



This item was submitted to Loughborough's Institutional Repository (<https://dspace.lboro.ac.uk/>) by the author and is made available under the following Creative Commons Licence conditions.

 **creative commons**  
C O M M O N S D E E D

**Attribution-NonCommercial-NoDerivs 2.5**

**You are free:**

- to copy, distribute, display, and perform the work

**Under the following conditions:**

 **Attribution.** You must attribute the work in the manner specified by the author or licensor.

 **Noncommercial.** You may not use this work for commercial purposes.

 **No Derivative Works.** You may not alter, transform, or build upon this work.

- For any reuse or distribution, you must make clear to others the license terms of this work.
- Any of these conditions can be waived if you get permission from the copyright holder.

**Your fair use and other rights are in no way affected by the above.**

This is a human-readable summary of the [Legal Code \(the full license\)](#).

[Disclaimer](#) 

For the full text of this licence, please go to:  
<http://creativecommons.org/licenses/by-nc-nd/2.5/>

# **Household and governmental perceptions of risk: Implications for the appropriateness of housing provision in south India**

Dr Lee Boshier

Lecturer  
Water Engineering and Development Centre  
Department of Civil and Building Engineering  
Loughborough University  
Loughborough  
England LE11 3TU  
United Kingdom

Email: [L.Boshier@Lboro.ac.uk](mailto:L.Boshier@Lboro.ac.uk)

## **ACKNOWLEDGEMENTS**

This paper has benefitted greatly from the comments of four anonymous reviewers. Their efforts and those of the editors of this special issue are much appreciated. The author is grateful to the Flood Hazard Research Centre, Middlesex University for financing this study and to Edmund Penning-Rowsell, Sue Tapsell and Peter Winchester for advice and support throughout the duration of the research. In addition, the author would like to thank the individuals and organisations that provided valuable assistance during field work in Andhra Pradesh. Most importantly, the author would like to extend heartfelt gratitude to all the villagers involved in this study, for their time, patience, hospitality and generosity. The research was undertaken to more clearly understand the nature of socio-economic vulnerability and resilience in the context of social interactions.

**Please cite this paper as:** Boshier L.S., (2011), 'Household and governmental perceptions of risk: Implications for cyclone resistant housing in south India', *Housing Studies*, Vol.26, No.2, pp. 241-257

# **Household and governmental perceptions of risk: Implications for the appropriateness of housing provision in south India**

Lee Boshier

## **ABSTRACT**

Disasters are on the increase, affecting more people globally and imposing larger economic losses for affected areas. Typically, the poorest and most marginalised members of society are disproportionately affected by such events, impinging upon their ability to cope with everyday life and improve their socio-economic status. The outputs from a three year project in Andhra Pradesh are presented providing a context specific but nonetheless important insight into how risk perceptions can have an impact upon local development. By assessing the disparities between existing risks and the risk perceptions of householders, government and non-governmental officials, evidence is provided that questions the day to day suitability of the risk responses. The case study highlights limited risk management strategies due to inadequate availability of insurance cover in the villages while ultimately illustrating the pitfalls of ill conceived and overly technocratic approaches to housing development.

**Keywords:** Natural hazards, risk perception, insurance, tropical cyclones, India

## **INTRODUCTION**

It has been observed that disasters (in varying shapes and magnitudes) are on the increase, or are at least affecting more people globally whilst also imposing larger economic losses on affected areas. In the past two decades alone direct economic losses from disasters totalled US\$629 billion (World Bank 2004). The scale of the threats facing societies have escalated in recent years as a result of demographic, economic and socio-political phenomena including an increasing global population,

**Please cite this paper as:** Boshier L.S., (2011), 'Household and governmental perceptions of risk: Implications for cyclone resistant housing in south India', *Housing Studies*, Vol.26, No.2, pp. 241-257

mass urbanisation and the impacts of climate change (UN/ISDR 2002; Wisner *et al.* 2004; World Bank 2005). The way in which the built environment has expanded over the past 30 years, with little apparent regard to the evolving climatic conditions (or how humans alter their environment and are thereby positively and negatively affected) has placed many developments in precarious locations (Burton *et al.* 1993; Cannon 1994; Hewitt 1997; Twigg and Bhatt 1998; Weichselgartner 2001; Wisner *et al.*, 2004; Boshier 2008). It seems clear that an unrelenting desire to build and develop has contributed towards many disasters and/or has exacerbated their effects (Lewis 1999; Wisner *et al.* 2004).

Therefore, the ability of housing to withstand the impacts of extreme events and to meet the needs of householders during the aftermath of a disaster is a key element in how society can recover from traumatic events. Many efforts to deal with natural hazards have focused on changing the physical attributes of structures while less attention has been paid to addressing the social, political, cultural and economic 'root causes' of people's vulnerability (refer to the 'Pressure and Release' model presented in Wisner *et al.*, 2004). The consequence is that the people who were the intended beneficiaries of apparent advances in both technical knowledge and policies have sometimes become steadily more vulnerable (Petal *et al.* 2008). By assessing the disparities between the existing risks and the risk perceptions of householders, Government officials and Non-Governmental Organisations (NGOs) this paper investigates the day to day suitability of the 'risk responses'. The case study explores the types of risk responses that are imposed and adopted in the villages, assesses the availability of insurance cover and ultimately questions the appropriateness of non-participatory and technocratic approaches to housing provision.

**Please cite this paper as:** Boshier L.S., (2011), 'Household and governmental perceptions of risk: Implications for cyclone resistant housing in south India', *Housing Studies*, Vol.26, No.2, pp. 241-257

## LIVING WITH HAZARDS

Along with the critical requirements of food and water, housing is a key factor in how people live their lives and protect themselves and their chattels from natural hazards, such as floods and earthquakes, and human induced threats such as crime and war. Therefore, it might be thought that communities would give careful consideration to location before starting to build their homes, particularly avoiding known seismic areas or sites that are subject to, or can be affected by, other hazards such as floods and landslides. However, for many people in developing countries, there is no choice about where they live because the benefits of a location outweigh the cost; people grow accustomed to a low-probability risk and they accept it; the hazard is perceived as being unavoidable or an act of 'God', and natural hazards are familiar aspects of everyday life (Wisner *et al.* 2004).

People have different capacities to avoid or cope with disasters, or in other words, differing *vulnerability*. Vulnerability is '*the characteristics of a person or group and their situation that influences their capacity to anticipate, cope with and recover from the impact of a natural disaster*' (Wisner *et al.* 2004:11). People's vulnerability is generated by social, economic and political processes that influence how hazards affect people in varying ways and different intensities (Wisner *et al.* 2004). Therefore, the outcome of a disaster is shaped both by the physical nature of the hazard and the vulnerability of people who are involved (e.g. why people live in dangerous locations, low quality housing, and the lack of disaster preparedness in particular places at particular times). The human influences upon the causes of disasters are too often overlooked because these influences can be discrete and driven by very different socio-economic factors (Williams 2008). For example, in many high-income countries people like to live near rivers and are prepared to pay for the benefit in many cases, because of the aesthetic and recreational benefits that rivers can offer. Therefore, a flood event that occurs in the non-tidal stretch of the River Thames in southern England, for example, inundating people's homes, businesses and lifelines will typically be referred to as a 'natural disaster' but the

**Please cite this paper as:** Boshier L.S., (2011), 'Household and governmental perceptions of risk: Implications for cyclone resistant housing in south India', *Housing Studies*, Vol.26, No.2, pp. 241-257

flood hazard manifests itself as a disaster because members of this 'high income' society have *chosen* to build in such locations (Bosher 2008).

Socio-economic factors that affect people's exposure to hazards can arise differently in low income countries, with key factors being related to poverty (low access to assets), marginalisation (poor access to public facilities) and powerlessness (low access to political and social networks) (Bosher 2007). These factors have an influence on the choices that people have regarding where they can live; for instance the landless squatters that live on the flood plains of rivers or the informal slums that are situated on the steep landslide-prone hills of many burgeoning cities. These factors also influence the levels to which people can provide themselves with adequate shelter to protect themselves from local conditions; therefore geographic proximity and exposure to hazards will affect levels of individual and social resilience (Wisner *et al.* 2004). Consequently, unlike the case of higher income nations where many people choose to live in areas that are exposed to hazards, in low income countries it is more the case of a 'lack of choice' that forces people to live in areas that are marginalised and exposed to such hazards (Twigg and Bhatt 1998; Weichselgartner 2001; Wisner *et al.* 2004).

After disastrous events, residents often feel that their only choice is to rebuild their houses with un-reinforced methods, thus leaving their new homes just as vulnerable as those that were originally damaged or destroyed. Petal *et al.* (2008) have noted that this might be because hazard-resistant designs are perceived to be too expensive, rely on materials that are not available through the local market, or demand a level of construction skill that has not been developed within the local population. Jigyasu (2004) describes an increase in the vulnerability of local communities after the Latur 1993 earthquake in India, where sustainable recovery interventions were poorly planned and implemented. Consequently, it has been argued that a 'community-based' imperative is needed in which construction and design professionals learn to share their knowledge with, and at the same time learn from, the users of the houses (Petal *et al.* 2008). It is hoped that this knowledge exchange would

**Please cite this paper as:** Bosher L.S., (2011), 'Household and governmental perceptions of risk: Implications for cyclone resistant housing in south India', *Housing Studies*, Vol.26, No.2, pp. 241-257

yield a bottom-up demand for safe construction, insurance cover and voluntary compliance with standards and that there would be public, government and private sector expectation and support for enforcement (Petal *et al.* 2008).

### **Risk management through insurance**

Amongst other requirements, the United Nations' 'Hyogo Framework for Action 2005–2015' (UN/ISDR 2005) calls on governments to mainstream disaster risk reduction considerations into planning procedures for construction projects. This has placed a growing interest in the potential of insurance as part of an effective risk management strategy for disaster-prone regions (Linnerooth-Bayer *et al.* 2005). A number of experts (see Crichton 2005; Kunreuther 2006; Boshier *et al.* 2007a; Williams *et al.* 2009) agree that insurance should act as a driver for proactive hazard mitigation features for residential properties, but too often the additional costs of 'hazard proofing' housing do not result in an anticipated reduction in insurance premiums or excesses.

Insurance has a role to play in risk management, but currently it is a limited role. Insurance may not reduce the immediate impacts of disasters but by pooling risks in exchange for a premium payment it can provide indemnification against losses (such as damages to buildings/shelters). Therefore, insurance is not a panacea, but can be viewed as an important component of effective risk management (Crichton 2005; Kunreuther 2006). However, to date the uptake of insurance in low- and middle-income countries, including India, has been poor with only 1 percent and 3 percent of households and businesses respectively, possessing insurance coverage against catastrophic risks, compared with 30 percent in high-income countries (Munich Re 2005).

Accordingly, as Mechler *et al.* (2006:5) have stated, "*the use of microinsurance to indemnify against losses caused by a severe or catastrophic natural disaster is only just emerging*". 'Microinsurance' is typically distinguished from other types of insurance by its provision of affordable cover to low-

**Please cite this paper as:** Boshier L.S., (2011), 'Household and governmental perceptions of risk: Implications for cyclone resistant housing in south India', *Housing Studies*, Vol.26, No.2, pp. 241-257

income clients. By providing timely financial assistance following extreme-event shocks, it is intended that microinsurance cover can reduce the short-term impacts of disasters. Mechler *et al.* (2006) claim that India is playing a leading role in low and middle income countries with its 'pro-poor insurance regulation' that provides pre-disaster solidarity through a cross-subsidized insurance system. However, it is also important to recognise that insurance in low-income nations does not necessarily conform to the typical formal insurance mechanisms. Therefore it is relevant to assess the availability of insurance cover, understand the types of risk management strategies that households adopt and identify how risk management is operationalised on the ground.

## **THE RESEARCH**

### **The case of Andhra Pradesh, South India**

Andhra Pradesh is the third largest state in India, covering 275,000 km<sup>2</sup>, bordering the Bay of Bengal. It is also one of the world's most cyclone-prone regions (O'Hare 2001). Historically, tropical cyclones have been the cause of large-scale losses of human life, livestock, crops, property and infrastructure in Andhra Pradesh, with serious adverse effects on the local and regional economies. Despite the threat of cyclones and floods to the lives and livelihoods of millions of people, many inhabitants remain in the area, through poverty and lack of choices, striving to live in regions that are dominated by mangrove swamps, brackish rivulets, aquaculture farms and paddy fields (Reddy *et al.* 2000). For the purposes of this study, the district of East Godavari was selected for research (see Figure 1) because of the tropical cyclone (07B) disaster that affected the area in November 1996 and the subsequent disaster risk reduction initiatives undertaken by the Andhra Pradesh State Government and local NGOs. These initiatives included the construction of community cyclone shelters, storm warning systems, improved evacuation measures, hazard mapping and enhanced community preparedness through education programmes in cyclone-prone areas (Reddy *et al.* 2000).

**[Take in Figure 1]**

**Please cite this paper as:** Boshier L.S., (2011), 'Household and governmental perceptions of risk: Implications for cyclone resistant housing in south India', *Housing Studies*, Vol.26, No.2, pp. 241-257



## **Research Approach**

Research was undertaken as part of a study conducted in Andhra Pradesh, between February 2002 and September 2004. The study was focused on the investigation of the social and institutional aspects of vulnerability and resilience to disasters in Andhra Pradesh. Cartographic surveys of eight case study villages and over 200 questionnaire surveys, 24 semi-structured interviews and five focus group workshops were undertaken with village inhabitants, local and regional government officials and personnel working for local NGOs involved with a range of developmental activities (physical, social and institutional).

Emphasis was placed upon the combined use of qualitative and quantitative research methods and the use of triangulation to facilitate rigorous data collection and to allow cross-checking of data during analysis. The respondents were selected using a stratified random sampling technique based on five types of housing found in the case study villages (see Boshier 2007 for details). Questionnaire surveys using open and closed questions were undertaken to provide contextual understanding. The qualitative data obtained from the interviews and focus groups provided depth and meaning to local level activities, decision making and perceptions of 'risk'. The quantitative and qualitative data were analysed using SPSS and NUDIST software packages.

## **Underlying perceptions of risk**

Too often contemporary visions of 'risk' can become dominated by the perspective of the 'Western world of states' (Beck 2009) leading to 'Western' governments or powerful economic actors producing and defining risks for others; such a 'Western' vision of risk could result in risk responses that are not appropriately attuned to the local context. Consequently, an important element of this study was to obtain an insight into the views of the respondents regarding feelings and experiences related to an important concept such as 'risk' (as espoused by Buckle, Marsh and Smale 2003). This element of the research was particularly critical as it was considered that local 'risk' perceptions were

**Please cite this paper as:** Boshier L.S., (2011), 'Household and governmental perceptions of risk: Implications for cyclone resistant housing in south India', *Housing Studies*, Vol.26, No.2, pp. 241-257

likely to influence individual and collective ‘risk responses’ (Beck 1992). Rather than asking the householders (that provided a 50:50 gender split) what they perceived the concept of risk to be (it was deemed that this would be akin to putting words into their mouths) it was necessary to ask a number of open and closed questions in a questionnaire survey that were related to problems in the householder’s village and what they felt the biggest threats were to their livelihoods and assets (for more details please see Boshier 2007). The findings of the questionnaire surveys were augmented with follow up interviews with key informants to add further depth to the data obtained.

At the time of the research the impacts of the 1996 tropical cyclone disaster in East Godavari were still clear in what could be termed as the ‘community memory’ (a term that can loosely refer to the informal and formal mechanisms that communities use to document local history and preserve local heritage). However, this did not appear to influence the householders’ responses because 80 percent of them stated that ‘everyday’ issues such as the lack of basic needs (i.e. housing, safe drinking water, sanitation facilities and healthcare provision) and employment opportunities were the main issues that threatened their homes, lives and livelihoods (see Table 1).

### **[Take in Table 1]**

Consequently, it became apparent that ‘risk’ for the village level respondents was generally perceived as an everyday concept rather than one related to relatively rare but devastating events such as cyclones and floods. This point was succinctly made by a 35 year old female from a village with typically poor basic amenities:

*“To be honest, I do not worry about cyclones and floods, these events occur maybe once every ten years. I have to deal with crises on a daily basis; therefore I am more concerned about whether I will still be around when the next disaster comes!”*

**Please cite this paper as:** Boshier L.S., (2011), ‘Household and governmental perceptions of risk: Implications for cyclone resistant housing in south India’, *Housing Studies*, Vol.26, No.2, pp. 241-257

When the household respondents were asked about how they could address the threats from tropical cyclones, one in five of the 200 people questioned (94 percent of whom were Hindu) stated that there was nothing they could do because such events were an 'Act of God'. This indicated that the householders felt there was little they could do to prevent a 'disaster' or indeed to reduce the impacts of a natural hazard. These views were incongruent with the views of the local NGOs and Government respondents (see Table 1). The householders apparently placed more importance upon problems related to the lack of provision of basic needs within their villages than the Government and NGO respondents did. This was an important development in the research because the understanding of risk from local government agencies and NGOs was that the local communities were mainly concerned about the threat of large-scale events such as tropical cyclones. The Government and the NGOs were more concerned with problems related to unemployment and competition from mechanised trawlers than other issues related to basic needs; which were generally not considered important by the NGO and Governmental respondents. It was likely that these differences in risk perception could have a bearing upon how risk management was operationalised on the ground.

### **Addressing risk through insurance/microinsurance**

The availability and utilisation of formal microinsurance schemes that are targeted at the poor, and informal insurance mechanisms that are adopted by the poor, are likely to play an important part in people's risk perceptions and consequently in how they manage risk. Out of the 200 householders questioned across eight villages in the district of East Godavari, none of the respondents stated that they had insurance cover for their homes and only two householders (both relatively wealthy landowners) had any form of insurance; in both these cases the insurance was for their motor cars. The main reason for the lack of insurance uptake in the case study villages was down to one fundamental issue, the non-availability of insurance cover, specifically insurance cover that would cover the costs of repairing or rebuilding people's homes. None of the householders had even heard of insurance schemes that could cover the costs of house repairs or reconstruction in the event of a natural

**Please cite this paper as:** Boshier L.S., (2011), 'Household and governmental perceptions of risk: Implications for cyclone resistant housing in south India', *Housing Studies*, Vol.26, No.2, pp. 241-257

calamity. However, 15 percent had heard of insurance schemes but such schemes tended to be associated with the insurance of crops (76 percent), cars (18 percent) and life assurance schemes (six percent).

Research conducted as part of this project found that the households in the case study region tend to utilise informal social networks with family members and work colleagues to bolster their resilience, typically through women's participation with community-based organisations (CBOs) and NGOs (Bosher *et al.* 2007b). However, the use of such networks can be unreliable, particularly if the poor households rely on family support that might not always be available in the aftermath of disasters that may have affected people simultaneously throughout a region or country (Bosher *et al.* 2007b), a situation referred to as covariant risks (Mechler *et al.* 2006). It was therefore found that rather than utilising insurance or microinsurance, householders in the case study often relied on a range of coping mechanisms at times of crisis. These coping strategies were similar to those found by Agarwal (1990) and included;

1. Diversifying sources of income, including seasonal migration;
2. Drawing upon communal resources;
3. Drawing upon social relationships including kinship, friendship and informal credit networks;
4. Drawing upon household stores and adjusting current consumption patterns; and
5. Drawing upon assets.

It is therefore apparent in the case study villages that insurance cover is not utilised because it is not available and that as a consequence the householders typically utilise a range of coping strategies in times of crises. In light of this finding it was deemed important to understand how the householders, NGOs and Government respondents actually addressed cyclone risks at village level, specifically for the context of this paper, through the development of housing provision.

**Please cite this paper as:** Bosher L.S., (2011), 'Household and governmental perceptions of risk: Implications for cyclone resistant housing in south India', *Housing Studies*, Vol.26, No.2, pp. 241-257

## **Addressing cyclone risk through housing provision**

Prior to the 1996 cyclone, a vast majority of the villagers lived in basic huts, known locally as *kutcha* huts (see Figure 2). The *kutcha* huts provided little protection from the impacts of extreme weather events such as tropical cyclones. Therefore, the villagers recognised the benefits of living in improved quality homes that could provide them with increased protection; these types of house are known locally as *pukka* houses (see Figure 3).

**[Take in Figure 2]**

**[Take in Figure 3]**

When a disaster strikes, market forces and political influences tend to establish pressures to reconstruct built assets as quickly as possible (Menoni 2001) resulting in some developments that are poorly conceived and applied (Williams 2008). The legacy of some of these hasty developments can result in built assets that are inadequate for their intended purposes. The house shown in Figure 3 was built in 1998 in the aftermath of a tropical cyclone that affected the village the previous year; the photograph was taken in 2002. The house owners decided to leave the house in 2001 because it was damp, unhealthy and unsafe; sadly this was not a unique case. This was the householder's first experience of living in a house that was constructed of reinforced concrete and the family's experience was not positive or indeed cost effective: *"initially this house felt strong and secure but it was never comfortable to live in, being too hot in the summer and too cold in the winter. I am very disappointed with this type of house, I could have built 100 'kutcha huts' for the price that this concrete house cost me; I will not have paid the house loan off until about 15 years time"*. It is not surprising to find out that this family subsequently constructed a basic *kutcha* hut on the land adjacent to their 'cyclone resistant house' (that primarily became a home to a family of goats).

**Please cite this paper as:** Boshier L.S., (2011), 'Household and governmental perceptions of risk: Implications for cyclone resistant housing in south India', *Housing Studies*, Vol.26, No.2, pp. 241-257

What is important to acknowledge is that it is not only the inability of many of these so called 'cyclone resistant houses' to function that is a problem; it is also the psychological impact of such 'technological failures' on the local community as this account of a cyclone shelter illustrates:

*“When the government came to build the cyclone shelter cum community centre the other villagers and I were very happy. We thought that the government would then also provide us with boreholes for safe drinking water, a small school or health centre and a decent road. When the cyclone shelter started to crack and then fall to pieces we were frightened to use the structure, it was useless, it was unsafe. It was then that we considered whether the government was more interested in being seen to help us than actually helping us. You will not be surprised to hear that we still do not have any safe drinking water, sanitation, school or health centre.”*

(Interview with Village Elder in East Godavari)

The reinforced concrete house shown in Figure 3 is indicative of a number of problems that also affected other important community assets, such as cyclone shelters, schools and public latrines that were built during the 1997-2001 cyclone reconstruction programme. Some of the key problems that were observed during this period included:

- Technocratic approaches that resulted in low, or typically non-existent, consultation with the local communities.
- Unquestioned usage of relatively high tech building solutions; this was not a problem in itself but the required maintenance of the structures was.
- Use of low quality materials; numerous accounts relayed that the concrete mix was created using sea water and sand from the beach. This is a concern because it has been well reported that sea water is inappropriate for use in structural concrete (see Kaushik and Islam 1995; Neville 1995).
- Design faults of the steel reinforcements used in the housing and cyclone shelters.

**Please cite this paper as:** Boshier L.S., (2011), 'Household and governmental perceptions of risk: Implications for cyclone resistant housing in south India', *Housing Studies*, Vol.26, No.2, pp. 241-257

- Inappropriate designs and materials for the local climatic conditions: traditionally, the most common houses in the case study villages were very basic (but affordable) huts that were constructed by the inhabitants from locally sourced materials such as mud, wood and palm fronds (see Figure 2).
- Development that contributed to a substantial debt burden upon low-income families: the ‘cyclone resistant housing’ (see Figure 4) was subsidised by local non-governmental organisations (NGOs) and the State government, with the recipients contributing approximately 10-20 percent of the final cost of 40,000-50,000 Indian Rupees (IR) that at the time of the research was equivalent to US\$1,000-US\$1,250. The costs incurred by the recipients therefore ranged from IR4,000 – IR10,000.

The Andhra Pradesh State Government and local NGOs were involved in the construction of new ‘cyclone resistant housing’ (see Figure 4, for an example of a semi-detached two house design). While such structures could indeed protect the inhabitants from the effects of severe tropical cyclones that may occur once every 5-10 years, these concrete houses were generally very uncomfortable to live in for significant proportions of the year. These periods of discomfort typically occurred during the hot season (April to August) when they were referred to as ‘ovens’ and during the cooler season (November-January) when they were more akin to damp and mouldy boxes.

**[Take in Figure 4]**

A large proportion of the people that owned ‘cyclone resistant housing’ had tried to adapt the structures to improve their utility by adding bamboo verandas (some examples are visible in Figure 4), canopies on the roof and even entire huts on the side. These adaptations were typically used for living and sleeping in while the cyclone resistant house was predominately used to store possessions.

**Please cite this paper as:** Boshier L.S., (2011), ‘Household and governmental perceptions of risk: Implications for cyclone resistant housing in south India’, *Housing Studies*, Vol.26, No.2, pp. 241-257

## **The needs of the householder**

Rather than pandering to the apparently misguided wants of the governmental institutions and non-governmental organisations, it was clear that it would be an important component of the research to ascertain what the actual needs of the householders were. During September 2003, five focus group discussions and a vast range of rudimentary sketches were undertaken with respondents from two villages in the East Godavari district of Andhra Pradesh; during these discussions the respondents were asked what types of housing they would find most suitable to live in. The key criteria that the householders used for defining the type of house design (note that protection from tropical cyclones was not one of the criteria) were:

- Flexible use of enclosed and open spaces.
- Safety from theft and robbery (including incorporation of a safe box to store personal possessions).
- Ability to use a combination of different materials and technologies (traditional and modern).
- Flexibility to provide a variety of functions and uses through possible adaptations to the original structure.

It is interesting to note that these four key criteria have also been identified, along with 10 other criteria, during in-depth studies on informal housing projects undertaken in South America and Turkey (see Lizarralde and Davidson 2007). After many iterations of design, the consensus of opinion regarding the most appropriate type of house that would meet their everyday needs fell somewhere between the low cost basic *kutcha* hut and the relatively expensive 'cyclone resistant house'. Figure 5 illustrates the type of house (not drawn to scale) that the respondents decided would most meet their everyday needs.

**[Take in Figure 5]**

**Please cite this paper as:** Boshier L.S., (2011), 'Household and governmental perceptions of risk: Implications for cyclone resistant housing in south India', *Housing Studies*, Vol.26, No.2, pp. 241-257



The house illustrated in Figure 5a is essentially six vertical columns, which could be constructed of steel reinforced concrete or timber, located on a raised concrete platform. Further reinforced concrete or timber bars provide bracing for the roof which could be made out of traditional and locally available thatching materials such as grass/straw/wood (see Figure 5b). Some of the key design features of this 'locally designed' house are explained and rationalised in Table 2. It is interesting to observe that the respondents were effectively advocating an approach to housing provision that would actually render their homes unusable for a limited period if an extreme event, such as a tropical cyclone, occurred. The philosophy behind this approach reflected the aforementioned householder perceptions of risk and was concisely articulated by one female householder who stated '*the cyclones happen very rarely but the hot and cold weather happens every year*'.

**[Take in Table 2]**

However, the viability of this approach would be contingent upon two key factors, namely 1) whether warnings were issued prior to an extreme event, such as a cyclone or flood, and 2) whether all the people in the village would be able to seek shelter from the cyclone in a suitably robust building, such as a cyclone shelter. In the villages where the focus groups were undertaken there were no constraints for people to use the cyclone shelters that were available in their villages. However, in some villages (typically multi-caste agricultural villages) two issues were raised about the ability of all the villagers to use a cyclone shelter. These issues were: a) everyone was allowed to take shelter in a cyclone shelter but there was insufficient capacity; and b) some people in the village were not allowed to use a cyclone shelter because they were excluded on the lines of caste (with 'lower' castes in some cases being excluded by the numerically weaker but politically and economically stronger 'higher' castes) and gender (a number of men voiced their objections to the female members of their family sharing facilities with 'strange men'; also see Rashid 2000).

**Please cite this paper as:** Boshier L.S., (2011), 'Household and governmental perceptions of risk: Implications for cyclone resistant housing in south India', *Housing Studies*, Vol.26, No.2, pp. 241-257

It should be acknowledged that the design represented in Figure 5 is not being endorsed here as a universally appropriate solution to cyclone resistant housing. This design was crafted by a wide range of villagers, male and female, young and old, who that felt the design was suitable for them for the context in which they live. The key caveats that should be considered in the potential success of such a design are related to a) the use of suitable materials in the preparation of any concrete, b) high quality design of any reinforced components c) the provision of suitable training on construction and maintenance for the local population and d) affordability. In support of these design considerations it would also be important that access to a suitably designed and constructed cyclone shelter is made available to all communities.

This context specific design does not fully conform either to the typical *kutch* hut or to the relatively high cost 'cyclone resistant house'; it arguably falls upon the middle ground between traditional and 'modern'. It is also important to appreciate that there can never be a 'one size fits all' solution to hazard resistant housing or post-disaster reconstruction and that is why knowledge of the local context and full involvement of local stakeholders is an essential component towards the attainment of resilient houses, infrastructure and ultimately communities. Ideally these considerations should not have to wait until a disaster has occurred before they are acted upon. 'Pre-disaster' is the key window of opportunity for appropriate development that is attuned to the needs of local communities while also integrating the principles of disaster risk reduction.

### **The way forward**

Many efforts to deal with natural hazards have focused on changing the physical attributes of structures while less attention has been paid to effecting needed change within specific social, political, cultural and economic environments (Petal *et al.* 2008). The consequence is that the people who are the intended beneficiaries of apparent advances in both technical knowledge and policies have sometimes become steadily more vulnerable. For example, poverty is often suggested as

**Please cite this paper as:** Boshier L.S., (2011), 'Household and governmental perceptions of risk: Implications for cyclone resistant housing in south India', *Housing Studies*, Vol.26, No.2, pp. 241-257

breeding fatalism with regards to disasters (Petal *et al.* 2008). Some commentators (see Mechler *et al.* 2006) have even argued that providing insurance to disaster prone households may even act as a disincentive to proactively address disaster risk “*Skeptics rightly warn that insurance may conversely present disincentives to taking proactive risk-reduction measures*” (Mechler *et al.* 2006:28).

However, in reality, when informed choices are permitted with regards to building, most people tend to incorporate *affordable* safety features (Maskrey 1989). In contrast, people who have homes built for them - without consultation, without information and without choice - are more likely to blindly accept the types of homes that they have been provided (Petal *et al.* 2008).

This irony suggests the necessity for a community-based approach to the design and development of appropriate housing and arguably for the development and management of appropriate microinsurance schemes. However, this is not a straightforward task and Morduch (2006) rightly points out that there are three fundamental obstacles to the attainment of effective microinsurance schemes, particularly in low and middle income countries, which are:

- 1) To be viable there is a need for a reinsurance market so that insurers can cope with the sudden onset large claims associated with extreme events such as cyclones.
- 2) Effective insurance schemes need access to reliable and up to date data on which to base premiums; obtaining such data could entail significant upfront expenditure, and
- 3) Finally, the ability to cut the costs of dealing with many small transactions.

None of these obstacles are insurmountable but concerted efforts will be required from the insurance sector to generate the products and from the government to help generate the demand. It may also be a case of needing to take a multi-pronged approach by coupling insurance schemes with other initiatives such as health education and an emergency fund to cover temporary non-health crises; an approach that could make insurance more effective and attractive for clients and providers alike (Morduch 2006).

**Please cite this paper as:** Boshier L.S., (2011), ‘Household and governmental perceptions of risk: Implications for cyclone resistant housing in south India’, *Housing Studies*, Vol.26, No.2, pp. 241-257

## CONCLUSIONS

This paper presents a context specific (but not unusual) case of how a range of risk management strategies can be adopted to cope with reoccurring problems, such as ill health and unemployment, and large scale events, such as tropical cyclones. By assessing the disparities between the risk perceptions of householders, Government officials and NGOs it is apparent that incongruencies between risk perceptions have had a role to play in the focus of governmental and non-governmental development programmes and ultimately in the inappropriateness of government and NGO supported housing. The risk perceptions of householders were predominately focused upon more fundamental issues associated with the lack of basic needs such as water, education and healthcare and not the developmental activities associated with large scale events that were being endorsed by governmental agencies and local NGOs. The 'locally designed house' concept developed by the householders demonstrated that the types of housing they required fell, in technology, materials, cost and design parameters, somewhere between the basic but traditional kutchas and the so called 'cyclone resistant housing'. The inappropriate risk management strategies that have been imposed upon the householders have been moderated to some extent by a range of well established informal coping mechanisms that were proxies for the lack of formal mechanisms, such as suitable housing insurance.

The case study therefore highlights limited risk management strategies due to inadequate availability of insurance cover within the villages and ultimately illustrates the pitfalls of ill conceived and overly technocratic approaches to housing provision. In the context of East Godavari, it appears that a community-based approach to the design and development of appropriate housing should be more widely endorsed, while efforts should also be made by the insurance sector to generate appropriate microinsurance products and from the government to help generate a demand. If so, such microinsurance schemes should be viewed and marketed as complementary to existing informal coping mechanisms and not as something that will be a substitute for them. While these findings may be very specific to a rural coastal region of south India they nonetheless raise some important issues

**Please cite this paper as:** Boshier L.S., (2011), 'Household and governmental perceptions of risk: Implications for cyclone resistant housing in south India', *Housing Studies*, Vol.26, No.2, pp. 241-257

about the importance of understanding the real developmental needs of communities and households in low income countries and in appreciating the many ways, formal and informal, in which risk management can be operationalised on the ground.

## REFERENCES

- Agarwal B., (1990), 'Social Security and the Family in Rural India: Coping with Seasonality and Calamity', *Journal of Peasant Studies*, **17**: 341-412
- Beck U., (2009), *World at Risk*, Polity Press: Cambridge
- Beck U., (1992), *Risk Society: Towards a New Modernity*, Sage: London
- Bosher L.S. (2010) 'The importance of institutional and community resilience in post disaster reconstruction', in: Lizarralde G., Davidson C.H. and Johnson C. (eds.), (2010) *Rebuilding after disasters: From Emergency to Sustainability*, Spon Press: London
- Bosher L.S. (ed.), (2008), *Hazards and the Built Environment: Attaining Built-in Resilience*, Taylor and Francis: London
- Bosher L.S. (2007), *Social and Institutional Elements of Disaster Vulnerability: The Case of South India*, Academica Press: Bethesda (Md.)
- Bosher L.S., Dainty A.R.J., Carrillo P.M., Glass J., and Price A.D.F., (2007a) 'Integrating disaster risk management into construction: A UK perspective', *Building Research and Information*, **35**(2): 163-177
- Bosher L.S., Penning-Rowsell E. and Tapsell S., (2007b), 'Resource Accessibility and Vulnerability in Andhra Pradesh: Caste and Non-Caste Influences', *Development and Change*, **38**(4): 615-640
- Buckle P., Marsh G. and Smale S., (2000) 'New Approaches to Assessing Vulnerability and Resilience', *Australian Journal of Emergency Management*, **15**(2): 8-14
- Burton I., Kates R.W. and White G.F., (1993), *The Environment as Hazard*, Second edition, The Guilford Press: New York, N.Y.
- Cannon T. (1994) 'Vulnerability analysis and explanation of natural disasters', In Varley A. (ed), *Disasters, Development and Environment*, Wiley: Chichester: 13-30
- Crichton D., (2005), 'Towards an integrated approach to managing flood damage', *Building Research and Information*, **33**(3): 293-299
- Hewitt K., (1997), *Regions of Risk: A Geographical Introduction to Disasters*, Longman: Harlow
- Jigyasu R., (2004), "Sustainable post-disaster reconstruction through integrated risk management". *Proceedings of the Second i-Rec International Conference on Post-disaster Reconstruction: Planning for Reconstruction*, 22<sup>nd</sup> -23<sup>rd</sup> April, Coventry, Coventry University
- Kaushik S.K. and Islam S., (1995) "Suitability of Sea Water for Mixing Structural Concrete Exposed to a Marine Environment", *Cement and Concrete Composites*, **17**(3): 177-185

**Please cite this paper as:** Bosher L.S., (2011), 'Household and governmental perceptions of risk: Implications for cyclone resistant housing in south India', *Housing Studies*, Vol.26, No.2, pp. 241-257

- Kunreuther H., (2006), 'Disaster Mitigation and Insurance: Learning from Katrina', *Annals of the American Academy of Political and Social Science*, **604**(1): 208-27
- Lewis J., (1999) *Development in Disaster-prone Places: Studies of vulnerability*, Intermediate Technology Publications: London
- Linnerooth-Bayer, J., Mechler R., and Pflug G. (2005), 'Refocusing Disaster Aid', *Science*, **309**:1044–1046
- Lizarralde G. and Davidson C. H. (2007) "Learning from the poor", in: Alexander D., Davidson C.H., Fox A., Johnson C. and Lizarralde G. (eds.). (2007). *Post-disaster Reconstruction: Meeting Stakeholder Interests*, Firenze University Press: Florence: 393-403
- Maskrey A. (1989) *Disaster Mitigation: A Community Based Approach*, Oxfam: Oxford
- Mechler, R., Linnerooth-Bayer J. and Peppiatt D., (2006), *Disaster Insurance for the Poor? A Review of Microinsurance for Natural Disaster Risks in Developing Countries*, Provention Consortium: Switzerland/IIASA: Austria
- Menoni S. (2001) "Chains of damages and failures in a metropolitan environment: some observations on the Kobe earthquake in 1995", *Journal of Hazardous Materials*, **86**(1-3): 101-19
- Morduch J. (2006), 'Micro-Insurance: The Next Revolution?' In: Banerjee A., Benabou R. and Mookherjee D., (eds.), *What Have We Learned About Poverty?*, Oxford University Press: Oxford
- Munich Re (2005), *Natural Disasters according to Country Income Groups 1980–2004*, Munich Re: Munich, Germany
- Neville A.M., (1995), *Properties of concrete (4th and Final Edition)*, Longman: London
- O'Hare G., (2001), 'Hurricane 07B in the Godavari Delta, Andhra Pradesh, India: Vulnerability, mitigation and the spatial impact', *The Geographical Journal*, **167**(1): 23-38
- Petal M., Green R., Kelman I., Shaw R. and Dixit A. (2008) "Community-based construction for disaster risk reduction", in: Boshier L.S. (ed.), (2008). *Hazards and the Built Environment: Attaining Built-in Resilience*, Taylor and Francis: London: 191-217
- Rashid S.F., (2000) "The Urban Poor in Dhaka City: Their Struggles and Coping Strategies during the Floods of 1998", *Disasters*, **24**(3): 240-253
- Reddy A.V.S., Sharma V.K. and Chittoor M., (2000) *Cyclones in Andhra Pradesh: A multidisciplinary study to profile cyclone response in coastal Andhra Pradesh, India*, Bookline: Hyderabad
- Twigg J. and Bhatt M., (1998), *Understanding Vulnerability: South Asian Perspectives*, Intermediate Technology Publications: London
- UN/ISDR, (2004), *Living with Risk: A global review of disaster reduction initiatives*, United Nations International Strategy for Disaster Reduction: Geneva
- UN/ISDR, (2002), *Disaster Risk and Sustainable Development: Understanding the Links between Development, Environment and Natural Hazards Leading to Disasters*, Background document for the World Summit on Sustainable Development, United Nations International Strategy for Disaster Reduction: Geneva

**Please cite this paper as:** Boshier L.S., (2011), 'Household and governmental perceptions of risk: Implications for cyclone resistant housing in south India', *Housing Studies*, Vol.26, No.2, pp. 241-257

- Weichselgartner J., (2001), 'Disaster mitigation: the concept of vulnerability revisited'. *Disaster Prevention and Management*, **10**(2): 85–94
- Williams S., (2008), 'Rethinking the Nature of Disaster: From Failed Instruments of Learning to a Post-Social Understanding', *Social Forces*, **87**(2):1115-1138
- Williams S., Jacobs K., Newton P. and Blakely E.J., (2009), *Natural disaster preparation and response: a guide for state housing authorities*, AHURI Positioning Paper No. 113, Australian Housing and Urban Research Institute (AHURI), Southern Research Centre, Melbourne
- Wisner B., Blaikie P.M., Cannon T. and Davis I., (2004) *At Risk: Natural Hazards, People's Vulnerability and Disasters*, London, Routledge
- World Bank (2005), *Natural Disaster Hotspots: A Global Risk Analysis*, Disaster Risk Management Series. No. 5, World Bank: Washington DC.
- World Bank (2004) 'Natural disasters: counting the cost'. Press release, 2 March, World Bank: Washington, DC.: <http://go.worldbank.org/NQ6J5P2D10> (Accessed 12th February 2010).

## **CAPTIONS FOR FIGURES**

**Figure 1:** Location of Andhra Pradesh and the Case Study District (Source: Boshier *et al.* 2007b)

**Figure 2:** Example of a basic 'kutcha' hut (East Godavari, Andhra Pradesh). (Source: Author)

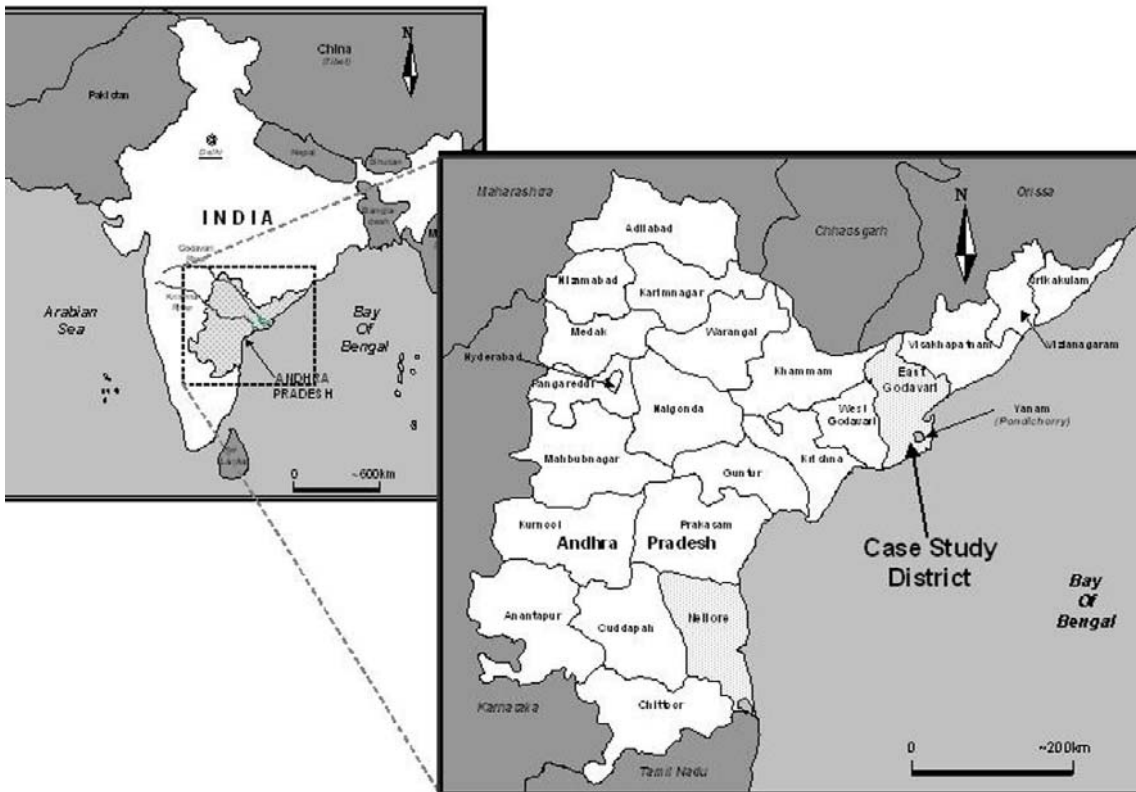
**Figure 3:** Example of a 'cyclone resistant house' built in 1998 (East Godavari, Andhra Pradesh).  
(Source: Author)

**Figure 4:** More recent type of 'cyclone resistant house' with improvised veranda, built after 2003  
(East Godavari, Andhra Pradesh). (Source: Author)

**Figure 5:** Simple illustration of the house that the village respondents designed; a) provides a see-through view of the basic house structure and b) a representation of the house once the roof and walls (made of locally sourced materials) have been added. (Source: Boshier 2010)

**Please cite this paper as:** Boshier L.S., (2011), 'Household and governmental perceptions of risk: Implications for cyclone resistant housing in south India', *Housing Studies*, Vol.26, No.2, pp. 241-257

## FIGURES



**Figure 1:** Location of Andhra Pradesh and the Case Study District (Source: Boshier *et al.* 2007b)



**Figure 2:** Example of a basic 'kutcha' hut (East Godavari, Andhra Pradesh). (Source: Author)

**Please cite this paper as:** Boshier L.S., (2011), 'Household and governmental perceptions of risk: Implications for cyclone resistant housing in south India', *Housing Studies*, Vol.26, No.2, pp. 241-257



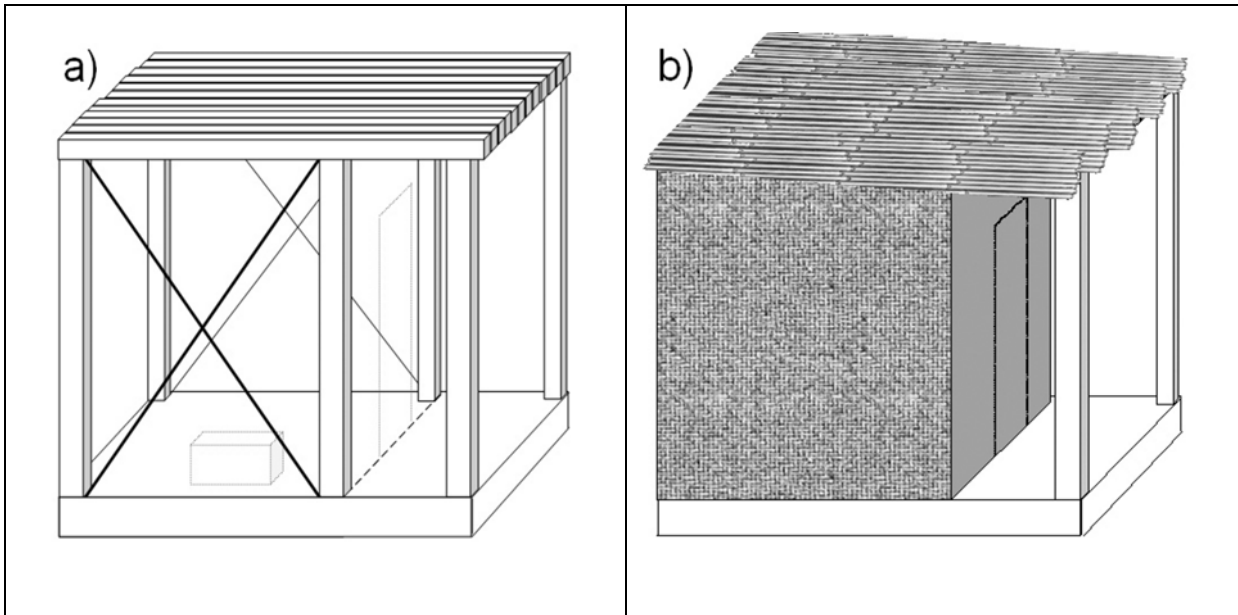


**Figure 3:** Example of a ‘cyclone resistant house’ built in 1998 (East Godavari, Andhra Pradesh).  
(Source: Author)



**Figure 4:** More recent type of ‘cyclone resistant house’ with improvised veranda, built after 2003  
(East Godavari, Andhra Pradesh).

**Please cite this paper as:** Boshier L.S., (2011), ‘Household and governmental perceptions of risk: Implications for cyclone resistant housing in south India’, *Housing Studies*, Vol.26, No.2, pp. 241-257



**Figure 5:** Simple illustration of the house that the village respondents designed; a) provides a see-through view of the basic house structure and b) a vision of the house once the roof and walls (made of locally sourced materials) have been added. (Source: Author)

## TABLES

**Table 1: Household and non-household perceptions of village level risks**

Notes:

Perceptions of village level risk		
Risk associated problem	Householders' response (%)	Govt/NGO Response (%)
Basic needs related	68%	15%
Employment related	12%	25%
Cyclone hazard related	15%	55%
Other	5%	5%

Basic needs = drinking water, sanitation, education, health care, electricity and roads/transport

Cyclone related = cyclone threat, no/poor cyclone shelter, no/cyclone resistant housing

Employment related = No jobs, aquaculture problems, mechanised trawlers, poor nets/boats

Other = N/A, Don't know

**Table 2: Key design features in the 'locally designed house' and the risk reduction rationale**

Design feature	Rationale for the design feature
The four external walls of the house are left open so that the home owners can use locally available materials such as mud daubed on wood or bamboo matting, or adobe brick as infill (as illustrated in Figure 5b).	The villagers found these materials far more suitable for the prevailing climatic conditions than solid concrete walls which they felt tended to 'turn the house into an oven' during the hot season. The respondents explained that if a cyclone or flood damaged the walls, but left the main concrete reinforced/timber structure standing, in this case they could quite easily rebuild the walls with locally gathered/procured materials.
A raised floor platform that includes a water tight sunken recess that can be locked.	The sunken recess was included in the design proposed by the respondents as a type of safety deposit box where valuables could be stored not only on a daily basis but also if a disaster struck.
The raised platform is designed so that timber or reinforced concrete columns can be sunken into holes located on the platform.	The floor platform is raised to protect the house from flooding that can regularly occur during the monsoon season. In a part of India where rights over landownership can be contested in post-disaster situations, the floor platform could also provide proof of landownership (for example via an embedded and unique identification number). The holes enable the use of a range of affordable construction materials (bamboo, timber, reinforced concrete) to be used and can also enable good building adaptability.
The roof can be extended (using reinforced concrete or traditional thatching materials) over the door to provide a veranda that affords protection from the extreme elements and also acts as extended accommodation during the hot season (as illustrated in Figure 5b).	The village respondents also felt that the basic structure could provide a base 'module' to which more 'modules' could be added to if the financial circumstance allowed (i.e. the structure was adaptable and flexible to meet the family's needs and future aspirations).