Human Settlements Development and Disaster Risks in Pacific Island Countries

The South Pacific Programme Office of the UN Department Of Humanitarian Affairs and UN Department of Economic and Social Affairs acknowledges the assistant of the consultant, Mr Luc Vrolijks in preparing this study for the South Pacific Disaster Reduction Programme (RAS/92/360)

March 1998

Contents

Acknowledgements

Many people have contributed to the preparation of this study. First of all, I would like to thank the government officials and other people who were consulted, for their enthusiasm to share their ideas and views about current developments in the region. Their names are listed in Annex 3. The inputs of the participants of the fifth IDNDR Pacific Regional Disaster Management Meeting, held in Tonga in September 1996, are greatly appreciated. Contributions of the staff of the South Pacific Programme Office of DHA are gratefully acknowledged, in particular from Angelika Planitz, who participated in the country consultations and reviewed earlier versions of this document, and from Joseph Chung, team leader, for his overall guidance. I am also thankful for the valuable comments of Margaret Chung and John Campbell. I hope that the findings of this study may be of use to those who contributed to its preparation. Finally, thanks are due to UNDP Suva and UN-DESA New York, for making this study possible.

Luc Vrolijks

Foreword

Natural hazards are a serious threat for the sustainable development of Pacific island countries. Their impact disrupts the lives of the people in the Pacific and every year there are lives lost and properties damaged due to cyclones, floods, earthquakes or landslides.

Reduction of disaster risks is a priority for the United Nations system. In order to emphasise this and to stimulate programmes to reduce disaster impacts world-wide, the United Nations General Assembly designated the 1990s as the International Decade for Natural Disaster Reduction. The Decade programme has increased awareness of the importance of disaster reduction for sustainable development. Numerous publications, projects, programmes and other activities were implemented. These have demonstrated that practical ways and means exist to reduce the exposure of people and societies to natural hazards.

In Pacific island countries, the United Nations system assists countries to reduce disaster impacts through the South Pacific Disaster Reduction Programme. This programme is funded by UNDP and eight bilateral donors. The UN Department of Humanitarian Affairs implements the activities through its South Pacific Programme Office. The programme provides institutional support, technical assistance and other support for disaster preparedness, mitigation and prevention. The first phase of the programme is completed at the end of 1997. The second phase will place even more emphasis on giving direct support to communities in reducing risk exposure.

This report was prepared as part of the South Pacific Disaster Reduction Programme. It analyses central issues regarding disaster vulnerability of human settlements in Pacific island countries. It notes that a wide range of factors contribute to this vulnerability. The report identifies six policy areas where strategic measures could be implemented to increase the safety of human settlements in the region. It proposes to implement these measures in a coherent way through the establishment of a national strategy to safer human settlements.

The subject of disaster vulnerability of both rural and urban human settlements in Pacific island countries does not usually receive priority consideration by governments or people until a disaster of some kind has taken place. This reactive response by governments and populations to disaster management and vulnerability urgently needs to be counter-balanced by a more pro-active response on the part of all concerned. This report is timely therefore. It aims to guide governments and planners in the formulation of a pro-active response to disasters by outlining the possible configurations such a response could take and by indicating possible strategies that can be implemented to improve disaster preparedness and management in the Pacific. The background information contained in Annex 1 is useful for evaluation of the report and its recommendations and it would benefit the reader to read this Annex first. It is hoped that the arguments for better disaster preparedness and management made by this report will be persuasive enough to lead on to the establishment of national strategies for safer human settlements in the Pacific.

Romulo Garcia,
UNDP Resident Representative,
Suva, March 1998

1. Introduction

Natural hazards, such as earthquakes, landslides, wind storms and floods are considered disasters according to the level of disruption they cause to the human population, to the built environment or to natural ecosystems. Natural disasters used to be primarily a rural problem in Pacific island countries, severely affecting the lives of the rural population and causing extensive damage to rural settlements, agriculture, roads, drainage schemes and other infrastructures. This threat remains and disasters still do much damage in rural areas. However, a more recent development has been the current urbanisation in the region. This poses new challenges and makes it necessary to consider the additional threat of disasters which affect urban areas.

Internationally, the link between human settlements and disasters is increasingly becoming a focus of attention, particularly in the context of continuing urbanisation. In 1994, one of the Technical Sessions at the World Conference on Natural Disaster Reduction highlighted the effects of disasters on urban areas. The panel of experts recognised the disaster-prone nature of urban areas due to the concentration of population, resources and activities. This has been confirmed in recent times: many recent major disasters have had their main impact in urban areas and densely populated human settlements.

The objective of this study is to assist Pacific island countries in incorporating natural disaster considerations into their programmes and plans for human settlement development. The target audience is primarily government officials with responsibilities in human settlement development. The study aims to raise their awareness of the need to give due consideration to disaster risks in their programmes. The study also identifies ways to improve human settlement development strategies by the incorporation of disaster risk aspects into planning. The study will benefit disaster management officials as well because it outlines key issues in incorporating disaster reduction strategies into sustainable development policies.

The study has been undertaken as part of the South Pacific Disaster Reduction Programme, a regional cooperation programme implemented by the UN Department of Humanitarian Affairs, South Pacific Programme Office, with funding contributions from UNDP and eight bilateral donors. The study was funded under the UNDP component of the programme (RAS/92/360). It is based on consultations and field visits in five Pacific island countries: Tonga, Western Samoa, Solomon Islands, Vanuatu and Fiji. It further builds on the collective experiences gained in the implementation of the South Pacific Disaster Reduction Programme and on consultations held at the 5th. Pacific IDNDR Regional Disaster Management Meeting, held in Nuku'alofa, Tonga, in September 1996. While the specific examples in the study focus on the five countries that were visited for the programme, the recommendations are thought to have wider application in the region. However, given the variations in local vulnerability characteristics, further specific country studies should also be done, if possible.

Chapter 2 identifies central issues in the disaster vulnerability of human settlements and reviews the factors that contribute to this vulnerability. It shows that disaster vulnerability is linked to a broad range of social and economic factors and processes. The chapter concludes with an identification of six critical themes for consideration in the development of safer human settlements. These are land tenure, human settlements planning, housing, rural development, infrastructure development and economic development.

For each of these themes, some key measures to reduce vulnerability are worked out in Chapter 3. These are illustrated with examples from the region. They form the building blocks for the construction and implementation of a national strategy for safer human settlements. Chapter 4 outlines starting points and gives an example of how such a national strategy for safer human settlements can be set up. A summary of recommendations is given in Chapter 5.

The study ends with 5 annexes. Annex 1 provides a thematic review of current human settlements development issues in Pacific island countries. Emphasis is placed on the six critical themes from Chapter 2. The annex indicates the variety in human settlement policies, strategies and situations in the region. Annex 2 gives an overview of current international policies, in particular within the framework of the IDNDR. This can be taken as a point of reference for the establishment of similar national policies in the region. Annexes 3, 4 and 5 provide lists of persons consulted, of relevant literature and of abbreviations used in the study.

2. Central issues in disaster vulnerability of human settlements

2.1 Introduction

Disaster risk is the probability that lives will be lost or damage suffered because of an extreme natural phenomenon. It is commonly seen as the combination of exposure to a natural hazard, and the existence of vulnerable conditions within a society. The hazard (for example, a tropical cyclone, an earthquake or a flood) can be described in terms of frequency, severity and potential impact. Vulnerability is defined as the characteristics of a person or group in terms of the capacity to anticipate, cope with, resist and recover from the impact of a natural hazard (Blaikie et.al., 1994:9). The term vulnerability can be used at various levels, ranging from countries or groups of countries to individual persons. In this study, vulnerability is used to identify how a human settlement, and parts of it, can be affected by a hazard.

Almost all human settlements of the Pacific region are at risk from natural hazards. In some cases, detailed hazard maps are available, but for most settlements, only broad, overall exposure has been identified. Table 2.1 gives a broad overview of the hazards to which Pacific island countries are exposed.

Table 2.1: Pacific island countries estimated level of exposure to specific natural hazards

Country	Population	Land area (km2)	Cyclone	Coastal flood	River flood	Drought	Earthquake	Landslide	Tsunami	Volcanic eruption
Cook Islands	19,500	240	M	M	L	H	L	L	M	-
FSM	114,800	701	M	H	L	H	L	L	L	-
Fiji	752,700	18,272	H	H	H	M	M	H	H	-
Kiribati	76,000	725	L	H	-	H	L	L	L	-
Marshall Isl.	50,000	181	M	H	-	H	L	L	L	-
Niue	2,300	258	M	L	-	M	L	L	L	-
Palau	21,600	494	M	M	-	M	L	L	L	-
PNG	4056,000	462,243	L	H	H	M	H	H	H	H
Solomon Isl.	337,000	28,370	H	H	H	L	H	H	H	H
Tokelau	1,600	12	M	H	-	H	L	L	L	-
Tonga	97,400	720	H	H	M	M	H	L	M	H
Tuvalu	9,100	24	L	H	-	M	L	L	L	-
Vanuatu	156,500	12,200	H	H	H	L	H	H	H	H
W.Samoa	163,000	2,935	M	H	H	L	M	H	H	L

Source: UNDHA et.al 1994; tsunami risk corrected on the basis of Hamnett (1996:20)

The extent to which these hazards can cause disasters depends on the level of vulnerability (in the case of this study) of human settlements and their inhabitants. This chapter analyses what this vulnerability consists of, and how it is related to human settlement development programmes and strategies. This is done in three steps. Firstly, section 2.2 outlines the central issues in the vulnerability of human settlements. Then section 2.3 provides an overview of the factors that contribute to the level

of vulnerability. Lastly, section 2.4 summarises how vulnerability is related to human settlement policies. It identifies six critical themes that provide the basis for the measures to reduce vulnerability which are discussed in Chapter 3.

2.2 Central issues

The central issues of disaster vulnerability are related to the everyday life of Pacific peoples and the settlements they live in. This chapter divides human settlements into three major components : the people, the economic activities and the infrastructure and public services. The issues of central importance for the disaster risks of each of these components are identified in table 2.2.

Table 2.2: Central issues in the vulnerability of human settlements in the Pacific

Vulnerability	Central issues
People	• where people live • how their houses are built • how their economic and social situation can be affected by a disaster • if they have access to a safe place during a disaster
Economy	• how can the economic system be disturbed by natural disasters • how does the population depend on these economic activities • where are the major economic production facilities located • how do they depend on infrastructure and services • what is their construction quality
Infrastructure and Services	• in what way do the infrastructure and services contribute to the development of safe settlements • where are public assembly sites (schools, hospitals, theatres, public markets etc.) located and what is their quality of construction • how is the infrastructure system (water, electricity, access, sanitation, telecommunication) laid out and what is the construction quality of this infrastructure • where are critical emergency facilities located and are they accessible and safely built.

An ideal picture of a safe human settlement given its exposure to natural hazards would perhaps be easy to paint on the basis of the above. In such a picture, houses would be of sufficient quality to withstand the most common natural hazards, and they would only be located in relatively safe areas. Critical facilities would be located in safe areas as well, and comply to rigorous construction standards. The economic activities would be diverse and safely located in strong buildings, and the infrastructure would consist of networks with a relatively low vulnerability, where even when one chain of the system is damaged, the overall system can continue to function.

The real picture , however, is something different. In reality, natural disaster risks contribute to the factors which determine how a human settlement evolves, and each of the above factors is influenced by the forces that shape development. It is not good enough to make general statements about the safe location of housing or compliance with building regulations. Instead, the actual processes that decide where and how people build their houses have to be identified and thoroughly understood. This understanding will provide a basis for the identification of realistic approaches to vulnerability reduction. To find the most critical areas of improvement, section 2.3 elaborates on the contributing factors to disaster vulnerability for each of the above major components (the people; the economy; infrastructure and services).

2.3 Contributing factors

2.3.1 The people

Table 2.3 summarises the factors that contribute to the vulnerability of people in human settlements. The summary table is then followed by a brief discussion of these factors.

Table 2.3: Contributing factors to the vulnerability of people in human settlements

Central issues	Contributing factors
Where people live	• physical planning • land tenure arrangements • availability of land • cost/affordability • willingness to invest in the house • political recognition of a settlement • squatter policy • access and water supply availability • distance to employment opportunities • hazardous conditions of the site • availability of shops, schools and other facilities • social ties to the community
How people build their houses	• available financial resources • land tenure Access to loans • willingness to invest in the habitat • knowledge of building techniques • supervision of construction by public authorities • availability of 'safe' building materials • insurance

Central issues	Contributing factors
How a disaster can impact on the social and economic conditions of the people	• regularity of income • availability of surplus income • availability of household stores (food, valuables, bank accounts) • human investments: household members available for work • availability of individual productive assets, such as land, equipment etc. • availability of common property resources, including land, tools, agricultural produce etc. • Existence of family or community ties to rely on in times of disaster • claims on other households, governments, patrons, landlords, lessees or otherwise • access to credit • stability of employment/income in times of disaster
If people have access to safe places	• terrain conditions (atoll communities, flood plains etc.) • availability of safe buildings • formal or informal arrangements for access

Where peolpe live

There are many factors which influence where people live. Where people live and how human settlements develop, depend only to a limited extent on systematic allocation of suitable housing areas through urban planning. In urban areas, this is a complex process that depends on the pressures of urban growth, the availability of land and services, the stability of land tenure, and a range of other factors.

The location of new housing areas depends largely on land tenure systems and the willingness and ability of traditional land owners to lease out (or in some cases sell) land. Even formal housing schemes increasingly depend on negotiating processes with traditional land owners. In Suva, for example, the location of new sites and services programmes of the Housing Authority of Fiji, depends increasingly on the success of the Housing Authority in reaching agreement with traditional land owners about use of land. The Housing Authority sees this as a major factor in determining where and how many new housing estates can be developed. Land availability is becoming a dominant factor which the Housing Authority sees as a continuing tendency in the future. Similar developments are seen in other countries. The result is that growth is constrained by the negotiating process between housing authorities and land owners.

The majority of urban growth all over the region is accommodated in informal housing areas, either through informal tenure arrangements or through the the illegal occupation of land. This latter mainly occurs on government land, and sometimes on unused private land. Generally speaking, a larger part of the informal housing, however, occurs with agreement of the (traditional) land owner. A wide range of informal tenure arrangements exists in most countries of the region. For example, a large part of the expansion in Honiara takes place outside the town boundaries on traditional land through more or less informal lease or sale arrangements.

Another factor that sometimes plays a major role is the political recognition of a settlement. While this is related to the overall squatter policy of the government involved, there are often other more informal signs that policy makers recognise which more or less legalise particular informal settlements. This is also recognised in other countries: there is no black and white separation between legal and illegal tenure. Instead, there is a grey area where some signs of recognition form an important indicator for the people living in informal settlements.

A factor that is hard to quantify, but important in the Pacific context, is the existence of social links within and between communities. Social links often relate to the island people originate from, even though they may have been away for generations. These links sometimes cause human settlements to grow in areas that are not necessarily the most attractive in terms of suitability of the land.

A more indirect factor is very apparent in Vanuatu: people sometimes do not wish to invest in an urban house, because living in town is seen as a temporary situation. A considerable number of inhabitants in Port Vila would rather save to build a house in their traditional village, than invest in an urban dwelling. The fact that many people maintain strong links to their traditional village, and prefer to invest there, is also related to traditional land tenure arrangements.

Depending on the local conditions, the accessibility and availability of suitable water sources can be important settlement considerations. As well, the construction of a new road often speeds up the development process and leads to fast growth of formal as well as informal housing areas.

Other factors include the following:

- distance to town and employment centres
- hazardous conditions on the site (steep slopes, river banks etc.)
- availability of shops, schools etc.

These factors not only determine what areas will develop as housing areas, but also influence which people will (can afford to) live in which areas. The cost of a plot depends on its perceived qualities in terms of the above factors. Households will seek to optimise their choice within the limits of affordability set by their economic conditions. Security of tenure, availability of water and electricity, access and traditional ties seem to be major factors.

When the development of housing is to be steered away from high risk areas, the above factors will need to be taken into account. Experience shows that it is not enough to identify hazardous areas and simply prohibit construction. An innovative mix of measures will be needed to influence the location and expansion of housing areas. This should result in a situation where the areas that are attractive for settlement (in relation to the above factors), are also the areas that are relatively unexposed to natural hazards.

When we turn to rural areas, we see that development of human settlements generally takes place in a gradual way. The growth of communities is regulated under traditional arrangements with relatively little government interference. In atoll countries there is often a shortage of land, but this is dealt with under traditional arrangements. The main problem for rural settlements as a whole is the location of entire settlements in highly disaster prone areas. This is not very easy to change in view of the strong ties of Pacific communities to their land. The only way public authorities can try to address such situations is through extensive consultation processes with the communities at risk, in which the need for relocation and a suitable alternative are jointly identified.

There is at present no good overview of the extent to which rural settlements are located in high risk areas, for which relocation may be a useful option to consider. Any strategy to improve the safety of rural settlements will have to start with an inventory of the problem areas. It will also need to be based on a highly participatory approach.

How houses are built

The quality of houses and construction is extremely important in establishing the level of risk, particularly with regards to earthquake and cyclone hazards. Again, the level of available funding and the willingness to invest this in a safe house depend on a range of factors. The following are important points to consider:

- **Poverty and economic conditions:** The lack of household resources for investment is the major overall limitation for investment in adequate quality of housing. Economic prosperity will trigger investments in improved housing.

- **Land tenure:** The house represents the major asset for most families, and it will be difficult for people to invest in their house unless there is some formal or informal arrangement under which their tenure is secured.

- **Access to loans:** Another compelling reason for having a secure, formalised tenure arrangement is that it is a basic condition for access to construction loans. Access to loans is further limited by the need to have formal and secure employment. The ability to borrow funds for construction is usually absent in rural areas because of the traditional ownership (which cannot be repossessed).

- **Willingness to invest:** People are not always prepared to invest available funds in the urban dwelling. Ties with the original rural community are strong, and sometimes people prefer to invest in a house in their village, with the intention to return there at a later stage.

- **Knowledge of building techniques:** When the general public as well as contractors are suitably well informed on disaster-resistant building techniques, construction quality can be improved. Yet several sources indicate that even when knowledge on disaster-resistant construction is available, contractors and building owners tend to 'cut corners' in order to cut costs. This obviously affects the safety of constructions. Thus, providing information on safe construction is not enough in itself. House owners and contractors need to be convinced that the only good investment is to build safely.

- **Construction supervision by public authorities:** The supervision of construction works by public authorities is seen as a good way to enforce adequate construction standards. Building inspection is often cited as one of the keys for improving construction quality. Western Samoa has considerably strengthened its building inspection unit which seems to have contributed to improvement of housing quality. However, in order to be successful, it must be realised that building regulations can only work when there are realistic and affordable standards in place. These standards are not always available in the region. Improvement of construction supervision further requires long term investments in capacity development of the inspectors.

- **Availability and affordability of 'disaster resistant construction materials':** To have suitable construction materials, such as cyclone strappings and suitable roofing nails, available at competitive prices can further help the implementation of safe construction practices.
- **Insurance:** The availability of specific cyclone and/or earthquake coverage for insurance can enforce a minimum construction quality. A major constraint however seems to be that, despite the fact that the house is the major asset for most families, there is no tradition in insuring this property, unless forced by the lending institute.

The above are a range of factors that influence how safely houses are currently built. The overriding factors are the economic prosperity that allows people to make long term investments, and the security of tenure of the land on which the house is built. A range of supporting programmes can be considered on the basis of the above factors to improve construction quality and make it easier for people to invest.

How the economic and social situation of the population can be affected by a disaster

The social and economic vulnerability of households and communities to disaster impacts has been the subject of detailed study internationally, and several models have been developed to analyse possible impacts. A general conclusion is that household vulnerability to disasters is a phenomenon with many sides. It includes physical aspects such as the location and quality of the house, but it is insufficient to look only at those aspects. Usually, social and economic conditions in coping with risk are at least as important so any attempt to improve the safety of human settlements will have to be based on an understanding of how disasters impact on the social and economic conditions of individual households, and how households can cope with these threats.

Several recent publications take the assets of a household or its access to resources as a starting point for analysing vulnerability. Starting points are not so much the vulnerable conditions, but the ways in which households can deal with them. The idea is that the assets of a household provide capabilities to cope with possible disasters or 'shocks' (which can also be other disturbances of the household organisation, such as illness, marriage, death etc.).

In this approach, the term 'livelihood' is important. The household has assets which allow it to maintain and build up a livelihood, including the creation of 'spare capacity', such as savings, sellable resources etc. The spare capacity provides the opportunity for the household to cope with disturbance of the livelihood by a disaster. The disaster can be a house that is washed away, but also the situation that there may be no casual work for three months, because a factory has been destroyed by floods.

The following are some of the major factors in a household's economic and social capacities to cope with disaster risks:

- Regularity of income
- Availability of surplus income
- Availability of household stores (food, valuables, bank accounts)
- Human investments: household members available for work
- Availability of individual productive assets such as land, equipment etc.
- Availability of common property resources, including land, tools, agricultural produce etc.

- Existence of family or community ties to rely on in times of disaster
- Claims on other households, governments, patrons, landlords, lessees or otherwise
- Access to credit
- Stability of employment/income in times of disaster

A household assesses its priorities in normal times and in disaster times on the basis of these and other factors. The choices made are very diverse, but a common approach is that a household will mostly try to maintain the productive assets by which it makes a living, for as long as possible. In some cases this is the house in which the household lives and works, but more often priority is given to keeping seeding materials, a car, tools etc. Many disaster mitigation programmes emphasise strengthening of housing but this may not always reflect the priorities of households themselves.

In 'normal' times, disaster mitigation often receives a relatively low priority, because there are more urgent and permanent disasters and problems that have to be faced. Some sources even maintain that natural disasters are only one additional aspect for 'people whose lives are a disaster'.

The 'Guideline for Community Vulnerability Analysis', also prepared under the South Pacific Disaster Management Programme, provides a detailed approach for community programmes to reduce socio-economic vulnerability.

If people have access to a safe place during a disaster

Particularly in the case of cyclones, floods and tsunamis, the access that people have to safe areas is very important for their vulnerability. Access mainly depends on the availability per se of safe areas, and the arrangements that have been put in place before the disaster. There are no indications in the region that specific groups are excluded from safe areas. Availability of safe areas is more of a problem in atoll countries and sometimes in low coastal zones where access to the hinterland is difficult. Particular attention should be paid to these communities and it may be necessary to erect purpose-built concrete frame structures that can provide safe places for them. This has been done in several places already. In the Rewa river delta in Fiji, for example, several communities have constructed such buildings. These were put to good use during cyclone Kina in 1993.

In summary, the vulnerability of the people depends on where they live, whether they have access to safe places, how their houses are built, and what their economic conditions are. These are the central issues, but they depend on a whole range of processes and policies in society, including town planning, squatter policies, land tenure, insurance, economic diversification and others. Governments wanting to implement policies to improve the safety of people, must look at a broad range of policies and development processes. This will help them to identify the most critical improvements to reduce vulnerability and to plan accordingly.

2.3.2 The economy

Small island developing countries as a group are considered by international policy makers to be particularly vulnerable to disasters. The main reason is that their economies can be severely disturbed by a natural hazard, and economic development can be set back for years by a single disaster. The actual scale of the economy is the major factor in this respect, but it is also important when small island economies are focused on one or two commodities.

In economic terms, the major impact of disasters in the Pacific is still in the agriculture, forestry and fisheries sectors. But the economic importance of manufacturing and services, including trade and tourism, is increasing. The economic system is a key ingredient of human settlements and the vulnerability of economic facilities is becoming more important and problematical under the influence of urbanisation.

A key vulnerability factor for countries is the level of diversification of economic activities. The taro leaf blight that severely affected Western Samoa is a case in point. Taro was the single most important export crop as well as the staple food of the country. When the plant disease took hold, it necessitated a considerable restructuring of economic activities and diversification in Western Samoa. The same may become a reality in the future for more settlement-based economic activities, such as tourism or manufacturing branches that are sensitive to disturbances. A related factor in the likelihood of disturbances is the extent to which economic activities rely on key infrastructures such as wharves, roads or pipelines.

The allocation of economic production facilities in human settlements is influenced by a range of factors. These factors are similar to those governing the growth of housing areas: land use planning, land tenure and the availability of infrastructure are key factors in this respect. Thus, pro-active land use planning and infrastructure development can stimulate the development of economic activities in relatively safe areas.

In summary, Table 2.4 provides factors that contribute to the vulnerability of economic activities in human settlements. For further reference, a more comprehensive review of economic vulnerability can be found in Fairbairn (1997).

Table 2.4: Contributing factors to the vulnerability of the economy

Central issues	Contributing factors
How can the economic system be disturbed by natural disasters?	• vulnerability of the various economic sectors • focus on sectors exposed to relatively high risks • lack of diversification of the economy • interdependence of activities • reliance on foreign capital • level of insurance/reinsurance • presence of highly critical economic activities or facilities, of which damage may impact upon a wide range of sectors (domino-effect)
How is the population affected by damage to economic activities?	• lack of security of employment and income • extent of available subsistence agriculture and ties to rural communities • availability of new opportunities after a disaster
Where are the economic production facilities located?	• land tenure • land use planning • cost/affordability • proximity of infrastructure, services, facilities • location of small, informal business
How do production facilities depend on infrastructure and services?	• focus on export/import • dependency on external supplies • dependency on external electricity, water, telecommunication • pipeline transport
How is the construction quality of economic production facilities?	• level of investment in various sectors and companies • market share of small, informal businesses • focus on safety • construction control by public agencies

2.3.3 Infrastructure and services

Several references have been made earlier to the structuring effect of infrastructure. Under this structuring effect, the availability of infrastructure and services is an important factor in the development of human settlements. Infrastructure can be used by local and national governments as an important instrument by which to steer overall human settlement development. The extent to which this can happen depends on the desire and the ability of government to keep one step ahead of developments.

However, continuing urbanisation in the small-island Pacific makes it difficult for governments of the region to even keep up with the development of new services and infrastructure. Several studies indicate that the current level of investment is insufficient to keep pace with developments so that the level of services deteriorates. Instead of staying one step ahead of developments with the provision of infrastructure, governments fall behind and the gap seems to become wider. Occasionally, new infrastructure will stimulate certain developments, but at present, the construction of infrastructure is rarely used as a systematic tool by government to direct the overall development of human settlements.

It is very clear that a more pro-active approach is necessary and desirable, but in practice this will be dependent on the availability of funds. To change the situation from an arrears in the provision of infrastructure to pro-active infrastructure construction for human settlements, governments will have to take a long term approach to the problem and to make substantive investments.

Apart from the possible use of infrastructure and services to guide safe human settlements development, the actual safety of the facilities themselves is also an important issue. In structures that accommodate many people, adequate safety requirements are very important. Fortunately, the examples of high occupancy structures such as schools, churches or community halls collapsing are scarce in the region, but the risk nevertheless exists. This risk is likely to increase with the continuing concentration of people in urban areas.

Another aspect to be considered is the impact that damage or disruption to infrastructure may have on social and economic development. Here, there are many examples from the region. The collapse of bridges after cyclones in Solomon Islands and Fiji not only hindered relief operations but also seriously threatened economic activities.

Infrastructure and services can be divided into public assembly sites, critical emergency facilities and infrastructure systems. The central issues that influence the vulnerability of public assembly sites and critical emergency facilities are their location and construction strength. These are also decisive for infrastructure systems, but in addition, the lay-out of the overall system is equally important for its vulnerability.

Table 2.5 summarises the main contributing factors to the vulnerability of infrastructure and services in human settlements. It shows that factors contributing to the vulnerability of infrastructure and services cover a wide range. Allocation depends on policy decisions of government, and on the allocation of funds. But a whole range of factors influence these decisions: the land tenure system, the population distribution, the availability of funds and the level of priority for investments, technical knowledge, allocations for maintenance, and other factors influence the vulnerability of infrastructure.

It needs to be realised that damage to infrastructure can have more far reaching implications than the simple damage of the facility itself. Infrastructure programmes can be used effectively to reduce disaster risks, but inadequate or even dangerous services and infrastructure can have far reaching impacts.

Table 2.5: Contributing factors to the vulnerability of infrastructure and services

Central issues	Contributing factors
Where are public assembly sites, such as schools, hospitals, theatres, public markets etc located?	• land tenure • cost / affordability • tradition • who decides on location of facilities • is there systematic planning of future facilities • available information on hazard exposure • proximity and social factors
How is the infrastructure system laid out (water, electricity, access, sanitation, telecommunication)?	• level of investment • lack of availability to keep up with the urbanisation • priority for investment in infrastructure • political commitment to invest in safe infrastructure
Where are critical emergency facilities located?	• lack of resources • limited political commitment to provide effective emergency services • extent of systematic planning of future facilities • limited availability of information on hazard exposure • lack of knowledge about the requirements for effective emergency facilities • level of authority of the government to decide on location
What is the quality of construction of public assembly sites, infrastructure and critical emergency facilities?	• level of investment • political will to invest in safe construction of public facilities • level of maintenance • limited knowledge on maintenance safety needs • limited ability to keep up with new developments • level of availability and effectiveness of regular government control • level of authority of the government

2.4 Critical themes for safer human settlements

As already outlined, the three major components of human settlements are the people, the economic activities and the infrastructure and services. The contributing factors to vulnerability discussed in 2.3 are some of the key processes and policies in human settlements development. The most critical themes for evaluation are land tenure systems; human settlements planning; housing; rural settlement safety programmes; infrastructure development; and economic development. The impact of policies in these areas goes beyond their direct influence; indirect effects should be considered as well.

Table 2.6 summarises where these major policy areas affect the level of vulnerability of people, economic activities and infrastructure and services. When looking for realistic and effective ways and means to reduce risk exposure, these critical themes need to be addressed.

This table provides the basis for the measures that are discussed in Chapter 3. Background information on the development of human settlements in these thematic areas is provided in Annex 1.

Table 2.6: Summary of human settlement policies and disaster vulnerability

Central issues in disaster risk	Land tenure arrangements	Housing policy	Human settlements planning	Economic development strategies	Infrastructure development	Rural development strategies
The people:						
where people live	X	X	X		X	
how their houses are built	X	X		X		X
how economic situation is affected	X	X	X			
access to safe places	X	X		X	X	
The economy:						
disturbance of the economic system	X	X				
dependency of the population	X		X			
dependency on infrastructure	X	X				
location of facilities	X		X	X	X	X
construction quality	X		X	X		
Infrastructure/services:						
location of public assembly sites	X	X	X		X	X
lay-out of infrastructure system	X	X	X	X	X	X
safety and location of critical facilities	X		X		X	X

3. Reducing disaster vulnerability through human settlements development: suggested measures

In Chapter 2, disaster vulnerability of human settlements and parts thereof was taken as the starting point for identifying the factors that contribute to vulnerability. The conclusion was reached that six key themes have far ranging influence on this vulnerability. This Chapter now discusses these six areas and recommends measures to reduce disaster vulnerability in them.

Clearly, there can be no easy solutions to fit all circumstances. But when the development process has to counter increasing disaster risks, it must be done on the basis of two things: a good understanding of the link between development and disaster risk; and a realistic assessment of the kind of policies that can be successfully implemented.

Overall population growth and the increasing concentration of people in urban areas are the motors behind urbanisation. These are taken as given factors for this study. The main concern of disaster management is how urban growth can be accommodated in a safe way. Although effective policies in these areas may be needed -and implemented- for other reasons, the focus of this section is not on ways to prevent or reduce urbanisation, but on effective ways to accommodate its development safely. The following areas are discussed: land tenure systems; human settlements planning; housing; rural settlement safety planning; infrastructure development; and economic development. For each area, some constraints are identified and some recommendations are suggested.

3.1 Land tenure systems

Land tenure systems are critical for the way in which human settlements develop, particularly in urban areas. In relation to disaster management, land tenure systems are important for the availability of safe land for housing, economic activities and public services. Where land tenure systems facilitate the development of suitable new housing and other areas at affordable rates, there will be fewer people forced to live on hazard-prone land. In most countries, freehold and government land, when available, is almost fully developed so continued urbanisation will need to be accommodated under traditional land tenure systems.

The extent to which 'traditional' land can be used legally for urbanisation varies throughout the region. Some arrangements are being put in place to facilitate and/or control this development, but there are also important constraints. The following are identified as the major possible constraints for the development of suitable land:

- Lack of clarity of ownership and frequent land disputes
- Legal provisions that hinder the lease, subdivision or sale of traditional land
- Lack of authority of planning authorities over the use of land
- High claims for the use of traditional land for public services

Most sources indicate that there is no support for big changes in the traditional land tenure systems. Solutions will need to be found in supportive arrangements that enable traditional land tenure systems to better accommodate urban growth. Such solutions can be found, and they can benefit

traditional land owners and prospective urban dwellers alike. Indeed, some of the problems have already been addressed by some countries of the region. The lessons learned from these experiences give rise to the following recommendations to better enable traditional land tenure systems to accommodate human settlements development:

Registration of traditionally owned land in urban fringe areas

Formalisation of land ownership in urban fringe areas would reduce the number of land disputes that now hinder the development of new areas or put new owners in a very uncertain legal position. Some countries have clear, established and registered (collective or individual) ownership, while others have not gone that route. It is legally or logistically impossible (or maybe even undesirable) to register all traditional land. However, governments could consider the registration of urban fringe areas as a contribution to accommodating urban growth in a safe way.

An approach that helps prevent problems in the registration process is the establishment of an intermediary, such as the Land Trust Boards in Vanuatu and Fiji. This enables subdivision of land, while some of the land disputes can be resolved at a later stage. The precondition is that these Boards need to be seen by land owners as an attractive solution. Otherwise, informal arrangements outside the system will be established.

Establishment of some physical planning approval arrangement for traditional land

To effectively decide on the suitability for new development areas, basic physical planning arrangements will be needed to stimulate or prohibit specific developments. In most countries of the region, physical planning authorities have no say whatsoever on the use of traditional land. Some means of regulation is needed and the solutions implemented in Fiji, Vanuatu and Kiribati may provide options to address the situation elsewhere.

In Fiji, the Land Subdivision Act requires all new subdivisions to obtain a planning authorisation. Through this Act, the Town and Country Planning Department has to approve land subdivisions also on traditionally owned land. As part of its analysis, the Department has to establish the suitability of the land for subdivision, including from the perspective of disaster risk. This provides a potentially forceful instrument to guide the establishment of new (formal) land subdivisions.

In Vanuatu, Provinces can declare parts of their area as 'town planning area', thus giving the government the authority to make development plans. This is a relatively long process, which requires government approval. Yet it has already been implemented in some of the areas surrounding the capital, Port Vila. The arrangement provides a mechanism for traditional land owners collectively to decide that planning arrangements for their area would be useful.

In Kiribati, a consensus-building approach was applied in the planning for South Tarawa. The preparation of the Urban Management Plan was based on an extensive consultation process, among others with traditional land owners. The resulting consensus formed the basis for further development. This consensus was possible because of the heavy population concentration in the area, which led all participants of the process to understand that some concerted approach was needed.

Another solution is to establish urban structure plans for the 'larger urban areas', for example the areas that are expected to urbanise over the next 10 years. This will require planning regulations to provide authority to prohibit or stimulate certain developments, and thus provide the necessary enforcement base for more comprehensive urban structure plans. The recent Nadi Scheme Plan in Fiji follows this approach. The urban management strategy for Port Vila in Vanuatu is expected to take a similar format (for more details see Annex 1).

Physical planning arrangements need to enable the development of suitable land, while at the same time making provisions to prevent the development of unsuitable land. In practical terms, restriction of unsuitable land alone will not work, because these provisions can only be enforced if safe suitable land is made available.

Authorisation to sell, lease or subdivide land in peri-urban areas

The extent to which traditional land can be handed over for use by others, is limited by legal restrictions in most countries. While there may be little support to change this overall, there may be good reasons to assess the possibility to establish specific legal conditions for areas that are already urbanising, or that are expected to urbanise over the next 10 years. Subdivision, lease, or even sale of traditional land can be considered for limited areas, depending on the local conditions. In combination with other arrangements, this could improve the availability of safe land for urbanisation.

A means to enforce the reservation or allocation of land for public services and infrastructure

For the safety of people, it is also important that there is an appropriate system of basic infrastructure and services. Currently, the possibilities to enforce the availability of land for public services (at affordable rates) are limited. A suggestion is to consider specific rules under which private developers can be stimulated to construct public services and basic infrastructure, or at least reserve adequate (safe) land for their later construction. This can be effectively combined with approval arrangements for subdivision, or provision of public services can be part of the consensus building negotiations for future urban development. The government could further consider providing incentives for the development of public goods, for example in the form of tax reductions.

Coverage of urban planning arrangements on traditional land

The suggested approach intends to maintain the principles of traditional land tenure but at the same time recognises that measures are necessary in urban fringe areas. An important question is for what areas the above measures should be implemented. A clear government policy is needed to limit application. This will help to address concerns that traditional land tenure arrangements may be 'hollowed out' by the suggested measures. The suggestion is to limit changes in the management of traditional land to the areas that are expected to urbanise over the next 10-15 years. These areas can be identified by analysing expected population growth and land tenure and suitability for development.

3.2 Human settlements planning

The above measures and strategies refer to human settlement planning as one of the strategies to guide the development of traditional land at the urban fringe. More generally, urban planning is one of the critical government instruments guide urban growth. Successful, pro-active government planning is a critical factor in the development of safe human settlements. Some overall constraints need to be addressed in order to allow planning to play an effective role in the development of safe human settlements through guidance of urban development. The situation differs between countries, but the following are some constraints that are often mentioned in relation to urban planning:

- Institutional capacity and human resources
- Need for a more pro-active role for urban planning
- Lack of basic information on urbanisation and the terrain
- Lack of involvement of physical planning authorities in the issuance of leases
- Lack of cooperation in the planning of infrastructure and services

Given the above, the following are some suggested recommendations to address these constraints:

Institutional strengthening programme

Throughout the region, there is a need to strengthen the institutional capacity and develop human resources of Physical Planning or Town and Country Planning departments. At present, the tendency is to decentralise urban planning to local or provincial authorities. Development of capacities is in that light all the more necessary to enable pro-active attitudes which are needed to cope with extensive urban growth. Institutional development programmes for human settlements development can combine training, technical assistance and regional exchange. In addition, it may be useful to engage external advisers in the preparation of a limited number of plans, which could then serve as examples for other urban areas. The improvement of capacities through such programmes will contribute to the safety of human settlements. Better instruments (plans) to guide human settlement development will become available and more pro-active approaches will become feasible.

Pro-active approaches to urban planning

The emphasis in the current physical planning practice is on the issuance of permissions for construction and development, rather than on the active guidance of future developments. This reactive approach allows only limited guidance of human settlement development. The fast and continuing urbanisation, and the need to provide safe areas for housing, economic activities and public facilities, necessitate a much more pro-active approach.

The preparation of medium term plans for urban development, also in relation to the above discussion on settlement on traditional land, is a necessity for most urban areas of the region. Such plans can take the form of urban structure plans, urbanisation strategies or urban management plans. Whatever the form, their essential requirement is to provide a framework for the guidance and appraisal of proposed development, both in the private and in the public sector.

Basic information on parameters for urbanisation

A pro-active approach to urban planning is currently hindered by a lack of information on the expected rate and direction of urbanisation as well as basic information on the terrain conditions. From disaster management perspective, the exposure of sites to specific hazards is an important basic information to decide on the planned use of these sites. More detailed hazard maps for larger urban areas are needed to decide on suitability of land for development. Although highly advanced methodologies are available for the preparation of such maps, low cost approaches are also feasible. Examples are the flood hazard map prepared as one of the basic maps for the Nadi Scheme Plan and the earthquake hazard mapping currently being prepared for Suva as part of the Suva Earthquake Risk Management Programme.

A programme should be established to prepare a systematic set of data on each major urban area. This would include population projections, infrastructure requirements, terrain information, hazard exposure etc. This can be largely compiled from existing sources, and would provide the necessary basis for pro-active urban planning.

Involvement of physical planning authorities in the issuance of leases

A problem that was mentioned by several physical planning authorities is that they are only involved in the issuance of construction permits, and not in the issuance of leases. Once a lease has been issued for residential purposes, it is almost impossible for the planning authority to refuse construction permits on the grounds of the unsuitability of the land for residential purposes. This situation makes it difficult for urban planning authorities to prevent the development of land that is considered unsuitable for development for some reason, such as risk from landslides or floods.

Physical planning authorities should be involved in all phases of land development in urban areas, including the issuance of leases. This can however only be effective when simultaneously the planning capacities are increased to cater for pro-active approaches to urban planning. Otherwise, the additional permission needed may only form an additional constraint for regulated land development, and indirectly lead to more informal construction.

Cooperation with providers of infrastructure and services

There is a clear gap between the planning and realisation of infrastructure and the overall urban planning. For example, in Vanuatu, the ADB urban sector loan will fund the improvement and construction of infrastructure, but the urban management plan on which the identification of these investments should be based, is prepared afterwards. In practice therefore, the construction of infrastructure directs the urban development.

The realisation of infrastructure is one of the major incentives or reasons for the development of areas for human settlement. This is clearly illustrated by the situation in Suva, Fiji, where the construction of the Nausori Backroad has resulted in fast urbanisation of an area that was previously difficult to reach. This process can be repeated. Development of infrastructure can become a major tool to direct urban growth to areas where this is considered most suitable. This requires good cooperation between human settlement planners and the departments that decide on investments in infrastructure.

3.3 Housing

Informal housing is widespread in the Pacific. The official housing programmes cannot keep up with the speed of urban growth and the share of informal housing is increasing further in most countries. The formal housing programmes are mostly targeted at middle income families with permanent jobs, and thus only cover a limited (but growing) segment of the market. The housing situation of urban populations is one of the important disaster risk factors to which they are exposed. This involves both the location and the construction quality of the dwelling. Aspects associated with the location have been discussed above; this section is limited to housing quality and constraints associated with formal housing programmes.

The following are seen as some of the *constraints* in the provision or availability of safe housing:

- Lack of capacity to provide sufficient urban housing or serviced plots
- High standards and lack of flexibility of formal housing programmes
- Lack of capacity to control construction quality
- Lack of tools to stimulate improvements in construction quality
- Limited knowledge on available cost effective safe low cost housing techniques
- Lack of access to funds for safe housing construction
- Lack of maintenance

Measures that could be considered to address these constraints are included in the following recommendations.

Increase the capacity of Housing Authorities or similar bodies

Most of the official housing programmes only address a very small proportion of the housing need. Capacity is limited by the level of investments needed in infrastructure and/or housing (and the land tenure situation discussed earlier). An interesting development is the recent decision of the Housing Authority of Fiji not to invest in housing per se, but to focus entirely on the provision of serviced plots instead. The Authority concluded that the houses themselves could be better provided by the private sector, and that this would allow it to provide more sites. This measure was feasible in Fiji because the housing market is large enough for private sector construction companies to step in and offer affordable ready made housing at competitive rates. This is a recent development which should be reviewed for application in other countries.

The best solution to provide affordable housing depends on the local situation, but a key point is the need to optimise the use of public investments so that the maximum number of people can be provided with affordable housing. Public policy makers should accept that active government involvement in the provision of low cost housing can only cover a limited segment of the market. Insecurity of income and the level of income will continue to limit access for large groups of people. Investments in public housing should always be balanced with policies to stimulate safe location and good quality of informal housing.

Flexibility of formal housing programmes

Formal housing programmes are not always flexible enough to accommodate the way in which people are able to invest in their dwelling. Private sector area development in Honiara only provides 2-3 types of ready made housing. This seems related to the profit maximising strategy of the developer, but in the public interest it would have been useful to have a more varied pattern, with low cost housing, serviced plots and middle class housing combined. Another example is the situation in Port Vila, Vanuatu, where land owners are not allowed to construct temporary dwellings on the serviced plots that they buy. In many cases they have to wait 4-5 years until the land is paid off before they are eligible for housing construction loans. In the meantime, the land is only used for gardening.

This situation is related to government's hesitation to authorise sub-standard solutions. While this is understandable, it should also be considered that the ultimate aim is that people can live properly in a safe house on a safe plot and with the relevant services. It is suggested to review construction permission arrangements and consider the approval of temporary housing as a step towards adequate permanent solutions perhaps within some reasonable time frame.

A second area where flexibility could be increased is the availability of loans. Currently, access to finance is limited to those having formal, fixed term employment. If more people can get access to finance, this may increase the 'market share' of formal housing. The loan policy lies with the private sector funding agencies, but government support strategies or communal lending approaches may be feasible without increasing the risk of bad debts too much. A balanced approach needs to be sought.

The third area where flexibility is very much in discussion at present is the size of plots. The World Bank has initiated a discussion in several countries in order to urge for smaller and more affordable plots. While there is much opposition to smaller plots, it should also be recognised that smaller plots make formal housing affordable for a larger share of the population. Some middle way has to be found between the traditionally large plots to which the region is used and the cost for construction of infrastructure. Perhaps a mechanism of 'cross financing' can contribute to a solution. Under such an arrangement, the larger plots would pay more of the infrastructure cost, and thus subsidise the infrastructure for the smaller plots.

Capacity to control housing quality

In most countries, building permits are issued by the Health Department or the Public Works, often after a range of authorisations is obtained from other departments. The process is not very clear in some countries and the impression is that only a very small percentage of the houses are constructed on the basis of the permit. Supervision of the actual construction is even more limited. Building inspectors have been assigned only in some of the larger urban areas; in most other areas, health inspectors are responsible for this supervision.

Western Samoa considerably improved its capacity to control housing quality after cyclones Ofa and Val. This is a good example of the kind of improvements that can be made. Key points in the success of Samoa seem to be:

- the availability of good information
- appropriate standard designs
- clear procedures for building application

- effective and fast handling of applications
- a well trained cadre of inspectors
- the authority to stop construction.

The approach followed in Samoa requires substantive investments in manpower development. It has worked well in Samoa, but may not be equally productive in other countries. The main difference is the extent of informal construction in countries. This is relatively low in Samoa, but dominant in many other countries. Government control cannot be exercised in informally developed areas, because there is no government permission to build on the site in the first place. It will be necessary to carefully evaluate investments in the government's capacity to control construction quality, and balance these investments with other approaches.

Stimulate quality improvements in informal housing

It is difficult to exercise direct authority over the quality of informal housing construction, since construction is not submitted for approval. The only way the government can work towards the improvement of informal housing is by facilitating and stimulating improvements in the way houses are constructed. There are a range of instruments the government can use for that purpose. Some overall policies have been discussed under land tenure and human settlement development. In particular the security of tenure is an important basic condition to trigger investment in safe housing. The following are some additional strategies that can be applied:

- **Standard designs:** the preparation and wide dissemination of standard designs for low cost housing can improve the available knowledge in the community on how houses can be built at affordable rates with a reasonable level of disaster resistance. This will be most successful if it is combined with a training programme for informal contractors. Several countries in the region have experience with such training programmes, although primarily in rural areas.

- **Insurance:** The standard coverage of insurance varies widely throughout the region. Insurance can contribute to the quality of construction when the issuance of insurance depends on the construction quality (e.g. through engineering certificates). Still, a programme to stimulate the public to take out such counter-disaster insurance is needed. In particular for low cost housing, many people only take insurance as long as it is required by the bank.

- **Pricing policy:** Another option is to subsidise disaster resistant construction materials such as spiralled roofing nails or cyclone strapping. Again, this will be most effective when combined with a public awareness campaign. Another consideration could be to label certain building materials as 'not disaster resistant' and ban their sale. However, this may be less successful since many of these materials may be used safely for other purposes.

- **Technical advice:** To further assist inhabitants of informal housing areas, the government could establish building advisory teams. These could disseminate general information on safe construction practices as well as provide tailored advice for the retrofitting of existing houses. People would than know specifically

how they can strengthen their house (and how much it would cost); they can decide to invest on that basis.

These strategies can best be implemented in the form of a coherent programme to improve low cost (informal) housing.

3.4 Rural settlement safety programmes

The expansion of rural settlements per se, is not seen as a major problem. Current traditional arrangements seem to be suitable and expansion takes place gradually. There are however three major constraints in the safety of rural settlements:

- The location of entire settlements in highly disaster prone areas
- The level, quality and maintenance of infrastructure and services
- The quality of housing construction

The following recommendations are some of the measures and strategies that can be considered in relation to these constraints:

Identify highly disaster prone rural settlements

In most countries, there is no systematic knowledge about the rural communities located in highly disaster prone areas. There is some experience with relocation, but these programmes were generally part of post disaster rehabilitation programmes. A more pro-active approach is needed to prevent future disasters. As a first step, an inventory of the problem needs to be made. Although many, if not most, rural communities of the region are exposed to disaster threats, the inventory should focus on highly disaster prone settlements. The challenge is to identify those communities where risk exposure is so high, that relocation could be considered as a realistic option. Relocation of communities is an extreme and exceptional measure.

Landslide, storm surge and flood risk are the major risks to be considered, as these hazards are highly localised and have the capacity to wipe out entire villages. The inventory can be based on historic evidence, if necessary in combination with a hazard assessment. The inventory provides the basis for a consultation programme with communities, as indicted below.

Establishment of community based relocation programmes

Once the extent of the problem of highly disaster prone communities is clear, and priorities are identified, a community based relocation programme can be established. Recent experience in Fiji and the Solomon Islands suggests that the relocation of a village is a difficult and long process. It is in most cases considered as a last resort only. It can only be successful when the community is convinced of the risk to which they are exposed and the need to reconsider their location. A series of consultations will be needed to discuss the level of risk. Once this is done, and the need to relocate is accepted and supported by the community, relocation alternatives and strategies can be discussed.

The role of external agencies, including the government, is to support the process of forming a community consensus on the issue. Outside expertise can help to clarify risks and identify solutions, but the decision to relocate needs to be made by the community itself.

Establishment of community action programmes for vulnerability reduction

Apart from the incidental need for relocation, as indicated above, there is a much broader need for community vulnerability reduction in many rural communities. This would include the need to improve houses, public and community facilities and socio-economic conditions. It is suggested to address this need through community action programmes for vulnerability reduction. A highly participatory and stimulating approach is needed, and a broad perspective on vulnerability needs to be adopted. The community should decide on the priority actions needed to address their problems. Detailed guidelines to establish and implement such community based programmes are being prepared under the South Pacific Disaster Reduction Programme.

3.5 Infrastructure development

The realisation of new infrastructure has an important impact on the way in which human settlements grow. Some even see it as one of the main tools that the public administration has to guide growth. It is important that urban planners and the infrastructure sector work closely together, as mentioned in 3.2. This cooperation should take place on the basis of an agreed development strategy for the urban area. Integrated planning is needed to ensure that safe areas are developed and hazard prone areas are seen as less attractive for development.

The advance planning of infrastructure and services is of major importance for the development directions of human settlements, and the safety related to that. Other factors are construction quality and safe location of the infrastructure and services itself. Recommendations to improve infrastructure and contribute to the development of safe settlements could include the following strategies:

- Inventory of needs to provide basic services to the existing population
- Inventory of infrastructure requirements to enable guidance of the future growth of human settlements, including housing and economic activities, on the basis of an integrated plan.
- Assessment of the maintenance requirements of present and future infrastructure and pub lic services and buildings, including current deficiencies in maintenance patterns
- Assessment of the safety of public buildings and the development of retrofitting plans as required
- Development of a balanced investment plan for infrastructure and public services, which combines the provision of basic services to the population with the potential of infrastruc ture and services development to stimulate safe human settlements development.

There is a balance between providing basic necessities to people and the need to utilise infrastructure to guide towards safe human settlements. Most countries in the region consider the provision

of water to a community as a basic necessity, regardless of how hazard prone the site is. This choice is widely supported because otherwise, already vulnerable people would be deprived of water, with all the health risks associated with it. Perhaps the most feasible option here is to prevent the development of informal settlements in new hazard prone areas by making safe land available through the provision of infrastructure to those locations.

3.6 Economic development

Economic development can contribute to the resilience of the population. A more stable economic situation and less uncertainty of future income will enable people to invest in their house, and -even more important- to continue to make a living after a disaster. Key words for a disaster resistant economy are stability, diversification, focus on sectors that have low disaster risk and human safety. It is beyond the scope of this paper to comprehensively review the economic strategies that can be implemented towards safer human settlements and lower household vulnerability. Some other studies are being carried out within the framework of the South Pacific Disaster Reduction Programme to address these issues.

4. Towards a national strategy for safer human settlements

4.1 Starting points

The population living in urban areas continues to increase throughout the region. Unless measures are taken, this will lead to an increase in disaster risk. A severe disaster affecting one of the major urban areas of the region would have a devastating impact on national growth and sustainable development. A wide range of options is available to prevent increasing disaster risks, as discussed in Chapter 3. These provide the building blocks for reducing disaster vulnerability for human settlements. They cover many sectors of government so an inter-sectoral policy is needed to address the situation.

It is proposed to address the situation through the formulation and implementation of a National Strategy for Safer Human Settlements. Such a strategy provides the opportunity to develop and implement coherent measures that address the various sectors of society. The following are suggested as starting points to underpin such a strategy.

1. Commitment to safe human settlements

The most essential requirement is a clear policy commitment for safer human settlements before disaster strikes. Such a commitment is needed in view of the increasing disaster risks and continued urbanisation. This commitment needs to be reflected in national resource allocation and in prioritisation of programmes and projects.

2. Recognition of the actual situation

The strategy should be based on a recognition of the actual situation of urbanisation and urban development. It recognises that urbanisation is likely to continue and that much of the new housing areas will develop through informal processes on which the government has only a limited influence. Focus is therefore on policies that enable and facilitate safer human settlement patterns.

3. Pro-active approach

The fact that urbanisation is at a relatively early stage in most countries provides the opportunity to governments and communities to guide the process towards safety. This requires a pro-active approach that is largely focused on guiding new developments, and to develop ways and means through which human settlement development can be guided towards safety.

4. Balancing investments

Investments in safety of human settlements will have to be balanced with priorities in other sectors. But also within the strategy for safer human settlements, resources will need to be balanced. Priority should be given to facilitating the safety of the most vulnerable groups and to the investments in infrastructure and services that are at the centre of government responsibility. It is also necessary to balance investments in rural and urban improvements.

5. Taking disaster risks into account in all public and private investments

Apart from specific investments and projects for safer human settlements, disaster risk reduction is also largely a matter of improving on what has already been done. Government and private

investment programmes should be reviewed on their contribution to either reducing or increasing vulnerability, with a view to subequent improvements which could be made. Such a review process could take a similar approach as the environmental impact assessment.

4.2 Institutional aspects

It is suggested to establish a special committee to implement the proposed strategy for safer human settlements. One of the departments with a key role in guiding human settlements development would take the lead of such a committee. Which department is the most suitable for this role depends on the national situation. Depending on the existing institutional structure for disaster management, the committee could function as a sub-committee under the National Disaster Management Council. It is suggested that the committee also reports to the National Development Commission, National Planning Board or similar authority.

Such a dual reporting structure would reflect that the role of the commission is not only to reduce disaster risk, but also, and equally important, to guide the development process. The committee would include all major players in urbanisation and human settlements development, including the private sector. Specific tasks could be assigned for the implementation of sub programmes and/or the systematic review of development investments.

4.3 Example of a strategy

Box 4.1 outlines an example of a Strategy for Safer Human Settlements. It provides some of the pointers that may need to be considered. The example is compiled from elements that may be relevant to some or all of the countries and can be adjusted accordingly. It should not be seen as a standard recipe, but as an indication of the necessary overall approach of a Strategy for Safer Human Settlements. The detailed activities are not described here; these can be defined and implemented by a committee or group of government officials and non-government representatives in each case. The 'building blocks' for the strategy are the measures which were outlined in Chapter 3.

Fig 4.1: Example of a Strategy for safer human settlements

A Strategy for Safer Human Settlements

Commitment

The Government is committed to the development, promotion and implementation of measures to prevent and counter the impact of natural disasters in the country. To protect the people and livelihood, the Government is particularly committed to ensure and promote the safety of housing and the formation of an economic structure that is well protected against disasters. This is part of the national commitment to meet the objectives of the International Decade for Natural Disaster Reduction (IDNDR, 1990-1999), as proclaimed by the United Nations.

The continuing urbanisation and urban growth pose new challenges to this commitment. In order to prevent an increase in disaster risks, due to the increasing concentration of people, services and economic activities, the Government feels it is imperative to implement a Strategy for Safer Human Settlements. The government seeks the cooperation of the general public, the private sector, non-governmental organisations and international agencies in the implementation of the strategy, as it will be to the benefit of all.

Objectives

The objectives of the strategy are to:

- Provide or enable access to safe areas for housing
- Facilitate, stimulate and support the construction of safe houses
- Reduce the vulnerability of the economic system
- Ensure the safety of economic production facilities, critical emergency facilities and public assembly sites (location and construction quality)
- Improve the lay-out and vulnerability of infrastructure systems
- Ensure that public and private investments do not increase disaster risks and (where feasible) ensure that they contribute to a reduction of those risks
- Address particular high risk situations, such as the location of communities in highly disaster prone areas Establish a management structure in human settlements that is able to cope with disasters

Background

The country has been regularly affected by tropical cyclones, floods and other disasters. The recent past has shown the damage and disruption that can be caused when a disaster affects the major urban centres. Until now, large earthquakes that affected the urban centres of the country have not taken place, but hazard assessments show that the risk is quite significant. To reduce future losses and to be well prepared for such disasters is a task that requires the contribution of many sectors of society. It is not only a matter of building a stronger house or a stronger bridge, but more importantly, also a matter of re-assessment of the way in which the development is taking place, and of how that development can be done in a safer way. There are no quick solutions. The strategy outlined here consists of a wide range of measures that, in combination, can provide a basis for safer human settlements.

This strategy addresses the safety of all inhabitants of urban and peri-urban areas. It recognises that a significant part of this development takes place outside the direct control of government because of informal arrangements. Emphasis in the present strategy is on the facilitating, initiating and guiding role of the government. In particular, it is designed to address the needs of those who face the highest risks, who are often the people who live in informal settlements.

Organisation

The implementation of the strategy is guided by the Committee for Safer Human Settlements, which is chaired by the Director of Physical Planning. The Committee reports to the National Development Commission and to the National Disaster Council. The following departments and organisations are represented in the Committee at the senior administrative level:

- National/Central Planning
- Urban Development and Housing
- Lands
- Town Council
- Public Works, Electricity, Water and Telecommunications
- Industry and Economic Development
- Social Services and Community Development
- NGO Umbrella Organisation
- Provincial/District authorities

The Committee will establish working groups for the implementation of the various parts of the Strategy. These working groups are responsible for the day-to-day running of activities. The Chairperson of each of the working groups reports to the Committee on a regular basis. The working groups can also include members of other Departments than those mentioned above.

Main elements of the strategy

The following are the main parts of the strategy (for each of which a working committee will have been set up by the Committee for Safer Human Settlements):

1. **Safe urban housing areas:** To estimate, for the medium term (10 years), what housing areas are needed for urban expansion; to identify safe locations where such housing could be developed; to analyse and resolve constraints that may hinder the development of suitable areas for all population categories.

2. **Safe rural communities:** To identify the potential need to relocate selected rural communities, and to consult with communities to establish relocation programmes; to establish a broad programme for vulnerability reduction of rural communities.

3. **Building quality:** To determine suitable standards for various types of construction; to identify and implement measures that contribute to the realisation of these standards; and to reduce constraints that may have a negative impact on construction quality (this includes houses, economic production facilities and critical facilities).

4. **Sound economic development:** To determine how various sectors of the economy are likely to be affected by a disaster, and to identify those critical elements and locations that may have far reaching impacts, when damaged; to stimulate and implement measures to reduce risk of those critical elements and measures that reduce the vulnerability of the economy as a whole, specific sectors or companies, and the dependency of the people on those.

5. **Infrastructure:** To analyse the existing infrastructure systems and the way in which people and economic activities depend on them, and to identify critical areas that need to be addressed; to identify infrastructure needs for new housing areas for the medium term, and to prepare programmes for these.

6. **Investing in disaster safety:** To review in a systematic way the investment programmes of the public and private sector and to advise how the investments can be further adjusted to prevent the increase of disaster risks and/or to reduce risk exposure.

7. **Hazard information support:** To analyse the hazards to which the country and/or specific settlements are exposed; to provide this information to the other committees and to the general public in a form that can be understood and used as a basis for action.

The targets, issues and measures that will be considered in each of the above will be worked out by the respective working committee.

<the strategy can elaborate the proposed approaches, measures and related resource commitments in more detail>

5. Conclusions and recommendations

Natural disasters used to be primarily a rural problem in the region. The threat to rural communities still exists. Some communities are currently so exposed to potential disasters that their relocation should be investigated by the community in cooperation with governments. For other rural communities, a broad programme to reduce their vulnerability is needed. Now, the additional threat of disasters affecting urban areas will also need to be addressed. Unless prompt measures are taken, urbanisation will lead to an increased urban disaster risk, with more people exposed to higher risks of natural disasters. With an increasing part of a country's economic activities concentrated in urban areas, a disaster affecting those areas may have a severe impact on the sustainable development of the whole country.

The Pacific island countries are urbanising at a rapid rate. Most countries are dominated by one or two urban centres, which account for a large part of the GNP. The urbanisation leads to profound changes in the human settlement pattern of the region. Availability of land that can be developed is the main guiding factor in the urban development. The land tenure systems, characterised by a large share of traditionally owned land, play an important role in the availability of land. But physical planning is relatively new in the region and only has a limited influence on the way in which urbanisation takes place. Several 'official' housing schemes are being implemented by government, semi-government and private developers. Nevertheless, the majority of new housing is realised under informal arrangements. This development increasingly takes place on traditionally owned land. The development of infrastructure and services has trouble keeping pace with the level of urbanisation. In addition, lack of advance planning, and insufficient investments make it increasingly difficult to continue providing an adequate level of services to the community.

The number of people living in urban centres will continue to increase in all countries. Combined with the natural growth of the population, this results in continued or even accelerated urban growth. The highest growth is to be expected in PNG, Solomon Islands and Vanuatu. The urban population there will at least double in the next 15 years. Urban concentration will increase in all countries. The instruments to accommodate this growth are not yet very well developed. Physical planning has limited influence, the formal housing programmes only cover a narrow part of the market and investments in infrastructure are insufficient.

For governments and countries to address disaster risks in a coherent way, it is necessary to analyse the central issues in disaster vulnerability, and consider which factors contribute to them. These factors cover a broad range of society. Economic dependency, land tenure, stability of employment, the ability of government to manage urban growth, are all factors of importance. The most critical factors affecting safe human settlements are land tenure systems, human settlements planning, housing, rural settlement safety programmes, infrastructure development and economic development strategies. For each of these themes, a range of possible measures is available to contribute to safer settlements.

To implement these measures in a coherent way, it is proposed that countries develop a National strategy for safer human settlements. This strategy should establish a clear political commitment to provide for, or enable, the development of safe human settlements. The strategy should emphasise a pro-active approach to disaster reduction and be based on a recognition of the actual situation, including limitations in the scope of government interference. The strategy should promote a balanced and realistic approach to disaster reduction and incorporate disaster risk assessment in a broad range of public and private investments.

There are no simple answers. A disaster risk is intrinsically linked to all aspects of human settlements development, and a national strategy will need to be based on an understanding of these linkages. The following are some measures that are recommended by the report. They are the building blocks for the construction of coherent national strategies for safer human settlements. These recommendations will not fit all circumstances in all Pacific island countries, but can be seen as important proposals to reduce the risk of human settlements in the region, both now and in the future:

1. Land tenure systems:

- Registration of traditionally owned land in urban fringe areas
- Establish some physical planning approval arrangement for traditional land
- Create the opportunity to authorise the sale, lease or subdivision of land in peri-urban areas
- Establish a means to enforce the reservation or allocation of land for public service infrastructure
- Identify which of the urban fringe areas would need to be covered by planning arrangements

2. Human settlements planning:

- Implement an institutional strengthening programme for human settlements planning
- Establish pro-active approaches to human settlements planning
- Collect basic information on parameters for urbanisation
- Involve physical planning authorities in the decision making process of the issuance of leases
- Establish cooperation between human settlement planners and providers of infrastructur and services

3. Housing:

- Increase the capacity of Housing Authorities or similar bodies
- Increase the flexibility of formal housing programmes
- Improve the capacity to control housing construction quality
- Stimulate quality improvements in informal housing

4. Rural settlement safety:

- Identify highly disaster prone rural settlements
- Establish community action programmes for vulnerability reduction
- Establish community based relocation programmes if necessary as a last resort

5. Infrastructure development:

- Identify infrastructure needed to serve population and guide developments
- Assess maintenance requirements and current safety of infrastructure and services
- Develop a balanced investment plan to serve the population and stimulate safe developments

6. Economic development:

- Analyse current development strategies in terms of their stability, level of diversification and focus on low risk sectors
- Identify current safety standards and needs for improvement

Annexes

Annex 1 Human settlements development in Pacific island countries

This annex provides an overview of some recent trends and features of the development of human settlements in Pacific island countries. The information is based on consultations with urban planners and other key officials in five Pacific island countries, as well on a review of some literature on human settlements development in the region. The overview provides background information for the critical themes and policies that are discussed in the main report. It shows the range of differences that occur in Pacific human settlements development and the types of solutions that have been adopted in parts of the region to deal with urbanisation. This background information has provided the groundwork for the approaches that are outlined in Chapter 3 of the main report.

For human settlement planners and other policy makers in the region, the overview may be useful in that it reveals the variety in problems and solutions within the region. During the country consultations, it was felt that discussion partners might also benefit from an overview such as this one.

The Annex does not intend to provide a comprehensive analysis of all aspects of human settlements development in the region. Human settlements development is a complex issue that touches many, if not all, sectors of society. A comprehensive study would require a much more elaborate approach than that used for the preparation of this paper.

To enable easy access to the specific themes discussed here, there has been some necessary overlap of details of the issues addressed.

1. The region and environment

The South Pacific covers a vast area, with small land masses dispersed over part of the world's largest ocean. The combined Exclusive Economic Zones of the Pacific island countries occupy 30 million square kilometres, but the land is only 1.8% of that total. The 15 countries of the region together have an estimated population of 5.8 million, of which 4 million are in Papua New Guinea. The island countries vary greatly in their physical and economic characteristics and their resource endowments.

The Melanesian countries of Fiji, Papua New Guinea, Solomon Islands and Vanuatu are extensions or parts of undersea mountain ranges. They comprise large, rugged, mainly volcanic islands which are generally rich in natural resources. They have relatively fertile land, mineral wealth and abundant living marine and terrestrial resources.

Micronesia and Polynesia are made up of countries comprising small island groups. The Cook Islands, the Federated States of Micronesia, Palau, Tonga and Western Samoa have some volcanic islands which are rich in soil. However, most of the islands are small, isolated atolls with poor soils. Among these are Kiribati, Marshall Islands, Tokelau and Tuvalu, where the highest elevation does not exceed five meters and is commonly between one and two meters. The seas of Polynesia and Micronesia are generally rich in living resources and reported to have significant prospects for exploitable non-living resources, but apart from these, the natural resources of these islands are severely limited.

The Pacific is often exposed to extremely damaging natural hazards, primarily in the form of catastrophic cyclones, volcanic eruptions and earthquakes. Some islands are also susceptible to landslides, extended droughts and extensive floods. Table I.1 gives an overview of the level of exposure of the countries of the region to the various hazards. A more detailed overview of the hazards to which the region is exposed can be found in Hamnett (1996), and Johnson et.al.(1995).

Table I.1: Pacific island countries estimated level of vulnerability to specific natural hazards

Country	Population	Land area (km2)	Cyclone	Coastal flood	River flood	Drought	Earthquake	Landslide	Tsunami	Volcanic eruption
Cook Islands	19,500	240	M	M	L	H	L	L	M	-
FSM	114,800	701	M	H	L	H	L	L	L	-
Fiji	752,700	18,272	H	H	H	M	M	H	H	-
Kiribati	76,000	725	L	H	-	H	L	L	L	-
Marshall Isl.	50,000	181	M	H	-	H	L	L	L	-
Niue	2,300	258	M	L	-	M	L	L	L	-
Palau	21,600	494	M	M	-	M	L	L	L	-
PNG	4056,000	462,243	L	H	H	M	H	H	H	H
Solomon Isl.	337,000	28,370	H	H	H	L	H	H	H	H
Tokelau	1,600	12	M	H	-	H	L	L	L	-
Tonga	97,400	720	H	H	M	M	H	L	M	H
Tuvalu	9,100	24	L	H	-	M	L	L	L	-
Vanuatu	156,500	12,200	H	H	H	L	H	H	H	H
W.Samoa	163,000	2,935	M	H	H	L	M	H	H	L

Source: UNDHA et.al 1994; tsunami risk corrected on the basis of Hamnett (1996:20)

2. Changes in the traditional human settlements pattern

Traditional human settlements in the region were small, ranging from a few tens to a few hundreds of inhabitants, sometimes even smaller, in particular in the Melanesian countries. Each family or small group within the hamlet or village held its effective land rights within convenient walking or canoeing distance with most people spending most of their lives within a relatively small radius. The families derived all or almost all their food, fuel, medicines, building materials and other products from their land (Crocombe 1994:6). This pattern has changed drastically because in large parts of the region, people now derive a significant proportion of their income from other sources than their land. Countries where for the majority of the population the land and water remain the direct sources of livelihood include Papua New Guinea, Solomon Islands, Vanuatu and Kiribati. These comprise the majority of all Pacific islanders. But even for them, Crocombe indicates, tenure conditions are radically different from those in the self-sufficient, subsistence past.

A common factor in the literature is the recognition that settlement patterns have changed with the introduction of paid labour. The traditional human settlement pattern still exists, but it is being combined with more urbanised lifestyles. In many cases, the traditional human settlement pattern is superimposed with a system of larger urban settlements. The way in which that has taken place differs from country to country. Depending on the size of the countries and the 'main island', there seems to be a variation in the extent to which economic changes lead to other human settlement patterns. Where people can benefit from economic changes without changing their habitat, urban concentration will be limited while the urbanisation trend seems stronger in the larger countries.

The clearest examples of countries where economic developments have had little impact on human settlement patterns are Niue and Nauru. In both cases, the country consists of one island with a unique culture and language. In neither case is the land the main source of livelihood, but the island is sufficiently small for people from anywhere on the island to live at home and drive to work each day. So everyone has ready access to lands they traditionally identify as theirs, and there is no need to adapt the settlement pattern in order to accommodate economic changes.

At the other end of the scale is a country like Solomon Islands, where the monetary economy is heavily concentrated in the capital, Honiara. The country is much bigger, and for most of its population, Honiara can only be reached by air or sea, at high cost. In order to participate in the 'urban' economy, people have to move to the capital city, and maybe go back home once a year. This leads to a very high growth of Honiara. In addition to the urban development of Honiara, a system of provincial administrations was set up in the Solomon Islands by the colonial administration. These provincial headquarters have also become centres of growth, albeit on a smaller scale.

Most of the countries of the region are somewhere in between these two examples, while the pattern of human settlements development also depends on the type and history of economic development and the physical features of the habitat. The following is a brief characterisation of some changes in the human settlement patterns for selected countries. This should demonstrate the range of change and provide background to the disaster risks associated with such developments.

The Cook Islands and Western Samoa resemble Niue in terms of their pattern of urbanisation. In the Cook Islands, the main island of Rarotonga has a circumference of around 35 km., and there is

no need to move in order to benefit from economic developments. There is significant in-migration from the outer islands, which accommodate around 40-50% of the population. This 'pull' towards Rarotonga seems to be relatively evenly spread over the island, with some concentration in Avarua and the adjacent villages. Upolu, the main island of Western Samoa is much bigger, and there is also a pull from within the island towards Apia, the capital. Apia is growing relatively fast and there is some concern in the country about youth moving into town to seek formal employment. People moving to Apia generally maintain strong links with their original villages, and there is strong interaction between the village economy and the urban economy. This seems to be true also for in-migration from Savaii.

In Tonga, significant concern is expressed about the growth of Nuku'alofa, the capital city. One in every five inhabitants now lives in the capital, while 40-50% of the total population lives on Tongatapu, the main island. Large parts of the population of Tongatapu benefit from economic activities in the capital without actually moving to Nuku'alofa, and the main cause for urban concentration seems to be the in-migration from the other main island groups of Ha'apai and Vava'u. Some sources indicate that there are villages in Ha'apai that have become 'ghost villages' due to the migration to Tongatapu. A regional development programme is being implemented in Vava'u in order to reduce migration by improving educational facilities and employment opportunities. The situation in Vanuatu resembles that of Tonga on a slightly larger scale. There has been strong in-migration into the two urban areas, Port Vila and Luganville, mainly from the 'outer islands'. This has resulted in explosive growth of both cities. Many people retain strong traditional ties with their 'home village' and hope to return permanently there one day.

In Fiji, there are two main processes that have altered the human settlement pattern of the country: the development of sugar cane farming over the last 100 years, and the (much more recent) urbanisation. The development of cane farming has drastically changed the rural settlement pattern. Villages inhabited by indigenous Fijians are still in the same location and can be characterised by a more or less gradual development. In addition, a pattern of Indo-Fijian settlements has formed over the last 100 years with the development of the sugar industry and, to a lesser extent, other commercial agriculture.

The traditional Fijian village pattern now exists side by side with three 'new' settlement systems. Firstly, there is the system of Indo-Fijian rural settlements as indicated above. Second, there is the system of provincial administration, which has led to the formation of some 27 small administrative centres. These are often existing villages that are extended to cater for the administrative system, and in some cases this growth has accelerated with the development of industries and trade.

The third major change in the settlement system is the formation of some main urban areas through industrialisation, the formation of a service economy and the development of the tourism industry. Suva, Lautoka and Nadi are the main centres in this respect, but Labasa, Ba and Sigatoka can also be considered in this category. The migration into these areas has a strong impact on the human settlement pattern of the country. It consists in part of in-migration from the outer islands like the Yasawa group, but there is also a strong pull towards the town from the rural areas of the main island of Viti Levu. Main pull factors seem to be the availability of education, access to markets and formal employment opportunities.

The situation in Kiribati is characterised by a strong and increasing concentration of population in South Tarawa, the only area that can be characterised as urban in the country. Out of every ten peo-

ple living in South Tarawa, six are not born there and even 84% of the population stated their home island elsewhere in Kiribati (UNDP, 1996: 11). The enormous distances within the country dictate that people often have to move physically to South Tarawa in order to participate in the economic changes. The government has set up a resettlement programme in order to reduce the fast growth of South Tarawa. A major part of this programme is the establishment of economic activities on the outside islands (notably Christmas Island).

In the Marshall Islands, a new settlement pattern developed under the influence of the USA military presence in the country. The military presence resulted in the concentration of people on the atolls of Kwajalein and Majuro, where human settlements are now characterised by concentration and relatively high densities. Ebeye on Kwajalein is the most densely populated island in the region, and accommodates over 8,000 persons on 0.3 square kilometres (UNDP, 1996: 11).

The other countries of the region each have their own characteristic changes in human settlement patterns but the above account indicates the range of changes that have taken place in the pattern of human settlements in the region. Changes in the human settlement pattern relate primarily to urbanisation and increased concentration of people on one or two islands, where urban areas are developing at a rapid rate. In most countries, rural settlements develop much more gradually, and their gradual growth takes place under traditional land allocation systems on which governments have little or no influence. This is the case despite the fact that economic changes have had their profound impact on rural areas as well. Changes are more reflected in the economic ties between urban and rural areas, the availability of infrastructure, and changes in the construction methods of houses. The pattern of rural human settlements seems relatively unaffected.

The exception is Fiji, where the introduction of sugar cane and the importation of labour has profoundly changed the outlook of rural Fiji. The traditional pattern of Fijian villages now only houses about half the rural population of the country. The other half, mostly sugarcane farmers of Indian descent, live in what is referred to in Fiji as 'settlements', groups of farms and houses that are relatively spread out. The disaster risks to which these settlements are exposed can be quite different. For example, a study into drought vulnerability showed that the water supply systems of settlements are generally much more vulnerable to lack of rainfall than those of the villages, which are traditionally located in areas where good water sources are more readily available.

3. Population growth

These changes in human settlement patterns should be seen in relation to the overall population growth of the countries of the region. The average population growth in the region is 2.0%, ranging from a high 4.2% for the Marshall Islands during the 1980s to a low 0.5% for Tonga and Western Samoa, or even a population decline for Cook Islands and Niue (Schoeffel, 1996: 8-21). Table I.2 provides an overview of projected population growth in the year 2010 for selected countries.

Table I.2: Present and projected population in selected Pacific island countries

Country	1993 population	2010 * extrapolation of 1980s	2010 high variant (Cole, 1993)	2010 low variant (Cole, 1993)	remarks
Cook Islands	18,900	22,800			
FSM	104,800	191,200			
Fiji	761,800	1,066,700	1,163,000	914,000	
Kiribati	76,600	112,700			
Marshall Islands	52,500	105,700			
Nauru	10,200	16,600			
Niue	2,100	1,400			
Palau	16,200	23,500			
PNG	3,862,700	5,685,600	6,420,000	5,194,000	
Solomon Islands	355,400	627,400	662,700	488,550	Projections Cole for 2011
Tokelau	1,500	1,200			
Tonga	97,800	106,500	124,950	89,110	Projections Cole for 2009; migration decisive
Tuvalu	9,300	12,400			
Vanuatu	159,600	255,200	255,880	238,440	Projections Cole for 2009
Western Samoa	162,600	177,000	257,000	180,000	Projections Cole for 2011; migration decisive

1993 population from UNDP (1994:13)
* = extrapolations by author calculated from UNDP (1994:13)
High and low variants available for selected countries only in Cole et.al. (1993)

4. Urbanisation

The changes in the human settlement pattern and the overall population growth form the basis of the urbanisation currently taking place in the countries of the region. Table I.3 provides an overview of the current level of urbanisation and the average annual growth rate of selected urban centres.

Table I.3: Indicative level of urbanisation and annual growth rate

Country	Main urban centre	% urban population	Overall population growth %	Urban population growth %
Cook Islands	Avarua	27	1.1	N/A.
Fiji	Suva	43.4	2.0	2.6
Fed. States Micronesia	Kolonia	26	2.6	N/A.
Kiribati	South Tarawa	35.5	2.3	3.1
Marshall Islands	Majuro	64.5	4.2	8.2
Nauru	Nauru	100	2.9	2.9
Palau	Koror	68	2.1	2.7
Papua New Guinea	Port Moresby	15	2.3	3.8
Solomon Islands	Honiara	13	3.4	6.2
Tonga	Nuku'alofa	30	0.5	2.5
Tuvalu	Funafuti	43	1.7	4.8-9.1
Vanuatu	Port Vila	18	2.8	7.3-10.0
Western Samoa	Apia	21	0.5	0.9

Sources: UNDP (1996:12), Schoeffel (1996:20-22)

There are some definition problems with the above table. In the Cook Islands, for example, only Avarua itself is considered as 'urban area', leading to an urbanisation rate of only 27%. However, it would be equally justifiable to identify the main island of Rarotonga as the main urban area, since most of the people living on Rarotonga use the same urban services and facilities. This would lead to a rate of urbanisation of around 50-60%. Similarly, Nauru is considered 100% urban because of the urban lifestyle and the use that people make of urban services. Nevertheless, in Nauru most people still live in their traditional village land arrangements, although they do not depend on their land economically. There are also some marked variations between the identified growth percentages, partly because they consider different periods. However, as an overall indication of the level and speed of urbanisation, the table provides a good indication.

It confirms that urbanisation is very rapid in the Melanesian countries, which are quickly evolving from predominantly rural societies to societies where the urban economy plays a significant role for a large part of the population. Already the urban economy in the Solomon Islands accounts for 50% of the national GDP. In Fiji, where the share of urban population is three times as high, this is 60% (UNDP, 1996:35). Again, some question marks can be placed with the exact figures, but the trend of growing importance of the urban economy is evident. The three atoll countries show a very

intensive urbanisation process, and concentration in one (or two, in the case of the Marshall Islands) urban area is quite strong. Cole et.al. (1993:111) estimate that by 2010, 39% of the people of Kiribati, or 41,070 people, will live on South Tarawa.

The extent to which urban areas have to accommodate growth is considered an important factor in the possible disaster risks associated with urbanisation. Table I.4 attempts to give a projection of the estimated urban population in some countries on the basis of available data. It shows that considerable growth will need to be accommodated in virtually all urban centres of the region.

Table I.4: Projected urban population in selected countries

Country	1993 urban population	% of total population	estimated urban population in 2010*	% of total population	new urban inhabitants every year	urban growth as % of total growth
Papua New Guinea	860,500	21	2,441,600	43	93,000	87
Fiji	321,600	40	414,800	43	5,500	30
Vanuatu	34,500	21.5	76,300	32	2,500	44
Solomon Islands	71,280	18	191,220	32	7,100	44
Kiribati	27,900	35	41,000	39	800	36

* = PNG, Fiji, Solomon Islands from Cole et al.(1993)
Vanuatu calculated from ADB (1995)
Kiribati from UNDP (1996 : 40)

While the figures given in table I.4 may not be accurate because of the assumptions and extrapolations on which they are based, nevertheless, the overall trend is clear. A very considerable part of the national growth in Pacific island countries will need to be accommodated in the urban settlement or settlements of the country. This varies from 30% in Fiji, where the urbanisation has somewhat stabilised, to a prediction of over 80% in Papua New Guinea. The figure for Papua New Guinea seems very high, but it conforms to international trends. During the 1990s, no less than 80% of the world population increase is expected to take place in towns and cities: 81 million people every year (Elo et al. 1996). In the light of these figures, estimates for Vanuatu and the Solomon Islands are likely to be on the low side. This poses a big challenge to urban development planners and urban managers. Disaster managers and developers together will have to address the risks of the increasing urban population.

The required expansion of settlements to provide housing for the increasing rural population is less problematic. Concerns in the rural areas will focus much more on the need to find arable land for cultivation, and to provide services, infrastructure and education. The rural expansion problem is not so much the extra space needed for safe expansion of settlements, although that will need to be a point of attention. An exception are the atoll islands and other communities located on small islands where land shortages are part and parcel of daily living conditions. Additionally, the need to relocate rural settlements that are now exposed to high and unacceptable risks, should remain an important point of attention.

5. Land tenure systems and their impact on growth of human settlements

Land tenure is a very complex and sensitive issue in the region. It is beyond the scope of this study to provide a comprehensive review of this issue. This chapter is primarily based on data derived from the consultations in the region. For a comprehensive review of land tenure in the region, consult USP (1987) or Crocombe and Meleisea (1994).

In all Pacific island countries, land tenure is characterised by a large percentage of land under customary ownership. The systems of land tenure are highly variable throughout the region, but land is mostly under communal ownership. In most countries, a small proportion of the land was alienated under colonial administration, mostly within the urban centres and fertile coastal plains. All over the region, it is estimated that over 80 % of the land remains under customary ownership. The main exception is Tonga, where all land is owned by the Crown with user rights vested with families.

Authority over land is a major development issue and land tenure systems are of great social, cultural and economic importance. Land tenure at the same time is a major factor in how the increasing urban population is being accommodated. Land tenure in some selected countries is summarised below to indicate the impacts this may have on human settlements development. Table I.5 gives an overview of land ownership in selected Pacific island countries.

Table I.5: Land ownership in selected Pacific island countries

Country	Customary land (%)	Government land (%)	Freehold (%)	remarks
Fiji	83	9	8	
Kiribati	40	60	0	Most government land on Kirimati
Marshall Islands	100	0	0	
FSM	-	60	40	Pohnpei only; freehold includes customary land
Solomon Islands	97	3	0	
Tonga	-	100	-	Land belongs to the Crown
Vanuatu	98	2	0	
PNG	97	3	-	

Source: UNDP (1996:19)

Tonga

All land in Tonga in principle belongs to the King. Through the Land Act, the whole country has been subdivided into 'town land' and blocks of 'bush land'. These are grouped in 'estates', which are mostly managed by nobles. Every male of over 16 years of age in the country is under the constitution entitled to a block of 'town land' (0.25 acre) and a block of 'bush land' (8.25 acre). He has to apply to the estate holder to be allotted with bush- and/or town land. If the estateholder is satisfied that the applicant is genuinely qualified, then the land can be registered. Once the registration is official, the lease holder has relatively strong property rights, which limit the influence of the estate holder. In turn, the lease holder is obliged to cultivate the bush land, mostly through agriculture under coconut trees.

Only a relatively limited percentage of the eligible people has actually been allotted their bush land (in 1984 this was 51%). The main problems are the shortage of land that can be allotted and sometimes the unwillingness of estate holders to officially register land to the lease holder. The latter is said to be related to the fact that after registration, the estate holder has relatively little control over the lease holder.

There is no difference in the principles of allocation of town land in urban or more rural communities. The provision of town land to those who qualify seems to be adequate in the more rural parts of Tonga. There is however a shortage of 'town blocks' that can be allocated to (prospective) city dwellers in Nuku'alofa. This is increasingly seen as a constraint for the development of the town. An additional aspect for Nuku'alofa is the importance of migration to the town from outer islands. Under the Tongan constitution, only one block of town land can be allocated to a person, and in practice often to a family. Many of the migrants to Nuku'alofa have retained their block of town land in their place of origin. Therefore, they cannot apply for allotment of a block of land in the capital. In some cases this has forced people to occupy government land illegally, which has resulted in the formation of quite an extensive informal housing area in a flood prone area near the capital.

Solomon Islands

Almost all land outside the national and provincial capitals in Solomon Islands is 'customary land' which is owned by tribes who subdivide it and give it out to the 'clans' that belong to the tribe. This is a process that has been established over generations. Customary land, which covers 97% of the land area of the country, is not centrally registered and there are many disputes over land rights. Some tribes have made a genealogy of their land, which has helped to identify which land belongs to which clans. Customary land can be sold if the principal ownership is not disputed. The sale of customary land is an uncertain process due to the lack of official registration of the land. It sometimes leads to a situation where the same piece of land can be sold by different individuals twice or even more often.

In rural Solomon Islands, the public authority has no say over the allocation of land. Villages grow through customary arrangements. There are no indications that the expansion of rural settlements is constrained because of this situation. Growth constraints seem to be the problem of the national capital and fast growing provincial centres.

Honiara and the provincial headquarters are located on government land, which was bought from

the traditional land owners. This sale took place in the colonial days and is sometimes still disputed. Much of the urban land is leased out for housing or commercial purposes. In particular in Honiara, there seems to be some concentration of ownership of leases, which leads to frustration of inhabitants who cannot get access to land. Many civil servants have been waiting for up to 15 years to get access to a plot and continue to depend on the (heavily subsidised) rental market.

In Honiara and some of the provincial capitals there is a lack of public land, which causes developments to 'spill over' to the surrounding customary land. The shortage of land is one of the most serious problems facing the development of Honiara. Because of the fast growth of the town, there is not much land available within the current town area that can be developed. The housing developments currently taking place (one of up to 700 houses) will occupy the last large land areas that are available for development (within the town boundaries). Insufficient provision of land leads to the unauthorised occupation of government land within the town boundaries (often in hazard prone locations) and 'spilling over' of the housing development into customary land around the town. The Physical Planning Act does not have any provisions for the regulation of customary land outside town boundaries.

Vanuatu

The land tenure system in Vanuatu is quite similar to that in the Solomon Islands. It is characterised by a strong position for traditional land owners. Only the land in Luganville and Port Vila is owned by the government, which 'declared public land' in 1982, after a settlement was reached with the traditional land owners for compensation. Further extension of government land, beyond the current town borders, would require extensive negotiations with land owners. In that sense, Vanuatu has the same problem as Solomon Islands: limited authority over the development of areas that are outside the current declared 'town area', but which in practice are becoming more and more part of the urban development pattern.

There are, however, three significant differences between both situations. First, the registration of customary land seems more developed in Vanuatu, although there are still many land disputes. Second, Vanuatu has more formal arrangements for leasing of customary land. The government acts as a mediator between the land owners and the lessee. The lessee does not directly deal with the land owners but with the Land Trust Board, which operates on behalf of the land owners. The Land Trust Board also registers the ownership of traditional land. When an agreement is reached, the lessee pays to the government trust account, which makes the payments to the land owners in accordance with ownership. This usually consists of an instalment and annual lease fee. The role of the government makes it less likely that developments are blocked because of land disputes, since the LTB can operate somewhat independently. When there are disputes over the ownership of the land, the Island Court or similar authority is called in to resolve it. Although there is much debate about this arrangement, it does improve opportunities to develop traditional land tenure areas.

Third, Provinces can declare part of their area as a'town planning area'. Although this is a long administrative and political process, in principle, it makes it possible to include urban fringe areas in the development planning. This is already taking place around Port Vila.

Lease titles for urban (government) land are registered by the Department of Lands, and there is up-to-date information available on the status of leases. Residential leases are for 50 years, while commercial leases are for 50 or 75 years. When an area is subdivided, new leases for each plot are issued.

The terms of the lease depend on the zone in which the land is situated. They normally consist of an instalment and an annual fee. Leases can be sold. The allocation of public land is partly politicised, and preferential treatment seems to be sometimes given outside the normal procedures.

Fiji

Around 83% of the land in Fiji is traditionally owned by Fijian land -owning units (mataqalis). A mataqali is a group of families that has joint authority over the land. This land is registered by the Native Land Trust Board (NLTB). Native land can be leased out and this has already been done for generations. Almost all sugar cane farms, one of the major economic activities, are situated on leasehold land. The NLTB is the mediator between the land owning unit and the lessee. Officially, Native land can not be leased out directly; this has to be done through the NLTB. Agricultural leases are generally for a period of 30 years, residential leases for 99 years and commercial leases for 50 or 75 years.

The development of Fiji has resulted in a drastic change of the rural human settlement pattern. The villages, inhabited by Fijians, continue to grow according to customary rules. For the newer settlements, mostly inhabited by Indian sugar cane workers and farmers, it may be more difficult to accommodate growth. Problems related to security of land tenure may make it more difficult to accommodate rural growth in these areas. Further detailed study is necessary to analyse this potential problem.

In urban and peri-urban human settlements there is a growing practice of informal land tenure arrangements that involve direct agreement between the prospective tenant and the land owning unit involved. Strictly speaking, this informal land tenure system is illegal. The system bypasses the NLTB system because of its perceived rigidities and because land owners feel they get insufficient return through the NLTB. The system is called the "Vakavanua" system and was started primarily for agricultural purposes. The arrangement is now increasingly applied in the development of informal human settlements. Indications are that the majority of the 'squatter' settlements around Suva, in fact have such informal tenure arrangements.

The remaining Fiji land consists of government 'Crown' land and freehold land. Foreigners can own freehold land in Fiji. Much of the 'traditional' urban areas in Fiji are on crown and freehold land, although recent urbanisation often takes place on native land leases. The legal framework in Fiji includes the Land Subdivision Act, under which approval for the subdivision of all land (including mataqali land, except the so-called 'native reserves') is required from the Government. This act provides a tool for the government to regulate land use beyond the government and freehold land.

Some common issues in land tenure

In rural areas, traditional arrangements for the growth of human settlements are still common practice in the region and there is little government interference in that respect. The extent to which this leads to constraints for those human settlements depends on the local conditions. In some areas, such as densely populated islands in Vanuatu, or the atoll communities, there definitely is, and always has been, a shortage of land. This primarily relates to land for agriculture, but it can also cause difficulty in finding suitable space for housing. By and large, the traditional land tenure

systems are still appropriate for addressing the expansion needs of rural settlements. Problems that exist are not caused by the land tenure systems per se, but by the severe constraints of the environment.

However, the traditional land tenure system seems to be a constraint in many of the fast growing urban areas of the region. There are three major aspects involved. Firstly, there is the extent to which the government has authority to prohibit or encourage specific developments. In Vanuatu and Solomon Islands, the government has no planning authority on customary land, and this is the case for most countries of the region. In Fiji, the Town and Country Planning Department has to authorise subdivision schemes, including those located on customary land. This gives the government some more authority over urban development on native or customary land.

Secondly, the knowledge and clarity of ownership of the land is an important factor. In most countries of the region, there are frequent land disputes and the formal registration of customary land is legally or logistically only possible in some of the countries (Schoeffel, 1996:58). Land registration is also seen as a complex and politically sensitive process. Only Fiji seems to have a more or less complete registration of traditional land under the NLTB. However, this register is blurred to some extent by informal leasing arrangements. In the Solomon Islands, the lack of registration of customary land tenure was cited as a major influential factor in the development of Honiara.

Thirdly, another factor is the extent to which the customary land arrangements are conducive to the development of the land as part of an urbanisation process. Urbanisation requires security of tenure, investments in infrastructure and services and consensus on the use of the land for housing and/or other urban facilities. There are also often legal limitations, e.g. with regard to foreign ownership or land tenure. In Vanuatu and Western Samoa, lack of security of tenure was cited as a major factor in limiting investments in the tourism industry. It is expected that similar restrictions apply to other sectors.

Similar issues seem to be at stake in the other countries of the region. In Nuku'alofa, Tonga, there is a shortage of town land and land tenure rules force people to settle illegally on government land. In Western Samoa, there is no systematic registration of traditional land; however, when there are legal disputes, the outcomes are registered. Although the price of land has gone up considerably in recent years, there does not seem to be a severe shortage of land for urban development in Apia. In Papua New Guinea, the influx from the rural areas necessitates strong expansion of the towns and cities. Urban sprawl and squatting on customary land inevitably occurs. The state has a monopoly right in alienating customary land, but finds it difficult to obtain further land for public use and general investment. Lakau (1994:79) indicates that land tenure problems are cited by companies in PNG as the most important obstacle to achieving growth and expansion. Land tenure problems hinder economic development and discourage entrepreneurship, investment and expansion of existing businesses.

Atoll countries have traditionally had severe limitations of available land, also in what have become the urban centres. The atolls were generally divided into territories based on islets or groups of islets and subdivided into household plots; each plot extended in a 'slice' from the ocean side across to the lagoon side of the islet (Schoeffel, 1996:36). Urban centres in atoll countries like Kiribati, Tuvalu and Marshall Islands are characterised by their fragmented traditional ownership, which makes it difficult to regulate development. In Kiribati, the government has tried to address this problem through the preparation of an Urban Management Plan for South Tarawa, which was based on an extensive consultation process.

The way in which the land is traditionally managed varies in the countries, but an overall characteristic is that governments only have very limited authority to decide on its use, or to prohibit certain functions. In rural areas, this does not lead to widespread problems in the safety of rural settlements. It just means that the government has to work closely with rural communities in order to influence rural settlement patterns. In relation to natural disaster risks, the only time this causes difficulty is when a settlement is located in a disaster prone area, and the government would like to increase safety by relocating the settlement.

In urban areas, the traditional tenure systems increasingly lead to constraints for urban development. Innovative ways will need to be found to enable urbanisation to continue in a coherent and safe manner.

6. Human settlements planning

Urbanisation is a relatively recent phenomenon in the Pacific islands. Under colonial rule, administrative centres were established, but urban growth has accelerated after independence. Physical planning of human settlements is also a recent activity. In most countries of the region it is confined to the identified urban areas. Even there, it often has rather limited influence on the growth pattern. Land use is still regulated by the traditional land tenure arrangements and physical planning departments are often mainly focused on their reactive task, the approval of building proposals. This section describes some recent developments in physical planning to illustrate current practices in Vanuatu, Solomon Islands, Kiribati and Fiji.

Vanuatu

The Physical Planning Act in Vanuatu was established as recently as 1986. It empowers Municipal Councils (Port Vila and Luganville) to control developments in their area. Local governments and Provinces can also declare 'physical planning areas' to regulate developments in clearly defined areas. This has to be approved by the national government. The Physical Planning Unit of the Ministry of Home Affairs is the specialised unit within government. It provides advice to the Municipal Councils and to some Provinces, although these can also assign their own physical planners.

The Physical Planning Unit points to its difficulty in convincing government departments of the usefulness of planning regulations. It sees the very recent introduction of physical planning as the main reason for this. The authority of the unit seems limited. It has no real say in the issuance of leases in urban areas; it only has to approve construction permits. Once a lease is given for residential purposes, it is difficult in practice to refuse construction permits on the basis of a land use plan. In practice, therefore, the planned improvement of urban infrastructure has a more regulating impact on the urban development than the urban expansion plan.

A detailed technical study was underatken with ADB funding, to determine the urban infrastructure required for the development of Port Vila and Luganville. This resulted in the establishment of an urban infrastructure programme under an ADB loan of US$10 million.

Under the influence of the ADB programme and proposed low cost housing programmes, the National Planning Office has initiated the development of an Urban Growth Management Strategy of Port Vila. The strategy will be formulated in an attempt to define a broad framework for the development of the capital. It will be based on an agreed 'vision' and include urban sector development plans and an urban structure plan. The model provides a broad perspective on urban development, one in which physical planning by itself seems to play a limited role. It may be significant that the National Planning Department has taken the lead in the process, rather than the Physical Planning Unit or the Municipal Council.

Solomon Islands

The Town and Country Planning Act of the Solomon Islands dates back to 1979. It regulates the preparation and authority of Local Planning Schemes, which are to be prepared for all Provincial headquarters. The Town and Country Planning Act only covers government (alienated) land; this includes Honiara and all provincial headquarters. No planning regulations exist for traditional or

custom land. However, villages can request assistance from the Physical Planning Department for subdivision schemes etc.

The main planning activities are zoning, local planning schemes, and 'action plans', which includes subdivision plans. Each Province has its own Town and Country Planning Board, which handles all land development and building approvals. The National Physical Planning Office provides support, training, and mediates in disputes. It also provides planning services for Honiara, although some decentralisation is currently taking place. 'Urban Centre Plans' exist for provincial headquarters, some sub-stations and some industrial estates.

An element that puts the planned development of Honiara and some provincial capitals at risk is the situation that no planning provisions exist for customary land, and that the government land in these towns is already almost fully developed so that urban sprawl is spilling over onto customary land. Unless other arrangements are made, government control of this spillover will be absent.

To coordinate urban planning with the provision of infrastructure, a Utility Planning Committee Meeting was established. The meeting mainly focuses on Honiara, but also addresses other areas. It discusses draft infrastructure plans before these are proposed to the Town Council. To some extent, this meeting also discusses more long term issues on the provision of services, but a stronger planning instrument will be needed to enable integrated planning.

Kiribati

The main recent development in physical planning in Kiribati is the establishment of an Urban Management Plan for South Tarawa. The draft plan was approved by Cabinet in January 1996. The process was initiated by government and local village committees in 1993 as a response to the increasing urbanisation on South Tarawa. The preparation was a long and complex process involving a wide variety of often conflicting groups - village committees, church groups, Tokatarawa (the South Tarawa landowners association) - as well as local and central planning boards. Through the plan, the various groups have agreed on some directions to accommodate the spiralling population and land problems of South Tarawa. The plan has forged new partnerships and has raised community and government awareness on the urban environment. It is seen as just one step in a longer term process, which will require continued resource commitment (UNDP, 1996:42).

The plan shows an interesting approach to finding solutions to the growth of human settlements by building on the existing traditional arrangements. The key is the recognition of the need to address the problem of growth of human settlements through processes which allow for a concensus-building process.

Fiji

Fiji has a relatively long tradition of urbanisation and urban development. An urban structure plan for the Greater Suva Area was prepared as early as 1975 (Government of Fiji, 1975). The Director of Town Planning has the authority to regulate land use under two Acts, the Town Planning Act and the Land Subdivision Act. The Town Planning Act covers the declared urban areas, which includes all major urban centres. These defined urban areas are in many cases already fully developed, with developments spilling over to the surrounding areas. The Land Subdivision Act requires approval for any subdivision, regardless ofthe land tenure or location in a declared urban area. Only Native Reserve Land is excluded from this Act.

The Town and Country Planning Department also prepares overall physical development plans for larger urban agglomerations. The Greater Suva Area Structure Plan of 1975 is an example, but also the Nadi Scheme Plan, for which a draft was recently completed, provides a basis for the development of a larger urban area, without being restricted by narrowly defined urban areas. It seems that the combination of both acts under which the Department operates, provides it with the authority to prepare these kind of plans.

A third aspect of interest is the authority of the Director of Town and Country Planning to deviate from established standards for plot sizes. Although the Act establishes four categories of housing, ranging from plots from 220 to over 800 m2, the Director can allow more dense, low cost housing in urban areas. A special study on 'relaxed standards' was commissioned within the framework of a World Bank funded housing scheme. The application of 'relaxed standards' is also seen as a key in the legalisation of informal housing areas.

7. Housing

Housing types

The Pacific islands have a rich variety of traditional houses and habitat forms. In each country, often in each island, village structures and housing designs have evolved over centuries, leading to a rich variety of dwelling forms and village arrangements. Most houses were constructed with wooden poles and thatch roofs, although volcanic stones were sometimes used.

The extent to which traditional houses are still prevalent, varies between the countries although traditional building materials are becoming more scarce and more costly all over the region. The Melanesian countries and Kiribati still rely to a large extent on traditional construction materials. In Vanuatu, the share of traditional building materials is estimated around 50%, and this share is higher in Solomon Islands, Kiribati and PNG. Yet even in those countries, housing construction techniques are evolving. In Solomon Islands, and probably also in other countries, the use of chainsaws is increasing rapidly, leading to the use of sawn timber for construction instead of the traditional round poles. There is also a marked increase in the use of corrugated iron as roofing material.

In some countries, such as Tonga, Niue, Cook Islands and Fiji, the traditional house has almost disappeared and a timber or concrete block house is now the common standard. In other countries, the traditional housing forms are partly maintained, but building techniques are modernised. This can be observed in Western Samoa, where traditional open fales are still important elements in the housing pattern, but they are more and more constructed in square (instead of the traditional oval) shapes, and with corrugated iron hip roofs.

There is some difference between rural and urban settlements in the extent to which they have shifted towards new building techniques and materials. This depends on how isolated the settlements are, and on the continuing availability of traditional materials. Overall, there is a significant shift towards the use of timber, concrete and corrugated iron. The prevalent housing type in the region is becoming a timber or concrete block one-family house with a corrugated iron roof. It seems that the use of concrete blocks for housing construction is increasing rapidly in Vanuatu, Samoa, Tonga and the Cook Islands.

An interesting recent development in Fiji is the operation of several private companies that offer ready made standard low cost housing at affordable rates. Engineering certificates for these houses can be obtained so that, provided land tenure is firm, loans can be issued on these houses. This development takes place alongside the decision of the Housing Authority of Fiji to concentrate on the provision of serviced plots, rather than on realisation of ready made houses. Although primarily aimed at urban areas, the houses also appear to be a popular solution to the housing needs of rural Fijians. A problem in this respect is that the rural buyers have no access to credit because of the traditional ownership of the land on which the building will be constructed. Traditionally owned land cannot be dispossessed for compensation or to force repayment of a loan. This is the reason that banks are reluctant to issue loans to rural dwellers.

Rural housing programmes

A range of government and NGO rural housing programmes has been implemented in the region. Several of these, such as in Fiji and Tonga, were established as part of disaster rehabilitation programmes.

The programme in Fiji started as a rehabilitation programme but has become part and parcel of the development efforts under the regional development programme. The programme provides technical advice to rural communities in the form of standard plans and construction advice. It issues loans for the purchase of building materials bought in bulk by the Department, and provides for transport of building materials. The programme is of particular interest and importance for communities on the outer islands of Fiji, where transport costs would otherwise prohibit the purchase of materials. Another programme that is implemented in relation to the rural housing programme is the training of rural carpenters.

The programme in Tonga was established after Cyclone Isaac in 1982. The programme was not limited to rural areas alone, but also provided housing in some areas of Nuku'alofa. Over 2000 houses were constructed. The houses were pre-fabricated in Nuku'alofa and assembled on site, mainly by the affected population with technical support of the Ministry of Works. This process has assisted the transfer of knowledge on disaster resistant housing, and disaster resistant building materials are now more widely available and applied. The project provided a simple two-room house, which could serve as a basis for future extension; several of the houses that were visited now have attached or separate extensions. The cost for one house was T$2900, of which T$700 had to be paid by the family itself.

It seems that most rural housing programmes play a supportive and facilitating role. Emphasis is less on the provision of houses and more on the transfer of knowledge and on facilitating the ways by which communities can build their own houses. The programme in Fiji is a clear example of this approach. On the other hand, the Tonga programme has put more emphasis on the actual provision of houses. This provided a suitable solution for the housing needs after Cyclone Isaac, but has not resulted in the establishment of a rural housing programme as part of the routine development activities, as has happened in Fiji. Perhaps a lesson here is that programmes that facilitate community initiative in the field of housing are more suitable as elements of national development programmes in rural areas.

Urban housing programmes

A considerable part of the new housing needs in the region will need to be met in urban areas. A recent development in this respect is the establishment of formal urban housing programmes. Such programmes are being implemented in Fiji, Vanuatu and Solomon Islands and probably other countries. The World Bank or the ADB provide funding in some cases.

The involvement of the World Bank and ADB has instigated a discussion on acceptable and affordable plot sizes for sites and services projects. Traditionally, urban housing plots in the Pacific are large; a standard of 0.25 acre (1000 m2), as used in Tonga and Samoa, is not uncommon. In

Vanuatu, the legal minimum plot size for a subdivision is currently 400 m2. The World Bank considered this size too generous (or expensive) for the sites and services programme it was providing a loan for, and insisted on a plot size of 260 m2. This led to extensive discussion and almost to cancellation of the project. Finally, a compromise was reached, under which 26% of the plots would be 260 m2, 42% would be 390 m2 and the remaining 16% over 500 m2. In Fiji, a study commissioned on the application of smaller plot sizes in low-cost housing programmes, led to the construction of terraced row houses on plots of under 100 m2. Box I.1 below summarises the current sites and services programmes in Fiji.

In the Solomon Islands, a large urban housing programme has recently been undertaken by the private sector. A private investor has bought urban land from the government, constructed an access road, arranged for the connection of water and electricity, and is now in the process of constructing standard timber frame houses. The houses have two bedrooms and are equipped with septic tanks. They are sold on the private market for around SI$90,000, which is considered a rather high price.

Box 1.1: Sites and Services Programmes of the National Housing Authority of Fiji

The Housing Authority of Fiji is a semi-private body that aims to provide housing for a large part of the urban community in the country. Until early 1996, the organisation also constructed low cost housing but it was realised that this was a cost intensive activity. It now focuses its attention on the provision of serviced plots. The gap has been filled with private companies that offer ready made low cost housing for amounts from over F$5,000. The authority was requested by government to provide up to 3,000 serviced plots per year to accommodate the urban growth of Suva. In practice, the organisation manages to provide around 800 plots per year. The plots vary in size from less than 100 to around 400 m2. The plots of under 100 m2 are generally for 'terraced houses' (row houses) that were constructed through the Housing Authority. Currently, the organisation uses a standard of 45 lots/ha, or plot sizes of around 220 m2. This is considered a reasonable size that is still affordable for the middle and lower income brackets. Services provided include roads, water supply, electricity, sewerage and telephone. All new formal housing areas in Suva are now equipped with sewerage systems. In other parts of Fiji, where septic tanks are sometimes still used, the plot size is increased to accommodate the tank. Once the leases are sold, the owners generally have the authority over their land and the type of construction. In practice there seem to be two 'main streams' of action. Some new lessees obtain loans from the bank and buy a 'ready made house' that is constructed by a contractor. Depending on the available budget, this can be a small timber house or a larger house of timber or concrete blocks. Other lessees construct a temporary house initially (a 'lean to') and gradually improve the dwelling through savings. This process is of temporary housing is allowed for up to five years. At present the Housing Authority still has many houses for sale in different classes, but with the change in policy this will diminish over time. The price of serviced plots ranges from F$20-35/m2, depending on the level of investments needed to make the land suitable for housing. A simple 'lean to' house with two bedrooms of reasonable standard would cost around F$3,000. The simplest ready built house (Ezibuilt) costs F$5,000 for the shell. This is without the price for the land. Terrace houses constructed by the Housing Authority (simple concrete block, 2 bedroom row houses on a plot of under 100 m2) cost

F$23,000, while a duplex house on a plot of 220 m2 would cost around F$33,000 The main constraint for the sites and services programme seems to be the access to loans. Most people will need to take a mortgage in order to buy a plot, and can only get a loan if they have a formal income, and thus a more or less permanent job. The amount that can be borrowed, and the duration of the loan depend on the job security and the age of the applicant. Because of these limitations, the Housing Authority still mainly covers the housing needs of middle class families with permanent jobs. The population groups in the informal economic sector will continue to depend on the informal housing markets, or will need to have enough savings to buy the lease directly.

Informal housing and squatter settlements

Formal housing programmes have not been able to keep pace with the level of urbanisation in any of these countries. The majority of new dwellings get constructed under informal land tenure arrangements or informal construction arrangements. In Tonga, for example, informal housing is linked to rural-urban migration and consists of illegal occupation of government land. In Betio, the most crowded islet on South Tarawa, Kiribati, approximately 25% of housing is informal (UNDP, 1996:23).

Whether these informal settlements are called squatter settlements or not is a matter of definition. For example in Fiji, the people living in informal settlements on native land are considered as squatters, although the majority of them has some form of permission to use the land (Bryant, 1994:9). In Vanuatu, the informal settlements in Blacksands were described as squatter settlements in the report 'Sustainable Human Development in Vanuatu' (UNDP, 1996b), and the people of Blacksands strongly protested this, arguing that they had a legal tenure arrangement with the land owners. Also the definition of informal housing is open to discussion. It can be argued that traditionally, most, if not all of the housing in the Pacific is informal. People obtain a piece of land, get agreement to construct a house through the traditional land tenure arrangements and then build the house.

What matters from a disaster management perspective, is that the expansion of human settlements takes place in a safe way. Informal houses and settlements are particularly vulnerable in this respect, as public authorities have generally not assessed the suitability of these areas for housing. Even if an area is identified as unsuitable for housing, it is difficult to prevent or prohibit settlements. Similarly, it is hard to prohibit poor quality housing, when the housing as such is not authorised in the first place. The result is the occupation of unsafe areas throughout the region and the construction of sub-standard housing. Nevertheless, these informal housing areas provide for a large part of the need for expansion of human settlements within the economic opportunities and priorities of the households that live there. It would not be possible to provide sufficient housing otherwise. The main question is how governments can effectively respond to the risks associated with informal housing. The most effective response would be to accept the prevailing socio-economic realities and try to create the conditions to make safe areas available, and to make it feasible for people to improve the quality of their dwellings.

8. Settlement infrastructure

The road infrastructure is generally the responsibility of the local or national government, mostly through Public Works. Water, electricity and telecommunications are in most countries provided through semi-private bodies, at least in urban and peri-urban areas.

In rural settlements, the water and electricity systems are mostly community based. Many water systems are maintained by the communities themselves. Responsibility for rural water supply mostly lies with the regional development authorities or under the Ministry of Health. Maintenance is often community based, for example in the case of Tonga, where the Ministry of Health is responsible for water supply in all areas except the main urban area (Nuku'alofa). To fulfil this task, the Ministry has set up village water committees which are headed by the town officer. These committees are responsible for operation and maintenance of the water supply systems that are put in place by the Ministry. Although there have been some problems in relation to the level of maintenance, the principle of working with task driven committees at the community level is seen as generally successful.

In urban areas, it is difficult for service providers to keep up with the fast population growth. The increase in urban population is far outstripping the capacity of existing infrastructure services, especially water and sewerage (UNDP, 1996:15). The difficulty in maintaining the provision of services is also related to the lack of forecasting of needs and of pro-active urban planning.

Access to safe water is by international standards relatively good in the more mountainous countries of the region, but it is becoming increasingly more difficult to provide an adequate level of services, in particular to informal settlements. In the Solomon Islands for example, many of the newly urbanising areas on the surrounding traditional land, and some of the temporary housing areas that are already long-stablished, cannot rely on piped water supply. The government water supply provides access to over 90% of the population, but coverage in greater Honiara is diminishing rapidly. In Tonga, the provision of adequate drinking water is problematic because of the unplanned growth of Nuku'alofa.

A recent study in Fiji (DHA, 1993) concluded that, despite problems to maintain urban water supply at adequate levels, generally speaking the vulnerability of urban water supply was low. The vulnerability of rural water supply however was noted to be much higher. The study concluded that the level of vulnerability depended almost entirely on the system in place. Rural communities with a deep well pump were generally well off. The most vulnerable communities were those relying on roof catchments and those with only shallow wells. This vulnerable situation was more common in the rural settlements than in traditional village settlements. Traditional Fijian villages were sited on places where abundant water sources were available, while the settlements were established in the much drier sugar cane areas.

The atoll countries face the most problems in terms of water supply. Their ground water reserves are extremely limited and the increasing urbanisation increases the risk of pollution and reduces the reticulation area. In South Tarawa, Kiribati, piped water is only available for 1-2 hours in the morning, noon and evening and breakdowns are common. There is a heavy reliance on traditional wells and a variety of catchment devices, and the water lens is increasingly becoming polluted (UNDP, 1996:16). In Marshall Islands, the water catchment area is primarily the airport runway, from which water is collected, treated and pumped over 30 km of island. Leakage and illegal connections have resulted in major reductions in water pressure.

In most countries in the region, water is considered as a basic necessity and squatters are generally not excluded from connection to water supply.

Sewerage systems are relatively new in the region and their coverage is still quite limited. In metropolitan Suva, only 25% of the population has a sewer connection with the two existing treatment plants at capacity. New Housing Authority development areas are equipped with sewerage connections but many of the other new housing areas are only equipped with septic tanks. In Honiara, Solomon Islands, sewage is not treated but directly disposed of through ocean outlets. The inland housing areas currently under construction rely on septic tanks, as is the case in some areas in Port Vila, Vanuatu. Again, the atoll islands are highly vulnerable. After a cholera outbreak in 1977, the most densely populated areas of South Tarawa were equipped with a reticulated sewerage system. The system is under increasing strain and already operating above capacity. Lack of maintenance is a major problem for sewerage systems throughout the region.

One of the large investment programmes in urban infrastructure is the ADB loan to Vanuatu, which makes US$10 million available for investments in improvement of the road and harbour infrastructure in Port Vila and Luganville. The road infrastructure in the centre of Honiara, Solomon Islands, which is currently in a bad condition, will also be improved through an ADB loan programme.

In all, the current situation of basic infrastructure and the provision of public services to urban areas is already quite constrained by the fast urban development taking place in the region. Continued urbanisation will necessitate a growing need for investment in this sector. Lack of maintenance is already a major burden, so it is considered of paramount importance to improve the level of maintenance. Well-maintained structures will also be less liable to damage from disasters. Rural infrastructure and services are still underdeveloped in large parts of the region. Where rural systems exist, they are generally maintained through community programmes, which have varying degrees of success.

Annex 2 International disaster management policies and human settlements development

1. Disasters in an international context

The Bangladesh cyclone in 1990, the eruption of Mount Pinatubo and the Bagio earthquake in the Philippines, the Chinese river floods in 1991 and 1995, the United States floods in 1993, the mudslides in Colombia in 1994, the earthquake in Maharashtra, India, 1994, the floods in western Europe in 1995, the earthquake in Kobe, Japan, 1995, and even the severe cyclone season in the Northern hemisphere in 1995, are but a few reminders of the devastation caused by natural disasters. Many of these events have been the worst events of their kind in the countries where they occurred. Most had their main impacts in human settlements, especially in urban areas where there is a large concentration of people with a heavy dependency on infrastructure and services. Environmental degradation often increases this vulnerability, in particular of low-income groups.

Table II.1 shows some recent disasters since 1990. These disasters are only the most visible, those widely reported in the international media. Many more disasters happened in the 1990s affecting the lives of millions of people on all continents, in rural and (perhaps increasingly) in urban settlements.

The fact that so many people are affected by natural disasters, highlights the need to look at disaster risks in the framework of human settlement developments. Natural disasters can only be reduced adequately -before disaster strikes- if they are analysed as an integral part of the resource allocation and planning for human settlements development. Planners need to be involved in disaster reduction and disaster managers need to be part of the planning process if a more sustainable development is to be achieved.

Table II.1: Some major natural disasters since 1990

Year	Hazard	Country	No. of Dead	Damage estimate (million US$)
1990	earthquake	Philippines	1,660	920
	tropical cyclone	South Pacific	8	119
	tropical cyclone	Philippines	503	720
1991	earthquake	Georgia	270	1,700
	volcano	Philippines	932	260
	cyclone and flash flood	Philippines	4,899	
	tropical cyclone	Bangladesh	138,866	1,780
	river flood	China	2,470	21,000
	cyclone	USA/Caribbean	20,000	
	earthquake	India	2,000	
	tropical cyclone	South Pacific	12	331

• Year	Hazard	Country	No. of Dead	Damage estimate (million US$)
1992	tsunami	Indonesia	2,080	100
	tsunami	Nicaragua	116	25
	earthquake	Turkey	547	
	mudflow	Philippines	333	320
1992-93	drought	Southern Africa		
	earthquake	Egypt		
1993	river flood	United States	20,000	
	earthquake / tsunami	Japan	122	31
	typhoons	Philippines	514	
	tropical cyclone	Fiji	21	134
	earthquake	India	10,000	
	flood	Western Europe	7	
	mudflows	Philippines		hundreds of millions
1994	earthquake	United States		20,000
	earthquake / mudslide	Colombia	650	
	volcano	Papua New Guinea	100,000 affected	
	flood	China	1,400	
	flood	India	2,001	
	mudflows	Philippines		
1995	earthquake	Japan	5,500	100,000
	earthquake	Russia		
	earthquake	Turkey	70+	
	earthquake	Indonesia	100+	
	hurricanes, 20+	Atlantic and Caribbean basins		
	mudflows	Philippines		
	floods	Dem. Republic of		
	earthquake	Korea	100+	
	floods	Mexico	171+	120+
	typhoon	Thailand	500+	
		Philippines		

(indicative losses cited, from various sources)

2. The International Decade for Natural Disaster Reduction

The International Decade for Natural Disaster Reduction (IDNDR) was declared by the United Nations General Assembly in December, 1989 as an international promotional mechanism for the period 1990-2000 to foster international cooperation in the reduction of the global effects of natural disasters. The objectives, goals and targets of the Decade are summarised in Box II.1.

Box II.1: International Decade for Natural Disaster Reduction framework of action

The international community, mobilised under the auspices of the United Nations, proclaimed the objective of the Decade to be:

"The reduction of loss of life, property damage, and social and economic disruption caused by natural disasters, through concerted international action, especially in developing countries".

In order to achieve this objective the following goals were declared for the Decade:

1. To improve the capacity of each country to mitigate the effects of natural disasters, with special attention being given to assisting developing countries in the assessment of disaster damage potential, and in the establishment of early warning systems and disaster-resistant structures;

2. To devise appropriate guidelines and strategies for applying existing scientific and technical knowledge, taking into account cultural and economic diversity;

3. To foster scientific and engineering endeavour aimed at addressing critical gaps in knowledge in order to reduce loss of life and property;

4. To disseminate existing and new technical information related to measures for the assessment, prediction and mitigation of natural disasters; and

5. To develop measures for the assessment, prediction, prevention and mitigation of natural disasters through programmes of technical assistance and technology transfer, demonstration projects, education and training, and to evaluate the effectiveness of those programmes.

Three programming targets have been established as a basis for assessing the achievements of the Decade by the beginning of the 21st century. Their accomplishment depends upon concerted international efforts and the policy commitment of national and local governments to establish coordination mechanisms for the implementation of disaster reduction. By the year 2000, all countries should have in place, as part of their national plans to achieve sustainable development.

1. Comprehensive national assessments of risks from natural hazards integrated into development plans.

2. Mitigation plans of practical measures for application at national and local levels that address long-term disaster prevention, preparedness and community awareness.

3. Ready access to global, regional, national and local warning systems.

The World Conference on Natural Disaster Reduction, held in Yokohama, Japan in May 1994, reaffirmed the commitment of countries and the UN system to work towards meeting the objectives of the Decade. The Pacific island countries actively participated in this Conference. They jointly prepared a regional policy paper which outlined some major areas the region will need to address in order to meet the objectives of the Decade. One of the issues discussed was urbanisation and population pressures.

Since the Yokohama Conference, the IDNDR Secretariat has reviewed progress and issues in disaster management for human settlements. It has identified four policy directions that need to be pursued to reduce disaster risks in human settlements:

1. Striving for sustainable development that takes account of the risks imposed by natural disasters;

2. Establishing local management capacities that are prepared and ready to cope with potential disasters;

3. Having a community that is alert and prepared to cope with disasters by realistic assessment of risks and the knowledge, ability and resources to take adequate protective measures;

4. Addressing high risk situations, particularly related to critical infrastructures and high risk informal settlements, through special disaster mitigation programmes.

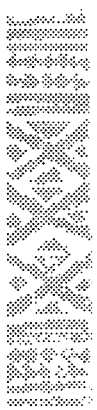
The most critical requirements needed to underpin these policy directions are political commitment, the need to understand the risks, the strengthening of the enabling role of the international community and the need to focus on community-based programmes. The proposed policy directions are worked out in a series of IDNDR strategies as summarised in Table II.3.

Table II.3: IDNDR strategies for disaster reduction in human settlements

Policy Direction	IDNDR Strategy
Striving for development that takes account of the risks imposed by natural disasters, and thus is more sustainable	• **Vulnerability reduction as a development objective:** The reduction of human vulnerability to disasters needs to be incorporated as one of the core objectives of sustainable development. This makes it possible to put into practice the 'culture of prevention' in the broad spectrum of development activities. Operational concepts and strategies need to be developed for that purpose; • **Risk assessment:** Assessment of both hazards and vulnerabilities is necessary to provide a basis for identifying forms of development that reduce risks rather than increase them; • **Disaster impact assessment:** Analysis is required to identify how investments in development are affected by disasters and how these investments impact upon the potential occurrence of hazards and the vulnerability of populations. A methodology similar to the environmental impact assessment (EIA) should be applied as a matter of routine in critical development decisions. • **Land use planning:** Suitable land use has to be defined and enforced for hazard-prone land. Functions and activities need to be located where they do not have a detrimental impact on the risk of other activities in the urban fabric. • **Quality of construction:** An adequate level of safety needs to be achieved for all construction. The establishment and enforcement of building codes is necessary, but additional policies are needed to reduce risks, in particular in non-engineered construction. These can include the use of incentives, pricing arrangements, training and professional education.
Establishing local management capacities that are prepared and ready to cope with potential disasters	• **Policies:** Clear policies need to be established for the way in which emergency situations and disasters are handled, in order to ensure equal distribution of disaster support and optimum use of resources. • **Disaster Planning:** A disaster management plan is needed at the National as well as the Local level Such a plan outlines the roles and responsibilities of the various departments and actors and puts in place appropriate arrangements for preparedness and response. From the point of view of the IDNDR Secretariat, it would be useful if such plans could have an integrated character, covering all aspects of disaster management, including responsibilities for disaster reduction.

Policy Direction	IDNDR Strategy
	• Institutional strengthening: Establishment and strengthening of disaster management institutions at the national, local and community level are priorities in many countries. The systematic allocation of responsibilities, resources and the development of capacities to manage disasters and risks also need to be extended to the local level, in particular in urban areas. • Communication: Proper channels for communication need to be established to allow authorities to communicate with the people at risk and to facilitate emergency and relief operations.
Having a community that is alert and prepared to cope with disasters by their realistic assessment of the risks and the knowledge, ability and resources to take adequate protective measures	• Effective disaster warning: Effective warnings are not always possible, but where the technical capacity exists to predict the occurrence of natural hazards, this information should be made available to the people at risk as well as to local decision makers, in a form that can be understood and acted upon. • Hazard and risk information: Information on hazards and risks should be freely available to communities at risk, and should be provided in a way that allows people to make a realistic assessment of the threats to which they are exposed; • Community based programmes and solutions: Disaster reduction activities need to be developed by or in close consultation with communities at risk. Programmes need to be based on community needs and should provide attainable solutions to the problems of disaster risks. Community-based hazard mapping and vulnerability-reduction programmes should be considered as part of the programme. • Public information and awareness: Programmes are needed to make people aware of the risks to which they are exposed and to provide them with the knowledge and capacities to resolve critical risks. Also people should be well informed on the measures, such as evacuation arrangements, that need to be taken in the case of a disaster; • Disaster warnings: Warnings of an impending disaster need to be widely disseminated in a way that can be readily understood by the population and advice and instructions should be given on the measures that need to be taken.
Addressing high risk situations through special disaster mitigation programmes	• Establishing priorities: High risk situations need to be identified and prioritised through risk assessments. This provides the basis for disaster mitigation programmes and special measures that are within the resources and carrying capacity of the urban society. Additional resources may need to be found to address the most high risk situations.

Policy Direction	IDNDR Strategy
Addressing high risk situations through special disaster mitigation programmes	• Critical facilities: Special measures are often needed to reduce the risks of critical facilities. These include structures that accommodate a large number of particularly vulnerable groups of people, facilities that are of critical importance during emergency and relief operations, installations that may cause secondary disasters and infrastructure elements that are of critical importance for the functioning of the urban society. • High risk communities: Communities that are exposed to high risks may require special programmes to address their risks. Innovative solutions will need to be found by communities at risk with support from local authorities. *(compiled by author from various sources)*



3. Sustainable Development of Small Island States

In 1994, the Global Conference on Sustainable Development of Small Island Developing States adopted the Programme of Action for the Sustainable Development of Small Island States. This Programme affirms that small island developing States, as a group, are particularly vulnerable to natural and environmental disasters and have limited capacity to respond to and to recover from such disasters. It outlines a set of actions to enable small island developing States to counter the threat from natural and environmental disasters.

The UN Commission on Sustainable Development recently reviewed the progress made with the implementation of the Programme of Action. The commission notes that the most effective strategy for responding to natural disasters is formulated through regional cooperation as an integral part of sustainable development frameworks, with international support.

The following main policy issues identified by the Commission are of key relevance to reducing vulnerability of human settlements in the Pacific region:

Regional cooperation: Regional cooperation is a vital factor for success in addressing the natural disaster problems of small island States. Regional as well as sub-regional cooperation arrangements are traditionally strong in addressing issues of common concern, in particular in the Caribbean and Pacific regions. Inter-regional cooperation could be beneficial for all small island States, and could, in particular, assist countries which have relatively less strong regional ties.

Policy support at the national level: A fundamental pre-condition for successful disaster reduction is its full integration into national planning. The effectiveness of applying necessary measures at all levels of society and administration is proportionate to the degree of political recognition and support for disaster reduction at the highest level.

Vulnerability index of small island States: Vulnerability to natural disasters is one of the most important factors to be considered in analysing the overall risk of small island States and in determining their potential for development. This requires the development of reliable vulnerability indices, comprising a sound assessment of hazards and risks, as well as ecological, economic and social data.

Environment, disasters and development: The Programme of Action for the Development of Small Island Developing States provides an integrated framework for addressing natural disasters in the context of environmental fragility and social and economic development. By considering disaster risks as a cross-sectoral issue in the development of small island States, disaster management can be recognised as extending beyond emergency relief and disaster response.

Human resources development: Natural, and environmental, disasters probably present the biggest systematic ongoing threat to achieving development goals in small island developing States. Consequently, there is a need for a comprehensive approach to disaster reduction as a universal focus rather than an approach which concentrates largely on high profile current events. Education in all its aspects, as well as scientific and vocational training, and awareness raising, both in general as well as in hazard specific terms, are key to capacity building and human resources development.

Participatory approaches: The ultimate success of any disaster reduction activity is overwhelmingly determined at the community and local levels by the extent to which lives are being saved and property and infrastructural investment is being protected. This calls for an active participation of populations and societies directly at risk from natural or environmental hazards. In most of the small island States the local communities implement, for example, land-use policies. Practical achievement requires the active involvement of local authorities, indigenous and international non-governmental organisations, and others.

In addition to these policy directions, the Commission recommended a targeted research programme, which would address the following thematic areas:

- Insurance as a preventive and mitigating tool for disaster reduction;
- Telecommunications and information systems as a tool for disaster reduction;
- Limits and opportunities for the establishment of national disaster emergency funds and emergency administrative procedures;
- Evaluation of constraints in the access of small island States to reliable data, disaster -specific knowledge, and technology means;
- A review of the linkages between disasters, development and environment, including the development of methods for the systematic appraisal of developments in relation to disaster risks;
- An analysis of the linkage between global climate change and the characteristics and occurrence of natural hazards in small island States.

Annex 3 List of persons consulted

1. 5th IDNDR Pacific Regional Disaster Management Meeting (Nuku'alofa, Tonga, 14 -19 September 1996)

Meeting participants

2. Tonga (20-26 September 1996)

Mr. Pilimi 'Aho, Director NDMO and Deputy director, Ministry of Works

Mr. Paula Sunia Bloomfield, Director of Education, Youth, Sports & Culture

Mr. Haniteli 'O Fa'Anunu, Director of Agriculture and Forestry

Mr. Willow Samani, Deputy Director, Ministry of Lands

Mr. Paulo Kautoke, Acting Director, Central Planning Office

Mr. Leveni 'Aho, Chief Architect, Ministry of Works

Mr. Laumeesi Malolo, Director of Health

Ms. Pamela Lino, Director, Red Cross

Mr. Sunia Takai Makasi, Branch Manager, National Pacific Insurance Ltd

Ms. 'Ana Tupou, MMI Insurance

Mr. Simione Silapelu, President, TANGO

Mr. Sione Taumoepeau, Director of Works, Ministry of Works

3. Solomon Islands (30 September - 5 October 1996)

Mr. Randall Biliki, Director National Disaster Management Office

Mr. Mick Castley, General Manager, and staff, Solomon Islands Plantations Limited (SIPL)

Mr. Robert Zutu, Town Planner, Honiara Town Council (including field visit)

Mrs. Judith Siota, General Secretary, Development Service Exchange and Mr. Peter Kakai, Solomon Islands Red Cross Society

Ms. Phyllis Talloikwai, Permanent Secretary for Home Affairs

Mr. Steve Likaveke, Chief Physical Planner, Ministry of Lands and Housing

Mr. Gordon Tusa, Chief Architect, Ministry of Works

Mr. Joseph Hasiau, Town Clerk and staff, Honiara Town Council

Mr. George Muir, Managing Director of Fletcher&Kwaimani Joint Venture construction company

Mr. Don Boyke, Managing Director of Pacific Architects

Mr. Geoff Batey, Director of Bain Hogg Solomon Islands Limited, insurance brokers

Mr. Abraham Banisia , Founder & Director of Solomon Islands Development Trust (SIDT)

Mr. Shaddrach Fanega, Assistant Secretary for Central Planning

4. Vanuatu (7 - 10 October 1996)

Mr. Job Esau, Acting Director National Disaster Management Office

Mr. Manaseh Tari, Acting Director Ministry of Works

Mr. Paul Willy, Director National Housing Corporation (includes field visit)

Mr. Harry Tete and staff, Physical Planning Unit, Ministry of Home Affairs

Mr. Gordon Craig, Chief Architect, Ministry of Works

Mr. Bob Loughman and staff, Rural Skills Training Programme

Ms. Karen Preston, Country Director, and Mr. H. Vira, Assistant Director, FSP Vanuatu

Mr. James Toa, National Planning Office

Ms. Rolenas Lolo , Vanuatu National Council of Women

Mr. Lazare Asal, Executive Director, Department of Culture, Religion, Women's Affairs and Archives

Mr. Sakaru Tsuchiya and Mr. Charles Kick, UN ESCAP, Pacific Operations Office (EPOC)

Mr. Geoffrey Feast, James Feerie and Partners, Architects

Dr. T. Jayaraman, Senior Project Economist, Asian Development Bank

Ms. Suliana Siwatibau, Community development expert

Ms. Antoinette Coulon and Ms. Elisabeth Muliaki Land Officers, Ministry of Lands

Mr. Stephen Wyatt, Vanuatu Land Use Planning Project

5. Western Samoa (10 - 14 October 1996)

Ms. Georgina Bonin, UNDP, Apia

Mr. Cam Wendt, Department of Foreign Affairs

Mr. Poloma Komiti, Prime Minister's Department

Ms. Luagalau Foisaga Eteuati-Shon, Secretary for Women's Affairs

Mr. Galuvao Tanielu, Commissioner of Police

Mr. Bismarck Crawley, GIS/Database Analyst Officer, South Pacific Regional Environment Programme (SPREP)

Taulealeausumai Dr. Eti Enosa, Director-General of Health

Mr. Faatoia Malele, Acting Director Apia Observatory

Ms. Lusia Sefo-Leau, Assistant Financial Secretary, Planning and Policy

Mr. Mila Posini, Assistant Director of Public Works, Building Division

Mr. Maka Sapolu, Director Red Cross

6. Fiji (27 September and 15 - 19 October)

Mr. Poasa Ravea, Deputy Secretary for Regional Development

Mr. Akapusi Tuifagalele, Senior Administrative Officer NDMO

Mr. Toka, Acting Commissioner Western Division,

Fiji Red Cross, Fiji Council of Social Services (FCOSS), and Rural Housing Unit of the Department of Regional Development

Mr. Somsey Norindr, UNDP Resident Representative

Dr Margaret Chung, Population and Development expert, UNDP

Mr. Jeff Liew, CTA Equitable and Sustainable Human Development Programme (ESHDP; telephone discussion)

Fiji Housing Authority, Home Finance Fiji and National Rental Board, Ratu Viliame Volavola, Mr. Ame Racule, Mr. Gregory Moore, Ms. Marica Rokovada

Mr. John Scott, Director General, Fiji Red Cross

Mr. Isoa Korovulavula, Coordinator SPACHEE, South Pacific Alliance for Conservation, Human Ecology and the Environment

Mr. Sevenaia Dacaica, Chief Planner, Department of Town and Country Planning

Mr. John Bola, Regional specialist on housing and building

Mr. Joe Chung, Head of South Pacific Disaster Reduction Programme (SPDRP)

Mr. Ian Rector, Disaster management adviser, SPDRP

Ms. Joanne Burke, Training Adviser, SPDRP

Mr. Atu Kaloumaira, Disaster Mitigation Adviser, SPDRP

Ms. Angelika Planitz, Technical Adviser, SPDRP

Annex 4 References

ADB, Vanuatu urban infrastructure project, internal report, 1996

Anderson, Mary B. and Woodrow, Peter J.: Rising from the ashes, development strategies in times of disaster, UNESCO, Paris, France, 1989

Aysan, Yasemin and Davis, Ian (eds.): Disasters and the small dwelling: perspectives for the UN IDNDR, James and James, London, 1992

Benson, Charlotte, The economic impact of natural disasters, case study Fiji, project correspondence SPPO, 1996

Bernstein, Janis,D., "Managing Hazard-Prone Lands in Cities of the Developing World" in Environmental Management and Urban Vulnerability, World Bank Discussion Papers, No. 168, (ed.) Alcira Kreimer, Mohan Munasinghe, The World Bank, Washington, D.C., 1992

Blaikie P., Cannon C., Davis I., Wisner B. : At risk: natural hazards, people's vulnerability and disasters, Routledge, London, UK, 1994

Bryant, J.J., 1994, Urbanisation trends and coping strategies, World Bank Pacific islands urban sector study, Suva, 1994

Cannon, T., "A hazard need not a disaster make: vulnerability and the causes of 'natural' disasters" in Natural disasters: protecting vulnerable communities (ed.) Merriman, P.A. and Browitt, C.W.A, Thomas Telford, London, 1993

Chung, M., Towards a settlement strategy for South Tarawa, SPREP, Apia, 1994

Cole, Rodney (ed.), Pacific 2010, Challenging the future, National Capital Printing, Australia, 1993

Cosbie Walsh A., Informal dwellings in urban Fiji, UNDP Suva, 1996

Crocombe, R and Meleisea, M (eds.), Land issues in the Pacific, USP, Suva, 1994

DHA, Drought vulnerability in Fiji, DHA South Pacific Programme Office, Suva, 1993

DHA/UNDRO, Urban seismic disasters, seismic resistant construction code and insurance, Selected papers of the UNDRO/MAPFRE/Caja Reaseguradora de Chile International Seminar, Santiago de Chile, 1991

Elo, O, Palm, E, Vrolijks, L, "Disaster reduction in urban areas", in ITC Journal, 1996-1, Enschede, 1996

Fairbairn, Te'o, The economic impact of natural disasters in the South Pacific with special reference to Papua New Guinea, Fiji, Western Samoa and Niue, internal draft report, DHA, Suva, 1997

FSP, Sustainable resource management projects in Melanesia, Lessons learned, a workshop report, FSP Vanuatu, 1995

Fuchs, R.J., Brennan E., Chamie,J., Lo,Fu-chen, Uitto, J. (ed.),Mega-City Growth and the Future,

United Nations University Press, Tokyo, 1994
Gibson, Lionel, The urban informal housing sector in Fiji: a review, n.p., 1995

Goethert Reinhart, and Hamdi, Nabeel, Making microplans, a community based approach in programming and development, Intermediate Technology Publications Ltd., London, UK, 1988

Government of Fiji, Greater Suva urban structure plan, Suva, 1975

Hamnett, Michael P., Natural Disaster Mitigation in Pacific island countries: a policy guide for planners and decision makers, UNDHA South Pacific Disaster Reduction Programme, Suva, 1996

Havlick, Spenser, W., "Third World Cities at risk. Building for Calamity." In Environment , V. 28, No. 9, November, 1986

Hooper, Anthony, "Development issues and traditional tenure in Tokelau" in Land Issues in the Pacific, Crocombe, Ron and Meleisea, Malama (eds.), University of the South Pacific, Suva, Fiji, 1994

IDNDR Secretariat, Yokohama strategy and plan of action for a safer world, United Nations, 1994

IFRC, Vulnerability and capacity assessment, a federation guide, Red Cross, Geneva 1996

Institution of Civil Engineers, Megacities, reducing vulnerability to natural disasters, Institution of Civil Engineers, London, 1995

Johnson R.W., Blong R.J., Ryan C.J. (compilers) Natural Hazards and their potential in the Pacific Southwest, Australian Government Publishing Service, Canberra, 1995

Jones, Barclay,G., "Population Growth, Urbanisation, and Disaster Risk and Vulnerability in Metropolitan Areas: A Conceptual Framework", in: Environmental Management and Urban Vulnerability, World Bank Discussion Papers, No. 168. (ed.) Alcira Kreimer, Mohan Munasinghe, The World Bank, Washington D.C., 1992

Lakau, Andrew, "Customary land tenure and economic development in Papua New Guinea" in Crocombe, R and Meleisea, M (eds.), Land issues in the Pacific, USP, Suva, 1994

Maskrey, Andrew, Disaster Mitigation, A Community Based Approach, Oxfam, Oxford, UK, 1989

Masure, Philippe, " Risk Management and Preventive Planning in Mega-Cities: A Scientific Approach for Action." in Regional Development Dialogue (RDD), Vol. 15, No. 2, 1994, UNCRD, Nagoya, Japan, 1994

McLeod, Ruth, The vulnerability of low income settlements and households in urban Jamaica to natural hazards - issues and intervention possibilities, OAS Natural Hazards Project, Washington, USA, 1987

Munasinghe, Mohan, Clarke Caroline,(ed.), Disaster Prevention for Sustainable Development, Economic and Policy Issues, IDNDR and the World Bank, Washington, 1995

Mustow, S.N. , "Megacities: The Vulnerability of Infrastructure to Natural Disaster" in The Effects of Disasters on Modern Societies. World Conference on Natural Disaster Reduction, Technical Committee Session C, UNCRD/ UNDDSMS, Tokyo, 1994

Naupa, Sarah, Urban expansion plan for Port Vila, Case study Blacksands, internal report 1996

OAS , Primer on Natural Hazard Management in Integrated Regional Development Planning, Department of Regional Development and Environment, Organization of American States, 1991

OAS, Integrated regional development planning: guidelines and case studies from OAS experience, OAS, Washington 1984

Overton, John, "Land tenure and cash cropping in Fiji" in Crocombe, R and Meleisea, M (eds.), Land issues in the Pacific, USP, Suva, 1994

Pereira J.A., Pilot study of the vulnerability of structures to earthquake and hurricane risk in Antigua, UNDRO Pan Caribbean Disaster Prevention and Preparedness Project

Raghavulu C.V. (1982), Disaster preparedness, a study in community perspectives, ARTIC, Hyderabad, India, 1982

Schoeffel, P., Sociocultural issues and economic development in the Pacific islands, ADB, Port Vila / Manila, 1996

UNCHS, Global report on human settlements, Nairobi, 1986

UNCHS, Human Settlements and Natural Disasters, United Nations Centre for Human Settlements (Habitat),Nairobi., 1989

UNCHS, Planning and Management for Disaster Reduction, United Nations Centre for Human Settlements (Habitat), Nairobi., 1990

UNCRD, Disaster management in metropolitan areas for the 21st century. Proceedings of the IDNDR Aichi/Nagoya International Conference, 1-4 November,1993, UNCRD, Nagoya, Japan, 1994

UNCRD/UNDDSMS, The effects of Disasters on Modern Societies, World Conference on Natural Disaster Reduction, Report of Technical Committee Session C, Yokohama, 1994

UNDHA, SPREP, EMA, Natural Disaster Reduction in Pacific Island Countries: Report to the World Conference on Natural Disaster Reduction 1994, Emergency Management Australia, 1994

UNDP, Human settlement issues in the Pacific, a contribution to Habitat II, UNDP, Suva, 1996

UNDP, Sustainable human development in Vanuatu: Moving on together, UNDP Suva, 1996b.

UNDP/DHA, (1994), Disasters and Development, Disaster Management Training Programme, UNDP/DHA, New York, 1994

UNDP/DHA, Overview of Disaster Management, Disaster Management Training Programme, UNDP/DHA, New York, 1992

UNDRO, (1991), Mitigating Natural Disasters, Phenomena, Effects and Options, a Manual for Policy Makers and Planners, New York, 1991

United Nations, Earth Summit; programme of action for small island States, New York, 1994

USP, Land tenure in the Pacific, USP, 1984

Vanuatu National Planning Office, Urban growth management, preliminary workshop, internal report, 1996

Varley, Ann (ed.), Disasters, Development and Environment. Wiley, Chisester, UK, 1994

Vrolijks, Luc, "Natural disasters in Pacific island countries" in van der Meulen and Erkelens (eds.), Urban Habitat, the environment of tomorrow, Eindhoven, 1996

Winchester, Peter, Power, choice and vulnerability, a case study in disaster mismanagement in South India 1977-1988, James & James, London, UK, 1992

Annex 5 Abbreviations

ADB	Asian Development Bank
DESA	UN Department Economic and Social Affairs
DHA	UN Department of Humanitarian Affairs
DHA-SPPO	DHA South Pacific Programme Office
EMA	Emergency Management Australia
FSM	Federated States of Micronesia
GDP	Gross Domestic Product
GIS	Geographical Information System
ICE	Institute of Civil Engineers
IDNDR	International Decade for Natural Disaster Reduction
NLTB	Native Land Trust Board
PIC	Pacific Island Countries
PNG	Papua New Guinea
SPDRP	South Pacific Disaster Reduction Programme
UN	United Nations
UNCHS	UN Centre for Habitat Studies
UNCRD	UN Centre for Regional Development
UNCSD	UN Commission on Sustainable Development
UNDHA	UN Department of Humanitarian Affairs
UNDP	UN Development Programme
USP	University of the South Pacific
WMO	World Meteorological Organisation