that in turn support a diverse human population, comprising of indigenous tribal groups as well as a diverse settler population hailing from various states of mainland India and Burma. This unique ecological and anthropological diversity makes the sustainable utilization of these resources a complex and formidable challenge. There is a need to develop participatory approaches that draw from a variety of disciplines and resources in order to develop a coordinated response to the multiple objectives of natural resource management in these islands.

It is proposed here to develop this platform into a formal functional structure to harness its expertise effectively. We have worked on developing an informal network of partners (proposed to be called the Island Resource Network) with varied expertise and resources to engage with the multiple objectives and demands of sustainable marine resource management in the islands. Given that the ANI's challenges demand multi-disciplinary expertise, the IRN is appropriately placed to provide such support to conservation and sustainable development initiatives. It is necessary to recognise the Island Resource Network (IRN) as a formal coordinated network of island based expertise.

This project has been initiated in collaboration with Dakshin Foundation.





ARTS

The vision for the Arts Division is to provide a space for artistic expression and practice rooted within the Centre for Island Ecology. The process of art practice, documentation and interpretation of island ecology through this new 'lens' adds impetus to our conservation efforts. The discipline creates multiple mediums for effective and powerful communication and the practice of the arts within itself brings observation tools that will enable us to teach and further explore the realms of scientific research and place based education. ANET is able to provide art practitioners multiple entry points for exploration, documentation and interpretation within the island context. The advantage of having

accessibility to varied island ecosystems and communities is further strengthened by ANET's in-house expertise of scientists/researchers. Against this backdrop - ANET is able to enable and facilitate a dynamic art-science and art-education interface. Here practitioners of art, science and education can collaborate and co-create, blurring the lines between these disciplines that are otherwise fragmented within itself and segregated from each other. Drawing from the fact that artists, scientists, and educators explore the natural world, apply similar motivations and document similar spaces in their practice, ANET would like to build a common ground to enable effective engagement between them.

ARTS RESIDENCY - ARCHIVE

The experience for an artist hosted at ANET's Art's Residency is pivoted at its point of interaction with science. It is exciting to consider how this exchange leads both practitioners into a labyrinth of information and co-creation. This expands the artistic process and extends the possibilities of 'making' within this diverse environment. Interpreting these experiences opens up the scope for multiple artistic mediums of expression.

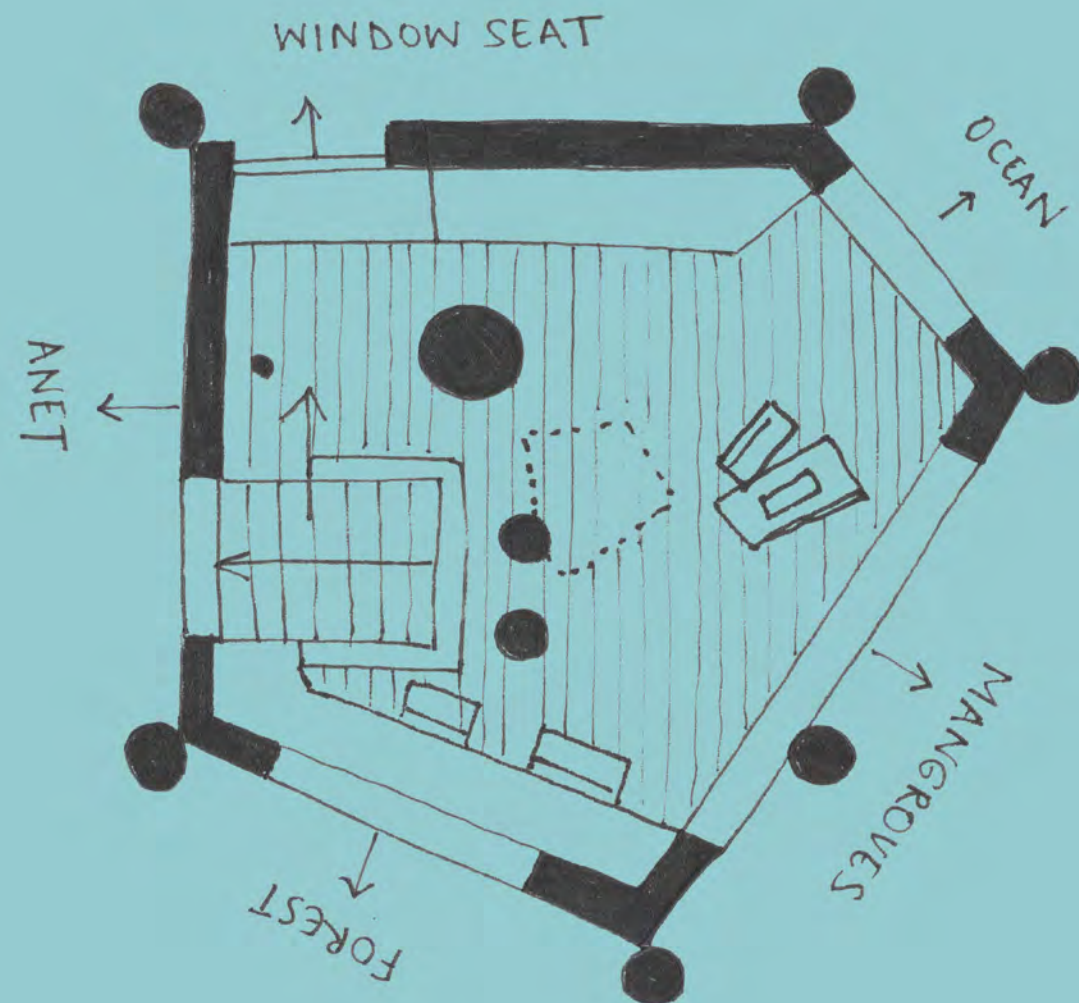


ISLAND ECOLOGY PALETTE

The arts residency program will be pivoted on an interactive ecosystem archive that will function as the central resource for arts practitioners. The archive will comprise of a dynamic map of the various ecosystems surrounding ANET. This map will be overlaid with photographs, sound bites, films etc documenting the facets of ecosystem. The process of documentation will capture primary components of each habitat i.e. plants and animals, soil and water.

Further they will be recorded in their abstractions in the form of color, patterns, textures and movements. The system process, functions and adaptations of organisms within each habitat will be cross linked to illustrate the complex interconnectedness. It will have the capability to juxtapose each of its components with another and experiment with multiple media formats. This multi-layered archive will serve as a palette for the artist across arts disciplines and projects.





TREE HOUSE WORKSHOP

Built in 28 days, the 'TreeHaus' at ANET is a dream come true. 2014 sees the birth of ANET's Arts Division and this beautiful studio is perched in the canopy overlooking the mangroves. Built through a natural building material workshop lead by Jackson

Poretta, Arnab Basu and their team from Green Chakra, 12 participants signed up to make magic happen. We owe a tonne of gratitude to this team for not only erecting the inspiring structure itself but the spirit of joy and adventure they brought along as tools.

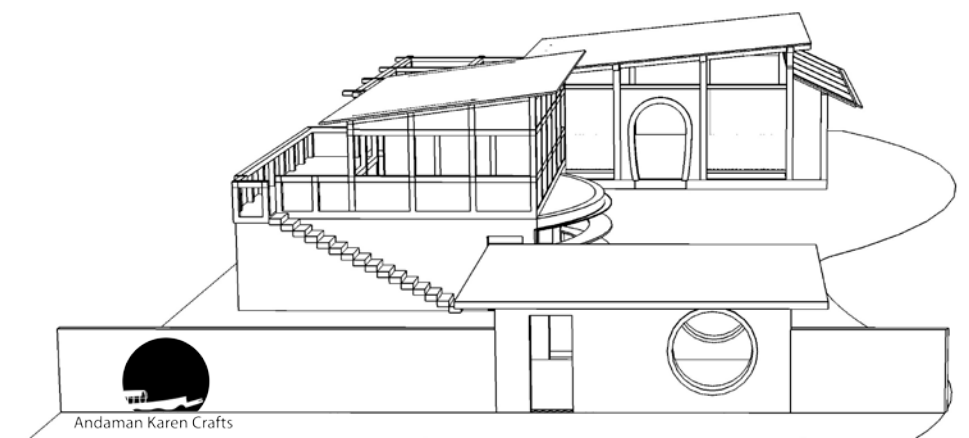
COMMUNITY CENTRE FOR SUSTAINABILITY AND ARTISTIC EXPRESSION

ANET's Arts division's first community venture has been with the Karen community of Mayabunder, Middle Andaman. Over the years ANET has built a strong relationship with the Karen community, providing employment to some members as field assistants etc. In December 2013 ANET established the 'Andaman Karen Crafts' and formed the women's tailoring and embroidery collective. This effort resulted in the production of tailoring and needle craft products for the tourism industry and will diversify traditional craft and products for local markets through handicraft emporiums, hotels and resorts in the Andaman Islands. ANET has earlier initiated alternate livelihood skills training in carpentry, tailoring, embroidery, mushroom cultivation, and raising forest nurseries. Presently ANET is engaged in developing a Community Centre, the vision is to design an aesthetically compelling piece of community architecture, a multi-functional space to serve a range of community needs, articulate the unique history, culture and ecological commitment of the Karen community to the outside world.

This will be housed within in a single unit of interconnected spaces including a craft workshop, educational space, library and gallery space and welcome centre. As a result it will allow for deeper reach and impact in the long term towards sustainable alternate livelihood options and conservation.

The activities will include the following:

- Cottage industry employing local men and women to practice traditional crafts and create products for the local and potentially global market.
- Education and training centre for local craft practitioners to diversify the skill sets and recruit new members.
- Library and museum space that showcases traditional knowledge, history of settlement of Karen's in the Andaman Island.
- Documentation of ethno-botanical information to encourage conservation and spread awareness of Karen traditions.
- The structure itself to serve as a model for sustainable building design and example of local material use in construction.
- Community gathering space for cultural events, meetings etc.



8 | MCBT

The Madras Crocodile Bank Trust | Centre for Herpetology (Croc Bank) is a registered trust and was formed on 26th August 1976. The mission of the trust is "To promote the conservation of reptiles and amphibians and their habitats through education, scientific research and captive breeding. Efforts are focused on, but are not limited to, Indian species and ecosystems and include both in-situ and ex-situ components."

Since its inception in 1976 the Croc Bank, which is a community support based conservation project, it has consistently worked towards the conservation and study of crocodilians, other reptiles and amphibians. A main strength of the facility is that it can function as a large outdoor laboratory. Today the Croc Bank has

developed into a public institution, which is involved in research and conservation of endangered herpetofauna, and is a centre to create public awareness.

The Centre for Herpetology of the Trust has been a pioneer in scientific research and conservation of reptiles for the past three decades. It provides support for surveys, standardized data collection and maintenance techniques, develop field studies and develop and collate educational materials. Research within Croc Bank and in the field has covered a wide range of herpetological topics since 1976, which has resulted in over 600 scientific publications, reports, books, newspaper, and magazine articles.



9 | PAST SUPPORTERS AND DONORS

- 1991 - World Congress of Herpetology for study on the distribution and ecology of the Andaman Day Gecko (*Phelsuma andamanensis*) in the Andaman Islands.
- 1992 - Swedish Society for Nature Conservation, Sweden.
- 1993 - The Royal Netherlands Embassy, New Delhi for the establishment of research and conservation base in the Andaman Islands.
- 1997 - Darwin Initiatives, UK, Conservation of biodiversity and protected areas management planning in the Andaman and Nicobar Islands.
- 1998
- 1999 - Wildlife Trust of India, New Delhi for protected areas assessment in the Andaman.
- 2001 - UNDP | GOI - National sea turtles project, Andaman and Nicobar Islands.
- 2003 - Wanaparthy Education and Charitable Trust, New Delhi - Environmental Education Andaman and Nicobar Islands.
- 2004 - UNDP | GEF-Production of Geography book about the Andaman & Nicobar Islands.
- 2005 - Association of India Development (Tsunami Relief Work).
- 2007 - IUCN, SOCMon; Socio Economic Monitoring.
- 2009 - ATREE.
- 2009 - SACEP; South Asia Co-operative Environmental Programme, Environment Education and teacher training workshops.
- 2010 - Central Illinois Herpetological Society.
- 2010 - FRIENDS funding agency, Mumbai.
- 2010 - SOCMon; Socio Economic Monitoring of Richie's Archipelago.
- 2011 - National Centre for Biological Sciences (NCBS).
- 2011 - Dr. Günther Koenig.





10 | SUPPORT FOR 2013-2014



National Centre for Biological Sciences - Research

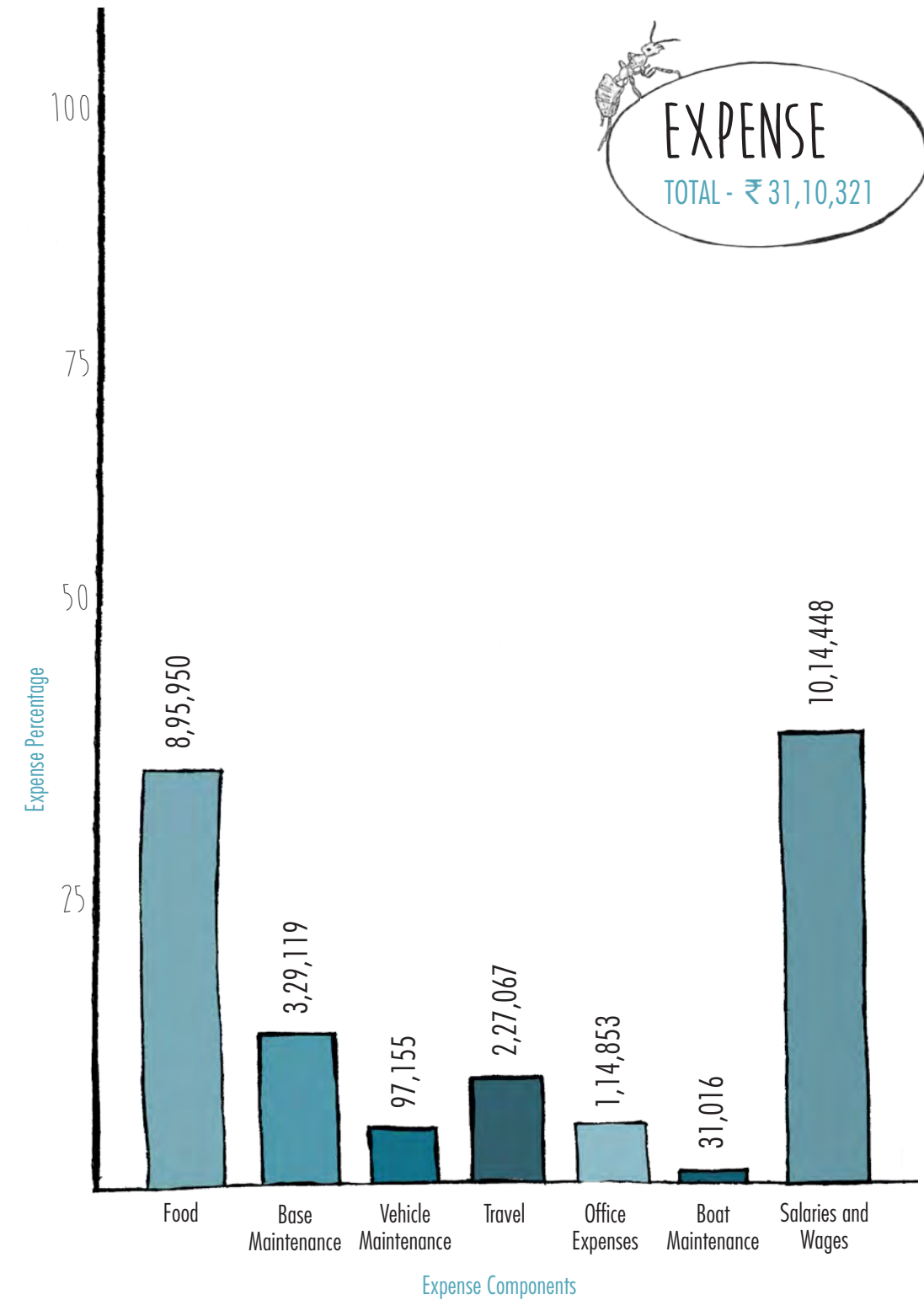
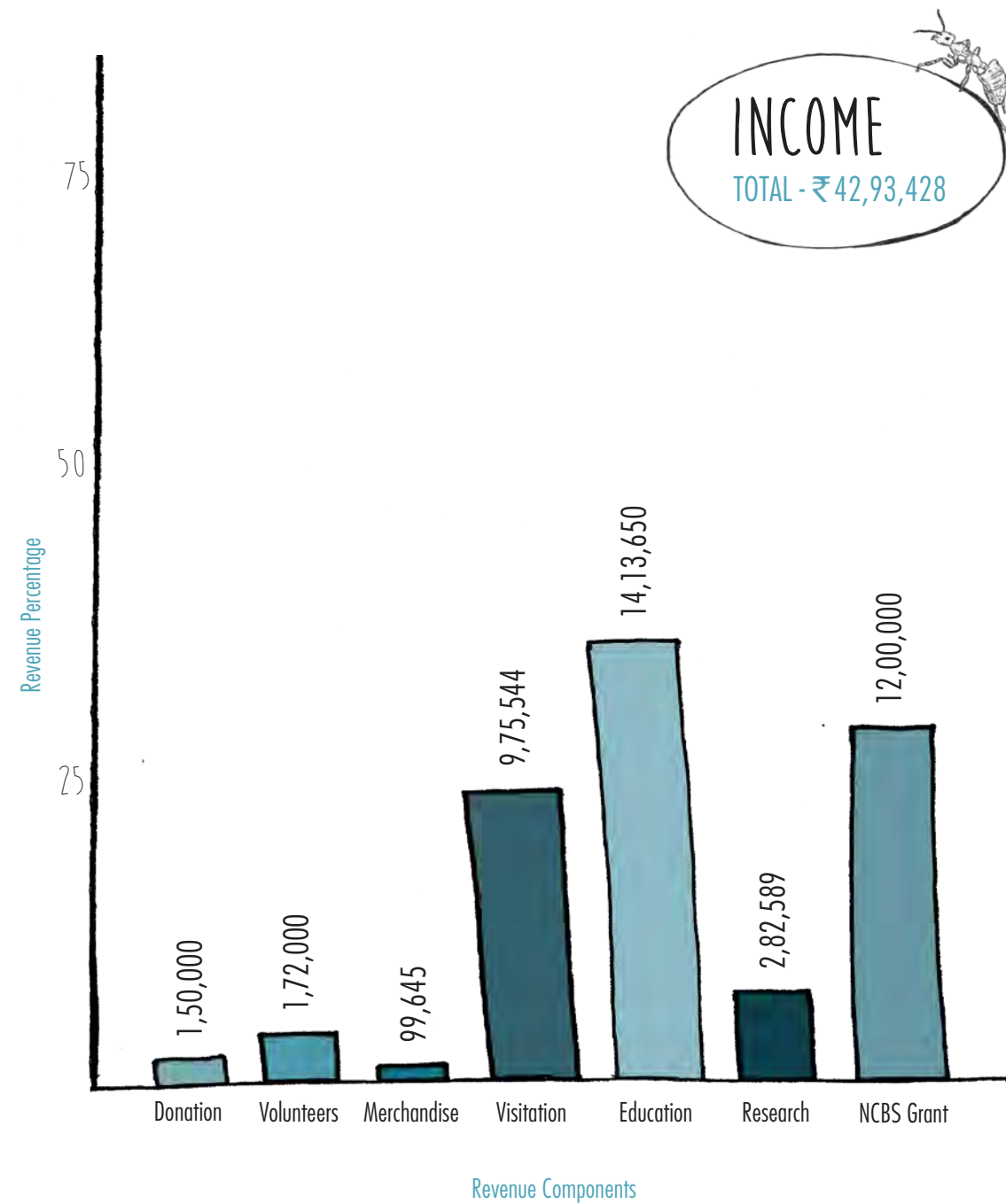


Rudolph Güdel - Infrastructure Development




SLK Software - Treasured Island Project

11 | FINANCIAL OVERVIEW 2013-2014



12 | PROJECTION



Expense Head	Expected Expenses 2014 - 2015
Salaries	40,00,000.00
Equipment Purchase	12,00,000.00
Base Maintenance	4,00,000.00
Office	1,50,000.00
Construction Renovation	3,00,000.00
Lab and Store Development	50,00,000.00
Vehicle Maintenance	1,00,000.00
Boat Maintenance	30,000.00
Travel	3,00,000.00
Food	9,00,000.00
Staff Welfare	40,000.00
TOTAL	INR 1,24,20,000.00

