

The cover features a red background with a faint, textured pattern of thin, dark lines. A white rectangular box is centered on the page, containing the title and subtitle. The title is in a large, bold, red font, and the subtitle is in a smaller, bold, white font. Below the subtitle, the text 'A PEOPLE'S PERSPECTIVE' is written in a smaller, bold, black font. The bottom half of the cover has a light blue background with a faint, textured pattern of thin, dark lines, and a large, faint, light blue silhouette of a plant with several leaves is visible at the bottom.

**Assessing  
Post-Tsunami  
Housing  
Reconstruction**

**In Andaman &  
Nicobar Islands**

**A PEOPLE'S PERSPECTIVE**

**Assessing  
Post-Tsunami  
Housing  
Reconstruction  
in Andaman & Nicobar  
Islands**

**A PEOPLE'S PERSPECTIVE**

**Vivek Rawal  
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# Foreword

The post-tsunami period in the Andaman and Nicobar Islands offered an opportunity to restore affected housing and living conditions of the large number of people whose homes were destroyed or badly damaged.

Such a process of restoration of people's lives needed to take place, keeping in mind basic human rights principles of gender equality, non-discrimination and participation.<sup>1</sup> It was clear, however, that even one year after the Tsunami, many shortcomings remained in the process of resettlement and rehabilitation.

In a Foreword written one year after the Tsunami tragedy, I had stated that '... the rehabilitation and reconstruction process is fraught with difficulties' and that 'All actors involved in relief and rehabilitation work must undertake efforts to make sure that the grave mistakes made in post-disaster experiences of the past are not repeated. Failure to comply with human rights standards immediately will deepen the human-induced tragedy already afflicted on the survivors of the Tsunami. The resolve shown by states and the international community in the immediate aftermath of the tsunami must not be allowed to dissipate. In the process of rebuilding the lives, livelihoods and homes of those affected, it is vital that immediate humanitarian needs be complemented with long-term rehabilitation and reconstruction programmes based on international human rights standards which uphold survivors' rights to dignity, equality, livelihood, and to adequate conditions of living'.<sup>2</sup>

This report points out in detail that the inadequacy of response from the authorities, evident one-year after the Tsunami, continues to mark the landscape. Clearly, the opportunities that the post-tsunami phase offered have been squandered by the authorities.

One distinct human right, essential in any rebuilding process, is the right to adequate housing. A key element of this human right is 'cultural adequacy'. As stated by the UN Committee on Economic, Social and Cultural Rights: 'The way housing is constructed, the building materials used and the policies supporting this must appropriately enable the expression of cultural identity and diversity of housing ...'.<sup>3</sup> Also vital to the success of any rebuilding process, and related to the element of cultural adequacy, is that authorities grasp the opportunity to train local masons and utilise local building materials and respect local traditions of space

1. For a compilation of relevant standards see: *International Human Rights Standards on Post-Disaster Resettlement and Rehabilitation* prepared by Habitat International Coalition – Housing and Land Rights Network and PDHRE – People's Movement for Human Rights Learning, in collaboration with the UN Special Rapporteur on adequate housing: [www.hic-sarp.org/news\\_show\\_user.php?id=53](http://www.hic-sarp.org/news_show_user.php?id=53)
2. See Foreword in *Tsunami Response: A Human Rights Assessment*, January 2006, Action Aid, Habitat International Coalition – Housing and Land Rights Network and PDHRE.
3. See General Comment no. 4 'The right to adequate housing' of the United Nations Committee on Economic, Social and Cultural Rights: [www.ohchr.org/english/bodies/cescr/comments.htm](http://www.ohchr.org/english/bodies/cescr/comments.htm)

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usage and layout. As this report points out, implementation of the right to adequate housing, including the standards of cultural adequacy, have been ignored in the reconstruction phase.

Even now, at the two-year stage it is not too late to return to the path indicated by the diligent application of the principles of human rights, including the cardinal principles of participation and respect for cultural rights of people, particularly the tribals, in the Andaman and Nicobar Islands. I would urge the governmental authorities, principally and all other actors concerned, to reflect on the many valuable recommendations contained in this report and grasp the possibilities that still remain to uphold the human rights of all affected people in the Andaman and Nicobar Islands.

***Miloon Kothari***

Special Rapporteur on Adequate Housing  
United Nations Human Rights Council

December 2006, New Delhi

# Executive Summary

The Andaman and Nicobar Islands, an archipelago located in the South-eastern part of the Bay of Bengal, were devastated by the earthquake and subsequent tsunami on 26 December 2004. Official reports mention more than 3500 persons as dead or missing, unofficial estimates put the figure far higher.

The government reconstruction programme to replace nearly 10,000 homes that were destroyed has thrown up many important issues. Major concerns voiced by communities include the design, location and cost of proposed housing and the lack of scope for them to be involved in the process.

This report presents findings from consultations with communities on three islands. From the southern-most and hardest hit island of Campbell Bay, home to people from the Nicobarese tribe, to Little and South Andaman where number of deaths was fewer but damage to homes and livelihoods extensive. Interviews were also conducted with officials and contractors.

## **Housing design**

Even though the traditional houses have withstood earthquakes very well and communities say they prefer them, the Government has decided to construct houses using pre-fabricated materials. These would be imported from mainland India through contractors at an apparently exorbitant average cost of approx. Rs10 lakh per unit. People have rejected this type of houses. The anger of the marginalised communities of A & N Islands recently was manifested in a protest against the Government in Little Andaman which left more than 100 people injured in police action. Similar sentiments continue amongst inhabitants of other islands as well.

Despite the diverse backgrounds and wide range of lifestyles of communities in A & N Islands, government plans propose a single type of house for all 9714 families. The only variation is that the same houses will be on stilts in Car Nicobar. The reconstruction programme guided by the Indian Planning Commission and Empowered Group of Ministers has been entrusted to central and local government agencies (CPWD and APWD) and NGOs. All the houses are to be built as per the design, specifications and technology finalised by CPWD whether being constructed by CPWD (7889 units), by APWD (1066) or NGOs (759).

The houses have been planned as twin units like government quarters – two homes together with a dividing wall rather than free standing. The communities however, say that such houses do not meet their needs. Traditional houses vary for tribal families and non tribal families, for agriculturist families and fisher families, from one island to the other island, depending on their lifestyle, occupation, customs, local resources and skills.

The ecological significance of Andaman and Nicobar Islands need not be reiterated here. In such fragile eco-system, houses are being built with reinforced cement concrete (RCC) isolated footings, steel structures, corrugated galvanised

iron sheets (CGI), bamboo boards and aero-con blocks, all imported from mainland India. These are projected to be alternative eco-friendly materials. But, the prototypes based on these materials were rejected by the community. The only significant change the Government made was that aero-con panels on the external face were replaced with timber planks. However, final specifications are not reflected in any model on the islands and are shown only in a model erected at the Chennai office of CPWD. Communities on the islands have been using timber structure houses which they know how to maintain, repair and extend as per their needs. Extensions that are securely connected to the new house would be difficult due to incompatibility between proposed structures and the traditional way of building.

### **Information and participation**

The learning in all past disasters has been to involve the communities in reconstruction work to achieve any satisfactory level of recovery. This has been disregarded in favour of construction through large contractor companies. A & N communities feel that reconstruction could have provided them opportunities for local employment, particularly for the carpenters and other highly skilled builders amongst them, but all this work has been awarded to contractors.

Information is the first pre-requisite for any effective participation but communities have little information about their inclusion in the programme, location of the settlements, their own plots, house designs, materials that are being used or the roles and responsibilities of contractors and implementing agencies.

Effective community participation needs to be planned through the whole process of design, procurement, implementation, monitoring and supervision. Sadly community involvement was limited to only a few consultations at the design stage. The ineffectiveness and inadequacy of these consultations is reflected in the fact that only one type of design is being built for 9714 families across eleven different islands. Clearly, the prefabricated steel structure houses with RCC footings have been conceived more on the basis of capacities of delivery agencies rather than community needs and priorities.

Clearly, the prefabricated steel structure houses with RCC footings have been conceived more on the basis of capacities of delivery agencies rather than community needs and priorities.

### **Location**

Affected communities have no information about the propose site location or specific plots for their new homes. Though few people have seen the prototype houses built by the Government, they have rejected it. The final design, materials and specifications is not known to them. Non-tribal communities have rejected the house because it does not suit the location for their agriculture or fishing activities. Tribal communities in locations like Harminder Bay have also made it clear that any location other than where they presently stay is not acceptable.

All families are being relocated on the land identified by the Government officials. Many families will be relocated on some different islands now. After our discussions with communities across the islands, we feel a large number of houses are going to remain vacant and unoccupied. At Loknath Pahar and Namunagar in South Andaman and Machhidara,

Netajinagar and Harminder Bay at Little Andaman, agriculturists, fishers and tribal community were not keen to move to any of the proposed relocation sites. The place of residence has always very critical linkages with their livelihoods. It is very likely that the tribal community will build its own traditional houses using their own traditional materials procured from the forests at a later stage though they will wait to ensure their entitlement from the Government.

An information dissemination mechanism should be established and it should ensure that information reaches to people in their temporary settlements or other locations where they are staying. It should be in a format that people can understand.

### **Land rights**

Use of land around the home is crucial to securing the housing rights of tsunami survivors but it is not clear whether the affected families will be provided any ownership to the homestead plot. Though some local government officials claimed that it could not be allowed, the higher level A & N officials in Port Blair said the policy in this regard is still being worked out. The future growth of the house is critical in the local context as the house being provided is only basic essential space and not sufficient for the families, particularly when the family size grows with time.

### **People's perspective**

In a nutshell, the communities we spoke with are not in favour of the declared reconstruction programme but feel vulnerable due to dependence on the Government and many feel unable to voice their concerns. People prefer the traditional house design and materials and would have preferred if cash or material support was provided. They would have built a larger-sized house of their own choice in a lesser amount. But the present construction plan does not allow that.

## **Recommendations**

**Looking into the above critical community concerns, the following recommendations are made:**

1. **Policy framework:** A comprehensive policy framework is needed that clearly articulates objectives, eligibility criteria and entitlements of the affected families and lays guidelines for processes for selection of construction sites and execution of construction. It should also define the roles and responsibilities of the different agencies and stakeholders involved and outline the principals of community participation, the time frame and the grievance redressal mechanisms.
2. **Transparency on entitlements:** The list of families entitled to new homes should be shared, along with the eligibility criteria. A mechanism should be put in place to ensure inclusion of all families that qualify, irrespective of where they are staying temporarily.
3. **Suitable location:** The site should be finalised only after informed community consultations and agreement. Plot allotment should be immediately taken up to facilitate community inputs to their own houses. Knowing one's own plot is an essential prerequisite for participation.



4. **Information:** All relevant information – house design, construction materials, cost, and the responsibilities of the administration and other agencies such as CPWD, APWD or contractors – must be communicated to the people, along with periodic reports on progress and decisions. An information dissemination mechanism should be established and it should ensure that information reaches to people in their temporary settlements or other locations where they are staying. It should be in a format that people can understand.
5. **Women’s property rights:** The ownership title to homestead plot must be given to the family in the joint names of wife and husband and in particular cases, to the woman only.
6. **Housing modifications:** One design cannot fit all. Permits for extensions and modifications of the house should be given to the titleholder/s. House owner(s) should be empowered to make those changes at the time of design construction.
7. **Monitoring construction:** Community must be empowered with specifications of materials and construction details so that they can monitor these. A formal mechanism must be established for monitoring quality and progress of construction which can provide periodic feedback to implementing authorities and convey the subsequent actions to the community.
8. **Promoting local building practices:** People should be given an option to build on their own as per their needs at appropriate locations of their preference. The process should be facilitated by providing financial and material assistance. The traditional materials and technologies that communities have expressed a preference for should be promoted in the reconstruction plan. The traditional structures that people have been building performed well during earthquakes.
9. **Environmental protection:** Assessment should be made to understand the environmental impact of large construction contracts. There needs to be constant watch on various construction processes, particularly sand mining from the beaches, etc.
10. **Decentralised basic services:** The post-tsunami reconstruction plan envisages construction of ‘centralised drinking water and sewage disposal schemes’. Such systems should not be implemented, particularly as current dependence on external agencies to run such services is expensive and unreliable. Instead, a decentralised system should be promoted that engages communities, is eco-friendly and encourages responsible behaviour of service users.

The traditional structures that people have been building performed well during the earthquake.



# Acknowledgements

We would like to acknowledge the local communities in Namunaghar, Loknath Pahar, and Wandoor at South Andaman, in Harminder Bay, Panchu Tekri, Netajinagar and Nanjappanagar at Little Andaman and in Rajiv Nagar and Govind Nagar at Campbell Bay for their resilience, not only post-tsunami but for challenging the reconstruction programme that excludes their participation.

Our thanks to government officials who helped us gain a good understanding of the reconstruction process. Some officials clearly realised the importance of promoting people-oriented sustainable development post-disaster.

Insights about the island communities, important geographic features, rich but fragile ecology and the post-independence socio-political challenges were gathered from numerous discussions with people who are passionate about islands. Discussions with Rauf Ali from Auroville and Samir Acharya from SANE have been particularly helpful in understanding the local ecology, local communities and local governance.

We are thankful to Harjeet Singh of ActionAid who gave sharp insights into the socio-political setting in which the rehabilitation process is taking place. Anupama, Mihir, Jyoti Prakash and other ActionAid friends facilitated meetings and enriched us with their field experiences and understanding of reconstruction and rehabilitation in Andaman and Nicobar Islands. The feedback from Pankaj Sekhsaria from Kalpavriksh, Shivani Chaudhry from Housing and Land Rights Network (HLRN) and Kranti Chinappa from Human Rights Law Network (HRLN), and Indu Prakash Singh from ActionAid India has contributed immensely to this report. A special mention to Alice from ActionAid India, Shoba from Books *for* Change for their efforts in editing with Colin from ActionAid giving his constant feedback. It has also been a very enriching experience working with the Books *for* Change team, especially Shailaja and Rajeevan who re-worked on the layout several times – and always with a smile.

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# Abbreviations

A & N	Andaman and Nicobar
APWD	Andaman Public Works Department
BMTPC	Building and Material Promotion Council
BRO	Border Road Organisation
CGI	Corrugated Galvanised Iron
CPWD	Central Public Works Department
CRZ	Coastal Regulation Zone
DC	District Collector/Commissioner
DST	Department of Science and Technology
EGoM	Empowered Group of Ministers
HUDCO	Housing and Urban Development Corporation
HTL	High Tide Line
IDA	Island Development Authority
IIT	Indian Institute of Technology
INGO	International Non Governmental Organisation
JE	Junior Engineer
MHA	Ministry of Home Affairs
MoEF	Ministry of Environment and Forests
MoUD	Ministry of Urban Development
MS	Mild Steel
MSL	Mean Sea Level
NBCC	National Building Construction Corporation Ltd.
NGO	Non Governmental Organisation
RCC	Reinforced Cement Concrete
SERC	Structural Engineering Research Centre, Chennai
SoR	Schedule of Rates
TCPO	Town and Country Planning Office
TOR	Torque
UT	Union Territory



# Glossary

## *Glossary of Indian terms*

- Chullah** – Indigenous stove, usually wood or coal is used as a fuel for the stove
- Panchayat** – An Institution (by whatever name called) of self-government constituted in every State, district, intermediate and at the village level by the 73<sup>rd</sup> Constitution Amendment
- Panchayat Samity** – The local self governance unit at the block level of the administrative structure
- Patwari** – An important village level official in the revenue administration. Responsible for safe custody of all records and maps in his jurisdiction.
- Pradhan** – head of the Panchayat
- Pramukh** – Elected Head of all the Panchayats coming under a single Tehsil
- Tehsil** – It is an administrative sub-division that has fiscal and administrative powers. It is the ultimate executive agency in administrative and land matters relating to maintenance of land records.
- Tehsildar** – Revenue Officer appointed by a District Commissioner and responsible for proper preparation and maintenance of the Tehsil's revenue records and accounts
- Tuhet** – Traditional joint family system of the Nicobari tribe
- Zilla Parishad** – A local government body at the district level. It looks after the administration of the rural areas of the district.



# Context and scope of the study

**W**hen the December 2004 tsunami struck the Andaman and Nicobar (A & N) Islands, it was the southern-most parts of this narrow archipelago spread over 800 km in the Bay of Bengal that bore the brunt. As the waves moved northwards, their force diminished but still wreaked havoc destroying lives, homes and livelihoods.<sup>1</sup>

Official figures put the number of dead and missing at 3513. 9714 families lost their homes. Livestock, agricultural land, crops and plantations were devastated. Survivors from Little Andaman and several of the Nicobar Islands were evacuated. Two years on over 9500 families are still living in temporary shelters.

Post-tsunami reconstruction in Andaman and Nicobar Islands has thrown up many issues. Instead of learning from past experiences, the Government of India (GOI) has largely ignored the concerns of affected communities while taking decisions on the reconstruction process, including their new homes.

The GOI has proposed to construct 9714 houses across 11 different islands to replace the homes lost. With pre-fabricated materials and components imported from mainland India, the average cost per unit will be approximately Rs10 lakh. This would be done through the corporate sector, the first time that disaster reconstruction process has been entirely entrusted to the corporate sector, and on such a massive scale. With construction underway, concerns raised are many. For any satisfactory and sustainable development to take place there has to be total involvement of the affected communities. Sadly in A & N this is not the case.

#### The present reconstruction plan:

- Promotes construction by developing new settlements at new locations disregarding their livelihood needs

- Features materials and construction agencies from the mainland instead of allowing any use of local materials and skills
- Has no role for the local communities

It is therefore highly unlikely that any appropriate housing will be constructed under the current Government plan.

It is critical that implications of such a policy are understood by local communities, civil society organisations and the Government. Hence, this study was proposed.

#### The scope of the study is to:

- Analyse the proposed reconstruction programme to understand the implications of the present plans for local communities – their life-style, culture, economy and environment
- Articulate the needs and requirements of the local communities to help further the people's perspective in plans for reconstruction of houses.

A three-member team of housing professionals visited the Islands to undertake this study and met with communities, NGOs and officials. ActionAid facilitated their field visits and meetings with various stakeholders and shared available information. The team engaged in intensive consultations with the

1. Based on records of A & N Administration available at <http://www.and.nic.in/post-tsunami.pdf> (accessed on Nov. 27, 2006)



communities on three islands: Namunaghar, Loknathpahar and Wandoor interim shelters in South Andaman; Harminder Bay, Padauk tekri and Panchu tekri in Little Andaman; and Rajiv Nagar, Laxmi Nagar and Govind Nagar in Campbell Bay.

Interviews were also held with the Chief Secretary; Programme Manager, CPWD; Superintendent Engineer, APWD; *Tehsildar*, Ferrarganj; South Andaman; Forest Officials and the Principal Conservator of Forests; Executive Engineer, Campbell Bay; Border Road Organisation officials and contractors in Campbell Bay.

## Andaman and Nicobar Islands

As well as being strategically important to India due to their close proximity to Indonesia, Myanmar and Thailand, the A & N Islands are of great anthropological significance. An archipelago of 570 islands with just 36 inhabited islands, A & N is home to ancient hunter-gatherer tribes that date back over 60,000 years. **Indigenous tribes** in the Andamans are Great Andamanese, Onges, Jarawas and Sentinelese, while the Nicobar group of islands are home to the Nicobarese and Shompens (these six tribes comprise the Scheduled Tribes). Of the total tribal population of 26,825 (as per Census 2001), nearly 98% are Nicobarese who are herders and horticulturists. The others are all hunter-gatherer tribes and face the threat of extinction today, largely due to loss of their habitats.

Besides, the six scheduled tribes, from 1858 during the British regime a large **migrant population** from the Chota Nagpur tribal belt of mainland India was brought to work as labourers for timber extraction operations and in construction. This was the time when the the British established a penal settlement at Port Blair.

Prior to 1947, most of the people were brought here as individual prisoners or as part of groups such has the Mopla, Bhatu and Karen imprisoned as punishment for rebelling against the regime. People also moved to A & N as government officials, traders and workers at that time. Most of the **freed prisoners** of the Cellular Jail settled in A & N when India won freedom in 1947.

After independence, the first people brought here by the Gol as free settlers were refugees from Bengali-speaking Bangladeshis (erstwhile East Pakistan), in the 1970s. In addition, large groups came from Kerala, Tamil Nadu and Andhra Pradesh. These groups are commonly know as '**settlers**'. Each settler family was given five acres of cleared land on the plains for paddy cultivation and five acres of uncleared land for homestead plus a horticultural purposes together with a grant of Rs1,050.

Other communities were brought by Gol from mainland India to work as labourers in timber extraction and construction. However, they were not given the legal status. Ranchi tribals are the most prominent of them. Belonging to various tribal groups including Oraon, Kharia, Munda, Mahli Turi Ghasi, Cheek and Dom, all of them are categorised as '**Ranchis**' in the A & N Islands. Though recognised as tribals on the mainland, the Ranchi community does not enjoy tribal status as the Tribal Act recognises only endemic tribes in the A & N Islands. They do not have any legal status as residents here. This has resulted in the community being one of the most vulnerable and marginalised on the islands.

All the islands in the Nicobar group of islands (except certain places of Great Nicobar) are protected under the Protection of Aboriginal Tribes Regulation. Entry to the Nicobar Islands is restricted. However, in the late 1960s, approximately 1,500 hectares of Great Nicobar were deregulated from being a tribal reserve to accommodate the rehabilitation of some 330 **families of ex-servicemen** from the Indian mainland.

In the late 1960s, a portion of land on Katchal Island was surrendered to the government by the then tribal leader for a rubber plantation on which 50 **Sri Lankan repatriates** were rehabilitated. The rubber plantation, now rather old, does not yield much and due to recent restrictions in monocultures as part of the new forest policy in the Islands,

The A & N Islands is an archipelago of 570 islands. Out of this, 36 are inhabited. The islands have over 60000-years of ancient hunter-gatherer tribes of the world and hence of extreme anthropological importance.

It must be mentioned that the hunter-gatherer tribes such as Onges, Jarawas, Great Andamanese, Sentinelese and Shompens face threat of extinction today.

new plantations are prohibited. As a result, the Sri Lankan repatriates, now numbering 2,387 individuals (115 families) remain unemployed.

Geographically, A & N Islands are located on the junction of tectonic plates of India, Burma and Australia. Andaman and Nicobar Islands are separated by 10°

channel (named after 10° latitude that passes through the area) which is supposed to be the birthplace of many cyclones and hurricanes that travel towards mainland India. There are two volcanic islands – Narcondum and Barren.

The ecological importance of A & N Islands is well known. These are some of the few pristine rainforests still surviving in the world. The climatic conditions are warm and humid with temperature around 22° to 30° Celsius. Average annual rainfall is about 3500mm. The islands are rich in flora and fauna with many endemic varieties that are not found elsewhere. Olive Ridley and Greenback turtles breed and nest on its coasts. The islands also have some unique species of the coral reefs. About 86% of the land is under forests while 6% is under agriculture. Due to rapid urbanisation and growth of population in these Islands, arable land is shrinking. Looking at the ecological importance of these islands, they have been designated as Coastal Regulation Zone (CRZ) by the Ministry of Environment and Forests (MoEF). The Supreme Court has also barred mining and timber extraction for commercial purposes due to the fragile ecology of the islands.

## Post-Disaster Reconstruction

The earthquake with its epicentre just north of Simeulue island in the Indian Ocean, off the western coast of northern Sumatra, Indonesia, triggered the most devastating tsunami in recorded history. It affected 11 countries and caused nearly 230,000 deaths.

In India the Central Government, in collaboration with the State Governments of the affected states

of Tamilnadu, Andhra Pradesh and Kerala and administration of the Union Territories of Pondicherry and Andaman and Nicobar Islands, took up rehabilitation of the affected families. In the past two years, the concerted efforts for rehabilitation are going on in all these affected areas. Civil society participation in these efforts has been unprecedented. Large resources have been put into rehabilitation plans by NGOs, INGOs, bilateral agencies and the Government. In Andaman and Nicobar Islands, the affected families are presently in interim shelters built primarily by the Government at new locations. However, a few families continue to live on their own in previous or alternative locations.

The disaster not only caused major destruction of human life, assets, livelihoods and the coastal environment but also caused some permanent geological changes. While the northern islands of A & N islands rose up by 1–1.5 metres and created more land, the islands on the southern side sunk into the sea and significant land was lost and inundated. The submergence of Indira Point in Great Nicobar Islands is estimated to be about 4.5 metres.

Andaman and Nicobar Islands are a Union Territory (UT) governed by the Central government directly through the Lieutenant Governor. They do not have any elected legislative assembly. Andaman and Nicobar Islands are represented by a sole MP in the Parliament. There is an Island Development Authority (IDA) under the chairmanship of the Prime Minister, set up in 1986 to formulate policies and programmes for an ecologically sound, and integrated development of A & N and Lakshadweep Islands. The steering committee of IDA is headed by the Deputy Chairperson of the Planning Commission.

After the disaster, the Government of India set up an Integrated Relief and Rehabilitation Command for A & N Islands for inter-ministry coordination to ensure effective and efficient response. The UT administration, with financial and other technical support from the central government, is involved in developing multi-sectoral rehabilitation plans. This includes not only construction of houses but also reconstruction of damaged infrastructure, power installations, water supply and drainage systems, roads, bridges, jetties and cargo handling equipments, etc. Tourism rehabilitation and

# Andaman & Nicobar



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environment protection have also been included in the integrated rehabilitation scheme. In addition to this, the government has also planned long-term resurgence projects for the development of islands in the post-tsunami context. In order to respond

efficiently and quickly, the GoI empowered the local administration by taking certain immediate steps, such as enhancing the financial powers of the Lt Governor. With the shift from relief to rehabilitation phase, the mechanisms of work have also changed.

The climatic conditions are warm and humid with temperature around 22° to 30° Celsius. Average annual rainfall is about 3500mm.

# Policy framework for reconstruction

**T**he Government of India and A & N administration are working on reconstruction of houses for the affected families. The government in the initial days after the tsunami, constructed interim shelters with Corrugated Galvanised Iron (CGI) sheets on steel understructure to house the families who were displaced. The interim shelter process was agency-driven and these shelters were then allotted to affected families. In each interim shelter site, the affected families come from many different areas and settlements. Studies on the quality of interim shelter have pointed out that these shelters are below the 'Sphere Standards' – an internationally recognised benchmark and framework for immediate disaster response.<sup>1</sup> After the interim shelter phase, the Government is now in the process of providing permanent houses. After any disaster, it is the Government which develops a policy framework defining the objectives and outlining delivery mechanisms for achieving the same.

**There is no single document that covers the present policy of the Administration in a comprehensive manner.** However, it is understood that the present policy has evolved from the decisions taken by ministers of the Government of India at various stages post-Tsunami. Such decisions are minuted. But the efforts to get minutes of the meetings have not yet yielded any result. It is, therefore, not very clear what decision-making process led to formulation of the present policy of reconstruction. Work is under way at the time of writing this report on the preparation of a policy document.<sup>2</sup>

The initial rehabilitation package for A & N Islands is mentioned as Rajiv Gandhi Rehabilitation Package (RGRP) for Tsunami Affected Areas. In A & N Islands it details out norms for cash doles, intermediate shelters, relief camps and supplies, livelihood support, infrastructure and evacuation and makes budgetary allocation for these objectives.<sup>3</sup> This, however, is actually only a relief package. The A & N administration website mentions a special package of Rs3452 crore for reconstruction work over the next four years.<sup>4</sup> RGRP initially made provision for construction of 8566 permanent houses<sup>5</sup> of 450 sq. ft. each and community infrastructure at a cost of Rs738 crore. Based on this, the Government developed house plans for reconstruction of houses. According to the Government, the designs have been drawn in consultation with the local population.<sup>6</sup> Subsequently, prototypes were set up in the islands. After the Government received acceptance of its proposal from the community leadership, it has finalised the construction programme. However, the extent and quality of

1. Battered Islands - Report of a Fact-finding Mission to Tsunami-affected Areas of the Andaman and Nicobar Islands, June 2006, Shivani Chaudhry & Enakshi Ganguly Thakural, Housing and Land Rights Network, Habitat International Coalition available at <http://www.hic-sarp.org/battered%20Island%20Final.pdf> (accessed on October 21, 2006)
2. Mentioned in meeting with Relief Commissioner, A & N administration on 23/09/06
3. For details on Rajiv Gandhi Rehabilitation Package, please refer annexure-1
4. <http://www.and.nic.in/post-tsunami.pdf> accessed on October 21, 2006
5. These figures of total houses to be rebuilt have now been revised and total 9714 houses have been planned.
6. Note circulated during the press meet of PM on 4/1/2006

participation and acceptance of the housing designs by the local communities is questionable. As part of this package, the Government has invited NGOs to actively participate in the reconstruction programme.

## Policy Objectives

The Relief Commissioner mentioned that the housing reconstruction policy was the result of various meetings that were held by experts, ministers and A & N administration. This report has tried to analyse the minutes of the meetings and other notes that are available in the public domain on web sites of CPWD, Andaman and Nicobar Island administration and Ministry of Home Affairs. There are details only of a housing reconstruction programme and there is no comprehensive policy document. It is difficult to say what the objectives of the policy are.

The main objective of this reconstruction programme as articulated by the Government through various notes and minutes of meetings is to provide disaster safe houses with eco-friendly materials and technologies that improve living standards without affecting the lifestyles of the affected families. The minutes of meetings document that the programme also aims for quick delivery of these houses.

## Main Features of the Reconstruction Programme

The main features of the reconstruction programme are:

- Provision of model and modern houses to improve living standards
- Provision of supporting infrastructure of 'international standards'
- Construction of 450 sq. ft. of plinth area for each affected family
- Use of alternative eco-friendly materials in place of timber
- Government agencies will be the lead agencies for implementation and execution but NGOs are also invited to build following the same designs and specifications.

The delivery mechanism for providing nearly 8000 houses to the affected families has been planned through Central Public Works Department (CPWD),

a government agency under Ministry of Urban Development (MoUD). Andaman Public Works Department (APWD) is entrusted with construction of about 1000 houses. NGOs are to build nearly 750 houses. The government documents suggest that this choice of delivery mechanism has been selected after due discussions with the community and local administration. An expert group from MoUD in its minutes of meeting during July 2005 at Hut Bay (Little Andaman) mentions public preference for the government agency-constructed houses over that of NGOs.

CPWD has started the process of execution of the project since 16 January 2006. Identifying the contractors and awarding the works has been completed. As per the proposed time line of CPWD, the first set of houses was to be delivered on 28 October 2006 and balance will be completed by 31 December 2007.

## Observations and Analysis

It needs to be reiterated that for effective and efficient delivery of constructed housing, a clear policy framework is necessary which at the moment is missing. The design, materials and specifications of construction are being put forth as policy. And these seem to have been arrived at through few official meetings held by the Government. A comprehensive policy framework must clearly articulate its objectives, eligibility criteria and entitlements of the affected families and lay guidelines for processes for selection of eligible families, selection of construction sites, delivery mechanisms for design, materials, technology and execution of construction, roles and responsibilities of involved stakeholders, community consultation and participation, time frame, grievance redressal mechanism, etc. There is no such policy document which can provide details on all these aspects.

Another important point is the selection of delivery agency for this Reconstruction Programme. APWD, rooted in A & N Islands, is the local government

However, the extent and quality of participation and acceptance of the housing designs by the local communities is questionable.

agency with mandate to take up construction works. Yet it was not given priority. During discussions with Government officials, it was mentioned that APWD was already burdened with responsibilities of providing roads and water supply. Hence any additional task would not be possible. However, CPWD ensured they obtained the assignment even though it was APWD that the A & N administration favoured for this task. The excerpts from the letter (no. 10/10/9/200-wks; dtd 15 July 2006) by Chief Engineer (SZ-1), CPWD to the Additional Director General (SR) indicate<sup>6</sup> the dynamics that existed during the decision-making process:

"If the final decision is to take up the permanent dwelling units by CPWD as per proto units provided with minor modifications, there should be total cooperation from the Administration and local tribal leaders. The administration should also endorse the views expressed by the tribals regarding the area, specifications and design and render wholehearted support especially when the general discussions indirectly reveal that the administration is interested to do the permanent dwellings with wood and that too through Andaman PWD though this view was not recorded openly in the minutes of the meeting.

The administration should furnish exact number of houses to be built in each village and the location needs to be identified and then only the master plan can be prepared."

Similarly, is the case with both National Buildings Construction Corporation Ltd (NBCC) and Housing and Urban Development Corporation (HUDCO) who were involved in construction of houses and providing design and other technical support respectively. At some stage both these organisations were either pushed out or coerced to withdraw. But in either case, the reasons are not clear.

Actually it is Government agencies such as Building Materials and Technology Promotion Council (BMTPC) and HUDCO who have been involved and worked on these post-disaster reconstruction issues in the past and have a fair amount of expertise. However, they seem to have played only a marginal role in the initial stages of internal consultations. APWD's role has been reduced to one-sixth of what CPWD has taken up. CPWD has complete monopoly over reconstruction, particularly in the islands of Nicobar district even though they have no prior experience and expertise of working in post-disaster scenario.

## Current housing scenario

**A**t present, communities in general do not agree with designs, materials and technology being used. Even those who have seen the model house have rejected it. Many community members suggested changes but these were never taken into consideration. Just like the CPWD staff, the communities are equally ignorant of the changes made by CPWD after so-called 'participatory consultations'. The community prefers the traditional house design and materials and would have preferred if cash or material support was provided. They would have built the house of their own choice and larger size in much lesser amount. The costs proposed by the government are too high. The community was keen to get employment opportunity from the construction of new houses and has made many such representations.<sup>1</sup> But the present framework of construction does not allow that.

### Interim Shelters

Interim shelters with walls and roof, made primarily with CGI sheets have carpet area of about 11'x16' in a single room. Most of the families have partitioned the room to separate the cooking space from the living space. Where some shelters had no bathrooms, families improvised. Water availability is inadequate on most of the settlement sites on all the islands visited during this study. Space around the shelter varies from site to site. Closed drainage has been made where required. Internal pathways are paved. Electricity is provided free of charge at present by the government.

#### South Andaman

At Namunagar interim settlement, the non-tribal community hails from Car Nicobar, Katchal and

South Andaman islands. According to these community members, each interim shelter cost Rs1.2 lakh – too steep for this type of structure. A local engineer clarified this cost as inclusive of charges towards site clearance, road and drainage works. According to him, safe assumption for only the interim shelter structure will be Rs70000 per shelter. On the other hand, the community claimed that locally built structures with CGI sheet roofs and bamboo mats for walls cost only Rs8000–9000. The permit to get bamboo from forests could be obtained from the DC's office. However, sometimes the bamboo is taken from the forest without permit but in connivance with the forest guards. The community ascertained that within Rs30000 they could have constructed similar government interim shelters with twice or thrice the current square area.

Some of the families living in Wandoor have not accepted the government/NGO built interim shelters particularly because of the location of the site where they were allotted the house. Preferring to live close to the place of their occupation, this Bengali-origin community has built its own interim shelters with material support in the form of CGI sheets and small cash support from an NGO.

1. Minutes of the discussions held between officers of the A&N Administration, Ministry of Urban Development, CPWD and tribal people held at Sawai Village, Car Nicobar on 09th July 2005 available at [http://www.cpwd.nic.in/TsunamiNew/minutes\\_cpwd\\_tribal.htm](http://www.cpwd.nic.in/TsunamiNew/minutes_cpwd_tribal.htm) (October 25, 2006)



### **Little Andaman**

Here, the community had a grievance. Many of them had been cheated of the promised wages in return for the labour they put in towards construction of the interim shelter. Some of the interim shelters are yet unfinished. Some are completed and the locals prefer not to shift out of them since they are comfortable and do not want to move into newer areas of neighbourhood. Some have built traditional houses in the interim shelter settlement for the old and differently challenged persons who are unable to bear the heat under tin sheet structures. When the community itself is very traditional – like the community at Harminder Bay hailing from the traditional Nicobari tribe, their lifestyle is very different from the other communities on the Island of Little Andaman. Though most of the shelters are built by the Government, some have been built by Nicobarese people themselves using CGI sheets only in the pattern of their own traditional *Tuhets*.

At Machhi Dera, Padauk tekri, the fishermen community is staying in interim shelters about 2kms from their original habitat. The interim shelters built with CGI sheets and steel pipe understructure have facilities of drainage but the toilets are located at a distance. These community toilets are not in use. There are no water and electricity facilities at these interim shelters. Panchu tekri interim shelters are a mix of communities of non-tribals from Hathiwater, Breakwater and Saw Mill area. They mentioned that they had occupied these shelters only because they did not want to be left out from their entitlement of permanent shelters. Average costs of Rs 1.5 lakh for each interim shelter was a point that had upset this community as some of the artisans in the community assessed the constructions to be not worth more than Rs40000. Even in this interim shelter settlement, community toilets are not used. Electricity and water have been provided but are inadequate. The community interim shelters at Netajinagar also faced similar issues. Some of the interim shelters at Nanjappanagar have problems of flooding during the rains and people have had to move to a nearby school thrice in the last 18 months. Of a total 650 shelters here, nearly 200 are not occupied but are in the possession of families who, though not staying, want to ensure their entitlement of permanent shelters. The families facing flooding in low lying locations cannot move to these

unoccupied locked interim shelters. Some of such shelters may belong to well-connected and influential people who are not affected and continue to stay in their old houses.

### **Campbell Bay**

In Rajiv Nagar-II, an interim settlement within Campbell Bay town, approximately a kilometre from the centre, many households have made a partition wall for extra internal privacy. Additional work like cement flooring has been done with the help of an NGO. Extensions have also been made in some houses with additional sheets supplied by NGOs. This has also been dependent on the space availability between the two rows. Some households have made a kitchen garden also. There are no bathrooms, since bathrooms made by an NGO have been rejected by people due to poor quality and lack of privacy. Toilets were provided by the Government for each household and these are connected to a common septic tank at the bottom of the hill. The toilets are lying locked by families and are not used. Interim shelters being situated on a high point, water supply has been a problem. There are very few taps and water is supplied for only a short duration. Hence, water collected by individual households is not adequate. People greatly depend on rainwater harvesting in tanks given by an NGO.

Govind Nagar is an interim shelter settlement of non-settlers from Magamala who have not had any legal land tenure earlier. Situated on revenue land approx. 5km from town, on a flat hill top, people want to settle there provided the problems of absence of electricity and scarcity of water are addressed. However, the land belongs to the Navy who now want them to be evicted. The site at present is accessed by a steep track which is paved only part of the way. The rest of the path, people have put stones since otherwise it gets extremely muddy during the rains. The site is spacious with significant amount of open land for community, livestock, kitchen garden, etc. Shelters are self-made with materials given by the government, and supplemental materials provided by the NGOs. People have made extension verandahs in the front and rear, using self-made bamboo mats. However, no sanitation facilities exist. An NGO had started with toilet construction but abandoned it for some reason. However, now that

the stink disturbs them, the people have expressed the need for sanitation similar to that at Rajiv Nagar. Being on the hill top, water supply is very limited and people fetch water from a water tank by the side of the road at the bottom of the hill. They also depend upon rainwater harvesting in water tanks given to them by an NGO and through the roof gutters installed by another NGO.

A settlement of the Nicobari tribe community at Rajiv Nagar in Campbell Bay has two major variations with the rest of the sites of the non-tribal community. The shelters are stilted and have flooring out of split bamboo made by the tribals. The site belonged to one of the members from the tribal community and prior to the shelters being built, it was a coconut plantation. At all the sites, roof rainwater harvesting has been adopted in a big way to meet the water needs since the centralised water supply has been inadequate, unreliable and erratic for obvious reasons in such difficult locations.

## Permanent Construction

Permanent reconstruction of houses is planned to be taken up on 11 islands of the A & N Islands. As described earlier, CPWD, APWD and some NGOs are taking up this construction work under the guidelines prepared by CPWD.

Name of the Islands	No. of Permanent Shelters to be Constructed by			
	CPWD	APWD	NGO	TOTAL
South Andaman	-	158	659	817
Little Andaman	965	908	100	1973
Car Nicobar	3941	-	-	3941
Teressa	462	-	-	462
Katchal	315	-	-	315
Kamorta	467	-	-	467
Nancowry	268	-	-	268
Chowra	343	-	-	343
Bambooka	16	-	-	16
Little Nicobar	111	-	-	111
Great Nicobar	1001	-	-	1001
<b>Total</b>	<b>7889</b>	<b>1066</b>	<b>759</b>	<b>9714</b>

Based on <http://www.and.nic.in/shelterP/islandwise.htm> accessed on October 8, 2006

The details of permanent shelter locations on each island and corresponding number of houses

sanctioned at each site are provided in annexure-2. The team visited South Andaman, Little Andaman and Campbell Bay to understand the scenario of permanent shelter reconstruction from the local communities. All the affected settlements are proposed to be relocated as per the Department of Science and Technology (DST) recommendation<sup>2</sup> of 1.5 km from High Tide Line (HTL) and beyond the 10m mark above the Mean Sea Level to ensure safety against a future Tsunami.

We are farmers. We cannot live away from our farmlands. We have to be on our land to take care of our crop and implements. When government officials visited we wanted to know why they did not come here before deciding what to build for us. Why do they ask us when they have decided everything? Do you think we do not know what kind of a house to build? We have been building it ourselves for years now. Nobody is here to listen to us.

*A farmer, Loknath Pahar temporary shelters, South Andaman*

In most of the locations where permanent shelters are being planned, access roads and terracing of land have been started. NGOs in South Andaman have initiated work. On many other sites, development works have been initiated by APWD. Interim shelters at Namunaghar and Loknath Pahar in South Andaman, the house owners had no information about permanent shelter reconstruction. But the community knew where all the construction has been initiated but were not sure which site is meant for them. The community had also heard that each permanent shelter would cost about Rs6.5 lakh. Patiram Sardar, a local mason, calculated that a house could be built in Rs2.5 to 3 lakh. However, the community felt that these issues could not be raised as they are dependent on dole from the government.

The Nicobari tribal community at Harminder Bay Little Andaman did not have complete information about details of the type of houses that are being built for them. The new relocation site where the construction has been initiated was not acceptable to the community as it is very far from the coast.

2. DST has recommended adoption of elevation based setback line for resettlement locations. Elevation of 10 m with 750 m distance from coast is suggested for North, Middle and South Andaman. 15 m elevation with 1.5 km distance is suggested for other islands. The DST goes on further to recommend that if such elevations not found, better not to inhabit people in those islands unless otherwise compelling social and security conditions prevail.

They have already moved inland for interim shelter and are not willing to move further inland. The captain of Harminder Bay complained that in spite of several representations made, nobody listened. The basic fault in the proposed design according to Harminder Bay community is that it is not on the 'machan' like their traditional houses. Also the houses have been placed too close to each other, leaving no space to rear their livestock. Traditionally the houses are on stilts and have a ventilated floor. But these permanent houses clash with the community's traditional lifestyle with their concrete flooring and are not acceptable to the people. In case the houses are not built according to their needs in a suitable location, they are determined to continue staying in the interim shelters. The captain at Harminder Bay felt the community members would have an opportunity for employment, if they were involved in building the permanent houses taking into consideration their traditions.

Machhi dera fisher's settlement, Panchu Tekri, Netajinagar and Nanjappanagar communities were also ignorant about details of house designs, materials and technology. People mentioned that no consultation with them took place. Some of the community members in these interim shelter locations were aware that new permanent shelters have been contracted at more than Rs5 lakh which they felt was too high. The *Pramukh* and *Pradhans* of all these settlements complained that there had been no consultation and their representation was not heard. The Machhi dera fisher community at Padauk Tekri was not willing to go further inland as their livelihood was connected to the sea. The women fish vendors sell fish till about 7p.m. to 8p.m. near the sea before going back home. They have already moved inland and are not willing to move in any further.

The Government officials have no idea of our relationship with the sea here. Do they know what security problems we will face to return so far inland after selling fish? Our houses have to be built by us. We know how to build, we know how to build it cheaper with local materials.

*A Fisherwoman from Machhi Dera,  
Little Andaman*

PRI members mentioned that they had not agreed to anything but had signed a few times on some

documents at the government office. They confessed that they were ignorant about what had been reported. Community leaders mentioned a preference for individual houses over twin houses. Panchu tekri community had seen the model house but had rejected it. They were not aware of what the progress on permanent shelter work was.

I have raised the issue of the twin house with the administration. I have explained to them that the lifestyles are very different here. There are issues of the maintenance of the house and the neighbourhood; Who will stay next to whom? What is going to happen to our social structure here, if this is done? But no one seems to be bothered. We are the public representatives. We have so much pressure from the people, but the Administration does not want to hear the public representatives. They have their own plans, their own ideas on how we all should live here.

*Pramukh, Panchayat Samiti, Hut Bay*

However, many masons and carpenters were interested to undergo training, provided they would be involved in building their own houses, according to the government guidelines.

Just because I am a woman, officers don't listen to me. I have raised points several times in last year about all the information we want. The houses are too small for our families. Twin houses don't suit our lifestyles. We also hear that they are going to be very far. But no one listens to me. What am I supposed to do? Where do I go? Whenever some important officials come, we try and meet them. We are always pushed aside, they never let us meet and talk freely like we are sitting here and talking amongst our own people.

*Ex-Zila Parishad member, Panchu tekri,  
Little Andaman*

Netajinagar people are primarily agrarian and have stayed in their own agricultural lands where they have to look after their seeds, fertilisers, produce, implements and livestock. The community at Netajinagar felt that it will not be possible to carry out these activities in the houses that are currently being constructed for them. There is a feeling in the community that the construction at these costs involves large-scale corruption.

No construction has begun anywhere in Campbell Bay. Shortly, the construction of several houses is expected to begin at Campbell Bay town for the residents who had lost their houses. Barring the area adjacent to the sea, almost the entire island has thick forest cover, and the sites allocated for the reconstruction of new settlements can be reached

We hear that Rs10 lakh are being spent on each of our houses. Give us half that money, we can build our houses. We have been living here since the days when there was no electricity, school or hospital. We hear that alternative land for plantations will be given to us. First, let that be decided. The house can be built only when we know where our land is.

*A Settler family in Campbell Bay*

only after a new road is built. The new road under construction by GREF up to the first settlement of Joginder Nagar will be approximately 6km away and will be completed sometime in March 2007. Only after that will the site be accurately identified and marked on ground, its survey carried out and plans for reconstruction drawn up. The terrain along this patch of the road alignment is hilly and wooded, has clayey soil that become mud under wet conditions, making it extremely difficult to achieve progress during rainy months. This alignment involves cuts as deep as 9 to 10m. As a result, the road construction pace has been rather slow. Fortunately, the rest of the alignment beyond Joginder Nagar will be through relatively flat terrain where the work is expected to progress fast. It is expected that the road up to the last settlement would be completed by the middle of 2008.

### **Damaged/Surviving Structures – houses as well as public buildings**

At Campbell Bay, a large number of structures, especially those of the government that have been damaged and are facing the menace of the inundation, periodic or permanent, have been vacated and are going to be demolished. Only very few may be modified for future use without

demolition. Some, such as the office of the DFO, have already been relocated, to a new higher location.

### **Observations and Analysis**

Regarding temporary shelters, many families in the interim settlements have come from different places and even other islands. These families have no means of livelihood and are completely dependent on the dole from the Government. As a result they feel vulnerable and are not able to voice their concerns. Most of the structures in the interim shelters are in better condition, particularly when we compare them with other tsunami-affected areas on the mainland. However, drinking water is an issue in some settlements, particularly in some of the settlements of Little Andaman and Campbell Bay. Community sanitation facilities have not been used but the rainwater harvesting system has been very useful. This system, wherever installed, has been found to be very much in use. New constructions as proposed by CPWD does not include rainwater harvesting.

Though the CPWD mentions that they have had a lot of consultations with the community, it is bare minimum information that the communities seem to have about the permanent shelters. In fact, the consultations appear to be restricted and limited to the Tribal Council and few leaders from Nicobari tribal community

However, the expressions of Nicobari tribal community in Nicobar district have been different. Though not happy with the designs and materials, they did not favour waiting any longer for the delivery of permanent shelters. The Tribal Council and Nicobari community in general have showed passive acceptance of the houses even though they feel the houses that are being built are not suitable for them. It is very likely that the tribal community will build its own traditional houses, using their own traditional materials procured from the forests at a later stage. At this stage they would wait to ensure their entitlement from the Government. This is information that has been documented in the minutes of the community meetings that the government has had with the tribal leaders.<sup>3</sup>

3. See 'Minutes of the discussions held between Officers of the A&N Administration, Ministry of Urban Development, CPWD and Tribal people at Govt. Guest House, on 11th July, 2005' available at [http://www.cpwd.nic.in/TsunamiNew/minutes\\_cpwd\\_tribalpeopleheld.htm](http://www.cpwd.nic.in/TsunamiNew/minutes_cpwd_tribalpeopleheld.htm) (accessed on October 20, 2006)

# Pre-tsunami vernacular housing

**T**he pre-Tsunami house construction was primarily dependent upon the resources available in the Andaman and Nicobar Islands. All had pitched roof, generally four-sided, sometimes two ways. The vernacular housing typologies could be defined as:

## 1. Traditional Houses of the Tribal Community

**Roofing:** Thatch on timber understructure and sometimes CGI roof on timber infrastructure

**Walling:** Stilted house on timber or masonry posts. For walling, timber planks or bamboo mats mounted on wood posts. In typical Nicobari hut, semi-spherical thatch roof covering the side walls also.

**Flooring:** ventilated flooring with bamboo or timber.



## 2. Traditional Houses of the Non Tribal Community – Poor households

**Roofing:** CGI sheeting on timber understructure.

**Walling:** Timber planks, bamboo mats or CGI sheeting on wood posts that are anchored to MS angles embedded into concrete.

**Flooring:** Compacted earth flooring sometimes cement finished.



## 3. Traditional Houses of the Non Tribal Community – Better off households

**Roofing:** CGI sheeting on timber understructure with sometimes RCC slab for the ground floor.

**Walling:** a) 200x200x400 Concrete blocks up to sill level with timber planks above them or up to roof level for single storey structure or up to ceiling level of lower storey in two storey structure.

b) Timber planks on wood posts that are anchored to MS angles embedded into concrete for upper storey in case of two storey structures.

**Flooring:** Cement flooring but sometimes tiles also may be used.



## 4. Government-built Structures



**Roofing:** Corrugated AC sheeting on timber understructure and RCC slab for the ground floor if there is more than one floor.

**Walling:** a) RC frame from foundation to roof level with wall infill made of 100x200x400 concrete blocks

b) Concrete blocks up to sill level and timber planks on wood posts that are anchored to MS angles embedded into concrete.

**Flooring:** Cement flooring but sometimes tiles also used.

### Access to Materials

Traditional houses are constructed from the locally available materials that the communities can access. The availability and access to materials is dependent on many factors:

- Socio-legal framework which varies from community to community
- Lifestyle and occupation of different communities.

The tribals in the A & N Islands depended totally on the locally found materials in their surroundings. They have free access to them. But in the case of non-tribals, the access to materials has not been free with various restrictions imposed.

**Timber:** For many years the people who were brought in by the government to settle down or the so-called 'settlers' were given 12 tons or 17 cu.m of timber to construct their houses, and later given up to 6 cu.m. for repair and maintenance every five years. This practice was stopped many years back. However, the timber required for the construction needs of all the communities can be accessed from the Government-owned saw mill at Chatham Saw Mill in Port Blair. Tribal communities continue to access the timber from forest as and when needed. The Supreme Court has barred timber extraction only for commercial purposes but communities can get it for their needs through the Government.

**Aggregates:** This is generally brought from the quarries of South Andaman. This stone, however, is not considered hard enough, and hence, at times this too is brought from the mainland. It has also been reported that the dead coral found on islands is used at times in place of aggregates. The Port

Blair aggregates cost Rs600/cu.m. locally while they cost approx. Rs4,800/cu.m. in Campbell Bay.

**Sand:** Sand from the beaches (Rs800/cu.m.) has been used for most cement-based construction. This sand contains salt as well as a high percentage of calcium carbonate from shells. Since both are detrimental to the strength of the structure, at times river sand was brought from the mainland. However, river sand costs Rs8000/cu.m. which is more than the aggregates brought from Port Blair. Hence, stone dust for Rs5,600/cu.m. from the quarries on South Andaman is preferred. For plastering, this is sieved, whereas for concrete it is used as it is. The locals have been using the local sea sand with its high content of salt in house construction since the last 30 years. They have not experienced any rapid corrosion of steel which has been used in the RC construction. According to them the salinity of the sea in this region is less than that adjacent to the mainland. Also they claim that the strength of the cement-based construction is quite high. This is likely since in the absence of rigorous destructive testing such reduction in strength is difficult to assess by common people. In recent years, however, taking cognisance of these facts and of the possibility of low strengths, instead of 1:2:4 proportions for concrete, people have adopted 1:1<sup>1/2</sup>:3, and instead of 1:6 proportion for cement mortar, 1:4 has been adopted.

**Roofing Sheets:** These are obtained from Port Blair. Since AC sheets experience breakage up to 10 to 15%, CGI sheets are preferred by the people. APWD is also going to replace AC sheets by the CGI sheets in its future specifications.

**Cement & Steel:** Obtained from Port Blair, these come from mainland. Therefore, transportation costs are very high. At Campbell Bay, cement costs Rs350/bag and steel Rs35/kg respectively.

## Access to Skills

In case of tribals there are some who possess masonry skills which they apply when necessary. Carpentry skills are possessed by most tribals.

In case of non-tribals, there are carpenters and masons (both at Rs250/day) who have come from mainland in search of work or for a particular project.

## Access to Finance

In case of Tribals, assistance for materials and labour was made available to the poor through Indira Awaas Yojna from time to time. In case of non-tribals they totally depend upon their own resources.

## Access to Technology

### Tribal Houses

The important points of the construction technology adopted by the tribals could be summarised as follows:

- *Machaan* style since living near the sea
- Stilts made of *Katkarch* wood which can survive 25 to 30 years
- Roofing consisting of thatch called *Dhani Patti* which grow near the creeks where the sea water and fresh water meet. This is excellent against heat
- Walls with planks on inside and thatch on the outside also have excellent insulating properties.
- No nails are used. Instead ropes made from *Bet* trees are used
- The smoke from the wood burning *Chullah* inside the house has helped increase the life of thatch as well as timber in roof.

### Non-tribal Houses

Important points of the construction technologies adopted by the non-tribals are:

### Timber-Based Houses

- Timber primarily used for most principle structural elements
- Rainy weather for 8 months out of 12 in a year Hence, the roofs are pitched, except in a few cases.
- Frame system is adopted consisting of cantilever timber posts that are anchored to foundation through MS Angle using 2 to 3 bolts, timber struts parallel to house length between the timber posts at more than one level, including the wall plate at the top of wall, timber truss anchored to the posts through the longitudinal wall plates, and finally the purlins bridging the gap between the trusses at roof level with CGI or Asbestos sheeting placed on top of them for roofing.
- Most important features of this Frame system are (a) Flexibility and ductility on account of the inherent property of timber, (b) anchoring of roof to the columns (which form an integral part



of the walls), (c) four-sided roof with gables being absent, and (d) light weight structure.

All these four features impart a high degree of earthquake resistance to the structures.

#### Timber & Concrete Block Masonry Based-Houses

- The principle element may still be timber with concrete block masonry used to a varying extent. There are two variants in this system, which have (a) 8" thick block masonry wall up to sill level with timber planking above that to roof level, (b) 8" thick block masonry wall up to roof level with timber posts at approximately 5' spacing stretching from plinth to roof level
- Frame system is similar to the timber-based houses and hence has proved efficient and resistant during the earthquake
- Masonry walls have RC beam/band 4" to 6" thick at plinth with 4 bars of 10mm TOR but none at sill. Those continuing higher have one more RC band of same size at lintel level. Typically the masonry walls go approximately 2.5' to 3' beyond the band
- The roof trusses are anchored to the wall plate at the top of the posts
- The most important feature of this system are (a) Flexibility and ductility on account of the inherent property of timber as well as because of installation of RC bands at one or more locations, (b) anchoring of roof to the posts columns (which form an integral part of the walls), (c) four sided roof with gables being absent, and (d) light weight structure. All these four features impart high degree of earthquake resistance to the structures because of which the structures of this type performed well against the earthquake that preceded the tsunami.

### Sanitation and sewage disposal system

Except for the people living in relatively denser urbanised settlement like Campbell Bay, there were very few houses that had a toilet. The houses with toilet had septic tank for sewage disposal. The people, tribals and non-tribals, resorted to defecating in the open by the seaside. They found this system of

sanitation adequate and effective since the sea carries away the excreta. Although, double pit toilets have been built in many houses, due to the high ground water table, there are still problems experienced.

### Water Supply

Most houses had access to open dug wells for water. Since it rains seven to eight months in a year, the wells have adequate water. Interestingly, shallow wells, within 100ft of the sea yield fresh water at a shallow depth in most settlements. Hence, piped water was not a necessity.

### Rainwater harvesting

Before tsunami the people were aware about rainwater harvesting but it was not really practised, even though it has great potential. In public buildings rainwater harvesting tanks were constructed prior to tsunami. But in most places this system is found lying unused.

Since tsunami, however, with the traditional water sources beyond reach in the interim shelters and centralised water supply being unreliable, the usefulness of roof rainwater harvesting has been experienced and appreciated by all. This is evident in the extensive presence of the system improvised by every household in front or rear of the interim shelters.

### Observations and Analysis

The traditional houses of Andaman and Nicobar Islands have withstood the earthquake. IIT Kanpur report on the damages of A & N Islands after the 26 December 2004 states:

"In general, the building stock consists of a large number of traditional and non-engineered structures. Many traditional structures are made of wood, and they performed well under the intensity-VII earthquake shaking sustained along the islands. However, a number of new reinforced concrete (RC) structures suffered severe damage or even collapse."<sup>1</sup>

The report by Dr B R Subramanian, Chairman of DST Team & Advisor, Department of Ocean Development, Chennai says,

1. Performance of Structures in the Andaman and Nicobar Islands (India) during the December 2004 Great Sumatra Earthquake and Indian Ocean Tsunami, CVR Murty, Durgesh C Rai, Sudhir K Jain, Hemant B Kaushik, Goutam Mondal, and Suresh R Dash Earthquake Spectra, June 2006, Volume 22, Issue S3, pp. S321-S354

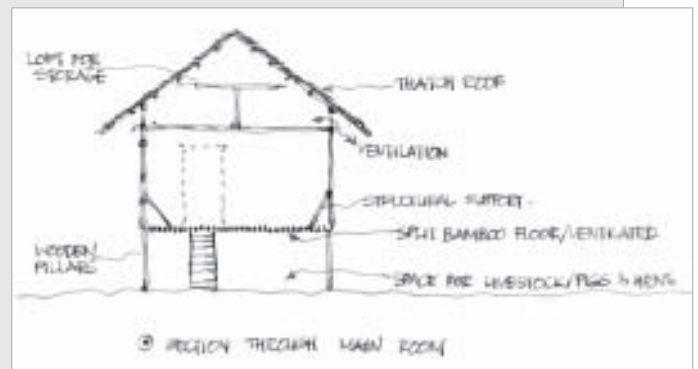
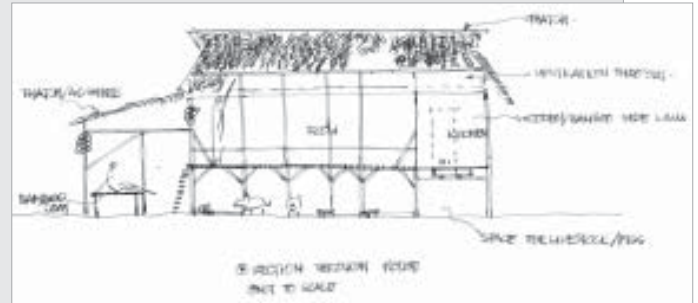
“Due to ground shaking, wooden buildings performed well as compared to few RC frame and concrete block masonry buildings.”

This provides a clear perspective into people’s traditional skills based on their own local resources. The materials for vernacular houses are sourced from nearby natural eco-system and there is less dependency on market based mechanisms. This gives households more control over procurement of materials as per their own capacities and needs. As we go for typologies of better of households, other sources of material procurement, like the market are also used. DST has recommended use of timber structures due to its good performance established in the disaster of December 26, 2004.

In tribal communities, the required skills to work with timber, bamboo and thatch are abundantly available. Almost every one in the community knows carpentry. House construction is a community affair with everyone participating. This mechanism has evolved to suit the cashless internal economy that they have and strengthen community bonds. As the typologies vary and other materials get included in construction, the dependency on skills and markets increases. As described above, various typologies of houses have not evolved only from the materials available locally but also their lifestyle, occupations and financial capacities. Thus, there are variations that suit every household’s own context and needs. The non-tribal communities who have different lifestyles and capacities due to other occupational involvements, choose varying extents of such materials for inclusion in the house they choose to construct. Therefore, one finds more use of cement, CGI sheets concrete blocks and steel angles in their houses.

Use of thatch and timber also makes the houses climatically comfortable. Making a stilted house in such humid climates with ventilated floors not only makes the house climatically more comfortable but

also ensures safety from wild insects, snakes and other such risks. The space in the lower portion has been very well adapted for a rearing livestock, and so on, to suit their lifestyle. The CGI sheets that have replaced thatch in houses of non-tribal families, in particular have been adapted because of their



suitability in high rainfall area, and less maintenance. It is difficult for these families to access thatch and timber from forests. These also offer opportunity for better rainwater harvesting which is emerging as an important need for the local communities.

The study of various construction details and structural system by the team shows that local communities have developed a very good system. Based on their own skills and capacities, it has proven to be safe to a great extent in times of natural disaster and hence should be promoted and strengthened.

# Government reconstruction programme

**T**he housing reconstruction has been planned to be taken up by primarily CPWD. Other agencies like APWD and the NGOs are doing comparatively much fewer number of houses. The NGOs involved are Hindustan Covenant Church, Mata Amritanandmayi Trust, CARE India and CRS-CARITAS. Of the total 9714 houses that are proposed to be constructed, CPWD is constructing 7889, APWD 1066 and NGOs 759. The construction by APWD and NGOs also is being undertaken as per the guidelines provided by CPWD. The design, material, technology and specifications are all determined by CPWD. The Ministry of Urban Development has made it mandatory for all other agencies to follow the same.

## Reconstruction by CPWD

CPWD is building the largest number of houses and feels that it is well prepared to deliver what is expected. The initial designs were developed in the months of January and February 2005, immediately after the disaster. As part of this process, an expert team from CPWD, TCPO, IIT, Roorkee, SERC, Town and Country Planning Office (TCPO), town planners, engineers and architects visited the area on 06 February 2005. CPWD then submitted a project proposal to MoUD in March 2005 and recommended construction of prototypes. The project proposal submitted included plans, layouts, specifications, estimates, project execution team planning, time lines, etc. Though CPWD's report on the housing for the tsunami-displaced was submitted to the Ministry in April 2005, finalising the project has taken close to more than year.

### Prototype Designs

Three types of prototypes were designed. The major difference in options was that one was proposed to be on ground and the other on stilts. These prototypes were constructed in Little Andaman and Car Nicobar.

In addition to this, NBCC also designed prototype designs and constructed the same on some other locations like Kamorta and Katchal. Finally, the CPWD prototypes were selected and modified but the people on the islands were oblivious of them as it was put up in the Chennai office.

### House Design

The house design is essentially a house with a living-dining room and two bedrooms with a kitchen, a small entrance verandah, a bathroom and a toilet with total plinth area of approx. 450 sq. ft. This design has two variations. One is proposed on the ground with cement concrete floor and the other is proposed on 8' high steel stilts with bamboo pressed board flooring. The houses are designed to be modern. The prototype models have been modified to some extent and this can be attributed to the feedback from the community.

### Materials and Technology

It is a fully engineered design with the structural analysis carried out on a computer. The foundations are isolated RCC footings on which the steel frame structure is installed. The structural components of the basic frame consisting of the MS Channel rigid frame will be prefabricated and brought to the site. They will be assembled using bolts/welding. This will require high quality of work with accuracy. Once the structural frame is erected, the cladding for walls

## Initial Prototypes at Car Nicobar by CPWD



## Initial Prototype at Hutbay by CPWD



and roof will be attached to the frame with the help of bolts. The walls will be with wooden planks on the outer face and inner face of wall and the false ceiling under the CGI roof will consist of 9mm thick and 4mm thick processed Bamboo Board respectively. In case of stilted houses, 8' steel columns have been installed and a steel staircase provided to access the upper storey. The flooring for stilted houses is pressed bamboo boards on steel structure. In case of ground storey structure, the flooring would be of cement concrete.

The bathroom and kitchen areas will have masonry walls made of aerated cement concrete blocks. The exterior walls are 200mm thick and the wall

bathroom and toilet is 100mm thick. The roof in this area is supported on the steel frame. The masonry walls do not have any elements specifically meant for resisting earthquake forces.

### Community Consultations by the Government

Meetings were conducted to gather people's feedback on the prototypes built by CPWD and NBCC. Following are the conclusions arrived at by the expert team on July 13, 2005.<sup>1</sup>

"At all locations, people preferred steel structure instead of wooden structure. In spite of the fact that they are accustomed to using timber as construction materials (sic) for the buildings built

1. Refer [http://cpwd.nic.in/TsunamiNew/conclusions\\_arrived.htm](http://cpwd.nic.in/TsunamiNew/conclusions_arrived.htm) (accessed on September 21, 2006)

by them, they preferred to use steel instead of timber. The reasons advanced by them for their change are:

- The structural steel elements used in the prototype units are quite strong.
- They do not want to adhere to old lifestyle and want to live in safe and well-designed permanent houses.
- Good quality wood is not available.
- Waiting for good quality wood may delay the construction.
- They do not want to cut trees, as that would adversely affect their livelihood.
- The good old trees which could have been used as building materials have been washed/damaged by Tsunami.

Above conclusions of the expert team are same as what has been mentioned verbatim in the letter written by Chief Engineer (SZ-1), CPWD to the Additional Director General (SR). In community meetings conducted by the administration, the affected families were also requested to work as labour in the construction work and promised wages for the same. This is seen as a way to give them some economic benefits and bring a sense of participation in the reconstruction project.

#### **Contracting Process and details on contractors**

For house construction, the contracts are given in two parts. First contract is for construction of foundations and plinth. It basically involves RCC and masonry work. Nine contractors have been awarded the work. These contractor agencies are primarily from A & N Islands. Second contract is for the superstructure. Though there were 5 contracts, it is only 2 agencies, which have been identified to do this work – **Simplex Infrastructures** and **Unity Infraprojects**. The contracts were conceived to be of large scale. It would not have been possible for

small contractors to manage such logistics as it would require significant initial investment by the contractors. The material proposed for the structures is such that it is not available on

credit. So contractor companies who have the capacity to invest so much money are only encouraged. Four to five bids were received and two have been awarded the work.

#### **Procurement and Monitoring mechanisms**

All the materials are to be procured by the contractors as turnkey contracts have been awarded. The contractors have been directed to import all the material from mainland. Suppliers for major materials like steel, aero-con blocks, bamboo pressed boards or bamboo-jute composite boards have been identified for executing agencies like contractors and NGOs. An executive engineer from CPWD has been deputed at Chennai and Kolkata from where materials may be shipped by construction agencies for quality check of the materials before shipping. CPWD engineers will also make quality checks at the time of arrival at A & N Island ports and it is only afterwards the agencies are allowed to transport the material to their construction sites.

In the past, there was the practice of using local beach sand. But with the demand increasing, this would necessitate procurement and shipment from mainland. However, it is likely that some of the sand may be sourced locally. But unlike the mainland, there are no rivers that provide sand, and the beaches are mined. As sand extraction has environmental impacts, the Forest Department provides permission to lift limited amount which it considers safe. However, it is not clear what methodology is used to arrive at 'safe' quantities that can be extracted.

Since Tsunami, the ingress of sea due to sinking of land has resulted in beaches in affected islands becoming even narrower. As the sand extraction is done mainly through sea route, it is not so easy. One more problem that local contractors point out is the time taken for submission of reports for approval to the Sand Allotment Committee at Port Blair. During that time, the sand deposited by the sea could return to the sea on account of the fact that there is nothing static in this process – it is always dynamic and keeps changing.

Forest department officials mentioned in the discussion with the study team that tenders were invited soon after the tsunami for extraction of the timber from trees that died in the aftermath of the

...the CPWD prototypes were selected and modified but the people on the islands were oblivious of them as it was put up in the Chennai office.

tsunami. But no one had come forward to do it. Local contractors have complained that at the time of tendering, they too were in a state of shock and the families of their workforce were impacted. As a result, the department is likely to dispose of such timber through auction at some point of time. CPWD does not have any mechanism to access this timber for use in the construction. Their interest in such a process is little as it involves a lot of bureaucratic difficulties.

According to CPWD, field labs have been set up on all the islands where CPWD is working and intensive monitoring during the construction is planned. Junior Engineers (JEs) have been deputed on all the islands and are regularly overseeing the work – almost on a daily basis. However, during the site visit, the team was unable to get any information about field labs from the JEs. CPWD field engineers were also unable to give any information on design or costs. The CPWD office in Port Blair was having all this information and was ready to share it. Orientation and training of JEs have not been handled efficiently to familiarise them with the design, construction details, materials and cost estimates.

### **Cost Estimates**

The initial estimates were prepared using the Delhi Schedule of Rates (SoR) and later on rates for A & N were finalised, based on the market rates. The bids received may be 5% above or below the revised estimates of CPWD. Initially cost estimates were about Rs3.5 lakh to 4.5 lakh. These have been finally revised; and for each house the cost varies now between a minimum of Rs5.9 lakh at South Andaman to Rs12 lakh at Katchal or Terrasa. These estimates do not mean the actual amount at which the contracts have been awarded. This information was not available with CPWD at the time of meeting with the study team. Of this expenditure, about 1/4<sup>th</sup> of the cost is for foundations.

At Car Nicobar, the initial estimate of the house was about Rs4.3 lakh. CPWD had calculated that Rs1.3 lakh of the above amount will be spent as wages to labour for the unskilled labour.<sup>2</sup> This provision seems to have been made only in the plans for Car Nicobar and not for other islands. Now

when the estimates have escalated almost doubled, what estimates for work through local community are finalised are not clear. Also it is not clear how this aspect has been ensured while awarding the tender to contractors for construction work.

### **Logistic management**

The logistics have been the major reason for deciding the framework of this reconstruction programme. As the decision has been to import all the materials from mainland, the technology for which material and labour procurement is easier was selected. Actually logistics has been overriding community preferences in many aspects. Due to logistical complexities, the demand of the affected families to reconstruct on the islands was turned down by the CPWD. The calculations for an earlier design which has now been modified show that materials for the twin houses on the ground would have an aggregate weight of about 10 tonnes and the twin houses on stilts would weigh about 18.5 tonnes. This indicates the amount of material that needs to be transported from the mainland for the reconstruction programme. The modifications in designs are likely to have increased these figures. This means, for housing alone nearly 50000 tonnes of material needs to be transported from the mainland. There will be additional works of community buildings and other infrastructure as well. In some of the islands like Katchal and Terrasa, where the jetty has been badly damaged, transportation is going to be quite a challenge.

### **Site Selection**

Selection of the sites has been based on the requirements put out to the revenue department by the engineering wing. The revenue department on each island was asked to provide the required amount of land and to comply with the 10m elevation and 1.5km criteria for distance from sea in accordance with DST recommendations. Though it has not been possible to meet the above mentioned safety criteria on all locations, the best

Another unconfirmed estimate is that nearly 100000 dead trees, of which many have usable timber, are lying un-harvested around different islands.

2. [http://cpwd.nic.in/tsunami/wages\\_car.htm](http://cpwd.nic.in/tsunami/wages_car.htm)

Most of the NGOs who were involved in prototype reconstruction have withdrawn from the house reconstruction programme.

possible option has been selected. Also due to the paucity of revenue land on the islands, land has been given to implementing agencies in different parcel sizes, depending on availability. This has caused mismatch between the requirement at particular location and the land availability. As per the State of Forest Report, 2003, 84.42% of the land is under forests even though the recorded area is 86.93% of total geographic area of the Islands.<sup>3</sup> This shows that buildable land is scarce. Now post-

tsunami, many of the settlements are being moved inland for safety reasons. It is, therefore, difficult to procure land for construction. Though based on DST recommendations, the Forest department has agreed to review the proposals if made by the Revenue department under Forest Act, 1980. The rehabilitation will require land for new settlements including that for housing, roads, infrastructure, community common lands, and agriculture land. The CRZ regulations and DST recommendations about site selection also cause major constraints in identifying suitable sites. At many of the Nicobar group islands such as Katchal, Teressa, Trinket, Great Nicobar, the situation has been further aggravated by the sinking of land after the tsunami which has rendered a lot of coastal area useless due to inundation by the sea.

The location of site has been agreed upon by the Tribal Council in areas under their control. Allotting the houses at various locations to different families living in interim shelters will be done by A & N administration and CPWD is not going to be involved in the issue in finally allotting a particular site to a particular community.

As many of these new sites are located in the hills or in the interiors as compared to earlier settlements, there is considerable work required – site clearance, access roads, terracing, retaining walls, etc. At many of these sites, the trees also had to be removed to fit in the proposed layouts and this has required to go through the process of obtaining permission from

the concerned department. In few cases, the layouts have also been modified to minimise the impact. However, there is no pre-construction assessment undertaken and it is not possible to say how many trees are being destroyed under these site development works. At Great Nicobar, it was mentioned that the proposed road will require clearing of 6000 trees but this data could not be confirmed. Another unconfirmed estimate is that nearly 100000 dead trees, of which many have usable timber, are lying unharvested around different islands.

## Reconstruction by APWD

APWD is constructing houses mainly in the Andaman group of islands. As compared to CPWD, APWD is constructing only 1/4<sup>th</sup> of the total required numbers. APWD has played a minimal role in developing designs, specifications, or technology for the proposed reconstruction programme. APWD has regular responsibilities of infrastructure maintenance apart from building and maintaining roads, bridges, government quarters, water treatment plants and supply system, and other public buildings during normal times. APWD appears to be already burdened with other regular works and hence additional works of providing infrastructure in all the new settlements are not given. The official perception is that since APWD is small it cannot handle the construction of a large number of permanent houses in a speedy manner.

### Contracting of the Works

APWD is still in the process of contracting the reconstruction of the houses. Tender notice has just been issued for 908 houses to be constructed at Little Andaman. APWD is also awarding separate contracts for the foundation work and superstructure like CPWD. The total estimated costs for RCC footing foundations of 240 houses at Harminder Bay is Rs25 lakh. The tender notice for 906 houses divided into three separate works of about 300 houses each estimates total costs of the houses to be about Rs27 crore. This means a house has been estimated at the average cost of nearly Rs4 to Rs4.5 lakh. The contractors are expected to complete the work within 4 months after the work is awarded. In case of APWD, the total contract sizes in terms of number

3. [http://www.fsiorg.net/fsi2003/states/index.asp?state\\_code=30&state\\_name=Andaman%20and%20Nicobar](http://www.fsiorg.net/fsi2003/states/index.asp?state_code=30&state_name=Andaman%20and%20Nicobar)

of houses are much smaller than those of CPWD. It is yet to be seen whether APWD also awards contracts to only large corporate companies from mainland or small contractors also. The three contracts being awarded by APWD at Little Andaman are estimated to be about Rs9 crore each. Meanwhile, APWD seemed to be slightly reluctant in sharing the information. APWD suggested that information should be procured from CPWD as what they were doing was exactly the same as CPWD who was the lead agency.

It is also not clear what measures have been adopted to ensure that there are no cost escalations during the project implementation. Both CPWD and APWD place the responsibility on the contractor as part of his deal. This needs to be understood in detail as we know that it is finally the taxpayer who has to bear any cost escalation.

#### **Logistics and Project Monitoring**

APWD has its junior engineers and assistant engineers on different islands who will be monitoring the construction project. In fact, APWD has a bigger team than CPWD on the islands and yet nobody understands why CPWD has been given the major responsibility.

Project monitoring is a complex task. Transportation logistics are so difficult that any material, once it reaches these islands, cannot be easily returned if found inferior in quality. Therefore, the APWD team is always under pressure to accommodate its use by the contractors who can face unbearable losses otherwise.

Another issue that came up was the confusion about the designs, materials and specifications amongst the team of engineers.

Orientation and training of JEs has not been handled efficiently to familiarise them with the design, construction details, materials and cost estimates.

Many consider the house to be same as the prototype that has been built on the island. Most of them have not yet received any set of drawings or guidelines for these materials. Most of these engineers will also be using materials like aero-con blocks for the

first time and therefore, are not likely to be aware of the quality issues involved. There are no material-testing facilities on most of these islands to ensure that all specifications are adhered to. Most of the engineers will be relying on the certificates produced by contractors.

## **Reconstruction by NGOs**

The role of NGOs in reconstruction of houses in A & N Islands is minimal. The policy framework or rather the reconstruction project, as devised by the Government, allows them to play the part only of a contractor and that too with the money that they themselves mobilise.

In most of the past housing reconstruction efforts, NGOs have played a very significant role. Their participation has always put forth a large variety of options in terms of design, materials, and technologies. NGO participation gives us a good understanding of appropriateness and effectiveness of different approaches and provides the communities options to make their own choices. In the past, NGOs also have played effective roles in addressing left out and marginalised affected families, developing methodologies demonstrative of participatory processes and creating awareness and community capacities for sustaining disaster safe reconstruction in future. However, there seems to be little clarity with the State about what should be the extent of NGO participation in disaster reconstruction. Though the Government expresses that it welcomes NGOs to participate in sharing the responsibility of housing construction, the NGOs are building about 750 houses in total on Andaman islands only. While government officials complain about lack of NGO response, NGOs cite limitation of framework to provide them flexibility of approach.

Initially many NGOs were keen to be involved in housing reconstruction on A & N Islands. The Government itself encouraged NGOs to put up different prototypes to understand people's feedback. SEEDS, CASA, Oxfam and some other NGOs were involved in developing models that could be used for rehabilitation of affected families. But at this stage, only a limited number of NGOs continue to participate in the government reconstruction project. Most of the NGOs who were



involved in prototype reconstruction have withdrawn from the house reconstruction programme.

### Prototype Options developed by NGOs

NGOs have developed various options with different perspectives for the affected communities. Some of these are serious attempts to come up with more participatory community-based alternatives. On one end are the options that use maximum of local resources (materials and skills), others try to arrive at something that is a combination of modern and traditional materials while some others have developed totally non-contextual alternatives.

SEEDS proposed an alternative using bamboo and CGI sheets and a prototype was constructed at Hut Bay, Little Andaman. They used local materials and local skills.

Though CPWD's report on the housing for the tsunami-displaced was submitted to the Ministry in April 2005, finalising the project has taken close to a year more.

CASA designed and built a prototype on stilts at Car Nicobar. This was based on the traditional idea of building the house on stilts but using modern technology of RCC. The walls were proposed to be constructed with wooden planks. The interiors of the house provided space for modern amenities.



SEEDS

CASA

Another local NGO also built a prototype with concrete block walls, RCC columns and CGI sheet roofs in South Andaman.



Another prototype built by a Japanese group which seems to be totally out of context has also been built using urban wastes like glass bottles, rubber tyres and other things combined with ferro-cement technologies.



Overall, NGO interventions have been very small and limited only to design, materials and technologies as prototype products. The constraints of logistics, and distances of remote islands posed a major challenge to NGO initiatives as well.

In other tsunami-affected parts of the countries, NGOs have been provided space to make a much larger contribution. In Tamilnadu, the Government went to an extreme, where instead of owning any responsibility of house reconstruction itself, all the houses were delegated to NGOs. And in A & N Islands, the Government framework presents another extreme where all the houses have been entrusted to the corporate companies through a state mechanism. The question that needs to be asked is what assessment of post-disaster situation or communities led to such diametrically opposite processes. What are the factors that influence the perspective for disaster reconstruction?

### Housing Reconstruction by NGOs

NGOs who have made agreements with the government to take up construction of houses as per CPWD guidelines have already initiated the work in South Andaman. CARITAS-CRS, HCC and Mata Amritanandmayi Trust have already started foundation work at their respective sites.



*CARITAS-CRS at Mithakhari*



*CARITAS-CRS at Badmash pahar*



*HCC at Bambooflat*



*HCC at Bambooflat*

## Basic Services for New Settlements

The government is planning to provide all necessary basic services required for the new settlements. Along with housing construction, budget allocation for infrastructure has also been made. CPWD and APWD are also developing details on providing services like water supply and sanitation in all the settlements. Centralised water supply schemes and centralised sewerage treatment plants are being planned for these settlements. However, not much details on these aspects are yet available. The site plans show basic community infrastructure like shops, community hall, PHC, veterinary hospital, parks, schools, etc., as per the town planning norms. It is not very clear as yet if these have been designed in detail and are being constructed. The present contracts do not include these buildings and it seems separate contracts will be awarded for construction of these structures. Looking at the special context of Nicobari lifestyle, birthhouse and death house have also been included in the list of additional community buildings to be provided in these settlements.

## Observations and Analysis

Formulation of the post-disaster housing rehabilitation programme is always greatly influenced by the area specific factors. These include the availability of relevant local resources, social setup of the community, dependence on distant resources, available skills, socio-economic-ecological context, etc. Andaman and Nicobar Islands are rather unique from this perspective, and within them Nicobar

group of islands is more unique. Hence, various issues need to be looked at closely to understand how they influence the housing rehabilitation, and what measures are needed to tackle the issues. Not enough efforts have been made by the implementing agency like CPWD or TCPO to understand these issues.

The choice of CPWD is almost like a sole implementing agency and any other agency wishing to work in the region has to comply with the directions of CPWD for designs, materials, technology and specifications. This has raised issues with NGOs and has resulted in lukewarm response to the rehabilitation programme.. Even amongst the Government agencies, there were more agencies involved in the beginning. However, at the later stage, CPWD is the only central agency to have been selected. MoUD had initially identified CPWD and NBCC as two agencies for the execution of the reconstruction works and had also asked HUDCO to provide designs and planning inputs.<sup>4</sup> However, the reasons of NBCC and HUDCO not being involved in the later stages are not clear. This indicates the influence CPWD had over the central government as compared to the A & N administration.

The prototypes that were built did not involve much community consultations. But the so-called community meetings later have been more in the mode of trying to convince the community about the proposed materials and technology. This attitude is reflected in the briefing meeting of the Expert team with A & N administration in July 2005. Any modifications that have been made in the prototype such as inclusion of verandah, shifting in the location of bathroom toilet and kitchen or use of wooden planks on the outer face of the walls are being put forth as result of community participation. But these are more a result of negotiations rather than participation. And the negotiations were complex due to the power government delegations had as compared to the local communities. The influence of the Tribal Council over the tribal community was used to obtain the consent of the latter. There was no compulsion to involve non-tribal communities, particularly settlers without full legal status, such as Ranchi tribals. Hence, they were ignored and

marginalised. In reality, this process of negotiation where delay could also be used as a tool, made the ordinary tribal household more vulnerable and marginalised. This **'style'** of operation is manufacturing consent not participatory consent. The mode of community meetings corroborates this. The community meeting (the video clipping of some are available on CPWD website) show that these were mostly held in specially erected pandals as is done when official functions are organised. Community and the experts sit on opposite sides. Experts and politicians, along with an amenable community leader, sit on the dais to convince them about what best efforts are being done to rehabilitate the affected community.

It is strikingly odd that the permanent housing plans, claimed to be the result of a participatory process with the tribal community, have segregated spaces for living, dining and bed. No tribal house has such segregation of spaces or rooms. The functions of the household of tribal familie, agriculturists and fishers should have been understood and houses provided for the specific functions. But obviously CPWD or TCPO had no idea about how to go about it. Instead, such a design is justified by statements that communities want modern lifestyle and do not like their traditional houses. Another interesting aspect of this whole process of design is that it seems to have been assumed right in the beginning that all the communities and all households within each community will have similar choice, irrespective of their occupations, their family size, their lifestyle habits, their beliefs, their economic capacities, their own beliefs, etc., and hence a single type of design. The delivery capacities of CPWD have been the final determinant of the house type proposed for tsunami-affected communities of A & N Islands.

Regarding the materials that are proposed to be used, longevity of bamboo boards may be a concern. Maintenance of bamboo boards too could be a problem in the long run. Replacement of such boards will be difficult on account of local unavailability. Also, any mistake of trying to hang a photo frame, picture, calendar or even a peg by nailing on this material will cause it to develop cracks.

4. <http://www.hudco.org/tsunami.htm> accessed on September 30, 2006

This material was used for temporary shelters after Gujarat earthquake in Bhuj on GIDC site and the experiences even for temporary shelters was not very good. Bamboo board is just a replacement of plywood boards and should be used the same way. Similarly, since cladding is to be attached to the steel



Storage in the traditional houses by making attic space

frame with bolts, in future the availability of appropriate skills and need for appropriate materials may create hurdles for the house owners in regular maintenance.

The idea of false ceiling as proposed by CPWD also shows a lack of understanding of the spatial structure of traditional houses. This is being promoted as a climatic feature in the construction to reduce the heat from CGI sheets. Traditionally, the roofs are very high sloped. And the ceiling space is used as attic by creating another level of ceiling inside the room. This not only provides better insulation but also ample storage space for which at present there is no provision in the house.

It is not very clear from the government reconstruction programme whether extensions to the house provided to the affected families will be allowed or not. Though some local government officials claimed that it could not be allowed, the higher level A & N officials in Port Blair said the policy in this regard is still being worked out. The future growth of the house is extremely critical in the local context as the house being provided is only an essential core space and not sufficient for the families, particularly when the family size grows with time. **But incremental growth of such houses is going to be an issue.** Extensions that are securely connected to this house will be difficult to ensure on account of frames made of steel since this will require drilling into rolled steel members and will be nearly impossible to carry out in such remote settlements. And finally it may result in poor and unsafe structures.

Another critical weakness of the house proposed by CPWD is absence of earthquake resisting features in the masonry walls and absence of connection between the roof and the walls. **The kitchen and toilet are proposed to be constructed with aero-concrete blocks without any safety features which could result in extensive damage to these walls in the event of a future earthquake.** This will be foolish to assume that kitchen and toilet are only small areas and therefore, such features can be neglected there.

There are concerns regarding the contracting process as well. Local contractors from Port Blair are hired to do the RCC footing works and big mainland companies will come and erect the superstructure.

Local contractors were found not capable to take up superstructure work because it involved i) large capital investment and ii) large specialised and skilled labour force to handle these materials which are not available on islands. It must be pointed out here that there is much higher proportion of profit involved in prefabricated superstructure work than difficult RCC work. And when the specialised skills required for construction with these materials are out of bounds for even local contractors, how can the same be maintained by tribals living in the remote islands? Moreover, presence of more than one principal party in the construction of each house would result in problems of coordination, quality and delays since the blame for any problem could be put on the other party.

Even after more than one and a half years of tsunami, the reconstruction work could not be initiated. This delay has been blamed on non-cooperation from NGOs<sup>5</sup> and lack of clarity in choice and priority of the local community. It is very clear that the delays have been due to bureaucratic inefficient procedures and political dynamics. The Planning Commission had approved traditional timber-based designs by NGOs. However, CPWD, NBCC and HUDCO pressurised the Government to adopt their model using steel based pre-fabricated houses.<sup>6</sup>

It is the government's responsibility to ensure that corporate interests do not adversely affect people's right to dignified housing, suitable to their lifestyle needs and functions. If the framework that is put in place does not ensure this right of the people, it is very serious matter. The total cost of reconstruction of houses in A & N Islands is estimated to be approximately Rs 1200 crore. This amount has been entrusted to the Government, not to the corporate agencies, for resettlement of the affected families. **This is the first example of complete privatisation of disaster reconstruction in India where public money in the name of aid to the affected people will be going to corporations as profit.**

What is interesting to note is that the Government took almost two years to finalise an adequate and dignified housing design, specifications and cost estimates and issue the tender notice but the

contractors are asked to complete all the construction work within a three-month period. The total estimated cost of these houses as per APWD is about Rs4.5 lakh per unit. Of course the contracts may be awarded at different costs based on the bids received. But as CPWD officials mentioned, their bids have only about 5% variation than the estimated costs. Even then there may be cost variations on different islands due to logistical difficulties of loading, unloading or varying distance of transportation, It seems there will be considerable difference in the costs of APWD and CPWD. CPWD houses are likely to be much more expensive. CPWD has awarded the contracts for Nicobar group of islands at the cost of more than Rs10 lakh of rupees for each unit. This raises concerns of what the actual costs are.

Regarding the services that have been proposed for these new settlements, it needs to be pointed out that the technologies under consideration are high maintenance and energy-intensive technologies which require considerable expertise in operation and maintenance. Decentralised options would be far more practical. There is no such instance where these technologies have worked efficiently in remote villages when even access is not easy. Also centralised systems have greater ecological impacts and the same have not been studied. The relevance of garbage dump in each settlement plan is not clear. What sort of garbage is going to be dumped there and how is it going to be finally cleared?

Lastly, another important point. We feel a large number of houses are going to remain vacant and unoccupied. At Loknath Pahar and Namunaghar in South Andaman and Machhidera, Netajinagar and Harminder Bay at Little Andaman, agriculturists, fishers and tribal community were not keen to move to any of the proposed relocation sites. The place of stay has very critical linkages with their livelihoods. So people who are engaged with agriculture or fisheries are not keen to move to any location which does not consider their livelihood needs. Close proximity to the farming land or coasts is what will determine whether they move to locations that have been decided without any people's consultation.

5. **Tsunami survivors wait for houses as Government debates design**, Santwana Bhattacharya, Indian Express, September 18, 2005

6. See the same reference as above

## Likely impacts of reconstruction programme

It is important to understand what will be the impacts of such a government programme.

The marginalisation of communities is going to happen through this programme. Affected families have no idea where they are going to be settled, particularly those who have to be evacuated from their original habitats. The communities have no idea what sort of houses are going to be built. The government believes that building one or two prototypes in any two or three islands is enough for people to understand the programme. Without information, no critical input is possible. Without any credible and acceptable alternative options, no real choice as per the needs is possible. Without involvement in site selection, material and technology selection and implementation, communities are surely being marginalised. It can only be predicted what the likely impacts will be of such reconstruction on various aspects of life, human settlements, environment, etc. in days to come.

**On local traditional housing process** – The local building systems in A & N Islands have performed well against the past disasters, notably earthquake and cyclones, on account of inbuilt features. However, the reconstruction programme takes no cognisance of these strengths. It will restrict the future expansion of dwellings that will be built in this programme on account of absence of compatibility between how these are constructed and the vernacular housing process.

**On housing typology** – A change in the housing typology with this reconstruction programme will not provide any sustainable solution to local communities as materials such as steel, bamboo board and aero-con blocks and panels are all required to be procured from outside. Also procurement of sand and aggregates has become very difficult. The timber-based technology is more than likely to continue. Since the people have been

happy with the local building technologies in the face of earthquakes and cyclones, and since they were affordable, people will want to continue using what they were using earlier. As for the Nicobari community, there is likelihood that they will build their own structure within a short duration as they have access to timber from the forest under tribal rights enshrined in legal provisions.

**On local economy** – Since the materials that are going to be used are not local nor are the skills that will be required, there will be no benefit to the local economy. The contractors are generally known to bring their own teams of labourers and artisans. Hence the programme will create very few jobs for the locals. With large quantum of work to be done, contractors will bring in machinery to build rapidly and wherever possible to increase their profits. This will further lead to reduction of employment potential. All the past experiences have shown that contractor-driven approach cannot incorporate ideas of community participation in construction. So despite the government mentioning how certain percentage will be spent through local communities, the award of contracts to contractors will not be able to protect that. Outside labour is already being brought into the islands by the contractors.

The communities in Andaman and Nicobar Islands are very keen to get livelihood opportunities from

such large housing projects. They are aware of the employment and income potential of such large-scale reconstruction. The Nicobari community feels frustrated due to the delays and has given up efforts to change the process. They may accept whatever houses are being built for them. Other communities of settlers and non-settlers are keen if they could build their own houses. But people who are aware of the government project see no such possibility any more. There is a sense of disenchantment from political leadership as all along they were promised houses which they could build themselves.

**On environment, ecology** – The construction may not have much immediate impact on the local natural resources since the materials used will be brought from outside. On the other hand, these materials will have greater impact on the environment. Unlike timber that the people used prior to Tsunami, the steel sections used in reconstruction are certainly environmentally unsound and hazardous. RCC used for single house has enough of negative environmental impact when compared with traditional options. It is the production of cement and concrete which is one of the worst industries in India causing some of the highest carbon emissions.

The law demands that even on Revenue land which has forest-like tree cover, prior government permission is required before any tree can be felled. The timber is harvested only for local consumption in the limited quantities based on the work plan that the forest department prepares in accordance with the Supreme Court directives. Hence, the earthquake resistant timber-based construction that the non-tribals have been practising commonly in the islands cannot be sustained from the local resources only and need to be augmented from other sources. Though the idea of importing materials from mainland was taken up so as to discourage them from extracting large quantities from the forests, this may not yield intended results. **As people find the houses unsuitable to their lifestyles, they are likely to build their own houses with their own materials, sooner or later. So the required amount of timber will anyway be extracted from the forests by tribal households.**

This, however, does not take into account the fact that over 6000 trees will be cut to construct the

RCC used for single house has enough of negative environmental impact when compared with traditional options. It is the production of cement and concrete which is one of the worst industries in India causing some of the highest carbon emissions.

new road going south from Campbell Bay to new settlements. More trees will be cut in creating access into the settlements from this road, for infrastructure buildings, and for new farmland for the 'settlers'. It is not clear how environmental clearances are obtained for all the new road network and the proposed port at Great Nicobar.

But the advantages of using timber in these islands, including the availability of the required skills, high potential in the islands to grow trees, and inherent high performance of timber structures against earthquakes, place timber as the best material for house building in these islands. There is also a possibility that timber could be imported from other parts of India or from Malaysia, just the way other items such as cement, steel, aggregates, CGI sheets are being brought in.

Looking at the scale of construction and investment, an environmental impact assessment of the reconstruction project in A & N islands should have been mandatory. It will be important for the environmentalist lobby now to take it up as project monitoring.

**On lifestyle and livelihoods of different communities** – Impact will be different on different groups. For the non-agrarian 'non-settlers' the impact is more due to site locations. In case of 'settlers', the smaller space with no scope for expansion will have serious impact on the agrarian lifestyle. This type of lifestyle calls for a lot of covered space for storage of agriculture implements, seedlings and produce. In case the married son has to live with the parents, the living space will be grossly inadequate. Once again, if there is no scope to expand then it will create major hardships. One of the most important things that has emerged in discussions with the communities is that livelihood



determines their housing – the location, size and type of house they have is closely linked with their occupational needs. After tsunami, several affected families have lost their livelihoods and are facing difficulties in getting back. In such circumstances, any housing that further alienates them from their livelihoods will be a big failure.

The impact on the lifestyle would be maximum in case of the tribal communities since they live in groups. Spaces like bedrooms are redundant. They burn wood for cooking and hence require a kitchen

with vents and not one with a platform and devoid of an escape route for the smoke. Having been used to airy living spaces, these small spaces with concrete floor, bamboo board paneling in walls and false ceiling may be suffocating for the tribal families. The clustering of units proposed by TCPO while doing the site plan is similar to what they would have done in any mainland settlement and just naming such a cluster *tuhet* does not mean much. It is very clear that the *tuhet* system is hardly understood by architect-planners and their own fetish for the forms is reflected in proposed site plans.<sup>1</sup>

1. For the site plans, see <http://cpwd.nic.in/TsunamiNew/intermediateseltersppt> (accessed on October 6, 2006)

## Recommendations

**T**he complexities of the post-tsunami reconstruction situation are quite clear. There is no clear policy framework and instead, merely a reconstruction project has been formulated. CPWD is steering the implementation under the patronage of MoUD and has already awarded contracts to two big corporate companies. APWD and NGOs are also implementing small number of houses as per CPWD directives. One type of design is being built for all types of the communities, irrespective of their occupation and lifestyle. The proposed cost of each house is estimated to be Rs6.5 lakh in South Andaman to Rs10 lakh in Car Nicobar and Rs12.5 lakh in Nancowry. There is a huge gap in information with the community about how, why and what decisions have been taken. Finally, it is very clear that the current framework of the reconstruction programme is not people-friendly and raises serious issues.

Following recommendations are made to ensure adequate and dignified housing to the tsunami-affected communities.

- **Policy Framework:** The Government should immediately bring out a comprehensive policy document for A & N Islands, providing guidelines and a framework for the reconstruction programme, setting the criteria for eligibility and entitlements and indicating the roles and responsibilities of all stakeholders under which this reconstruction project has been undertaken.
- **Beneficiaries:** The list of beneficiaries should be immediately shared with people. A mechanism should be put in place to ensure inclusion of all genuine families irrespective of where they are staying – be they in temporary shelters or not or even stay outside because of factors influencing their livelihood and other reasons.
- **Location:** The site should be finalised only after community consultations and agreement. Plot allotment also should be immediately taken up so as to ensure transparency about who is getting the houses and to facilitate their inputs in their own houses. Knowing one's own plot is essential prerequisite for participation, particularly in case of non-tribal communities or communities which are being completely relocated. These decisions are likely to greatly impact their livelihoods.
- **Information:** All relevant information and decisions relating to the type of house, costs involved, the materials used, the various responsibilities of the administration, CPWD, APWD and contractors and periodic progress must be communicated to the people. An information dissemination mechanism should be established to ensure that information reaches people in their temporary settlements or other locations where they are staying. It should be in format that people can understand.
- **Women's Property Rights:** The land and house ownership title must be given to the woman too and not always look out for a male member of the family to be the joint titleholder.

- **Relevant Permit:** The titleholder should also have the permit to be able to make any extension or modification to the structure.
- **Participation:** Families must be allowed and empowered to make their own changes, modifications and additions in the house designs. Families have different sizes. It is not possible that only one type of design suits every one.
- **Costs:** With the estimated costs of each so exorbitantly priced – between Rs6.5 to Rs12.5 lakhs, the information regarding assigning the massive reconstruction contracts to construction companies should be transparent – the cost of materials used, why they are used, where are they being sourced from, and so on.
- **Monitoring Mechanisms:** With the reconstruction of houses completely entrusted to contractors, attention must be focussed on quality control. The community must be empowered to take upon this role of monitoring the construction work. CPWD and APWD despite claiming to have elaborated monitoring and quality control set up are likely to be deficient in their performance. Also the contractor-technocrat lobby is a problem.
- **Choice:** The traditional materials and technologies must be promoted in the reconstruction framework. The traditional structures that people have built so far having performed well during the earthquake, they must be encouraged to build on their own as per their needs at the appropriate location of their preference. The process should be facilitated by providing financial and material assistance.
- **Environmental Costs:** An Environment Impact Assessment should be made mandatory. There needs to be constant watch on various construction processes particularly sand mining from the beaches, logging of timber, etc. A mechanism must be worked out to bring out ecological concerns and any effort or event that may cause negative impact.
- **Decentralised Services:** Alternative decentralised community-based mechanism must be used, regarding the services such as sanitation and drinking water supply, instead of the centralised highly engineered system. Decentralised system engages communities, is eco-friendly and ensures responsible behaviour from the users.

## Rajiv Gandhi package

S.No.	Particulars	Amount in Crores
1	Cash Doles	Rs107.54
2	Intermediate Shelter	Rs97.10
3	Relief Camp and Supplies	Rs31.41
4	Livelihood Support	Rs276.13
5	Infrastructure	Rs304.70
6	Evacuation	Rs5.00
	<b>Total</b>	<b>Rs821.88</b>

## CASH DOLES – Approved Amount – Rs107.54 Crores

S.No.	Nature of Assistance	Approved Norms
1	Loss of Limbs/eyes	Rs25000 per person
2	Grievous injury	Rs5000 per person
3	Damaged houses	
	i) Fully Damaged Houses	
	Pucca House	Rs10000per house
	Katcha House	Rs6000per house
	ii) Severely Damaged Houses	Rs2000 per house
	iii) Marginally Damaged Houses	Rs2000 per house
4	Loss of life	Rs100000
5	Missing persons	Rs100000
6	House holds articles & Belonging	Rs10000 per family
7	Temporary Relief for affected families	Rs3000 per family
8	Relief to small business enterprises	Rs10000 each
9	Assistance to Artisan	
	i) Damaged Equipment	Rs1000
	ii) Raw Materials	Rs1000
10	Paddy Crop Loss	Rs2000 per hectare
11	Plantation Crop Loss	Rs4000 per hectare
12	Sub-merged Land	Rs10000 per hecatare
13	Saline Affected Land	Rs5000 per hectare
14	Assistance to orphans	Rs200000
15	Assistance to unmarried girls above 18 years who have lost both their parents	Rs100000
16	Assistance to widows	Rs100000
17	Assistance to disabled	
	i) 100% disable	Rs100000
	ii) 40% disable	Rs50000

## Allotment of permanent houses

Name of the Islands	No. of Permanent Shelters to be Constructed by				
	CPWD	APWD	NGO	TOTAL	Other Details
<b>South Andaman</b>	-	158	659	817	
Ausitinabad			168	168	(CARE 168)
Bambooflat		56	311	367	(Mata 100, HCC 152, CARE 59)
Mithakhari		29		29	
Ograbraj			22	22	(Caritas 22)
Badmaspahar			99	99	(Caritas 99)
Nayasahar		69		69	
Sipighat			19	19	(CARE 19)
Teylarabad			21	21	(CARE 21)
<b>Little Andaman</b>	965	908	100	1973	
Harminder Bay		240	100	340	(Caritas 100)
Ongey Tikrey	965			965	
Farm Tikrey		536		536	
Netaji Nagar		132		132	
<b>Car Nicobar</b>	3941	-	-	3941	
Perka	416			416	
Malaka	245			245	
Tamaloo	337			337	
Kinyuka	276			276	
Chukchuka	303			303	
Tapoiming	217			217	
Small Lapathy	273			273	
Big Lapathy	261			261	
Kinmar	189			189	
Mus	387			387	
Sawai	302			302	
Tee top	110			110	
Arong	261			261	
Kimos	119			119	
Kakana	245			245	
<b>Teressa</b>	462	-	-	462	
Kanhaninot	12			12	
Bengali	86			86	
Alurong	64			64	
Kalasi	78			78	
Chukmachi	66			66	
Minuka	62			62	
Hinam	56			56	
Laxi	38			38	
<b>Katchal</b>	315	-	-	315	
Wimco E-Wat	36			36	
Sallo Tikrey	82			82	

Japan Tikrey	132			132	
Upper Katchal	65			65	
<b>Kamorta</b>	<b>467</b>	<b>-</b>	<b>-</b>	<b>467</b>	
Chotainak	36			36	
Badainak	26			26	
Trinket camp	53			53	
Kakana	80			80	
Pilpillow	101			101	
Daring	64			64	
Banderkari	23			23	
Changua	32			32	
Munak	45			45	
Al uk Heak	7			7	
<b>Nancowry</b>	<b>268</b>	<b>-</b>	<b>-</b>	<b>268</b>	
Champin	132			132	
Balubasthi	15			15	
Taplong	76			76	
Hitut	45			45	
<b>Chowra</b>	<b>343</b>	<b>-</b>	<b>-</b>	<b>343</b>	
Alheat	54			54	
Taeela	100			100	
Chongamong	41			41	
Kuitasuk	75			75	
Raiheon	74			74	
<b>Bambooka</b>	<b>16</b>	<b>-</b>	<b>-</b>	<b>16</b>	
Porat	16			16	
<b>Little Nicobar</b>	<b>111</b>	<b>-</b>	<b>-</b>	<b>111</b>	
Makachuva	41			41	
Pillopania	28			28	
Pillobha	16			16	
Pillollow	17			17	
Pullokiayang	9			9	
<b>Great Nicobar</b>	<b>1001</b>	<b>-</b>	<b>-</b>	<b>1001</b>	
Campbell Bay	181			181	
F/Man colony	106			106	
Govindnagar	70			70	
Agri farm	28			28	
Joginder Nagar	267			267	
Laxmi Nagar	75			75	
Gandhinagar	152			152	
Sastri Nagar	59			59	
Kopen heat	22			22	
Afra Bav	35			35	
Vijay Nagar					No. not mentioned
Kondul Island					No. not mentioned
<b>Total</b>	<b>7889</b>	<b>1066</b>	<b>759</b>	<b>9714</b>	

Based on <http://www.and.nic.in/shelterP/islandwise.htm> accessed on October 8, 2006

## Chronology of design development

Date	Details	Remarks
26/12/2004	Devastation by Earthquake and Tsunami	
15/1/2005	Expert team from CPWD, TCPO, IIT Roorkee, SERC accompanied by Prof. A. S. Arya visits	Suggests model and modern habitat to improve living standards but not affect the lifestyle
6/2/2005	Team of engineers, architects and town planners visits	Understands local lifestyle/architecture. Identifies sites, assessment of materials, skilled labour, logistics, etc.
3/2005	Project proposal including plans, layouts, specifications, estimates, requirement of project teams, timelines, submitted to the ministry	Prototypes proposed to be put up as materials proposed were not what people were conversant with
3/2005	Full scale model built in Chennai	
4/2005	Construction of prototypes begins in the islands	
7/2005	Prototype construction was completed	Feedback received was that people were not very happy with the prototypes.
6-15/7/2005	Expert team of CPWD, TCPO, local administration visits	To understand feedback and explain the community merits of the design and materials used.
16/7/2005	Meeting to decide to allow NGOs to put up different prototypes	Objective was to give people wider choice. Decided to put up the prototypes in one month.
1 <sup>st</sup> wk/9/2005	Expert team from CPWD, MoUD visits	Same decisions of July visit reiterated
10/2005	MoUD prepares detailed note for cabinet approval	
8/12/2005	Meeting of EGoM approves the note	Decided that NGOs may be invited to build the same design and specifications with their own funds
27/12/2005	A & N administration invited EoI	Some NGOs show interest
27-29/1/2006	Vice chairman, NDMA with officers from various ministries visits islands	Outcome not mentioned
29/1/2006	A & N administration finalises the numbers to be built by different agencies	7145 by Government agencies and 2477 by NGOs ( <i>This has now changed and NGOs are building only 759 houses</i> )

Based on [http://cpwd.nic.in/TsunamiNew/tsunami\\_Chronology\\_of\\_events.pdf](http://cpwd.nic.in/TsunamiNew/tsunami_Chronology_of_events.pdf) accessed on October 12, 2006

## Villages/Settlements visited

### South Andaman

1. Namunaghar
2. Loknath pahar
3. Bambooflat
4. Wandoor

### Little Andaman

1. Harmider Bay
2. Panchu tekri
3. Padauk tekri
4. Machhi dera
5. Netaji Nagar
6. Nanjappa Nagar

### Campbell bay

1. Rajiv Nagar – 1
2. Rajiv Nagar - 2
3. PHC colony
4. Govind Nagar

**In addition to this all the sites where construction is planned in South Andaman were also visited:**

1. Austinabad
2. Bambooflat
3. Mithakhari - Ograbraj
4. Badmaspahar
5. Nayasahar
6. Sipighat
7. Teylarabad



### **Vivek Rawal**

An independent professional trained as an architect working in the area of disaster reconstruction for more than 12 years. The main focus of the work has been participatory housing, developing appropriate alternative approaches for contextual needs and strengthening capacities of NGOs for housing facilitation. Besides, Vivek Rawal also has substantial experience of monitoring and evaluation of humanitarian responses by various NGOs, INGOs and bilateral agencies.

(contact: [alkavivek@gmail.com](mailto:alkavivek@gmail.com))

### **Rajendra Desai**

Founding co-director of National Centre for People's Action for Disaster Preparedness (NCPDP), Ahmedabad. Rajendra Desai, a structural engineer, has more than 20 years of experience on developing appropriate technologies and strengthening artisanal skills. He has particular expertise on post-damage retrofitting of traditional buildings and technical training. NCPDP has wide experience of working in various disasters all over the country directly with the communities as well as with NGOs and the Government.

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### **Dharmesh Jadeja**

An independent professional from Auroville (Tamilnadu), Dharmesh, an engineer by education, has been actively involved in tsunami rehabilitation processes to promote community oriented reconstruction. Dharmesh has his own architectural design practice in Auroville where he has been involved in very creative works with natural materials and traditional skills to create built environment.

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**Society for Andaman & Nicobar Ecology (SANE)** is a non-profit organization actively voicing concerns of the archipelago's indigenous communities, the ecology, and sustainable development since 1986.

**TRINet:** Tsunami Rehabilitation Information NETwork was set up in March 2005 as a response to the broad information requirements in the state of Tamil Nadu for tsunami rehabilitation and reconstruction phases to help in sharing information between different groups working on various aspects in the different districts of the state. Initiated by SIFFS : South Indian Federation of Fishermen Societies, ICSF: International Collective in Support of Fishworkers and the Bhoomika Trust,

**Housing and Land Rights Network (HLRN)**, as an integral part of the Habitat International Coalition, works for the recognition, defence, and realisation of the human right to adequate housing, which involves securing a place for all individuals and communities to live in peace and dignity.

**ActionAid International** works with 14 million poor and excluded people in 47 countries in Africa, Asia and the Americas to support them in securing their rights and eradicating poverty. [www.actionaid.org](http://www.actionaid.org)

#### Collaborative effort of



#### **Society for Andaman & Nicobar Ecology (SANE)**

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