Peri- Urban Production Systems Research
Natural Resources Systems Programme

Literature Review on Peri-Urban Natural Resource Conceptualisation and Management Approaches

Final Technical Report

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ACRONYMS

CBOs	Community-based organisations
DFID	Department for International Development
EIA	Environmental Impact Assessment
EPM	Environmental Planning & Management (UNCHS / UNEP guidelines)
FAO	Food & Agriculture Organisation (UN)
GIS	Geographical Information System
GNP	Gross National Product
GTZ	Gesselschaft fiir Technische Zusammenarbeit (German Development Co-operation Agency)
ICLEI	International Council on Local Environmental Initiatives
LIFE	Local Initiative Facility (UNDP's for Urban Environment Programme)
LIS	Lands Information System
MEIP	Metropolitan Environmental Improvement Campaign
NGOs	Non Governmental Organisations
NRSP	Natural Resources Systems Programme (DFID)
PUI	Peri-Urban Interface
RNR(S)	Renewable Natural Resource (Strategy) (DFID)
SCP	Sustainable Cities Programme (UNCHS)
SPM	Settlements Planning & Management (UNCHS / UNEP guidelines)
TA	Technical Assistance
UMP	Urban Management Programme (WB/UNDP/UNCHS's)
UN	United Nations
UNCED	United Nations Commission on Environment & Development
UNCHS	United Nations Centre for Human Settlements (Habitat)
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNHCR	United Nations High Commissioner for Refugees (The Office of)
UNICEF	United Nations Children's Fund
WCED	World Commission on Environment & Development (Bruntland Commission)
WB	World Bank
ZOPP	Zier Orientierte Projekt Planung (Objective Oriented Project Planning) (GTZ)

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DISCLAIMER

This report summarises the findings and recommendations of a consultant team (from the Universities of Nottingham and Liverpool) sponsored by the Department for International Development (DFID) through Natural Resources International Ltd.

The views represented here are those of the consultants alone. They do not necessarily represent the opinions of DFID, NR International, nor the two Universities; who bear no responsibility for the comments, analysis and recommendations contained herein.

EXECUTIVE SUMMARY

1. INTRODUCTION

1.1 Purpose of Report

There have been few comprehensive studies specifically focusing on the peri-urban areas of developing nations. The purpose of this report is to consolidate literature on what has been documented, and to provide a cohesive review of peri-urban natural resource conceptualisation and management approaches. The report outlines research into the periurban interface (a transitionary zone of mixed rural and urban: economic, social, cultural and natural resource uses) at the periphery of cities in developing nations.

The literature review is intended to set detailed specific case studies into a wider context, through summarising and making a preliminary assessment of available theoretical conceptualisations of the interactions between the urban and the rural, and the different natural resources in the peri-urban interface. A second task is to review management procedures and approaches, which have been adopted to deal with natural resource issues.

1.2 Structure of Report

The report is divided into the following sections:**STRUCTURE OF REPORT**

Executive Summary

Part 1 **Conceptual Issues**
- Introduction
- Conceptual Background
- Land & Economic Activities • Social Issues
- Environmental Impacts

Part 2 Management Approaches
- Introduction
- Strategic Approach to Urban Environmental Planning & Management
- Environmental Guidelines for Settlements Planning & Management
- Habitat's Environmental Planning & Management Guidebook
- The Sustainable Cities programme
- Metropolitan Environmental Improvement Programme
- GTZ Manual for Urban Environmental management
- Local Agenda 21 Planning Guide
- Participatory Local Governance Approach to Urban Environmental Problems
- Indicators
- Other Management Issues

Conclusions, Information Gaps & **Recommendations**

References

2. NATURE OF REVIEW

2.1 Methodology

Literature was identified from library searches, on-line bibliographic searches, and from citations in publications and thence distributed to appropriate members of the research team for review. Interviews were conducted with researchers at the World Bank in Washington, UNDP in New York, and the FAO in Rome where further additional unpublished `grey' material was sourced. This was supplemented by information obtained from Internet searches on management approaches.

2.2 Client Policy Framework

This research forms part of DFID's Natural Resources Systems Programme (NRSP). Its purpose being to benefit poor people by applying understanding of PUI production systems. This should contribute towards DFID's primary development goal of eliminating poverty, as expressed in the vision and principles of the DFID White Paper on Development: in particular, the focus on poverty alleviation and democratic accountability through sustainable development processes. It is devised to optimise the management of peri-urban resources through improved productivity, control of environmental degradation and energy efficiency.

The literature review specifically tackles NRSP logical framework outputs to:

(1) Contribute toward an understanding of the impact of urban growth on land use patterns and natural resource degradation, and the planning and management approaches adopted to take advantage of opportunities to overcome the problems of urbanisation.

(2) Enhance understandings of changes (social, economic, technological, political, cultural) to the peri- urban environment including impacts on resource allocation and access to market systems identified and incorporated into peri-urban planning and management strategies.

(3) Identify appropriate integrated systems management methods for agricultural production.

(4) Identify appropriate technologies and management strategies to increase production of commodities in peri-urban areas.

(5) Identify appropriate approaches to increase availability of energy resources.

Kumasi and Hubli-Dharwad

Two Peri-Urban Interface natural resource management lead research teams are currently active in Kumasi (Ghana) and Hubli-Dharwad (India). These case studies have been drawn upon in research and also particularly perceived in relation to implementing research findings and recommendations. Follow up actions (specifically and in general) will be dependent on DFID advisors, such as the Physical Planning Advisor in the Engineering Division, or the various DFID Development Divisions or Country Desks.

3. FINDINGS & KEY RECOMMENDATIONS

3.1 Synopsis of Sections

Part I - Conceptual Issues

Generally the Conceptual Issues review illustrates the lack of direct attention given peri-urban areas of developing countries. Generally theories are outdated and add limited understanding to the current dynamic processes of change. A somewhat artificial distinction into rural and urban has led to the neglect of issues affecting the peri-urban interface. Many of the general environmental and ecological processes tend to be relatively familiar from other production systems, so the emphasis has been placed on bringing together material covering the urban dimension. Some of the issues identified are similar in kind but not degree to those facing rural development practitioners. Often, the technical solutions to problems are known, but weaknesses in organisation and management prohibit effective implementation.

Section 1 - Introduction

This section examines the urbanisation process as a backdrop to the PUI. Principal findings include:-

- **Urban growth** rates in developing nations are exceeding the developed world by five times; with Africa and Asia expected to grow exponentially (Section 1.1)
- **Urbanisation pressures resources** via three main channels (1) land conversion (to urban areas) (2) natural resources (depletion & extraction) (3) urban wastes disposal (Section 1.1)
- **Three themes** persevere throughout studies on the PUL (1) inconsistent definitions of peri-urban (2) issues of sustainability, poverty and gender (3) urban management and governance (Section 1. 1.2)

Section 2 - Conceptual Background

Reviews definitions of the PUI, rural-urban linkages and changes, population movements, sustainability, poverty and gender. Principal findings include:-

- The **Peri-Urban** may be best examined in terms of development *processes* which it experiences (sometimes rapidly) over time. (Section 2.2)
- **No single theory or model** adequately explains activities in the rural - urban fringes. Background source material is needed for the research programme to underpin peri-urban strategies through systematic integration of different sectoral and geographic interests (Section 2.8)
- **Migration & Landlessness** Processes affecting human resource movement relate to peri-urban areas in two principal ways: demands for shelter and employment. It is unclear whether pressures for land use changes stem from in-migration or more distant rural areas. Peri-urban areas are more familiar environments for rural migrants, however, the cost of land / housing may simply be cheaper. Also family individuals may choose to engage in non-farm activities, commuting to the city. The pressures for land use changes, however, may stem from out-migration of city residents into the peri-urban areas, perhaps seeking cheaper building land, more space, or a more attractive environment.(Section 2.4 & 7.7)

Section 3 - Land & Economic Activities

Examines issues of land and economic activities including transport and communications, urban and peri-urban agriculture, markets and food production systems. Principal findings **include:-**

- **Land** Rather than reflecting Western models, cities in developing countries have demonstrated that physical characteristics such as land quality and location are not the only crucial factors in determining land values and uses. Also social, cultural, economic and political forces are of great importance; and situations (whether rural, urban or periurban) must be reviewed in these unique contexts (Section 3.2)
- **Land Values** More information is needed on (and factors involved in changing) land values in the PUI. A land information system (LIS) would facilitate mapping and accelerate land registration (in turn facilitating mortgaging land to gain credit to e.g. invest in agricultural changes or non-farm activities). Section 3.2 & 7.11)
- **Land Transactions** Those selling land, (or dispossessed by intermediaries, such as traditional chiefs or the public sector land assembly process) may gain short-term compensation, but may not have skills to compete in the urban job-market. Research is needed into the mechanisms by which they adjust to their changed status. Some agricultural family members may become landless labourers, rent or buy land elsewhere to continue farming, adjust their farming practices, or enter the urban non-farm labour market. The barriers to this adjustment process need to be understood if interventions are to be successfully made. (Sections 3.2.3 & 7.7)

- **Urbanisation** As rural areas are urbanised (with increasing populations and decreased land availability) there is a resultant decline in fallowing and a trend towards intensification and diversification of production (Section 3.3)
- **Industrialisation** Large scale free standing industrial estates are increasingly impacting primary and other major cities especially in East and SE Asia. However, common throughout the peri-urban interfaces of cities is smaller scale industrialisation with associated housing (Section 3.3. 1)
- **Informal** Sector Most studies of the Informal Sector are aspatial in nature neglecting locational factors. Subsequently impacts upon natural resources and the PUI are little understood. Structural adjustment processes emphasise informal sectors and thus such impacts should be better researched (Section 3.3.2)
- **Changes in Economic** Activities There is need to research remedial measures to assist with the adjustment processes facing peri-urban families. More examinations of livelihood changes undertaken by peri-urban residents are needed (e.g. developments in non-farm and informal sector activities to focus on locational factors and consider incentive packages).
  The multiplier effects of non-farm activities are likely significant, and the impacts of the- expenditures of these informal sector workers should also be assessed. Farmers within the city region may be the principal beneficiaries of this multiplier process, but potential sources of leakage to other regions should also be investigated (Section 7.9).
- **Transportation** Provision of appropriate transportation and communications infrastructure greatly affects not only the nature of urbanisation but also has significant natural resource impacts especially regarding pollution and also effects socio-economic- and health indicators (Section 3.4).
- **Production** Common factors for production in peri-urban areas are land availability (or scarcity) and access to markets so that production becomes more intensive and produce is orientated to supplying perishables to urban consumers (Section 3.7)
- **Users of Renewable Natural Resources** (Farmers) A livelihoods study is needed to examine the adjustment processes faced by peri-urban farmers and other users of renewable natural resources. This should cover the factors involved in leading some low-income farmers to increase their real agricultural incomes or intensify their agricultural activities, either within the same area or through relocating their activities (Sections 3.5 & 7.9)

• **Urban Agriculture** is found within built up areas of cities as well as on the margins of cities so these activities may be fragmented under differing authorities with varied and uncoordinated policies. More information is needed on urban agriculture, particularly on promotional policies, and the economic, social, cultural, political as well as natural resource use or constraints (Sections 3.5 & 7.9).

• **Interactions and resource flows** between rural and urban areas are critical for understanding agricultural change which is a pre-condition for specific policy recommendations especially if the ultimate aim is towards poverty alleviation (Section 3.7)

Section **4 -** Social **Issues**

This section reviews housing, infrastructure, health and leisure services. Principal findings **include:-**

• **Natural' processes cannot be separated** from **the socio-economic, cultural and political** contexts of the peri-urban interface. The peri-urban is the prime area for locating new populations and for accessing related construction materials. Conversely, increased populations increase natural resource depletion and pollution (Section 4.6)

• **Resource implications** for **housing** in pen-urban areas can be categorised into three types (1) Land as a resource, and its transformation into residential land use from non-residential (2) Physical construction resources used for housing, needed by peri-urban inhabitants and found within the urban fringe (3) Environmental impacts of increasing, often poor, populations on the urban fringe (for example increased waste and burning of fossil fuels). (Section 4.2)

• **Infrastructure** similarly impacts resources in three ways (1) Land used for infrastructure projects (2) Materials used for infrastructure (3) Potential pollution resulting from inadequate or non-existent infrastructure to deal with increasing peri-urban inhabitants. Water and sanitation, waste disposal and electricity supplies are often either absent or ad hoc. Thus natural resources such as land, water and forests are affected, with concomitant implications for residents' health and well-being. (Section 43)

• **Infrastructure** Facilities & Services Information is lacking on how far peri-urban areas are neglected. NGOs or community groups are often left to complement public sector activities. It may be possible that peri-urban areas are actually drained of resources and public sector investments through not receiving their 'fair share' of public sector attention (Sections 4.3 & 7.10)

• **Ill health** is irrefutably correlated to deficiencies in the physical environment, including inadequate water and sanitation, overcrowded housing, air pollution, uncollected garbage and dangerous workplaces. It appears likely that the provision of environmental and other services or facilities are not geared towards assisting changes in peri-urban areas, or preventing environmental health or other problems. Social factors (such as alienation, unemployment and poverty) are also significantly related to physical / environmental factors (Section 4.4)

• **Political and Economic Factors** within a city determine the distribution of and access to physical, biological and social benefits that cities provide. The cities poorest groups face greatest exposure to physical and biological threats *and* have least access to protective services (Section 4.6)

• **Environmental Health Problems** & **Environmental** Services Access to environmental services (as in education or health services) are not adequately addressed by literature **and** research. Often the causes of environmental degradation result from industrial or residential areas within cities, but may result from changed practices / activities within peri-urban communities (e.g. breakdown of traditional environmental management practices - maintaining village waste dumps, domestic water extraction points or personal hygiene practices). Studies are needed into whether such agricultural intensification

measures as the increased use of inorganic fertilizers or pesticides have led to health hazards or environmental degradation in peri-urban communities. (Sections 4.6 & 7.5)

• **Leisure Developments** Golf and stadia developments (particularly in rapidly industrialising nations) represent significant peri-urban developments. Here high value land uses replace low value ones and middle / upper income groups replace poorer populations. There is a need for further research in this area (Section 4.5).

Section 5 - Environmental Impacts

This section examines agricultural land loss and degradation, water resource exploitation, exploitation of aggregates, energy and power generation, transportation and waste disposal. Principal findings include:-

- **Wider analyses of environmental costs of a nation's development processes should** incorporate an environmental impact assessment of developmental scenarios that achieve similar levels of GNP growth with lower levels of urbanisation (Section 5.9)
- **Biophysical Impacts** Most **peri-urban** developments (e.g. airports, reservoirs, quarries, power stations, golf courses, informal housing...) have biophysical impacts extending beyond their immediate boundaries (Section 5.1).
- **Remaining agricultural land** in the peri-urban area is likely to experience the following negative effects (1) productivity decline, due to heavy pollution of soil *and* water by industries (2) Degraded soil quality, through fertilisers, pesticides and insecticides (3) Land degradation in areas surrounding agricultural land (Section 5.2).
- **Water** is commonly in short supply. Generally urban / industrial users will out-compete agricultural water users, which may lead to the transference of land out of productive agriculture (Section 5.).
- **Aggregate resource exploitation** is exasperated by the large number of small scale, low technological and un-regulated operations with no form of EIA (Section 5.4)
- **Waste producing industries** are increasingly located in pen'-urban areas (often moving from urban centres). Several factors such as better transportation explain this; however, ironically better developed and enforced pollution controls in urban centres (not so well established in the peripheries) are simply moving pollution problems to the PUI. (Section 5.7.1)
- **Urban waste** A common gap in knowledge relates to the role of the informal sector in the recycling of waste, which could not only have income-generation effects but also remove glass, plastics or other substances which reduce the value of urban waste for agricultural purposes. Waste is seen as a potential productive resource for farmers rather than as landfill or a cause of environmental degradation. Future problems arising from current inadequate investment in environmental services in peri-urban areas is perhaps seen as a future problem, a failure to plan for or meet the needs of growing populations in peri-urban areas. (Sections 5.7 & 7.9)
- **Brown Agenda & Waste Management** priorities of communities involved in the urban environmental planning and management process are not yet reflected in the peri-urban interface production system outputs. Although there is some awareness of the problems created by environmental degradation, and hence a link to the brown agenda issues addressed by the international studies, the DFID emphasis is on current problems faced by farmers or other renewable natural resource users (Section 7.5)
- **Particular environmental problems to address have** been identified. These include (1) Breakdowns in traditional management systems (2) Differences between large and small cities (3) Specific problems (4) EIAs (5) The rapid rate of deterioration. in the natural resource quality (Section 5.8)

Part II - Management Approaches

Part II focuses on the development and application of environmental planning and management approaches by multilateral aid agencies, and local government associations. This has covered the strategic EPM approach of the World Bank/UNDP/UNCHS Urban Management'Programme, the earlier UNEP/UNCHS environmental guidelines for settlement planning and management, and the more recent UNCHS environmental planning and management guidebook. It also summarises a manual for urban environmental management, produced by GTZ, and a Local Agenda 21 planning guide. Applications examined include the Sustainable Cities Programme, Metropolitan Environmental Improvement Programme in Asia, and the UNDP LIFE programme. Urban and sustainable indicators are also discussed, together with environmental impact assessment, and issues related to decentralisation and jurisdictional complexity. Lessons are drawn for peri-urban research and management'.

3.2 Lessons from and for Kumasi & Hubli-Dharwad

The two existing NRSP case study city-regions of Kumasi and Hubli-Dharwad might benefit from setting the research within an overall framework offered by the strategic environmental planning and management approach. Both teams in Ghana and India have emphasized the stakeholders consultation process, and worked very closely with local researchers. However, workshops (or other dissemination activities) are unlikely to initiate a community-wide environmental forum able to agree environmental priorities, or lead on to the local organisation of active issue-specific working groups, or result in the implementation of co-ordinated stakeholder action plans. More work will be required to convert research findings into development projects to solve environmental and other problems.

Workshops for stakeholders and the local research community were initially convened in both cities. In Kumasi, this preceded the baseline survey phase, but appear to have raised as-yet-unfulfilled interest and expectations among the stakeholders, even though efforts have been made to disseminate research activities and findings to them. In Hubli-Dharwad, baseline survey results were presented to a Workshop, but this generated only relatively limited interest among NGOs or community groups in Hubli-Dharwad. The consultation process appears to have been only partial.

Both research teams have been handicapped by the absence of comprehensive lists of contact points or information about recent activities or interests of grassroots formal **and** informal community organisations, NGOs who might wish to be involved, or pressure groups. Based on experiences noted elsewhere, the active participation of the private and voluntary sectors in the preparation of city-region and community environmental profiles would be an important first step towards a comprehensive meeting of all stakeholders. This would be expected to lead to the convening of a city-region environmental forum able to continue the environmental planning and management process in partnership with public sector institutions and the local research community.

Research on the creation of LISs would complement work already being undertaken in Kumasi on the application of GISs for practical planning purposes, using Kuminfo.

3.3 Lessons for the Peri-Urban Interface

A series of lessons have been noted for peri-urban interface research and management at the end of each section in Part 2 (Management Approaches). These are compacted below**;**

Summary of Suggestions for Research and Management

1.Revise PUT Production System Log-frame (Section 6.2.4)
2.Gather data on low income communities (6.2.4)
3.Link health effects with environmental conditions (6.2.4)
4.Prepare Environmental profiles (6.2.4)
5.Foster the local consultative process (6.2.4)
6.Examine environmental problems created by poverty (6.2.4)
7.Place stress on livelihoods studies (6.2.4)
8.Focus on city region scale, with regional impacts and spatial breakdowns into PUI and other areas (6.2.4) 9.EPM to develop more effective or efficient urban/peri-urban linkages (6.2.4)
10.Disaggregation to produce small-area environmental profiles (6.2.4)
11.Initial step of consultation process to identify peri-urban environmental, poverty-related or RNR problems (6.2.4)
12.Increase understanding of public-private partnerships, & activities of community-based organizations (6.4.2)
13.Analyse urban areas as well as peri-urban interface areas (6.2.4)
14.Make use ofGIS to display and analyse information from different agencies (6.3. 1)
15.Involve stakeholders more fully in community participation & a partnership approach (6.3. 1)
16.Data collection and mapping to focus on urban environmental profile for use in consultation process (6.3. 1)
17.Identify specific locations of environmental problems (6.4.6)
18.Add renewable natural resource issues to the brown agenda bias of EPM (6.4.6)
19.Circulate EPM Guidebook to stakeholders (6.4.6)
20.Stakeholders to specify research gaps and information needs (6.4.6)
21.Promote partnerships, and provide technical support and training of local counterparts (6.4.6)
22.Promote sustainability through local self-sufficiency to reduce transport costs (6.5.2)
23Determine impact of changing economic activities for PUI as well as urban areas (6.5.2)
24.Case study cities to participate in Sustainable Cities Programme (6.5.2)
25.Collaborate with other DFID Divisions (6.5.2)
26.Examine PUI of smaller secondary cities within metropolitan areas (6.6.2)
27.Tackle PUT environmental problems in low income areas using community-based demonstration projects (6.6.2)
28.Circulate GTZ lists of environmental problems to initiate consultation process (6.7.6)
29.Provide training courses for stakeholders (6.7.6)
30.Circulate material on practical examples from elsewhere in country, with contact points (6.7.6)
31.Demand led research, according to community's own priorities and needs (6.7.6)
32.Disaggregation of EPM process to villages and neighbourhoods (6.8.6)
33.Synthesis of local knowledge before conducting technical assessments (6.8.6)
34.Circulate sample worksheets from ICLEI Planning Guide (6.8.6)
35.Add RNR issues to ICLEI EPM approach aimed at service providers and users (6.8.6)
36.Add jobs and incomes to environmental issues and services (6.8.6)
37.Incorporate the needs of in-migrants & indigenous families shifting.to non-farm activities (6.8.6)
38.Adopt LIFE approach through technical advice & small grants to locally-identified environmental projects (6.9.2)
39.Re-focus to facilitate participatory local governance EPM methods (6.9.2)
40.Involve all stakeholders, & provide technical & management advice for local environmental projects (6.9.2)
41.Estimate impacts, costs & benefits, & technical feasibility of local partnership projects proposals (6.9.2)
42. Assist assembly & analysis of information from other department by local policy-makers (6.10.3)
43. Circulate lists of urban indicators for use in policy formulation & performance monitoring (6.10.3)
44.Circulate lists of sustainable indicators for policy formulation & performance monitoring (6.10.3)
45.Examine why EIA still an ineffective technique for environmental management in PUI (6.11.3)
46.Assemble baseline information for use in future EIAs in PUI areas (6.1 l .3)
47.Regular monitoring of pollution to identify sources of pollution & suggest remedies (6.11.3)
48.Facilitate more proactive long-term, forward planning (6.11.3)
49.Analyse the impacts of gradual changes in urban areas on PUI areas (6.11.3)
50.Assess advantages & limitations of specific proposed planning policies (6.11.3)
51.Identify methods to reduce harmful effects of urban sprawl (6.11.3)
52.Undertake research at city-region scale (6.11.3)
53.Focus on EPM without undue priority to small-scale or village case studies (6.11.3)
54.Investigate multi-agency inter-relationships & linkages (6.11.3)
55.Facilitate exchanges of information among agencies & stakeholders (6.11.3)
56.Develop GIS as a potentially useful practical tool for EPM (6.11.3)

3.4 Recommendations for the NRSP Research Programme

Introduction
Further to the research gaps identified in the synopsis of sectoral activities of Conceptual Issues (see 3.1) and the above Table on Suggestions for Research and Management; this section specifically makes recommendations for the further development of the NRSP Programme itself, within broader DFID parameters.

Action Research Approach
It is suggested that future research might consider the merits of adopting an Action Research approach. This might aim to foster the application of the strategic, participatory local governance approach to environmental planning and management, **developed** by the World Bank and the UN agencies, international associations, or other bilateral aid agencies. This work should be demand-led, with the objective of initiating practical development projects by the beneficiary communities themselves. The research component would involve observing the activities and interactions of the various actors, but investigations might also be conducted to help resolve queries or problems raised by the stakeholders themselves, with an emphasis on providing appropriate technical and managerial advice or training.

Linking Development Projects to Peri-Urban Research
Closer linkages of peri-urban research to development projects appears necessary to meet the needs of target groups, the ultimate research beneficiaries. These not only need to be planned with full participation by the communities and other stakeholders themselves, but also requires their active involvement in implementation. The achievement of this objective would involve closer consultation and collaboration with DFID Country Desk advisors, as well as overseas DFID Divisions to identify common objectives and priorities. Attention, however, should focus on examining environmental and other problems, both within cities as well as within the peri-urban interface areas covering the rest of a city region.

Community Forums
Many of the causes of economic stress and environmental degradation will affect neighbourhoods within the built-up urban areas as well as in more distant villages or communities in the rural-urban fringes surrounding the city. Consequently, it would be sensible to encourage a community forum to cover these specific issues and bring together representatives of stakeholders from all parts of a city region. This will not only enable common interests or inter-related aspects to be covered, but will also provide the necessary political commitment, support and organisation for on-going activities. This will ultimately involve broadening out the focus of attention beyond environmental issues into a consideration of the sustainability of the city region. As already noted earlier for other multilateral aid agency programmes, environmental concerns can be the initial entry-point before poverty-related employment or income issues, or infrastructure needs, etc. can be examined. The ultimate concern needs to be how to identify the best means that policy-makers or planners can adopt to protect the interests of particular groups, facilitate adjustments, and resolve land use and other disputes in all areas, including the peri-urban.

Adoption of Environmental Planning & Management Approaches
Additional city regions, of varied size and global coverage, need to be examined so that lessons and experiences can be shared, and good practices or pitfalls observed and publicized. International networks already exist, based on the work of the Urban Management Programme of the World Bank/UNDP/UNCHS, the UNCHS Sustainable Cities Programme, the Metropolitan Environmental Improvement Programme, the UNDP LIFE Programme, and the International Council on Local Environmental Initiatives and other organisations. DFID funding might be provided to enable other selected cities to adopt similar environmental planning and management approaches. These studies might be designed to identify similarities in problems and contrast the differences between large megacities and small cities.

Impact of Urbanisation on Creating or Reducing Poverty

Greater attention needs to be paid towards identifying which groups actually gain or suffer from the processes of change taking place in peri-urban areas. Priority needs to be given to investigating the impact of urbanisation on creating or reducing poverty, not only for existing and former peri-urban areas, but also in older, densely-settled urban core neighbourhoods, or peripheral squatter housing areas. Particular attention appears to be given to what happens to peri-urban communities annexed or absorbed within the administrative boundaries of cities, since these provide lessons for the future. Their social and political structures will clearly change, but little appears to be known about the economic activities of those living in engulfed communities. Some members of these communities, or the landless in other parts of the peri-urban interface, may suffer from poverty as a result of urbanisation pressures and related land use changes.

DFID

Finally, some consideration might be given towards further modifications of the proposed Peri-Urban Interface Production System logical framework. Currently it appears to be setting external priorities on the identification of problems and their solutions, independently of peri-urban residents. An overall output, such as **the development of environmental planning and management strategies for city regions,** would permit stakeholders concerned with the peri-urban communities themselves to indicate their own specific problems and priorities. These might be expected to incorporate some of the other proposed outputs as essential steps towards achieving this super-output**,** but would reflect the differing problems, characteristics, and priorities of individual city regions.

PART 1

CONCEPTUAL ISSUES

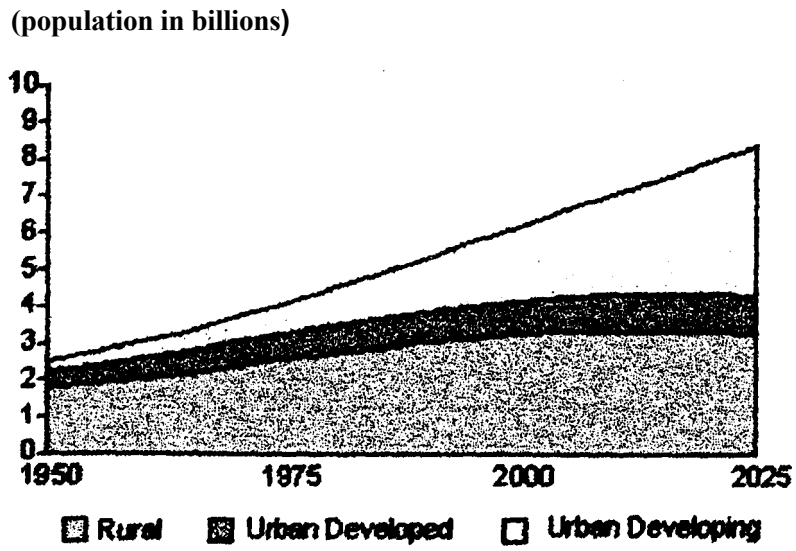
PART I CONCEPTUAL ISSUES

1 INTRODUCTION

1.1 Urbanisation: The Backdrop to Peri-Urban Issues

In 1990, for the first time, the World Bank recorded more people living in towns and cities than rural areas, with a global urbanisation growth rate of some 4.5% per annum. The principal impetus to this global growth comes from low-income countries. As illustrated by Figure 1. 1, between 1950 and 1975 the urban population of developing nations grew by 400 million and by 2000 AD will have increased by a further million, with the rate of urban growth in low-income countries exceeding that of the developed world by more than five times.

Figure 1.1 Urban Population Growth 1950 – 2025



Within developing countries there are demonstrably differential growth rates:

- **Latin America and the Caribbean** constitute the most urbanised regions of the Developing World, with approximately 70% of their populations living in urban areas in 1995 (UN, 1995).

- **Africa and Asia**, in contrast, are currently between 30% and 35% urban (in most countries). It is these regions which are expected to grow exponentially, with both continents expected to be 54% urban by 2025 (UN 1995).

In the new millennium developing nations will subsume lists of the world's most populous cities. In many countries urban primacy is very marked; an extreme example being Bangkok, some 50 times larger than Thailand's second city. However, most urbanites in developing countries do not live in mega cities and urban management problems are present across the range of large, intermediate and small towns. Most settlements receive migrants and have high natural growth rates. Their ability to deal with the consequent problems posed for inner city or peripheral areas are usually a function of the quality of management skills, associated planning objectives and the scale of resources available, rather than the rate or scale of population growth as such.

Studies reveal the relentless growth of urbanisation in developing countries and, by implication, the parallel growth of pressure on resources of all kinds associated with such expansion. The urbanisation process places pressure on resources via three major channels:

(1) Land Conversion - to urban uses
(2) Natural Resources - extraction and depletion
(3) Urban Wastes - disposal

1.1.1 Urbanisation and the Peri-Urban Area

Peri-urban development can be considered as part of this wider urbanisation process. Indeed, the development of a peri-urban area is a natural consequence of urbanisation. As cities in developing countries continue to grow, the peri-urban area moves outwards in waves, Some of the most rapid urban growth has in fact been recorded as occurring on the periphery of the city. For example, in Jakarta, the urban fringe has been recorded as growing by up to 18% faster per year than the city itself (World Bank, 1994).

As cities expand, land (often prime agricultural) and habitats such as wetlands and forests are transformed by housing and industry. The peri-urban area expands, yet people and economic activities require resources far in excess of what the local area can supply. As a result, essential supplies are drawn from distant places and the `ecological footprint' of the city extends its reach (WRI, 1996-97). As later discussion reveals, the larger the city the more likely it is that its `ecological footprint' will extend well beyond what used to be called the hinterland into other regions and other cities.

1.1.2 Persevering Themes

Several key issues run throughout this report which are fundamental to the understanding of processes at work in peri-urban areas:

- **Defining Peri-Urban -** Definitions of what constitutes `peri-urban' are thin and inconsistent so that research literature directly relating to peri-urban areas is not substantial. Much of the review, therefore, overviews related theories and concepts, and extrapolates the processes in operation in peri-urban areas from literature on related spatial areas.

- **Sustainability, Poverty and Gender -** These issues resurface throughout the report; hence owing to their importance are directly (though briefly) addressed in Section 3.

- **Urban Management & Governance -** The extent to which change is initiated and/or managed from above or below also cross-cuts most of the report and is the focus of Part 11.

1.1.3 Urban Management and Governance

Urban governance is crucial to city management and can be defined as the relationship between municipal/city authorities and citizens (Harpham and Boateng, 1997). Indeed, promotion of `good governance' is increasingly imposed by donor agencies with respect to providing aid and assistance. It has, as Harpham and Boateng point out, become a component of `aid-speak'. Various components of governance have been highlighted in Figure 1.2.

Figure 1.2: **Urban Governance and Urban Services: Variations in Composition**

BOENINGER(1991)	**CLARK (1991)**	**OSBOURNE(1992)**
1. Political 2. Technical 3. Institutional	1. Equity 2. Democracy 3. Social Justice 4. Economic Growth	1. Economic Liberalism 2. Political Pluralism 3. Human Rights 4. Accountability
WORLD BANK (1992)	**OECD (1993)**	**McAUSLAN (1993) ;**
1. Public Sector Management 2. Accountability 3. Legal Framework 4. Transparency	1. Democratisation - legitimacy of government 2. Accountability 3. Competence to form policies and deliver services	i. Efficiency 2. Transparency 3. Accountability 4. Probity 5. Equity
PAPROSKI (1993)	**WORLD'BANK(1994)**	**ODA(1995)**
1. Political 2. Economic 3. Policy and Decision Making 4. Managerial	1. Public Sector Management 2. Accountability 3. Legal Framework 4. Transparency 5. Participatory Approaches 6. Human Rights	1. Democracy 2. Human Rights 3. Transparency 4. Accountability

Source: Harpham and Boateng (1997)

A key issue for the peri-urban interface is that rural and/or urban authorities are often immature or even not established and spheres of responsibility (for planning, services, transport, infrastructure, security, waste management etc.) are often ill-defined. Personnel are frequently not appointed, unpaid or underpaid and under-resourced. Expenditures are often inadequate, linked to corruption, and inefficiently targeted. Urban governance, a wide ranging issue, will gather increasing importance as urbanisation further dominates developing countries. The World Bank and IMF have drawn `governance' to prominence in their literature, entering political and social arenas previously felt beyond the scope of multilateral institutions.

1.1.4 Methodology

The objective of this report is to review the recent literature on the conceptual issues, resource implications and management concerns of the peri-urban interface of cities in developing countries. Within this context, it also examines existing, related research on spatial change and suggest new research themes related to the management of identified problems.

Statistics related to urbanisation vary enormously in the nature of their source materials. For example, definitions of what constitutes an `urban' settlement differ considerably, as does the quality of data itself. This makes international comparisons difficult, and suggests from the outset that local factors are more important than generalised assumptions in characterising the nature of peri-urban natural resource issues.

Finally, we note that the report is strongly influenced by the nature of research interests of the review team. Most have research interests structured around the economic, social and political development dimensions, but this is buttressed by interests more directly related to environment and physical geography; including direct interests in agro-economics and agro-biology. However, the team is quite different in composition and interests from `traditional' NRI development perspectives and the report reflects this. In this way we hope to bring an alternative perspective and draw attention to a broader range of management problems.

1.2 Organisation of the Report

The report is structured into two parts as outlined below:

PART I - CONCEPTUAL ISSUES

Section 1 - Introduction
Introduces the underlying principles of the peri-urban environment, the main issues of study and sets out the research agenda.

Section 2 - Conceptual Background
Investigates the conceptual background of the spatial focus for the study, addressing both direct and indirect literature associated with the peri-urban interface, It particularly examines population movement and overviews the broader related issues of sustainability, poverty and gender - running throughout the report.

Section 3 - Land and Economic Activities in Peri-Urban Areas
Examines land and related economic activities; primary, secondary and tertiary. It looks particularly at the changing situation of agriculture and food production at the interface of city and country.

Section 4 - Social Issues
Focuses primarily on shelter, other infrastructure and health in the context of their linkages to both the human and physical geographies of change. In concludes with a short section on recreational activities in the peri-urban area.

Section 5 - Environmental Impacts
More directly reviews, previously discussed, environmental issues and effects of peri-urban activities: In particular, resources of land, soil and mineral deposits, water, energy and wastes. The section concludes by examining natural resource management implications, as a prelude to Part H.

PART H - MANAGEMENT APPROACHES

Includes a fuller and more detailed examination of peri-urban management issues. In addition (also drawing on Part 1) it overviews fixture research needs of the peri-urban interface in order to enhance our understanding of the development processes' underway at present and in the future.

2 CONCEPTUAL BACKGROUND

2.1 Introduction

This section investigates the conceptual background for the spatial focus of the peri-urban interface. It follows three main directions:

(1) **Problems of defining the `Peri-Urban'.** Recognising the paradox of a spatial framework to an amorphous and mobile site for the interaction of social, economic and cultural processes and rural-urban interlinkages. The extent of these interiinkages is also examined in a discussion of how interchanges between rural and urban promotes change to the peri-urban.

(2) **The role of the Peri-Urban Interface in Rural-Urban Migration Processes of Developing Countries.** An analysis of how migrants' demand for land, shelter, employment and social development at various stages of the migration cycle precipitates changes at the peri-urban interface.

(3) **Key Conceptual** Themes. An examination of three key conceptual themes fundamental to the appreciation and management of the peri-urban interface:
• **Sustainable Urbanisation -** A more integrated and specific process than `sustainable development'. We illustrate how the conceptual tool of sustainable urbanisation can be used to recognise all of the variable dynamics of the urbanisation process and also acknowledges the significant ecological footprint of cities. Acknowledging the urbanisation process allows the peri-urban to be embraced by the sustainability debate.
• **Poverty -** A major planning and managerial goal of our time, and of this government.
• **Gender -** To encourage gender sensitivity in managing peri-urban areas, and to enhance understanding of the gendered economic and social roles that shape processes effective at the per'-urban interface.

2.2 Definitions of the Peri-Urban Interface

An early use of the term `peri-urban' was by the Office of Rural and Institutional Development (ORID), in the late 1980s, when assigning aid activities to priority areas. Although now more widely used other labels exist: Commonly `urban-rural fringe', `urban transition zone' and `semi-urbanised area' have, to some extent, become interchangeable with `peri-urban'. Certainly, peri-urban refers to the area where urban and rural development processes meet, mix and inter-react, usually on the periphery of cities. One must recognise that the peri-urban is often not a discrete area, but rather a diffuse territory identified by combinations of features and phenomena, generated largely by activities within the urban zone proper.

The then ODA's Renewable Natural Resources Research Strategy, defined the peri-urban interface deliberately broadly by its characteristics and also considered two broad zones of interface (bulleted).

> *"The peri-urban interface is characterised by strong urban influences, easy access to markets, services and other inputs, ready supplies of labour, but relative shortages of land and risks from pollution and urban growth. "*
> (ODA RNRS)

• The zone of direct impact - experiencing the direct impacts of land demands from urban growth, pollution, commute etc.

• A wider, market-related zone of influence - recognised in many settings, the extent of which may be described in terms of the handling of agricultural and natural resource products.

The Kumasi and Hubli-Dharwad ODA NRD teams did not attempt to define spatial limits, either timer or outer, to the peri-urban area; not least because the area is regarded as in a state of movement and most economic activity would cross any arbitrarily defined boundaries. For example, urban dwellers may have rural incomes and vice versa. However, certain impacts, such as water pollution, do have a physically defined spatial extent. In terms of considering what is called the `peri-urbanness' of a village, the ODA NRD employ a land use definition. They state the continuing presence of bush/fallow agricultural land accompanied by land competition from non-agricultural uses, to be significant.

2.2.1 Modelling the Peri-Urban Interface

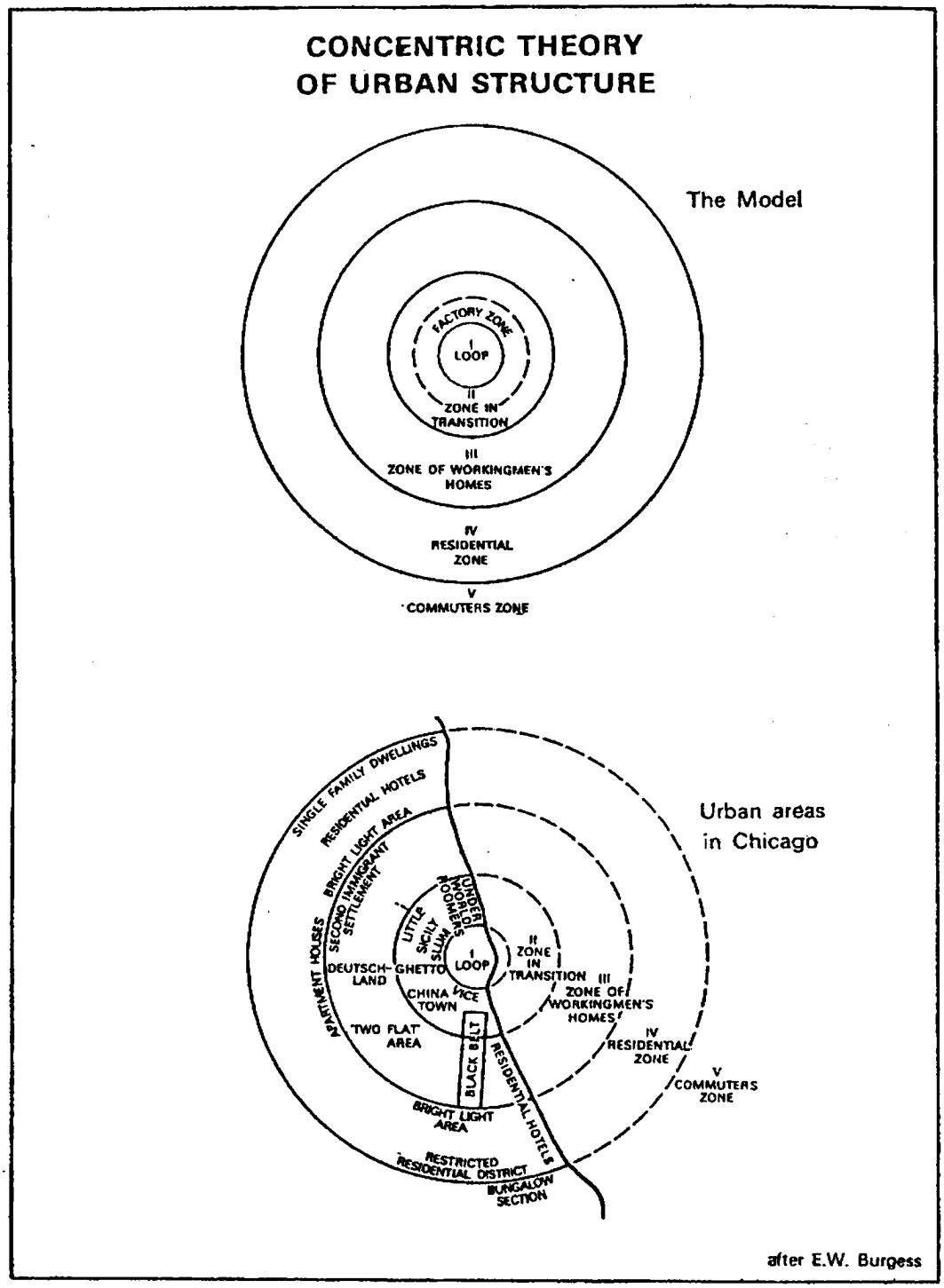
Early land-use models (influenced by earlier philosophical theorising) provide initial insight to the peri-urban interface; but depicted it as a static rather than dynamic and evolving area. The Chicago School of Urban Sociology influenced early (1960s) conceptions of the city region with E W Burgess's concentric ring model the most famous (Figure 2.1) (Carter, 1981; Herbert and Thomas, 1982). Later commentators used Burgess' ideas to theorise concentric zones of decreasing productivity and intensity of activities surrounding urban areas. The most productive zone immediately surrounding the urban core was classified as the urban-rural fringe or the zone of transition between urban areas and more rural hinterlands. Writers have modernised the basic ring to incorporate, for example, radial transportation routes to produce a `star' model (Johnson, 1969; Herbert, 1972; Carter, 1981; Herbert and Thomas, 1982).

For the individual, spatial models remain influential in the personal geographical visualisation of the peri-urban. However, it is now widely regarded that such purely spatial models are in some way inappropriate as academic and planning tools. A number of fundamental problems are apparent. First, spatial models tend to over-simplify the character of these areas. They account for neither the economic, social or cultural complexity of these areas, nor the processes found in them. Secondly, as noted above, there are fundamental problems with assigning definite spatial boundaries and limits to *city* areas. The most potent problem may be described as a technical challenge of attempting to hit a moving target. It is difficult to assign spatial boundaries to economic and social processes as, even if achieved, the constant change in the system will invalidate the defined boundary almost immediately. In short, an approach based on zoning is very hard to reconcile with the rapid socio-cultural and other changes occurring at the peri-urban interface. It is more constructive to consider processes of influence and zones of influence and interaction, rather than attempting to assign boundaries around phenomena. Indeed, DFID itself talks of interfaces - areas where different production systems merge to create regions in which the influences of each can be identified. In this way, an interface is not a distinct boundary, but is a region of change.

Labelling also creates problems. Recent criticism has suggested that the term `peri-urban' itself has served to stereotype the very zone it describes. Browder *et al.* (1995) argue that studies of the metropolitan fringe have suggested that three dominant patterns of development prevail:

(i) Many studies generalise residents of the areas as low-income migrants, portraying the fringe as socially and economically homogeneous, yet section 4 (discussing housing and shelter) shows this to be at times erroneous.
(ii) They stress the essential roles played by the informal and agricultural sectors
(iii) They portray residents as part of both the urban and rural economies.

Figure 2.1: Burgess' Concentric Theory of Urban Structure



Source: Herbert and Thomas (1982)

Browder *et al's.,* study of metropolitan fringes of large cities such as Bangkok, Jakarta and Santiago, found the vast majority of residents to be lower and middle income, long-term dwellers who had relocated from the city centre. This indicates a more complex pattern of migration than identified in much of the previous literature. Informal sector activities were also found to be the exception rather than the rule, with many people receiving regular salaries. Most residents were found to be integrated into the urban economy, contrary to the popular image of a dual rural-urban orientation. Finally, Browder *et al.* 's three case study areas were found to vary greatly in both function and form. In this respect, it may be argued that a single label or traditional image of the per'-urban would be unreliable if applied to all three sites. In short, it is argued that the metropolitan fringe is much more diverse in social composition and economic structure than conventional stereotypes acknowledge. It is therefore appropriate to conceptualise the zone in terms of linkages and interdependencies.

These conclusions have recently been corroborated by NRI's Hubli-Dharwad project (Nunan & Shepherd 1997) which observed pen'-urban interface concepts. It emphasises the dynamism of the pen'-urban zone in economic, cultural and environmental change terms; and illustrates the importance of flows of people, commodities energy and wastes. Clearly, in such fluid circumstances, traditional administration and governance systems are often managerially inadequate. However, whilst this suggests that the traditional spatial conceptualisation of the pen-urban area may be inadequate, nevertheless rapidly changing human activities take place on a terrestrial surface. Land, therefore, provides both a real and conceptual link between movement and its spatial context. Section 2 examines the varied nature of this 'land link'.

2.3 Rural-Urban Linkages and Change in the Peri-Urban Interface

Within geographical literature in particular there is a considerable amount of published work on rural-urban linkages (see for example Dixon, 1987; Potter and Unwm, 1989), sometimes referred to as the RUI (Baker and Pedersen, 1992). Much relates to economic, political and social processes as they impact on people rather than specifically to place (Figure 2.2). As seen in Lipton (1977) and Stohr & Taylor (1981), concern predominantly involves reallocating scarce resources. Sometimes, however, there is a focus on place - usually in the form of secondary cities which Rondinelli (1983) and Baker & Pedersen (1992) interpret as the RUI i.e. the places from which urban values and influences are imparted into rural areas. There are also discussions, admittedly few, on the nature of rural urbanisation, examining the planned and unplanned shift of urban values and activities into rural areas as part of their transformation (see Sanghera and Hams-White, 1995). Rarely, if ever, does the peri-urban interface or area feature as a specific focus of these discussions. For example, Figure 2.3 distinguishes between flows and interaction, but does not indicate where interaction takes place and how it affects *in situ* resources. Part of the conceptual problem may be that rural-urban interaction involves mobile resources (people, enterprises, activities), whereas physical resources are static (although changeable in their role). Whatever the reason, these broad discussions of changing rural-urban links and flows have little specific content related to pen'-urban places or activities. Even those analyses aimed specifically at a `new territorial order' neglect the territory between the urban and the rural (Friedmann and Weaver, 1979). However, our discussion may be informed by an examination of the alleged features of the rural-urban interface as interpreted in these discussions. It may be questioned whether the peri-urban interface would replicate processes and needs attributed to, for example, the rural-urban interface as expressed through the nature of secondary cities (Pedersen 1997). Baker and Pedersen (1992) summarise these as follows:

• Enterprises are often not independent but linked to others in the main city in a hierarchical structure

• Decentralisation of decision-making
• Development of the physical, social and institutional infrastructure
• unproved terms of trade between agriculture and the urban economy

The response must be that these issues provide only a partial context against which to examine the processes involved in the pen'-urban interface. Far more useful in this respect is Rondinelli's list of the major linkages involved in spatial change (Figure 2.2). Several of these provide the basis for the remainder of this section, and underpin discussions elsewhere in the report.

Figure 2.2 Major Linkages in Spatial Development

Linkage Type	**Elements**
Physical linkages	Road networks, River and water transport networks, Ecological interdependencies
Economic linkages	Market patters; Raw materials and intermediate goods flows, Capital flows, Production linkages - backward, forward and lateral, Consumption and shopping patterns, Income flows, Sectoral and interregional commodity flows "Cross linkages"
Population movement linkages	Migration - temporary and permanent, Journey to work
Technological linkages	Technological interdependencies, Irrigation systems, Telecommunications systems
Social interaction linkages	Visiting patterns, Kinship patterns, Rites, Rituals, and religious activities, Social group interaction
Service delivery linkages	Energy flows and networks, Credit and financial networks, Education, training and extension linkages, Health service delivery systems, Professional, commercial and technical service patterns, Transport service systems
Political, administrative and organisational linkages	Structural relationships, Government budgetary flows, Organisational interdependencies, Authority-approval-supervision patterns, Inter jurisdictional transaction patterns, Informal political decision chains

***Source. Rondinelli** (1985)*

It must also be noted at this point that the rapidly increasing integration of the rural and urban in the face of contemporary urban growth is posing problems for organisations, like NRI, with traditional rural and agricultural interests. FAO, for example, has recently sought to come to grips with this situation. Its land use division, for example, is currently undertaking a similar discussion to that going on in NRI - attempting to define what constitutes the peri-urban and what methodologies are needed to investigate this rapidly changing situation (Groppo po. comm 1998). Some early publications on this topic will be available in the near future. Other divisions within FAO are currently establishing research bases on more focused dimensions of the rural-urban interface viz. the 'food for cities' programme and the peri-urban / urban forestry case studies. These will be more fully discussed at appropriate sections in this report.

Figure 2.3 Urban-Rural Linkages, Flows and Interaction

Linkages	Flows	Interaction
Economic	- labour	- labour/capital
	- money	- marketing
	- food	- shopping
	- vehicles	- transport
	_ commodities	
	- energy	
	- credit	
	- raw materials	
Social	- people	- social groups
	- correspondence	- family
	- telephone calls	- friends
	- medicine	- class
Political.	- power	- political action
	- authority	- lobbying
	- budgetary allocation	- justice provision
	- law	- allegiance payments
Ideological	- ideas	- religious activity
	- books	- education
	- radio	- advertising
	- television	

Source: *Unpin* ***(1989)***

2.4 Population Movements and the Peri-Urban Interface

Rural to urban migration is a well established demographic phenomenon active in most developing nations in recent decades (Parnwell, 1993). It is not the only migrational movement present, but is generally far greater in scale than other permutations and also greater than international movements (although increasingly important). However, rural-urban migration is not uniform - it varies over time and space with consequential impact on the peri-urban.

2.4.1 Migration Models

Attempts to model the migration process have met with varying degrees of success. The Harris-Todaro 1974 model being the most utilised, cited and analysed migration model to date. In their pioneering work, Harris and Todaro tried to account for the propensity of developing populations to move from farm to city despite high and continuing levels of urban unemployment (Suits, 1985). The distinguishing feature of the model is that migration proceeds in response to urban-rural differences in expected earnings - urban wage rates were seen to be so much higher than rural earnings, that city life provided elevated expected earnings even if unemployment was taken into account (Harris and Todaro, 1974).

In terms of modelling population movements, Harris and Todaro's work has greatly influenced the development of migration models, Dual economy models take into account many of the obvious facets of urbanisation and structural change (Shukla, 1988). They view labour

migration as a response to rural-urban differences in expected incomes, and assume people migrate to urban areas in search of jobs and money with imperfect knowledge regarding job opportunities in their destinations *(ibid.)*. The models' implication is that migration adds little to the economy but creates significant social and infrastructural costs, as migrants rarely find waged employment and are forced into the informal sector. Later commentators have used the model to support calls for government interventions such as wage subsidies and migration restrictions, but with little implementation. Nevertheless, this literature has encouraged a policy climate in many countries which discourages city growth and supports employment generating activities *(ibid.)*. Empirically, the model has been updated and extended over time and it has certainly influenced future models to adopt more behaviourally motivated specifications *(ibid.)*. One example of updating the model is Levine (1993) who extends it to include urban agglomeration effects, urban wage flexibility and government budget constraints.

Certain studies have gone further challenging the validity of the model's basic features, especially its pre-conceptions regarding migrants and their relationships with informal sector employment. Banerjee (1976), for example, examines the validity of migrant transition envisaged in the Hams-Todaro model and challenges its four main sub-hypotheses, namely;

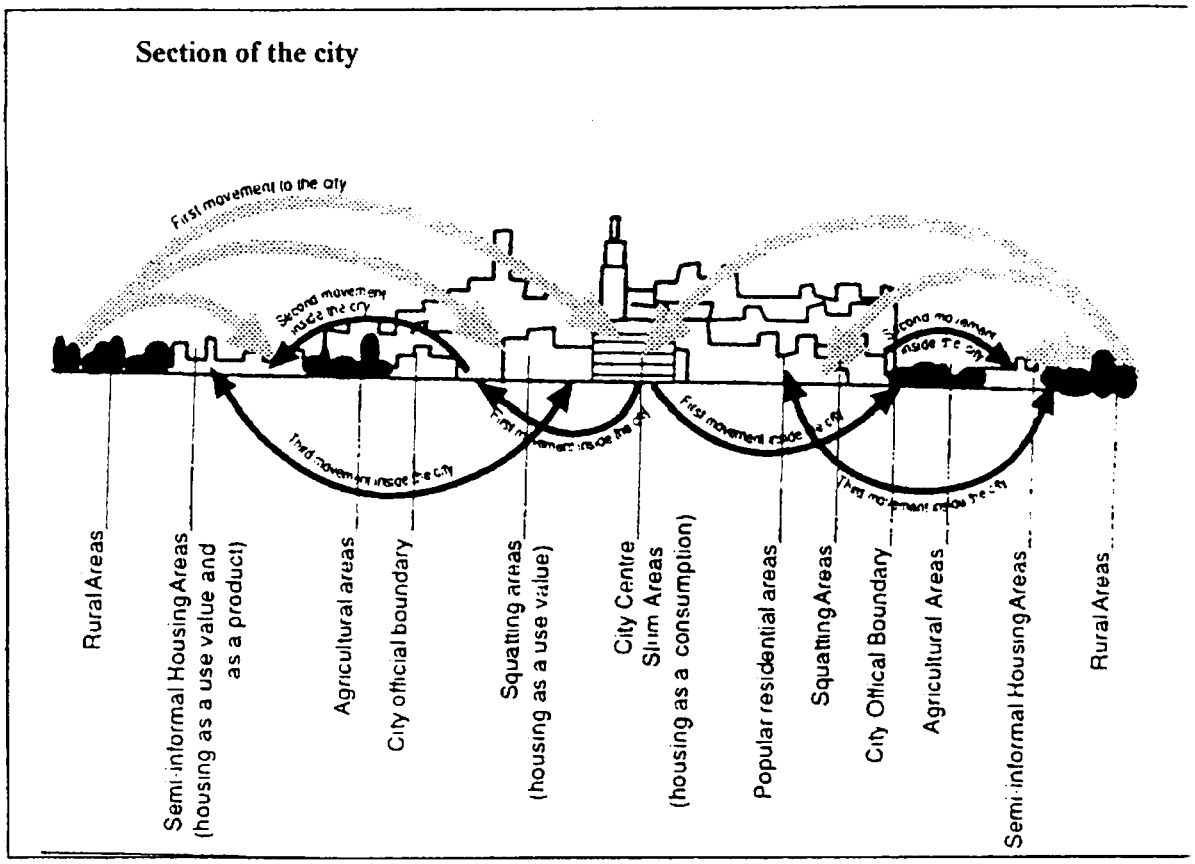
(1) Migration is a response to differences in expected income between rural and urban areas
(2) A potential migrant enjoys information regarding employment opportunities
(3) The informal sector is a temporary employment reservoir for migrants
(4) There exists an institutionally determined high wage in the informal sector

It is concluded that, contrary to the model's suggestion, migrants do, in fact, undertake life-long careers in the informal sector and may never enter formal employment. Banedee (1976) has indeed gone further than most in criticising the model. Empirical testing presents the foremost constraint to further analyses (Shukla, 1988).

2.4.2 **Furthering the Models**

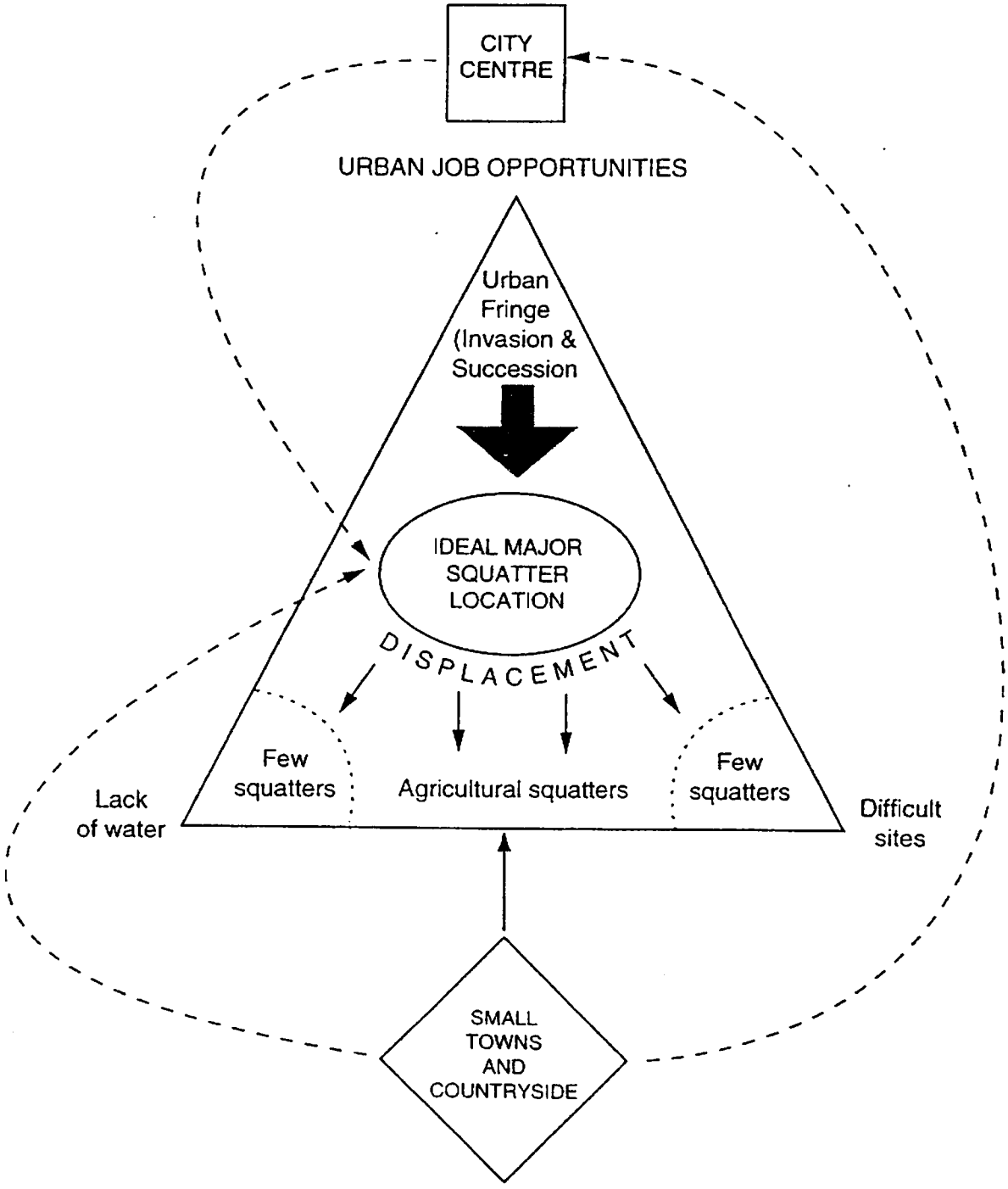
In reality, in almost all developing countries outside Latin America, most urban migrants were single men seeking work, often moving step-wise up the urban hierarchy as they acquired skills and ambitions. Such migrants often by-passed peri-urban areas accommodating in city centres, often small dilapidated lodging units, near sources of casual work. Later, when more confident of prospects, many would be joined by rural families or establish a new family in the city. In either event, the prevailing conceptual wisdom of the 1970s was that this change in family structure also induced a move from the city centre to areas where land was cheap or `free'. This was normally in the peri-urban or fringe areas around the city. Several models have been constructed illustrating this spatial link (Dwyer, 1975, Soliman, 1996) (see Figures 2.4 and 2.5). The nature of these, often illegal, peri-urban settlements varies throughout developing countries and is discussed in a later section of this report (section four). It is perhaps instructive to note that Dube and Dwivedi (1994) claim in their study of Varanasi that peri-urban areas often have much higher population growth rates than urban areas proper because of in-migration and higher natural growth rates.

Figure 2.4: The mobility of the urban poor to and within the city of Alexandria



Source: Soliman (1996)

Figure 2.5: Typical movements of low income population in Third World Cities



Source: Dwyer (1975)

Of course, there are areas in which this generalised migration model does not apply, where migrants originally settled in peri-urban areas, increasingly so as cities grow. Often this is where migrants constituted family units and/or accompanied with difficulties settling in the city proper. An excellent example is Alice Springs where the many small Aboriginal settlements ringing the town result from both land rights issues and ethnic discrimination. These settlements are known as fringe camps and, in Alice Springs, are located up to l Okms from the town centre (Drakakis-Smith, 1981). Soussan (1980) too provides an excellent description of migration direct to peripheral villages as they become absorbed by expansion of the city proper.

2.4.3 Recent Trends

However, new trends in rural-urban migration have affected the theoretical and actual role of the peri-urban area. These are particularly discernible in SE and E Asia where female labour has become prominent in urban employment patterns. When taken in conjunction with emergent mega-cities, incorporating *in situ* rural settlements and activities, new patterns are emerging on the urban fringe. In Bangkok (Wongsuphasawat, 1997) women workers reside in dormitory accommodation alongside major arteries of the city proper. As yet, however, the mega-city literature contains relatively little on the new, complex urban fringe and its relation to migration. Robinson (1995) discusses several types of spatial models (Figure 2.6) related to hyper urban growth; mentioning peri-urban, urban fringe and similar phrases, but they do not feature as part of the theory itself and conceptually they are effectively ignored.

Rigg (1997) has produced a curious hybrid model (Figure 2.7) in which peri-urban areas are distinguished diagrammatically, but not conceptually, from desakota (literally town-village) and densely populated rural areas. In Rigg's text peri-urban receives no attention, but the model indicates the increasingly complex interaction of urban and rural in some parts of Asia. Ginsberg, in Rigg (1997), claims that desakota have several main features:

- Dense populations engaged in small holder cultivation
- Increase in non-agricultural activities
- Well-developed infrastructure of roads and canals
- Reservoirs of cheap labour
- Perceptions of being invisible in planning terms

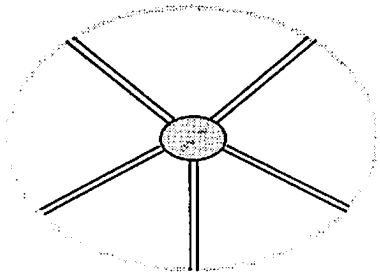
By complete contrast, recession and structural adjustment in parts of Africa have resulted in dramatic declines in the rates of rural-urban migration, even to reverse flows in some countries (for example, see Mijere and Chilivumbo, 1987).

As Chapman and Prothero (1985) illustrate, relocated migrants create new peri-urban movement patterns (Figure 2.8). Some retain strong rural links and may become involved in circular migration patterns (Chapman and Prothero, 1985; Mabin, 1990). Others develop individual, highly varied local mobility profiles depending on their socio-economic circumstances; which likely include substantial `lateral' movements within the peri-urban and also various commuting to the center. Therefore, the nature of interaction between human and natural resources of the peri-urban area depends on a variety of factors - from nature of economic activities to recency of rural experience. Not all peri-urban migrants have empathy for their environment and its resources. Some exploit non-renewable resources for quick benefit polluting their immediate location: others seek to replicate rural activities through skilful, sympathetic cultivation practices. Often there is marked correlation between recency of arrival in peri-urban areas and nature of economic activity (see Igoche, 1995). In part, this reflects access to land, but can also mirror traditional cultures and willingness to adapt, with migrant groups tending more towards commercial food production - if they have the resources.

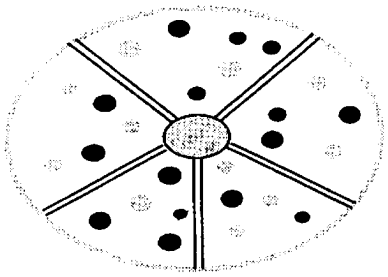
Figure 2.6: Alternative spatial models

A. TRADITIONAL (MONOCENTRIC)

Most if not all of the metropolitan area population and employment are centralized in the urban core.



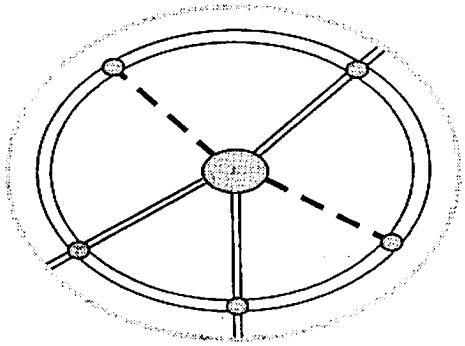
B. DECENTRALIZATION (METROPOLITAN - INTRA - REGIONAL)



1. Unplanned (sprawl/spread/scatter)

   Decentralized population and employment are in scattered, non-contiguous, and separate locations mainly following the roads radiating from the core.

   Proportion of metropolitan area's population and employment in the urban core is somewhat less than under (A) because of decentralization.



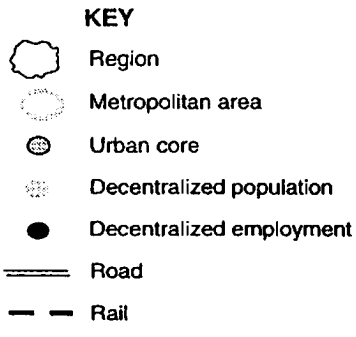
2. Planned (polycentred)

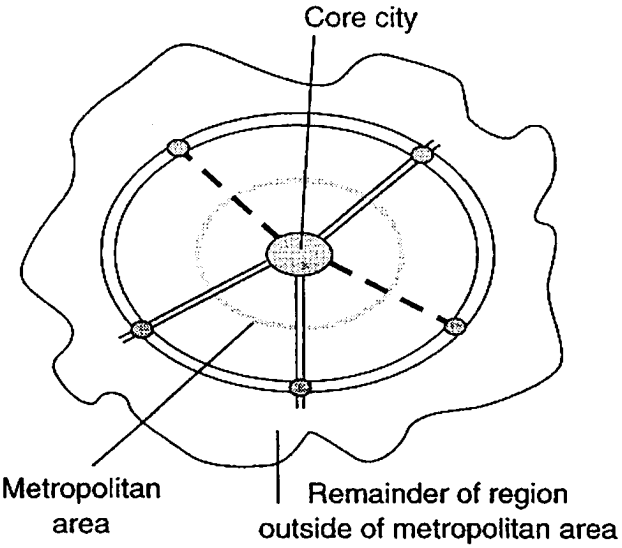
   Planned nucleated centres and sub-centres, with concentrated population and employment. All roads do not just lead from outskirts to core (as they do in the other models); they also link outer centres with one another.

   Proportion of metropolitan area's population and employment in decentralizes nucleated centres equal to, if not greater than in urban core because of planned decentralization.

C. DISPERSAL (INTER-REGIONAL)

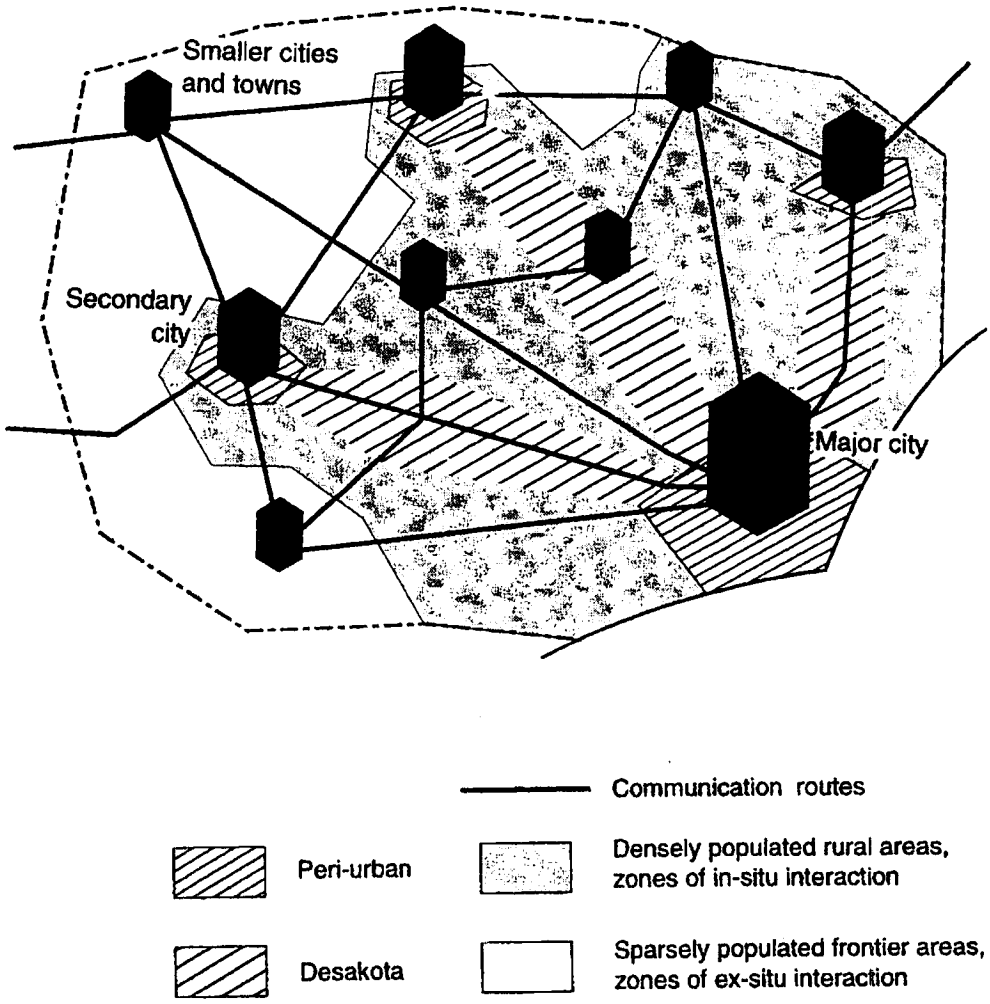
Counter magnets (growth centres, secondary cities) located outside Metropolitan Region(s).





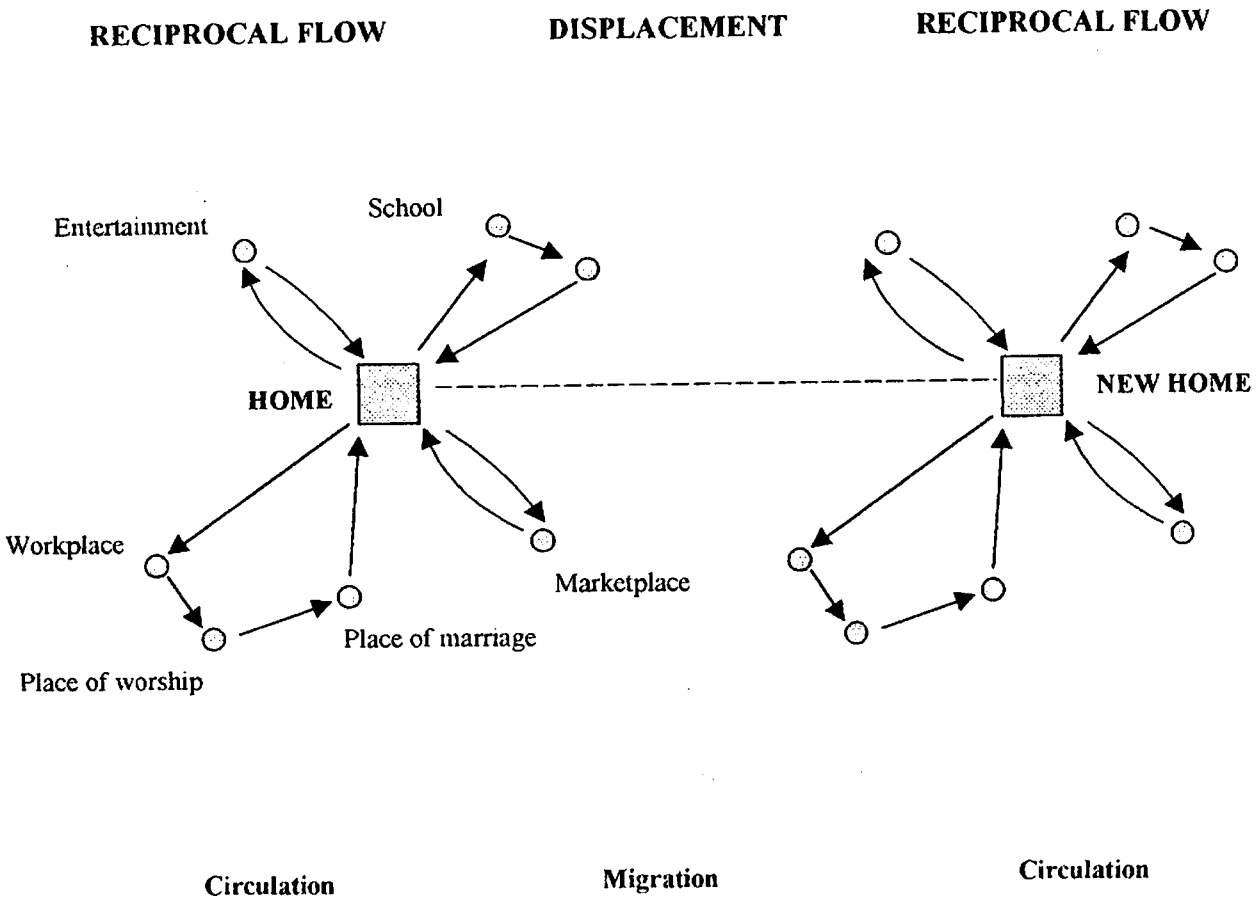
Source: Robinson (1995)

Figure 2.7: Rigg's Hybrid Model



Source: Robinson (1995)

Figure 2.8: Reciprocal flows and displacement of people



Source: Chapman and Prothero, 1985

2.4.4 Conclusion

The literature on migration, as generally in urban-rural linkages, tends to be aspatial with focus on the nature of the movement process, the reasons for this and migrants' characteristics. Few discuss the spatial context of the overall process other than in very general terms. For example, Josef Gugler's chapter on `The Urban-Rural Interface and Migration' in Gilbert and Gugler (1992) fails to define what is meant by the rural-urban interface and does not discuss its relationship to migration. The spatial context, as in most migrational studies, is therefore ignored; resurfacing only in specific debates on the implications of population influx, such as shelter.

Effectively therefore, processes affecting human resource movement relate to peri-urban areas in two main ways - the demands for employment and shelter. One of the principal links connecting these is land, discussed at greater length in Section Three.

2.5 Sustainability and Urbanisation

Until the 1990s urbanisation and sustainability were rarely discussed together other than in the former's contribution to global environmental problems (Mitlin and Satterthwaite, 1996). The ecological footprint of cities has made a considerable impression on surrounding regions. But despite the centrality of cities to the development process, debates on urbanisation and sustainability were largely separate entities. There was, admittedly, a central role envisaged for cities in sustained economic growth - for some this was as close to sustainability as they needed to get (Atkinson, 1994).

There is an extensive literature on what might constitute sustainable urbanisation - on poverty, basic needs provision, urban management and, inevitably, economic growth - but seldom were these components integrated into conceptual discussions of urban sustainability. By the mid 1990s this had changed with several major texts given over to urban sustainability (e.g. Stren *et al.,* 1992; Houghton and Hunter, 1994; Girardet, 1992; Pugh, 1996; Burgess *et al.,* 1997) and the concept adopted as a major theme during Habitat H. The Ellis Fifth Environmental Action Programme also contains a sustainable cities programme emphasising management of natural resources, the urban economy, social issues, accessibility, land use planning, and urban regeneration (Anon 1997).

2.5.1 Sustainable Urbanisation

Terminology should be clear. The debate is not of the `sustainable city' - in a global context such a self-contained entity is improbable. City life-styles of the developed world are often at the expense (and benefit) of those elsewhere - often in the developing world. Nor is the debate here of the `role of cities in sustainable development'; a role often (though needlessly) conflated with sustained growth. Essentially, the discussion here is about `sustainable urbanisation' – a process rather than an entity. So how should sustainable urbanisation as a process be defined?

2.5.2 Defining Sustainable Urbanisation

One simple approach is to adopt accepted tenets of sustainable development *per se* and use them as a framework for studying urban development, viz. meeting the needs of the present without impoverishing future generations, and identifying areas of conce rn. There is, of course, considerable debate about the nature and discourse of sustainability. Shiva (1991) illustrates a growing critique of sustainable development as envisaged by many global institutions and advanced economic powers *i.e.* global resource management oriented towards concerns and

priorities of a northern agenda. Problems are often seen as social and local in origin and cause, whilst solutions global and technical. David Satterthwaite (1996) often drawing attention to this contradiction in its urban setting. Robert Solow, too, has recently added an important issue arguing *"there is a least as strong a case for reducing contemporary inequality (and probably stronger) as for worrying about the uncertain status of future generations "* and that *"the advanced economies of the world do not seem at all anxious to think about equity when it comes to the use of current resources "* (Solow, 1996: 16). Certainly within many contemporary developing world cities the scale and persistence of inequality, vulnerability and poverty compels any attempt to define sustainable urbanisation, to give substantial weight to the conditions of the present as much as those of the future. Indeed, `meeting the needs of the present' must imply considerable change at the local level to ensure that economic, social and political equity, stability and harmony make a future worth sustaining.

There are at least two levels in addressing the question of defining sustainable urbanisation. A broad philosophical approach in which sustainability objectives of an urban content are established. Also we must recognise cities not as assemblies of functions and buildings, but as places where people live and increasingly migrate in search of a better life. Sustainability in this context becomes humanised implying the desire and determination to achieve a set of goals which benefit individuals and households as much as enterprise or governments. At this generalised level, therefore, there are certain prerequisites which, the pursuit and management of sustainability in an urban context must satisfy:

- Equity in the distribution of the benefits of economic growth
- Access to adequate basic human needs
- Social justice and human rights
- Environmental awareness and integrity
- Awareness of linkages and representations of change over space and time

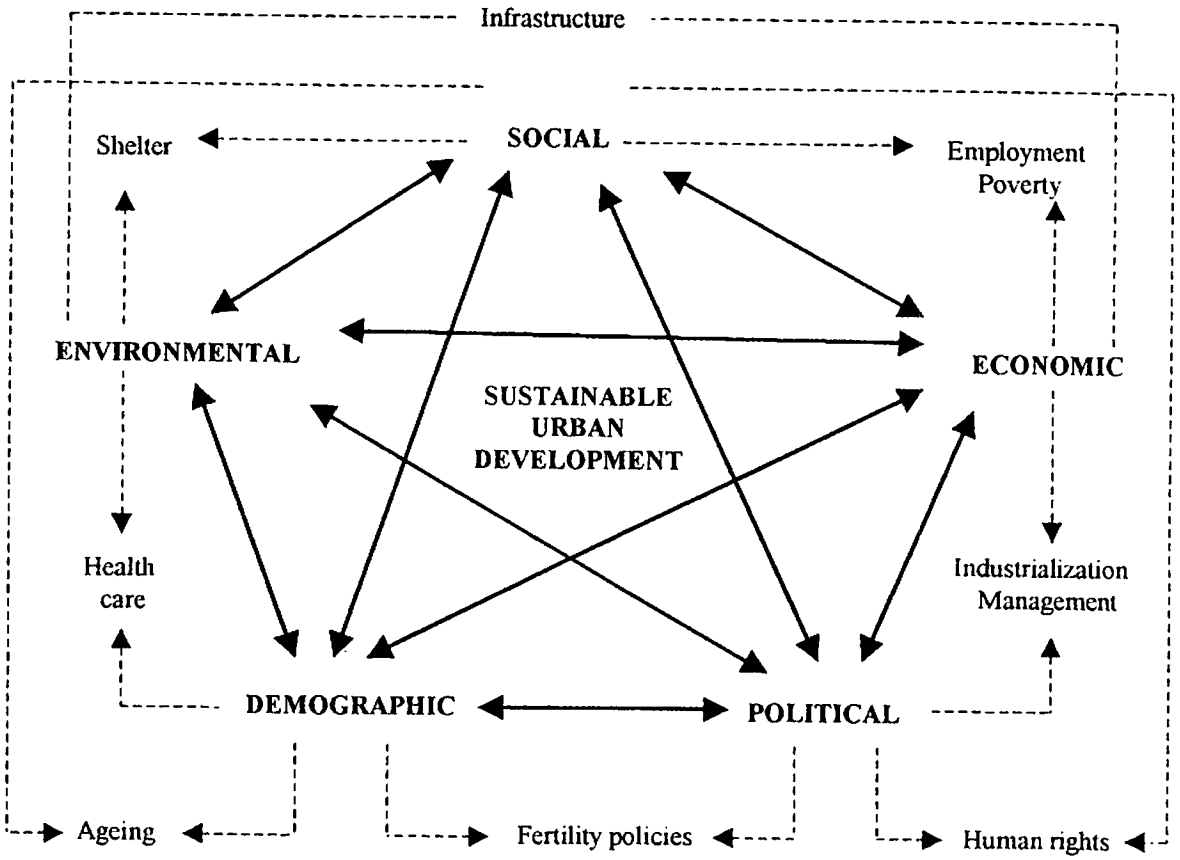
Although ability to achieve these goals relates to State economic well-being - one cannot deny correlation between sustainability improvements and economic development - policies encouraging sustainable urban development can and should be introduced to any management strategy, whatever the economic situation. One must recognise these goals as closely related and needing comprehensive and integrated attention. Addressing one isolated area will not necessarily result in lasting improvements. This is clearly illustrated in the environmental domain, where legislation and/or encouragement to enterprises or households to behave more responsibly has little impact if the underlying poverty effecting environmental attitudes by many urban residents is not addressed. As Forsythe (1996) observed, the ecological modernisation beginning to appear in some lower income countries reflects the agendas of local elites, foreign enterprises and international agencies. Low income groups often have quite different priorities, related more to their immediate living or working environments than to global warming or falling water tables.

2.5.3 Conceptual Framework of Urban Sustainability

The micro dimension of the definition of sustainability leads on from the principles outlined above to identify particular issues or components around which research and policy can be structured. However, through the framework provided by the macro guidelines it takes on board the need to be aware of the complex integrative nature of effective urban sustainability. Figure 2.9 illustrates just a few of the micro-level issues that can be raised within the overall conceptual framework of urban sustainability; crucially important to the investigation of such issues is the interwoven nature of the framework itself. Thus in the economic sphere it is essential that not only are the regional, national and global roles of urban economic activities

considered, but also what this means in terms of returns to labour. The role of the informal sector in this context is seen as crucial in it's ability to create income for groups in, or vulnerable to poverty, as well as providing flexibility to the manufacturing process and service sector. A series of similar and parallel issues can be raised for each of the basic components of the sustainability concept - all of which have multiple linkages. Figure 2.9 is, of course, meant to be illustrative not comprehensive or rigid, and many other components and linkages could be added to it (for further discussion see Drakakis-Smith, 1995, 1996a, 1996b, 1997).

Figure 2.9: Sustainable urbanisation: main components and indicative issues



Source: Drakakis-Smith, 1996

Mitlin and Satterthwaite (1996) suggest that the issues and concerns described above, might be taken to constitute the `development' aspect of sustainable development in the context of human settlements. The `sustainable' component, they argue, *"requires action to prevent depletion or degradation of environmental assets so that the resource base for human activities may be sustained indefinitely"* (UNCHS, 1996: 422). Specifically they identify:

(1) Minimising use of waste of non-renewable resources, including cultural and historic assets alongside energy and material consumed in industry, commerce and domestic use
(2) Sustainable use of renewable resources, such as water, crops or other biomass products
(3) Keeping wastes within the absorptive capacity of local and global `sinks', such as rivers, the sea or the atmosphere

These are eminently sensible comments, particularly in the context of the links between sustainable urbanisation and peri-urban areas, but can be interpreted as conflating sustainable development solely with ecologically sustainabiiity. What is clearly needed as well is a programme for sustaining and developing `human resources' through education or health care. Part of the problem in these interpretations is the nature of the discussion of sustainable urbanisation itself As a concept, it is relatively new. Indeed, as this discussion indicates, much of the debate has been within the contextual confines of `cities' rather than the `urbanisation process', often stressing the local in the face of the global. Thus the two main components are identified as development within cities and sustaining their resource base for the future. Such a conceptualisation makes it relatively easy to ae itr the ne s of the present generation of urban residents, but is less useful for giving substance to the nature of sustainability in the urban milieu. My contention here is that for such a fuller definition to occur, sustainability needs to be discussed in the context of the urbanisation process as a whole. Hence `sustainable urbanisation' is a more useful conceptual tool than `sustainable cities'. This will be reflected in this report in the sense that process will take priority over form in the analysis of peri-urban areas.

2.6 Poverty, Urbanisation and the Peri-Urban Interface

During the 1990s the relationship between urbanisation, economic development and poverty has intensified in focus and importance. Two quite different approaches can be identified in this debate which relate to this project.

(1) **Urban-based economic growth has substantially reduced poverty. The `virtual** elimination' of poverty in the `Four Tigers' of Pacific Asia frequently cited to exemplify the relationship (World Bank, 1993b). Unfortunately, other investigators, including UNDP (1995), **Booth** (1997) and Schmidt (1997) would dispute these findings, although not denying some relationship between growth and poverty.

(2) **Increased poverty and vulnerability accompanying widespread structural adjustment programmes imposed by international lending agencies. The** impact of such programmes, with their emphasis on **a reduced bureaucracy** and cutbacks in welfare programmes, has been disproportionately felt in cities, particularly capital cities and regional administrative centres. When coupled with increasing rural - urban migration, this has resulted in an increase in urban poverty in Asia (Firdausy, 1994), Africa (Gibbon, 1995) and Latin America (Latapi and de la Rocha, 1995) and, indeed, has in some heavily urbanised countries resulted in a shift in the absolute distribution of poverty from rural to urban areas (Table 2.1).

Table 2.1: **Absolute poverty in urban and rural areas (percentage below poverty line)**

	Urban[e]	Rural area	Percentage urban	Ratio of Rural poor to
Africa				
Botswana	30.0	64.0	29	4.8
Cote 61voire	30.0	26.0	41	1.3
Emt	34.0	33.7	47	1.1
Morocco	28.0	32.0	49	1.2
Mozambique	40.0	70.0	28	4.5
Tunisia	7.3	5.7	55	0.7
Uganda	25,0	33.0	11	103
Asia				
Bangladesh	58.2	41.3	17	3.4
China	0.4	11.5	60	18,9
India	37.1	38.7	27	2.8
Indonesia	20.1	16.4	31	1.8
South Korea	4.6	4.4	73	0.3
Malaysia	8.3	22.4	44	3.2
Nepal	19.2	43.1	10	21.0
Pakistan	25.0	31.0	33	2.5
Philippines	40.0	54.1	43	1.8
SriLanka	27.6	45.7	22	6 1
Latin America				
Argentina	14.6	19.7	87	0.2
Brazil	37.7	65.9	76	0.6
Colombia	44.5	40.2	71	0.4
Costa Rica	11.6	32.7	48	3.2
Guatemala	61.4	85.4	40	2.1
Haiti	65.0	80.0	29	3.1
Honduras	73.0	80.2	45	1.3
Mexico	30.2	50.5	73	0.6
Panama	29.7	51.9	54	1.3
Peru	44.5	63.8	71	0.6
Uruguay	19.3	28.7	86	0.2
Venezuela	**24.8**	42.2	85	0.3

Sources: UN Habitat (1996), World Bank (1994)

In general, the poverty debate has broadened considerably from simple income-based poverty lines to issues such as entitlements, vulnerability and deprivation (see Table 2.2 and Drakakis-Smith, 1996b). For the purposes of this review, however, the discussion will be confined to the particular nature of urban poverty and, as far as possible, the spatial dimensions of this situation in relation to peri-urban areas. As will become evident throughout this review, most cities have major spatial concentrations of deprived and vulnerable households near and beyond their peripheries.

Table 2.2: **Conceptualising poverty: a glossary of current terminology**

Poverty	Usually refers to low income, inadequate for purchasing minimum basic needs such as food, housing or health care. Income levels are themselves, however, the result of other factors, notably assets.
Deprivation	Physical deprivation refers to a lack of adequate material goods and services and is often resultant from poverty. Deprivation can also encompass powerlessness, weakening people's capacity to bargain for improved incomes, services and rights.
Vulnerability	A condition of insecurity which renders people and households exposed to deprivation under changed conditions, such as loss of income through illness, itself linked to limited assets.
Entitlement	The control exercised over resources and assets, such as land, property or paid employment. Entitlements often differ within the household.
Assets	The resources that individuals, household and communities can call upon when needed. These include investments (in housing, land, equipment, education, health), stores (food, money, valuable) and claims (on other individuals, patrons, government, etc.).

Sources: Wratten (1995), UN Habitat (1996), Moser *et al.* (1994), Moser (1994) **2.6.1**

The Urban Poor

Poverty in urban areas is often affected by a particular combination of factors which produce a type of vulnerability different from that which households experience in rural areas (Wratten, 1995; UNCHS, 1996). The most important of these factors is that the urban poor are much more immersed in the cash economy and must pay for most of their basic needs. Position in the labour market is, therefore, all-important and the status and sector of employment is a strong determinant of income and well-being. Many of the poorest are found in the informal sector where incomes are low, irregular and unreliable. Moreover, the costs of living in the city are much higher than in rural areas. Ironically, the costs to the poor of some basic needs, like water, are much higher than for the better off (Table 2.3).

Table 2.3: Water Charges in selected cities

	Average Piped Tariff US$ M^3	**Private Vendor** Tariff US$ M3	**Ratio PrivatelPublic°**
Jakarta	0.363	1.848	5.1
Bandung	0.268	6.161	23.0
Manila	0.232	1.873	8.1
Calcutta	0.049	2.099	42.8
Madras	0.046	0.875	19.0
Karachi	0.047	1.747	37.2
Ho Chi Minh City	0.045	1.511	33.6

Sources: various

In attempting to cope with these pressures, the urban poor are restricted in their options. Return migration to rural areas is not a widespread response, although it does happen (Baker, 1995); however, rural assets are often used if there is still access and entitlement. Coping is more difficult in and around urban areas too, because of the more fragmented nature of the household (more single-person) or the community (where ties are weaker than in rural areas), reducing the role of claim-based assets in limiting vulnerability.

Table 2.4: Urban household strategies for coping with worsening poverty

Changing household composition
Migration
Increasing household size in order to maximise eaming opportunities Not increasing household size through fertility controls
Consumption controls
Reducing consumption
Buying cheaper items
Withdrawing children from school
Delaying medical treatment
Postponing maintenance or repairs to property or equipment Limiting social contacts, including visits to rural areas
Increasing assets
More household members into workforce
Starting enterprises where possible
Increased subsistence activity such as growing food or gathering fuel Increased scavenging
Increased sub-letting of rooms and/or shacks

Source: Rakodi (1995)

Despite difficult conditions, the poor cope and are not passive recipients of their fate, as suggested by Oscar Lewis (1952) in his `culture of poverty' theory. Rakodi (1995) has outlined three broad strategies, each with a set of actions, through which the poor attempt to cope with worsening poverty and increasing vulnerability (Table 2.4). Of course not all strategies are available to all poor households; it depends on internal structure, local and national circumstances and links between these. However, we can note that there are two broad spatial consequences of such coping actions:

(1) **Those who cluster in central areas** where jobs, particularly casual manual labour or informal services, are more readily available. However, because of increased living costs of the central city, this strategy is usually limited to singleton households with limited service/shelter requirements.

(2) **Those who need more shelter space at low** cost for whom limiting household size is not a major option. Often this takes the form of squatter settlements peripheral to the city, in which various informal income-earning activities take place and around which there may be opportunities for cultivating food (addressed elsewhere in this review). These activities may well be the consequence of such settlements being beyond the official boundaries of

the city, but this is not always the reason for inactive management responses. Finally, it must also be noted that peripheral settlements and activities are not always illegal and may indeed be the preferred option of households for whom the centre of the city provides an unattractive economic, social and environmental option.

The most important point to make in this context is that for many of those in poverty, or vulnerable to changes in their circumstances, a location in the peri-urban area is an integral factor in their survival strategy. As a result poverty, vulnerability and their relationship (both positive and negative) with the natural resources of the peri-urban interface will feature as a prominent thread running through this review, not only in terms of explaining natural resource usage but also in terms of affecting management responses to the problems highlighted.

2.7 Gender In Peri-Urban Areas

A clear focus of research on gender and development in the 1980s and 1990s has been the need to include a gendered analysis in all development work, rather than merely `adding gender on' (Pearson, 1992; Moser, 1993; Kabeer, 1994; Elson, 1995; UNDPa, 1995). The purpose of this section is, therefore, not to cover all aspects of peri-urban resource issues from a gendered perspective, but to provide an introduction to concepts used in gender and development studies and to highlight some of the main themes discussed in later sections of this report.

Although this section deals with `gender', it mostly focuses on women. This is a reflection of the current literature on the topic which, although recently addressing issues of men and masculinities in development, for example in family planning and health (see Cornwall, 1997; White, 1997), has tended to focus on women. Similarly, nearly all work on gender has dealt with low-income populations. This bias will be apparent from the following discussion.

As many researchers note (see Moser, 1992, 1993) one of the reasons development theory and practice has been gender-blind, is the negligent recognition of what Moser has termed the `triple role' of women:
- Productive, or income-generating activities
- Reproductive activities involved in the maintenance of the household
- Community activities

These activities, while taking place throughout the city, may take particular forms in peri-urban areas.

The need to incorporate a gendered analysis into all aspects of development research has been widely acknowledged. In this brief section, the importance of this consideration in peri-urban areas has been highlighted with reference to economic activities, **reproductive** tasks and the particular context of female-headed households.

2.7.1 Economy

Women's participation in the urban labour force has increased since the Second World War, reflecting increased levels of education, changes in social norms regarding female employment and increased demand for female employment in `women's jobs'. There was also a significant increase in female labour force participation as a response to economic crisis in the 1980s and associated structural adjustment policies (Vickers, 1991; Tripp, 1992; Beneria, 1992; Chant, 1994). In the context of economic activities in peri-urban areas, the two main features of interest are participation in informal sector activities and involvement in urban agriculture. In many ways, economic demands on, and opportunities for, women have been superior to those of men. A major emphasis for many development agencies has been income generating

programmes for women, to enhance cash income and, hence, socio-economic status and personal autonomy.

Nevertheless, women tend to be over-represented in the informal sector, as informal activities tend to be more flexible, do not require high levels of education and allow women to combine household responsibilities with income-generation. Informal occupations open to women include taking in washing, dressmaking and food selling. While they can be undertaken anywhere in the city, there is evidence that informal activities are more successful in the city centre where there is a larger market (Strassman, 1987). Because women tend to have less spatial mobility than men, they are more reliant on employment opportunities in or near the home (Hanson and Pratt, 1995; OECD, 1995). As a result, women living in peri-urban areas may not be able to participate in informal activities as much as women living in city centre districts (Willis, 1996), although opportunities for agriculture related activities may be greater in these locations.

Gender divisions within urban agriculture demonstrate regional variations, often reflecting the gender division of labour in agriculture in rural areas within particular countries. For example, in Harare, urban agriculture is characterised by a division of labour in which house gardens, where green vegetables are cultivated, are the responsibility of women. Women are also responsible for selling any surplus from the home or from casual pavement sites. Men often look after more distant, usually illegal plots in which maize is grown, mostly for household consumption. One of the main reasons for this is personal safety in areas away from houses. Peri-urban plots of maize can provide shelter for muggers. In West Africa, however, women usually undertake all tasks.

2.7.2 Infrastructure

Because responsibilities for household chores fall most heavily on women, there are clear gender implications of poor infrastructure in peri-urban areas (Tinker, 1995). As highlighted in Section Four (Housing), many low-income households construct in peripheral areas without access to piped water, electricity or drainage systems. Women's daily contact with water through washing themselves, their children, clothes and dishes, means that they are far more exposed to water-bome diseases than men (Jordon & Wagner, 1993). They are also placed in physically demanding roles relating to gathering water when potable piped supplies are not provided.

2.7.3 Natural Resources

A consideration of reproductive activities in peri-urban areas needs to include not only the impact of poor infrastructure, but also the differential roles of women and men in the consumption of raw materials found on the urban fringe. On a day-to-day basis the most important resources extracted are fuelwood, water and food. World-wide it is usually women who are largely responsible for fuelwood collection because of its association with food preparation (Ardayfio-Schandorf, 1993). Similarly women generally collect water. It is, therefore, women who are having to spend more and more of their time collecting firewood as the areas nearest to the city are stripped of appropriate fuel.

The management of natural resources, particularly communally-owned ones, although often carried out on a day-to-day basis by women, is usually vested in the hands of men (Agarwal, 1997). Not only does this lead to problems of sustainability, but it also excludes a large section of the population from decision-making processes (Meinzen-Dick *et al.,* 1997).

2.7.4 Female-Headed Households

One of the themes of gender and development research in urban areas has been a consideration of the particular needs of female-headed households. There are obvious problems with defining headship by sex (see Varley, 1996 for an overview). However, there needs to be a recognition that female headed households are not always lone mothers with young children (Varley, 1996; Chant, 1997). Female-headed households may need to be considered as a separate category in certain contexts.

The extent of female headship in urban households is greatly contested (Varley, 1993, 1996), but there is evidence that female-headed households are increasing absolutely and relatively throughout developing world cities, although varying regionally. Whilst it is clear that such households are not always among the very poorest (Chant, 1997a, b), it is apparent that for many female-headed households owner-occupation in peri-urban areas is not possible because of financial constraints, or because women are excluded from participating in government sites and services schemes (Machado, 1987; Nimpuno-Parente, 1987; Vance, 1987; Moser, 1992; UNDP, 1996b). However, it may also be that women heading their own households prefer to live in rental accommodation in the city centre where they have access to work and local support networks to help with childcare (Gilbert, 1993; UNCHS, 1996). It should be said that evidence varies and there is a quite strong regional differentiation.

2.8 Conclusion

The above discussion leads us firstly to the conclusion that the peri-urban interface is not easily defined, nor does it feature strongly in the literature as a term or reference. It should perhaps be considered in basically as the interface of different systems and processes at the rural-urban fringe. The peri-urban is an area which can only loosely be defined in spatial terms and its$_i$ extent is generally shifting. Certainly, its activities are characterised by great diversity and in which resource management issues are complex and evolving. Thus, peri-urban may be best examined in terms of the development processes which it is experiencing and which change, sometimes rapidly, over time. Whilst these experiences may be spatialized in empirical terms, such perspectives often represent chronological snapshots which have changed by the time of the next review. Moreover, they may relate closely to the local context, making more broadly relevant conceptual conclusions of dubious validity.

Secondly, there are several key issues which need to be considered in a review of the peri-urban interface - namely poverty, gender and the new and emerging concept of sustainable urbanisation. The importance of these issues is unquestionable and the remainder of this review should contextualise the peri-urban with respect to them. In order to create *effective* and informed planning and managerial goals for the peri-urban area, a thorough understanding and appreciation of these issues is paramount.

3 LAND AND ECONOMIC ACTIVITIES

3.1 Introduction

This section examines land and associated economic activities of the per'-urban; with particular attention to communications, manufacturing, service industries and urban agriculture. Land is the prime natural resource, but land values, uses and ownership patterns vary greatly both within and between the peri-urban interfaces of cities.

3.2 Land Issues and the Peri-Urban Interface

This section examines the complex and overlapping relationship between land use, access, values and management. The literature rarely specifies the peri-urban, with the notable exception of Van der Berg (1984). Although his study draws on detailed investigation of Lusaka, he discusses major land issues more generally. In contrast, the comprehensive text on land edited by Angel *et al.* (1983) is broadly geographically focused (on Asia), but primarily discusses land problems relating to urban poor shelter provision (again not specifically peri-urban). Further individual papers and reports are utilised by Bhadra and Brandao (1993) in a World Bank study with useful comparisons across developed and developing nations.

3.2.1 Changing Land Use Patterns

Land values are inextricably linked to land usage (and other influences). Most international observers of the urban fringe commenting on its complex, wide-ranging mix of land uses (see Wissink 1962; Carter 1981 and Van der Berg 1984), showing little or no correspondence with classic models of (western) urban land uses, posited by Von Thunen 1966, Burgess 1925, and Hoyt 1939 (see 2.2). Van der Berg alleges that land use patterns are shaped as much by socio-cultural as economic and political; citing ethnic differences as illustration (see also Lourenco-Lindell, 1995): Considering colonial tenure differences, much successive peri-urban development has been determined, even since independence, by land tenure and ownership. This vividly illustrated in Zinyama's (1993) excellent study of Harare's historical geography. Nkambwe and Amberg (1996) confer this relationship in their study of the consequences of urban pressures on adjacent spaces under different ownership types in Gaborone's urban fringe.

In the context of housing development Tipple (1994:8) highlights how "*in land administration, clarity of title and sound registration practices seem to be lacking in all too many countries so that the land is difficult to acquire even where a developer can pay the market price.* " This has key implications for issues of urban management (discussed in section six), particularly on the urban fringe, but even if land ownership is clear, differing ownership patterns will affect the direction and type of development. For example, Dredge (1995) highlights how the transfer of communally-held *ejido* land to privately-owned property around Xalapa, Mexico in the 1970s and 1980s aided the physical expansion of the city.

Most peri-urban land use change discussions, revolve around shifting `rural' to `urban' uses, largely meaning agricultural to non-agricultural (though conceptualisation of `urban' or `rural' land use has rapidly diversified). For example, in developing countries, an estimated 476,000 ha. of arable land is converted to urban uses yearly (USAID, 1988, in World Resources Institute, 1996: 59). At a smaller scale, some 32 Km^2 of land was converted from rural to urban uses around Bangkok between 1974 and 1984 (Dowall, in Bhodra and Brandao, 1993). Frequently, of course, land is idle as one set of users is forced out and new uses are yet to be accommodated (Hill, 1986). Often there appears little logic when prime agricultural land is

built over before less productive tracts. In part, this is owing to transport route quality /productive land value correlations. For example, Robinson (1995) and Ocampo (1995) describes ribbon development in Bangkok and Manila respectively. Here urban expansion is along main transport routes, with housing and industrial developments leapfrogging zones of contested tenure. There are, however, other reasons such as political corruption or cultural constraints - the latter encompassing variations in tenure that make individually-owned plots more accessible than customary or group owned tracts.

3.2.2 Land Use Processes

In analysing land use processes, Van der Berg (1984) has classified two groups: Centripetal and Centrifugal (though largely analogous to rural and urban respectively). Positively the model conveys variation in those types of rural and urban land uses likely affected by forces of changes exerted by urbanisation.

- **Centrifugal** Forces (easiest to identify) are grouped into:
  (1) Noxious, though necessary, uses pushed from centres (including squatter settlements as well as rubbish dumps, industrial plants etc.).
  (2) Large scale uses requiring cheap land (e.g. sewage plants, cemeteries, airports).
  (3) Uses attracted by space, such as middle class residential developments.
  [One should also add those relating to speculative profits encompassing idle or short-term, temporary land use.]
- **Centripetal Forces**
  (1) More intensive profitable rural activities which, attracted by proximity to concentrated wealthy markets, gradually push out the less profitable. For example, cereals and grazing being replaced by dairies, market gardening, piggeries and floriculture (see 3.5).
  (2) Other types of `rural' activities such as garden centres, riding stables and related `rural recreational' uses (woodland reserves with barbecue facilities, urban game parks etc.).

Mixing centrifugal and centripetal processes and resultant land use patterns, generate forces that in turn influence peri-urban agriculture: Bhadra and Brandao (1993) noting:

- Increased tendency towards speculative decision-making when land becomes a financial, rather than a productive asset
- Increased impact of the market as transport costs are reduced;
- The social impact of the city through, for example, increased vandalism or theft of crops.

All these forces shape peri-urban farmers' responses. Indeed, given competition from competing urban land uses, wherever the peri-urban area is located at any given point in time is usually the principal zone of conflict in terms of tenure.

Van der Berg (1994) has produced an even more detailed typology of different types of urban farming (Figure 3.1). He also explains their spatial patterning and other land uses in the peri-urban area by suggesting that: Those most directly related to the city (through markets or tenure) constitute an inner zone, whereas an outer zone is formed by those less city dependent, or residuals of former traditional land uses.

This generalisation has some validity, but ground truthing reveals a more complex mix of land uses, influenced by various factors. Poor soils strongly affect farm size and nature and, also, building activities - Horvath (1969) noting vegetable farming persistence along river banks quite near centres owing to building unsuitability. Lourenco-Lindell (1995) also reports strong correlation between ethnicity, land use and land tenure - with the basic site crop cultivated by original Bissau ethnic groups on customary land, and market gardening by more recent arrivals on land of very mixed tenure.

Figure 3.1: A typology of farming activities in the urban fringe

Background of farmer	Importance. of farming	Size of farm - Large-scale NO ha) -	Medium4cale' (2-10 ha)	Small--scale (<2 ha)
Urban invaders	little	Large property Owners Town-based Land speculators Country estates	'salariat' 'hobby farmers'	'leisure gardeners'
	some		big-man-in-town' market gardener	Allotment gardening 'subsidary gardening by urban employees
Rural vacators	little	Farmer - subdivider	Rural working-class commuters	
	Some	Part-time Commercial farmer 'undercapitalized uneconomic farmer		
Rural stayers	much	'truly commercial farmer'	'traditional ruralities' (tend to be specialised in activities like garden centres, horse-keeping, etc.)	Agro-industry (greenhouse horticulture, piggeries)

Source: Van der Berg (1994)

Ciparisse (1997) in his discussion of peri-urban agriculture, refers to peri-urban areas as "new *frontiers "* describing how they represent land conflict zones - a need for cheap nutritious food for urban populations, whilst expanding populations increase land resource pressures as housing, infrastructure and industry demands increases. He advocates a strong local and national state role in managing these conflicts, stressing the importance of incorporating agriculture into urban plans, securing tenure for peri-urban agriculturists (men and women), using satellite images to map land use activities, and assessing the marketing of pen-urban produced food.

3.2.3 Land Values, Tenure & Ownership

It is thus clear that peri-urban land use is influenced by more than only natural and economic resources. As Angel *et al.* (1983: 3) note, *"the land issue is not a technical issue. It is largely a political and institutional one"* (particularly true of land access). The state acquires large tracts of peri-urban land for public (universities, sports stadia) or industrial uses at minimal compensation (if any) hugely disrupting land use patterns (Swindell, 1988). Of course, many gain illegal access or have `arrangements' with gate-keepers. However, insecurities of such arrangements can strongly affect usage, including use and abuse of associated natural resources. Baross (1983) has divided access to land into several distinct categories based both on the process of transfer involved and current land use (Figure 3.2). Whilst Baross writes principally of access to land for shelter, his categorisation has relevance for peri-urban areas in the sense that much, but not all, of land access is non-commercial, and increasing urbanisation is indicated by increasing involvement of commercial and administrative modes of access (see Main and Cline-Cole (1986) for a study of this infiltration process in Kano).

An identifiable peri-urban characteristic is often unruely tenure (see Yahaya and Shekamang, 1986), further aggrieved when lacking cadastral maps. Doebele (1983) has suggested concentrating research on three `strategic moments of transition':

1) (most valid to the peri-urban) The informal or formal division of land into `urban-sized plots', signalling rural to urban use transition. Land controls and taxation can here be used to shape the nature and pace of change in the peri-urban interface.
(2) When major urban services are made available to peri-urban areas, usually precipitating a second land value rise. As such services are usually the result of public intervention, the possibility for land control is correspondingly high.
(3) The point at which constriction begins, strongly influenced by farming and building regulations.

Each `moment of change' is important for pen'-urban development as it identifies crucial stages in changing land values at which management intervention can be critical in shaping the nature and pace of change (though strongly influenced by local actors' weights). These encompass not only local bureaucrats and planners but also agrarian and urban elites, commercial and industrial elites, the nature of the middle class, and features of low-income populations (recent arrivals, renters, land owners etc.).

Figure 3.2: The range of ways through which people obtain land for housing in cities in the South

Formal Commercial	Informal and/or illegal
• Public or private residential development of serviced sites available through purchase or renting • Land purchase with approval obtained for its use for housing	• Purchase of plot in illegally subdivided public land • Purchase of plot in illegal subdivision • Purchase of house site formed by subdivision of existing plot • Renting of land site on which a shelter (often only a temporary shelter) can be built • Purchase or renting of permission to develop a house on a plot without tenure rights to the plot
Semi- or non commercial	
• Government subsidised site and services schemes	• Settlement on customary land with permission of traditional authority or farmer - although the size of 'gifts' given for this may reach a level where this is better considered as commercial
• 'regularization' of tenure in what were illegal settlements • inheritance or gift	• squatting on government land • squatting on marginal or dangerous land which has no clear ownership • squatting on private land • 'nomadic' squatters who use site temporarily

Source: UN Habitat (1996)

In his 1984 analysis, Van der Berg undertook a comprehensive review of land values in periurban areas derived from earlier studies. Whilst generally there is, as expected, a value decline from centre through peripheral to rural areas; this is not uniform and, in common with land use patterns and tenure, exhibits considerable spatial variation and chronological erraticism. For example, Briggs (1991) notes a rise in peri-urban land values in Dar es Salaam of some 450% between 1986 and 1988 following deregulation of food marketing. Van der Berg (1984) outlines a series of hypotheses related to these patterns which he uses primarily to assess the situation in Lusaka. However, the essence of these hypotheses provide useful insights into the range of issues related to land values in peri-urban areas in general:

a) Land values can be influenced by cultural characteristics. For example, group ownership often discourages attaching any economic `value' to land
b) Incipient and hybrid land markets often emerge in peri-urban areas; for example, through gifts to chiefs in return for usufruct rights
c) Land use planning is often ineffective in reducing speculative action
d) Land values decrease not just between the city and the rural areas but also with increasing distance from major radial roads
e) Land values in the peri-urban area will be conditioned by the mix of uses on either side of the `urban/peri-urban border'
f) Physical conditions, such as site, soil, aspect and vegetation, continue to *affect* values
g) Land values tend to increase in phases over time, coinciding with periods of economic expansion of the city

This last point underpins the chronological situation structured by Doebele (1983) confirming the importance of identifying crucial moments for management action. Unfortunately, the literature on land management *per se,* as opposed to urban management overall, is limited and not significantly peri-urban focused. One can, however, extrapolate. In Asian megacities, Khan and Lanarch (1996) examine demand and supply processes affecting land, summarising key issues in two tables (Figures 3.3 and 3.4). They also summarise key lessons from current land management practices (Figure 3.5). In their view, peri-urban urban sprawl is mismanaged rather than unmanageable Though current urban development strategies often by-pass periurban chaos, by consolidation into the city proper, or leapfrogging the urban periphery developing `city-out' policies viz. new towns or rural urbanisation (see Kirkby, 1996 for a discussion of this in China).

Figure 3.3: Key Lessons: Demand for Land

• High land prices deter residential and commercial investors and create inequality

• Unrealistic zoning and inefficient bureaucracy prevent market forces from determining an optimum equilibrium between demand and supply

• Slow and cumbersome land transfers procedures impede efficient and equitable allocation of land use

• In many of the DMCs, the role of agriculture in the economy and the impact of urban growth upon agricultural production is an important consideration

• Lack of accurate, timely information affects demand and promotes uncertainty in the market

• International trends in communications, information technology, and the growth of the service sector have major implications for urban spatial structure

Source; Khan and Lanarch (199)6

Figure 3.4: Key Lessons: Supply of Land

• Government intervention has created inefficiencies in the supply side of the land market.

• Enormous population growth, unanticipated economic growth and structural change, globalisation, regulations, and speculation have caused land price escalation, contributing to changes ownership patterns and social polarisation, for example.

• Infrastructure provision is vital for ensuring productive land use and increasing supply.

• Inadequate supply and high prices have negative impacts for social equity.

• Loss of some government control is required for environmental sustainability.

Source: Khan and Lanarch (1996)

Figure 3.5: Key Lessons: Managing Land, Current Practices

• Growth management initiatives involve a balance between the unacceptable inequality arising from inevitable externalities and other breakdowns in the market mechanism, and the inefficiencies shown to result from conventional state regulations.

• Minimum standards of land use are necessary to ensure interests of all parties are served

• The fallibility of policymakers, inflexibility of traditional zoning, and inequality of zoning produce inefficiencies.

• The significance of the informal economy must be recognised and incentives put in place to encourage more effective development of this sector.

• Equity and economic efficiency can be compatible with the implementation of realistic regulation, accurately targeted services, and infrastructure and cost recovery mechanisms.

• Deregulation should be planned and undertaken carefully. It is critical that planners take into account, and not underestimate, the setbacks that characterise any adjustment period.

• The increasing practice of joint ventures between the public and private sectors promises to be the most effective means of working toward deregulating the land market.

• *The* role of public land development agencies in land banking and development has been shown to be inappropriate for today's circumstances.

• Irmovative schemes that rely on private acquisition and development within a state co-ordinated framework, to maintain city-wide planning aims and equity considerations, are illustrative of appropriate alternatives to the conventional approach of direct state involvement in the land market

Source: Khan and Lanarch (1996)

3.2.4 Land Management

Strongly linked to land management is the nature of governance. Here peri-urban areas, despite their spatially nebulous nature, hit the rigidities of administrative boundaries. What happens to peri-urban land values, land use and land tenure very much depends *who* is responsible for development. If mostly municipal, development will likely be different to that promoted by a regional development authority. Municipal authorities may wish to create green belts or shift industrial growth from congested central areas. Regional authorities may seek raised revenue from industrial growth near cities, or preserve agricultural production for political reasons. Peri-urban administrative patterns are, however, more complex. Soussan (1980), describes a situation whereby villages encompassed by an expanding Dehli retained their own administration for a considerable time, facilitating inward movement of people and enterprises. Bhadra and Brandao (1993) suggest that the critical role of land in society is justification for government intervention in land markets viz. ensuring food security, reducing negative externalities, preventing environmental degradation and excessive speculative holding. Common to Pacific Asian countries, such as China and Vietnam, is a form of double urban governance with a (mostly built-over) recognised inner city, and an outer suburban dimension usually with considerable agricultural activity. For example, the suburban area of Hanoi contains over a million people and also some 40,000 hectares of agricultural land.

Whatever authority is responsible for peri-urban areas, all would benefit from improved land management. Drawing from Soliman (1987), Pierce (1983) Khan and Lanarch (1996), Bhadra and Brandao (1993) Chambers (1994), Hasan and Mulamoottil (1994) and Newman (1993), the following general points have been compiled on more effective land management. (These do not necessarily represent the views of the authors).

a) Government control of land supply should be gradually withdrawn and complemented by improved land administration, registration, infrastructure, and environmental protection Demand management through unrealistic zoning, housing patterns, regulations, and similar approaches, distort prices, produce inequality, and stunt development. New interventions should consider fiscal measures, improved infrastructure, time and economy in processing of land registration, indirect demand regulations for rural-urban balance, improved access to quality information, and easy access to credit for low cost housing
b) Deregulation is important for the achievement of market efficiency, although limited regulation is necessary to ensure equity and environmental sustainability
c) The significance of the informal sector must be recognised and necessary incentive packages may be provided to help consolidate its assembly and growth
d) Traditional state-managed land development agencies produced neither economically efficient output nor assisted equity
e) Assessment of political and economic dynamics indicates the need for reorganisation of city governance to enhance its autonomy, fiscal authority, and capacity to plan and implement development in a more flexible and consultative way
f) Corporate management strategy, rather than the co-ordinative management strategy, with improved information technology (application of a geographical information system) seems to be the answer for city planning with interconnecting multiple variables

3.2.5 Conclusion

This section has found that rather than reflecting western models, cities in developing nations have demonstrated that physical characteristics such as land quality and location are not the only crucial factors in determining land values and uses. Also social, cultural, economic and political forces are also of great importance.

3.3 Economic Activities in Peri-Urban Areas

Section Two has shown employment the principal attraction for urban (and peri-urban) migrants, where opportunities are perceived better than in rural areas. For discussion, we may categorise tertiary, secondary and primary activities. The latter, as in subsistence farming, is not necessarily remunerative and such activities (such as food production) are discussed in 3.5. Section 3.4 discusses issues relevant to transport and communications.

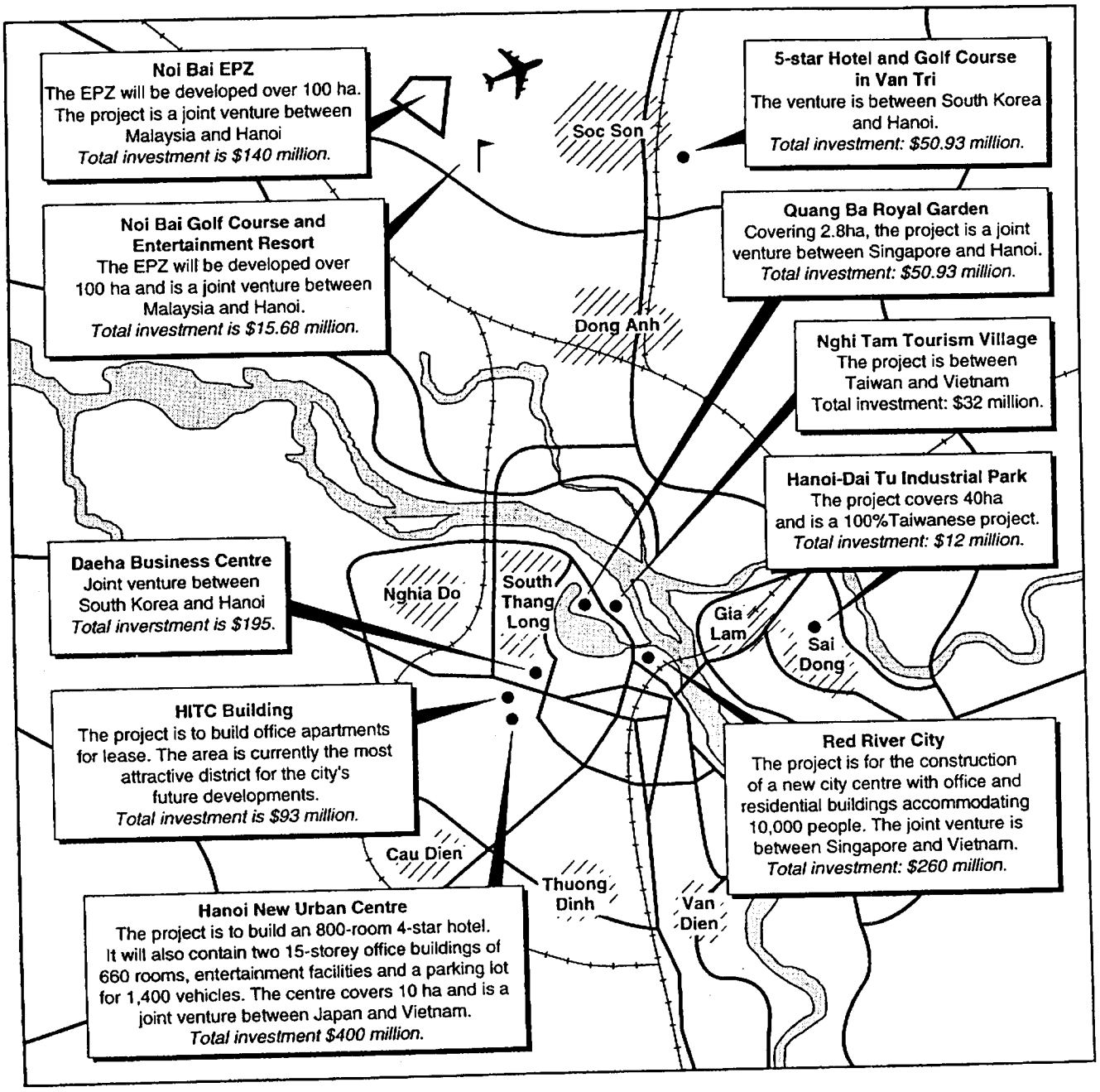
3.3.1 Secondary and Tertiary Activities

Peri-urban areas provide much `secondary' employment. This relates to a variety of input factors, such as levels of external and domestic investment, land prices or conditions in the central city. This situation in many rapidly industrialising countries is of economic growth focusing on one or two large cities. In Bangkok, industry (usually large-scale) is or has moved out of congested central areas where land prices have risen more than five fold since the mid 1980s (Wongsuphasawat, 1997; Dixon, 1998). By 1993 approved developments in the outer ring of the Bangkok Metropolitan Area (BMA) were double the BMA itself Developments radiate along roads leading out of the BMA in corridors 20-40 metres wide; factories interspersed with residential accommodation (often barrack-like units for female workers). In-filling between these strips is uncontrolled and chaotic, often resulting in substantial land speculation. As Dixon (1998: 18) notes *"large tracts of land have passed out of agriculture and into the hands of developers and speculators"* - estimates put this at some 5-7% per annum. In Bangkok, this is highly productive agricultural land lost.

Less typical, are large-scale free-standing industrial estates consuming more land and natural resources. Again in Bangkok, the Gateway City development, located near the city's main airport and container port, covers some 1700 hectares. In addition to consuming large tracts of land, and encouraging land speculation, such peripheral developments have enormous impact on surrounding natural resources through air, water and soil pollution (Hardoy, Mitlin and Satterthwaite, 1992) with knock-on effects on agriculture for example.

Bangkok is not atypical. Cities of more recently industrialised countries exhibit the same trends in their peripheries. Figure 3.6 illustrates Hanoi where two large industrial parks are being developed across the river from the main city. Hanoi also illustrates other major peri-urban developments typical of Pacific Asian cities viz. large scale recreational or institutional uses, such as army/police barracks, airports and golf courses, despite recent moves to prohibit building on rice land - a move more likely to encourage the further development of mega-urbanisation (Cooke 1995). Employment in these large-scale enterprises varies considerably with many jobs created at airports but relatively few in most tourist developments, particularly in `green areas'. However, in terms of natural resources all are space/land consuming and this is likely to increase as incomes rise and leisure time expands. In Hong Kong, for example, Hill (1986) reports a doubling of the numbers using country parks between the late 1970s and mid 1980s. Such changes also place additional burdens on other natural resources, particularly water. For a more detailed discussion on the effects of recreational developments on the periurban area, see section four. Of course, not all peri-urban areas suffer SE Asian style large-scale developments, although even in cities such as Peshawar many new industries are 20km from the urban centre (Khan, 1994).

Figure 3.6: Development in Hanoi



Soc Son: Noi Bai International Airport is located in this area. Malaysia is investigating in two projects there: A golf course and an EPZ

Dong Anh: At the moment the area is one of the main vegetable supplying sources for residents in Hanoi

Nghia Do: Only five minutes from the West Lake, a property development area

South Thang Long: Attracts a lot of foreign investment. The infrastructure is good with the water supply system aided by the Finnish government

Gia Lam area: Called the 'Daewoo area', and it will soon become a satellite city of Hanoi

Cau Dien: Recently approved project of traditional Cultural Tourism Villages

Thuong Dinh: Local industrial area

Van Dien: An industrial park with infrastructure not yet developed. No foreign investment at present

Source: Vietnam Economic Times (September, 1995)

3.3.2 **The Informal Sector**

Employment related activities around secondary cities in Asia and most African cities are primarily small in scale, and often `informal'. There is an abundant literature on the informal sector, a term which emerged to prominence, like `Third World', in the 1970s when non-formal economic activities were first investigated. Rural-urban migration is commonly regarded as an important labour source for the informal sector (see Gupta, 1992) but not exclusively so. Other ways of identifying this amorphous group of activities are their generally small-scale, family-orientation, low technology and minimal capital inputs. Whilst many productive activities occur in the informal sector, most of its activities relate to service provision of one kind or another.

Much informal sector literature relates to the 1970s and 1980s and is currently unfashionable, with the notable exception of the edited volume on South Africa produced by Preston-Whyte and Rogerson (1991). This is despite the role identified for the informal sector in ameliorating the worst impacts of structural adjustment. However, this role has tended to be subsumed within discussions of poverty rather than the informal sector *per se. Some* interest has been generated by the apparent similarities between `flexible specialisation' in the West, and the informal sector in developing countries, but as Parnwell and Turner (1997) point out, flexible specialisation can be regarded as swimming towards success, whereas in the informal sector most enterprises are floundering for survival.

The common factor in almost all these studies, theoretical or empirical, is their aspatial nature, so that the location of the informal activities is rarely discussed. As a consequence, not only is the peri-urban dimension to informal activities poorly covered, but the links to and impact on its natural resources are also thinly investigated. This is a major omission in the research literature in my view because of the heavy emphasis placed on the informal sector in so many structural adjustment programmes.

There are few exceptions to these general criticisms. Isin (1987), for example, undertook a factor analysis to attempt to explain the ways in which the informal sector appropriates and transforms the urban landscape. He does not refer to the peri-urban area as such, but does discuss why various enterprises locate at various points around the city. He concludes that location factors are immensely varied and are often a complex mix of the entrepreneurial actions of the individual, the social relations of production and the fact that informal activities continually change the urban landscape itself. Sousson (1980) has a more spatial emphasis, relating the nature of employment changes in the enclave villages of Delhi's peri-urban areas to the nature of their surrounding neighbourhood**.** Thus, those in high-income areas generate service jobs whilst those in industrial districts give rise to labouring and small-scale enterprises. Perhaps the most theoretically informative paper is that by Van Dijk (1983) who specifically investigated the locational behaviour of small entrepreneurs in Ouagadougou as a basis for spatial planning. In this he overviews and rejects classic location theories, conceding that informal entrepreneurs may well be `satisficers' rather than `maximisers' in their motivation, but that motivation *per se is of* minor concern in their location decisions because of the climate of uncertainty and vulnerability in which they make such decisions. The principal features of this study which relate to peri-urban areas are indirect, in the sense that this area is simply implied in the discussion i.e. it is not the city centre. Perhaps the main feature which emerges is that entrepreneurs involved in production may have a tendency to move to peripheral areas in order to obtain tenure to land on which they establish their business. As there is also a preference for an association between workplace and home at this level, the peri-urban areas may also be able to provide this. Certainly in the sphere of exchange or service activities, there is often a strong association between activity and residence in Africa where the urban periphery is characterised by illegal or semi-legal stores operated from the home or as an extension of it.

These enterprises go by a variety of names such as `spazas' or `tuck-shops' and are found throughout most African cities. However, there is a tendency for them to become more prominent in peri-urban areas because of the absence of `formal' competition, because they meet local convenience needs and because they are often beyond the formal controls of city authorities (for some discussion see Dewar and Watson, 1991; Rogerson, 1991 and Drakakis-Smith and Tevera, 1993).

Ironically, the main retail competition to these illegal stores, often comes from even more informal activities such as street sellers, either from fixed table sites or casual pavement retailers. As Drakakis-Smith & Tevera (1994) have shown, such activities often compete with each other making little economic sense to all. Such retail activities usually affect the periurban resource base only when they result from direct production in the same areas. This particularly occurs through the retailing of food and will be more comprehensively dealt with in the next section. However, it is also worth noting that peri-urban retailing, particularly through the informal sector, often produces considerable amounts of recyclable waste (also discussed elsewhere in this report), which itself becomes the basis of further informal sector activities (Tevera 1993).

The direct impact of informal production activities on natural resources and the environment, particularly from manufacturing, like their more formal and sizeable counterparts, are usually considerable. Indeed, as Bartone *et al.* (1994) point out, small-scale production activities often` pose far greater pollution problems than large-scale industries. The latter are more likely to be monitored and conform to existing standards and legislation. The dubious legal status of many smaller industries on the other hand, means that they `might as well be hung for a sheep as well as a lamb'; dated and poorly maintained machinery also exacerbates this situation. Add to this the fact that many of the industries pushed to the semi-periphery are the more noxious ones and the impact on soil, water and air quality is often severe; for example, tanning or dyeing industries. However, there are also activities using specific resources located in peri-urban areas; brick and cement for example with sometimes devastating effect (Hardoy, Mitlin and Satterthwaite, 1992). Around Bangkok, large areas of fertile top soil have been sold by small farmers to brick-makers leaving water-filled ponds in which new soils will take decades to regenerate (Parnwell, 1988).

The literature is correspondingly limited in policies towards these production and exchange activities in peri-urban areas. Whilst informal sector planning receives considerable attention, its spatial context is largely ignored. Dewar and Watson (1991) do discuss the urban fringe but only in the context of urban agriculture (discussed below). Production and exchange within the peri-urban areas is not discussed, other than through indirect reference to the need for planning in South African cities to implode and make more use of open spaces within the city proper, thus stabilising the moving edge of the urban fringe. There is some sense to this latter point for stabilisation of the rapid changes usually affecting peri-urban areas would enable more consideration to be given to the planned development of human and physical resources.

3.4 Transport And Communications

The share of infrastructure expenditure which transport and communications activities represent, tends to increase with increased national wealth (UNHCS, 1996: 263), but are still important in lower-income countries. In terms of the spatial location of transport and communications infrastructure, some such as airports, need large tracts of cheap land and are hence more likely located on the urban periphery, with impact on peri-urban natural resources.

The resource implications of transport infrastructure also need to be considered in relation to the interrelationship between a city's areal size and the transport provisions within it. Newman, Kenworthy and Vintila, (in UNHCS, 1996: 277) show how urban population density and spatial extent varies according to the dominant mode of transport. As motorised transport, particularly private cars, increases in availability, the physical size of the city is likely to increase as residents are no longer reliant on walking, animals or bicycles. Similarly, different districts of the same city may have differences in transport use, with residents of areas further from the city's core travelling greater distances, resulting in greater potential air pollution.

For some **peri-urban** low-income districts, transport facilities are the main infrastructure priorities. Angel *et al* (1983: 13, found that for the low-income residents of Bombay's peripheral commuter villages and towns, transport facilities were of primary importance, whereas for other Asian cities such as Colombo and Dacca, the more usual water and sewage systems were prioritised.

Many fragmented residential and industrial ribbon developments are not accompanied by appropriate transport infrastructure, instead relying on the pre-existing major routeway. For example, Robinson (1995) describes the expansion of Bangkok and the neglect of private developers in building an adequate secondary road system, as producing large scale congestion. Ocampo (1995: 288) describes a similar process in Manila where *"urbanization has not spread far from the highways due to lack of feeder roads. "*

However, congestion is not the automatic outcome of such processes. The Brazilian city of Curitiba has expanded along main transit routes, but the provision of cheap and clean public transport has helped reduce private car use. Over 70% of the city's commuters travel by bus (Rabinovitch, 1992).

3.4.1 Airports

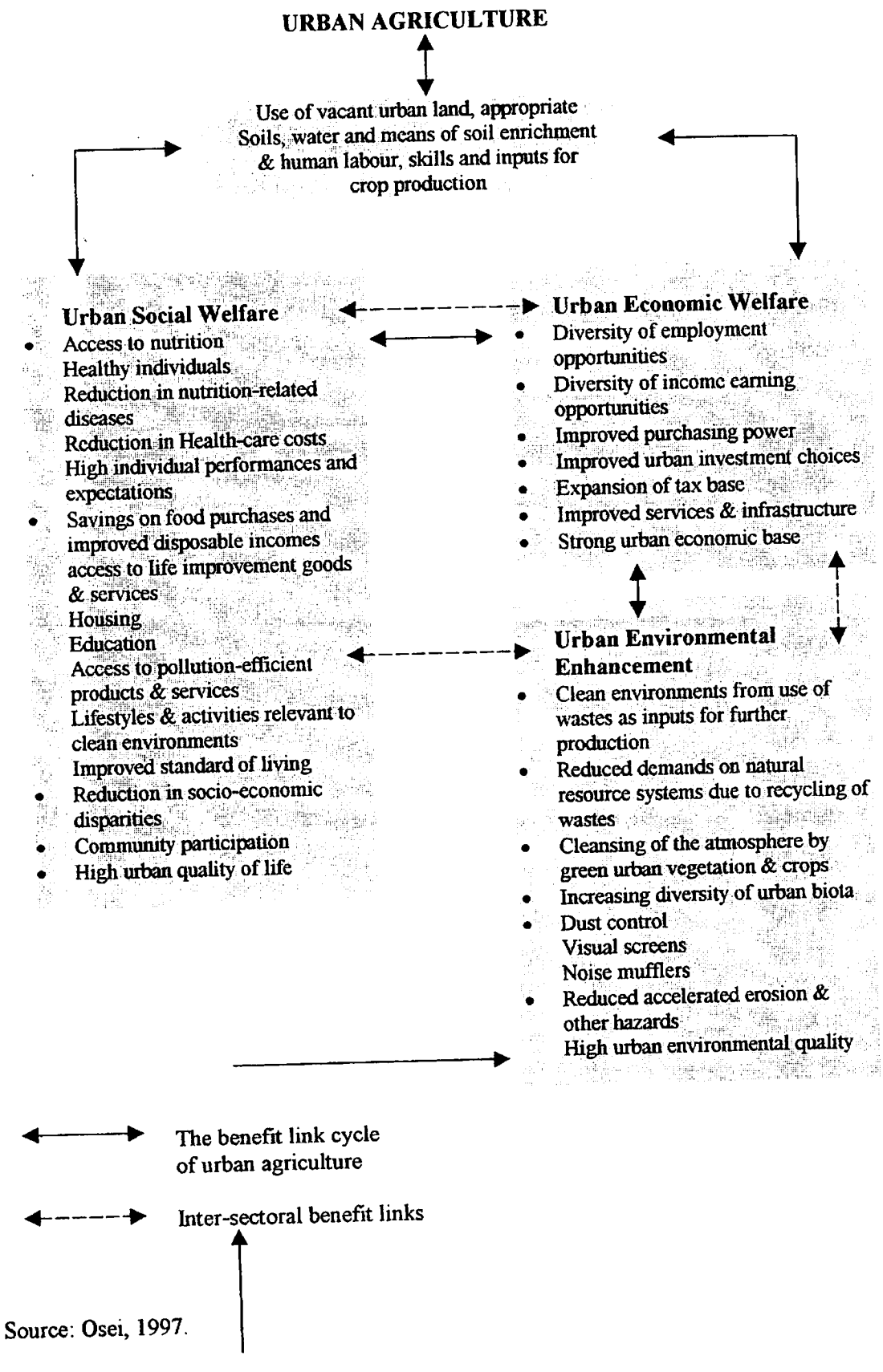
Airports are regularly sited on the urban fringe with cheap and plentiful land within reasonable reach of the city. As cities grow airports may be relocated, either because existing capacity is insufficient, or because the land becomes valuable for another purpose. Robinson (1995) outlines plans for the opening of a new airport, in Nong Ngu Hao in Samut Prakan on the edge of Greater Bangkok. Of course, airports not only take up land (usually agricultural) but also develop other transport networks attracting other economic activities.

3.5 Primary Activities : Urban and Peri-Urban Agriculture

Spatially the term `urban agriculture' commonly refers to *"an industry that produces, processes and markets food (and fuel), largely in response to the daily demands of consumers within a town, city or metropolis, on land and water dispersed throughout the* ***urban*** *and* ***peri-urban area*** *(emphasis added), applying intensive production methods, using and reusing natural resources and urban wastes to yield a diversity of crops and livestock"* (UNDP, 1996: 3). This section uses `urban agriculture' to cover both urban and peri-urban activities.

Urban agriculture is regarded as a fundamental aspect of sustainable urbanisation (May and Rogerson, nd) integrating as it does with health, environment and economic issues. Osei (1997) has attempted to illustrate the extent of these interlinkages (Figure 3.7), not entirely successfully, but does convey vividly the fact that urban agriculture impacts on, and is affected by, many other aspects of life in and around the city.

Figure 3.7: Urban agriculture and the sustainable city



Source: Osei, 1997.

3.5.1 Nature of Research

Despite the integral importance of urban agriculture to sustainable urbanisation, research and associated literature has until recently been patchy (Guyer, 1987). It is largely empirical, documenting its extent, practices, importance and administrative responses. The 1970s and 1980s witnessed a scattering of publications from Latin America and Asia (see Yeung, 1988 for a useful summary), partly stimulated by an early United Nations University initiative on the urban-food nexus (see *inter alia* Yeung, 1985; Sanyal, 1986; Khouri-Dagher, 1987; Wade, 1987; Tricaud, 1987) but most research originated in Africa where the pressures of structural adjustment have considerably exacerbated conditions for the urban poor (Drakakis-Smith, 1994). However, until the late 1980s it was largely uncoordinated by project or, indeed, conceptual perspectives. Even in the 1990s, Maxwell (1995) alleges, information is so limited that policy is based on speculation. Much of the earlier work was undertaken in relative isolation, comprising studies of what has clearly become an issue of growing importance to the cities concerned, although urban authorities were seldom prepared to admit this (see Rakodi, 1985, Bryceson, 1987; Bigsten and Kayizzi-Mugerwa, 1992; Maxwell 'and Zziwa, 1992; Mlozi *et al.,* 1992). More recently, however, there have emerged more co-ordinated efforts aimed at elaborating and identifying the role of urban agriculture within the development process as a whole. Indicative of this growing interest have been the special journal editions devoted to the theme of urban agriculture (Habitat International, 19(2) 1995; African Urban Quarterly, 11(2/3) 1996).

Following co-ordinated but focused studies supported by USAID, GTZ and IDRC in the 1980s, the present decade has witnessed the emergence of several major programmes viz. UNDP's Urban Agriculture Network (TUAN), IDRC's Cities Feeding People initiative and DFID's own work in this area. It is almost impossible to summarise the range of research now being undertaken in the field of urban agriculture and this brief summary will simply focus on several of the major issues which have arisen: these are the nature and rationale of the production process itself and the direct relationship of urban and peri-urban agriculture with natural resources.

Much of the new literature of the 1980s was located in Africa and was linked to the fact that structural adjustment policies had made life so much worse for the ever-increasing urban populations, particularly the poor (Sanyal, 1987; Pryer and Crook, 1988). In this context, urban agriculture was seen as a coping response to increased pressures on the household to meet family food needs. In fact, other processes too were increasing such pressures as urban food systems and diets became less indigenous and more costly (MacLeod and McGee, 1990; Barraclough, 1991; Salih, 1994; Goodman and Watts, 1994; Walton and Sedden, 1994). Evidence has been convincingly displayed that malnutrition amongst the urban poor has persisted and even increased as food costs have risen and incomes have remained static, erratic or decreased in real terms. Often such health problems exist amidst increasing agricultural production (Atkinson, 1991; Bijlmakers *et al.,* 1995; Gibbon, 1995). Most of the research undertaken has noted that much urban agriculture comprises basic food crops, such as green vegetables and/or cereals, and has discussed the constraints that prevent the poor increasing their production, and the related action that is needed. Usually such recommendations related to improving production *per se,* such as better seeds, fertilisation or cultivation techniques etc. However, often the constraints are more political, economic and cultural. Urban agriculture is frequently seen by urban authorities as an undesirable remnant of bush life and is proscribed in various ways. Although occasionally, in extreme circumstances, the state itself has encouraged urban agriculture - as, for example, in Cuba (Harris 1998). Other problems may relate to the fact that it is increasingly being recognised that production is not solely for self-consumption, but is for sale for other family needs or to purchase other types of food. This relatively recently

recognised fact indicates the need for a market system that facilitates informal production and retailing at all levels - from the mainly subsistence grower to the more commercialised small-scale producers. Without such arrangements commercial potential often goes unrecognised or is developed by peri-urban producers (see Briggs, 1991 study of the links between peri-urban production and the urban market of Dar-es-Salaam).

3.5.2 Agricultural Activities

Urban agriculture is not simply subsistence and even for self-consumption, not the prerogative of the poor. In order to cultivate a family needs garden space or access to other plots, fiends for seeds, fertilisers and labour, access to water etc. - all of which are easier for the not-so-poor to access. Even the middle class produce food, particularly in urban Africa where they too have been affected by structural adjustment. Most of those who take up commercial production on a more substantial basis are the already better off, often bureaucrats with the necessary knowledge and connections (Swindell, 1988). What this suggests is that for many urban households, food production is not their main activity, although it remains an extremely important source of employment and remuneration (as well as nutrition) for many, particularly women (see Nishimura, nd; Sheldon, 1991; Lourenco-Lindell, 1995; UNDP, 1996a; Gowan, 1996 and Phororo, 1996 for discussions of these issues in various African and Asian settings). Recently, Egero (personal communication) has proposed an investigation situated at the interface between population dynamics and urban food production, examining in full the role that the latter plays in household labour structure, economics, health care etc. In particular, the infra-housebold gender implications of increasing involvement in urban agriculture have been thinly addressed (IDRC, 1997).

With recent in-migrants and other very poor households often having little access to household garden-space, or on-plot land (Mbiba, 1995), many have no alternative but to find off-plot production space illegally or through other non-formal arrangements - it is such families that often form the bulk of illegal, small-scale producers within the urban fringe. Their position is such that whilst they *are* most in need of help, advice and encouragement, they are the least likely to receive such aid. There are, of course, exceptions to this generalisation, often with positive knock-on effects. For example, usufruct based urban agriculture schemes organised by the Undugu Society for squatter areas in Nairobi has led to profits which the squatters are using to rent or purchase further plots (Undugu Society, nd). However, this is the exception rather than the rule and in many cities the peripheral location of illegal cultivation often brings growers into contact and conflict with the second main type of urban agriculture viz.commercial production.

Commercial peri-urban agriculture production has increased proportionately to urbanisation itself (Briggs, 1991). The city provides an ever-expanding cash market for food, and not just for basic foods. As the urban market grows, so does its middle-class who demand greater variety and better quality in their diet and food intake. Indeed, around capital cities in the tropics, where air transport is available, an expanding and valuable export industry in exotic vegetables and/or floriculture has also emerged (Barrett and Browne, 1988; Smith, 1989). Moreover, the impact of these commercial changes is felt far beyond the immediate environs of the city (Dijkstra and Magori, 1991-5; Ornberg, 1994; Dijkstra, 1996; Njuguna, 1997). For example, the demise of former export markets for rural products, such as ground nuts, has made the cities seem a more attractive, alternative market for small scale producers who may well choose to exercise their skills on producing another commodity specifically for the urban market (Swindell, 1988). In some cities, such as Nairobi (Staal, 1997) and Dar es Salaam (Ellis & Sumberg, 1997), one of the fastest growing of commercial peri-urban production activities is dairying, with many small enterprises appearing in the wake of deregulation. Much

of this milk production is sold unpasteurized to local consumers, such as households, shops or restaurants. Where these production units are zero-grazing operations links, have been established with local breweries whose waste is fed to cattle together with fodder obtained from other peri-urban farmers.

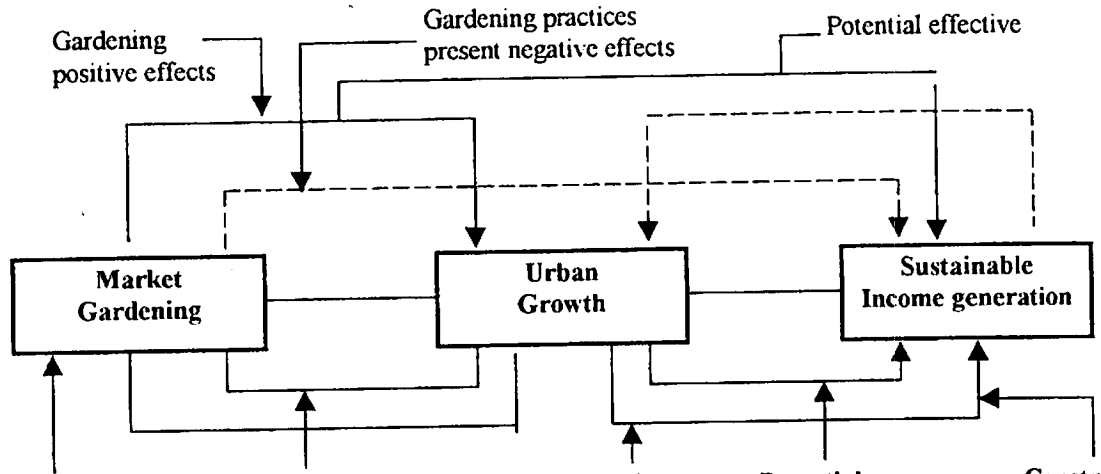
Increasingly in the 1990s research projects have focused on commercial food production in peri-urban areas; mostly seeking to inform and encourage production for marketing within the city. The Israeli - Dutch - Nigerian collaborative venture on the Jos plateau is a particularly sizeable project of this nature, findings shortly available in Goodman (forthcoming). However, a summary has been prepared by Ajaegbu (1996) which includes a model on the assumed relationships between urbanisation, market growth and income-generation (Figure 3.8). Additional studies include Tanzanian peri-urban market production (see Stevenson, 1996) **and** Hormann (1996) who also produces a model of production and marketing issues (Figure 3.9).

There are noticeable differences in the nature of the research approaches to urban agriculture as a commercial enterprise and as a subsistence activity (see Stevenson, 1996, for a fine distinction between peri-urban agriculture and agriculture in the peri-urban zone), despite the fact that there is a clear continuum in the nature of the production process (Swindell *and* Sutherland, 1986), Indeed, across much of the spectrum farmers produce crops both for self-consumption and sale. Lourenco-Lindell (1995) has illustrated this process in Guinea-Bissau documenting an extensive proportion of the food sold in the six urban markets of Bissau comes from producer-sellers. Essentially, therefore, the constraints that affect subsistence production and commercial food production, particularly at the lower end of the scale, are very similar, although the scale of production and range of crops may be larger:

- Access to land, either on-plot or off-plot, and land security
- Cost of inputs such as fertilisers and labour
- Low savings/credit
- Weeds, pests and diseases
- Seed/seedlings
- Poor marketing systems/transportation

Policy responses, therefore, should be able to spread benefits across the range of producers, particularly if those policies involve aided self-help schemes. However, as noted below, community based improvement schemes themselves often face constraints. Moreover, more valuable crops generally have more regulated production. and marketing processes. For example, Omberg (1994:10) writing about potato production in Northern Thailand remarks that *"it is a crop surrounded by quotas, restrictions and control"* even though it is mostly grown by small farmers. The reason is that the potatoes supply the rapidly expanding potato chip market in Bangkok, a mainly middle-class market whose standards are high.

Figure 3.8: Model of market gardening, urban growth and sustainable income generation by small scale farmers in the Jos area



Effects on role of gardening

1. Stimulated by urban market demand
2. Meeting local & distant market demand
3. Influencing & responding to urban consumer preferences

Urban positive effects

1. Provides stimulus for gardening through demand
2. Provides ready market for foreseeable future production capacity
3. Source of middlemen who handle, transport & market gardening products

Urban negative effects

1. Encroachment on fadama & other gardening land
2. Pollution of gardening land, water, air & crops places
3. Exploitative activities of the middlemen

Potentials

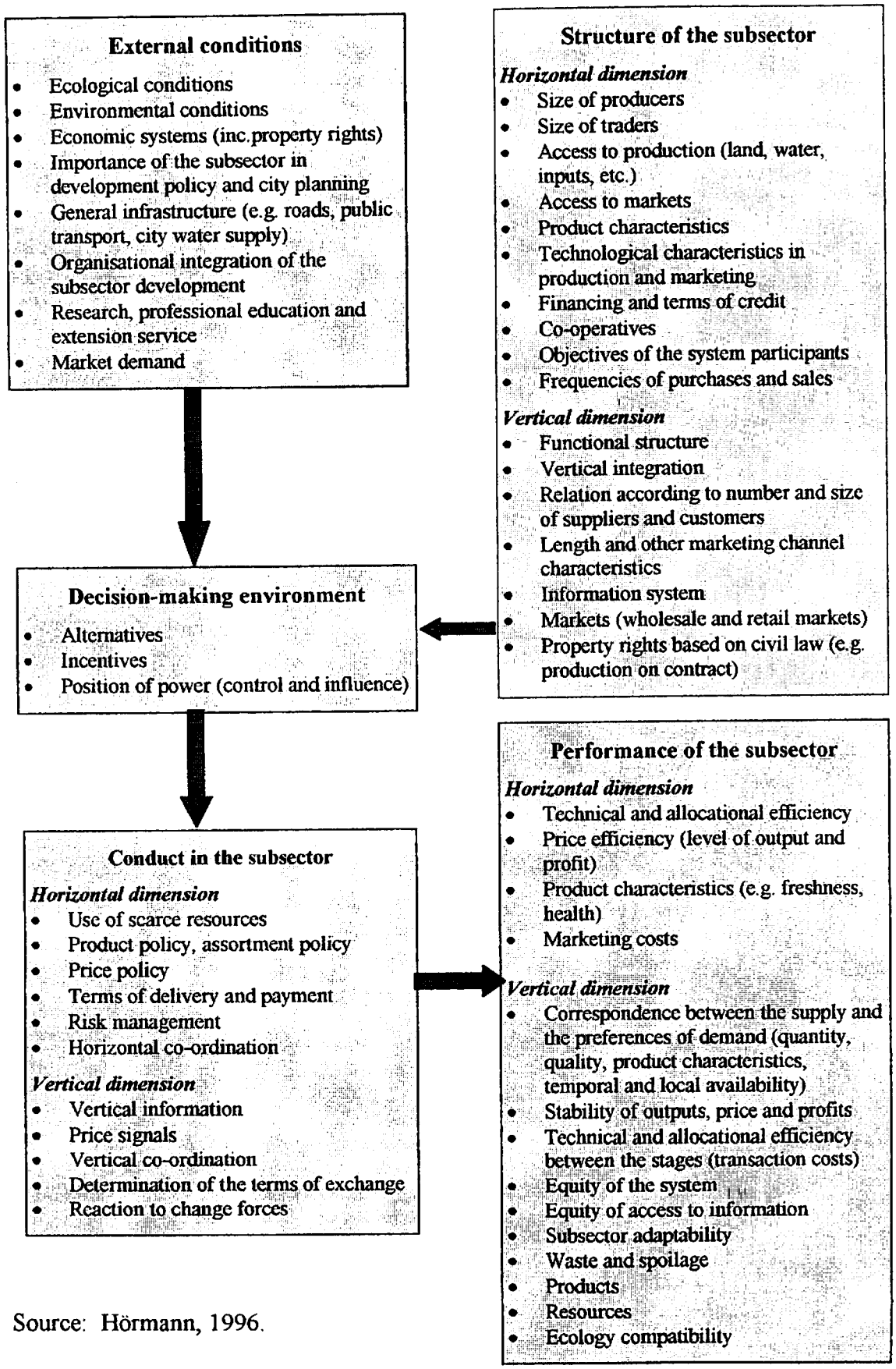
1. Assigned local & external market demand
2. Considerable physical resources potentials in the gardening area generally

Constraints

1. Land insecurity
2. Urban & industrial activities generally generate pollutants
3. Unfavourable marketing & pricing systems
4. Diseconomies of small-scale & distance in some places
5. Unorganized undeveloped communal co-operation approach to common problems

Source: Ajaegbu, 1996.

Figure 3.9: Structure conduct performance (SCP) Approach for the investigation of production & marketing systems for urban & peri-urban vegetables in the tropics & sub-tropics



Source: Hörmann, 1996.

3.5.3 Natural Resources & Urban Agriculture

Many detailed peri-urban agricultural studies, contain development constraints linked to the natural resource base. For example, Ajaegbu's (1995) study of small-scale market gardening around Jos; eight of ten listed constraints relating primarily to the physical environment and used to trigger a series of responses associated with relevant natural resource oriented disciplines and organisations (see Figure 3.10). However, whilst researchers and advisers often recognise these issues as constraints on development, many local authorities and/or administrators interpret environmental issues differently as problems resultant from uncontrolled urban agriculture; problems which need to be tackled firmly. Harare provides a typical example of such reactions in the long-term negative reaction of the city council towards off-plot/illegal agriculture (Drakakis-Smith et al., 1995; Mbiba, 1995). Invoking legislation from the colonial era on the assumed adverse effects of such activities (encouraging malarial mosquitoes, resulting in soil erosion and water-channel inOing etc.), the authorities slashed and burned such cultivation with vigour - until it stimulated adverse reactions and was halted in advance of elections. The legislation, however, remains on the statute-books. However, as Bowyer-Bower (1996) has clearly illustrated, much of the environmental `damage' resultant from urban agriculture is eminently controllable. However, as noted earlier in this report, natural resource use and abuse is much more than a technical issue and is clearly related to political and management attitudes. Positive approaches see `constraints' on the development of urban agriculture, negative approaches see urban agriculture as a `problem' that needs to be dealt with.

Figure 3.10: Principal Constraints on Small Farmers in the Jos Area

i Water shortage: water quantity, quality, access, management practices, seasonality of surface flows, high evapo-transpiration during January-May, etc.

ii Pollution: water and soil, industrial waste dumping, human waste dumping, household waste dumping, chemical fertilisers over-use, dearth of data on heavy metal and other pollutants, or their effects on the fruits and vegetables (if any), lack of awareness or sensitivity, etc.

iii Dilapidated dams, ponds, wells: lack of maintenance, intensive erosion, silting, interference with river flow upstream, improper usage, unregulated usage, low yield/retention capacity, high evaporation, seepage, lack of right of ownership or free use of the abandoned mining dams/ponds, competition for use of mined-out/pond water from non-farming users, lack of proper adaptation of former mining ponds/dams for use in irrigation, lack of co-operation among the framers for constructing, maintaining, managing, regulating the use of the water, temporary and seasonal nature of some of the dams etc.

iv Soil impoverishment: soil erosion, loss of top soil, stony/gravely top soil layer, leaching, sandy/loose soil, water-logging, gullies, improper application/use of fertilisers, inadequate crops combination or rotation systems, inadequate soil amendment practices, over-crowding of crops, etc.

v Hailstones: unpredictable incidence, occasional high intensity, inadequate information, unpreparedness and lack of measures to protect the crops etc.

vi Rock outcrops: high incidence (in Korot, Farin Gada Biya locations 9, 2 and 7 respectively), fairly large covering sizeable areas, restricted irrigable land area, difficulty to mechanisation, etc

(Continued Over)

vii Input supplies: preponderance of small holdings/farm sizes, uncertainty of tenure in some cases, encroachment by urban use, relative cost of using/irrigating upslope plots, large unutilized potential irrigable land, relatively long distances from existing irrigation water source, overall land scarcity for extensive large scale irrigated farming (compared to Kaduna area), labour shortage during harvest peak period; inefficient capital (money), relatively low capital, reliance on personal income/savings, inadequate information about other sources of capital, absence of a local savings arrangement; relatively insufficient time for rest, too much time spent in the farm, lack of effective time management plan, lack of recreation time, often signs of fatigue, etc; relatively low level of entreprenurship, little forward (strategic) planning, no known management models, feeling of helplessness in many management challenges (including the adverse effects of a highly organised middle-men system of marketing the crops), gardening notreally regarded as a 'business', etc.

viii Pests, diseases and weeds: variety of pests (including rodents, grasshoppers, ants/termites, birds, human thieves), considerable destruction of crops, inadequate control measures, tough and resistant (obstinate) weed species, etc.

ix Organic and inorganic fertilisers: inadequate supply of organic manures, no formal method of generating organic manures (e.g. composting), high cost ofprocurement and/or sorting, insufficient variety, high cost of inorganic fertilisers, irregular supply, insufficient supply (in quantity and variety) abuse of the application, lack of analysis or after-use monitoring of effects, insufficient knowledge regarding use, etc

x Farm business management: generally low business-like attitude to market gardening, almost complete lack of records keeping, profit and loss accounting, strategic planning capital investment in bulk buying and storing inputs for medium-term or long-term use, lack of sustainable systems or organisations (e.g. for raising capital, marketing crops, tackling common problems), etc.

Source:Ajaegbu

3.5.4 Ecology & Urban Wastes

Within this general attitudinal structure, a variety of other more themed approaches relate peri-urban agriculture with natural resources. One of the more broad of these draws on ecological literature and theory. In many ways the ecological approach within development is no longer fashionable, but there are still research papers and programmes structured in this way (see Katzir, 1996, for example), although they can lean towards the technical in terms of responses. In contrast, earlier urban agriculture research was more oriented toward systems approaches, particularly those within the `man and biosphere' programme. Fairly typical in this respect is Newcombe's work on the Hong Kong Human Ecology Programme (see Newcombe and Nichols, 1977) which sought to develop a synergy between the city and the agricultural activities on the urban fringe, focusing in particular on the possibilities of using urban wastes as agricultural impacts. Indeed, this has been one of the most persistent research themes in the interface between natural resources and peri-urban agriculture, largely under the auspices of DFID itself (Lewcock, 1994; Allison and Harris, 1996) and IDRC where it constitutes one of the four focus areas within the Cities Feeding People programme (Dennery, 1995). Particularly imaginative in this respect are developments in the field of peri-urban aquaculture using treated effluents (Moscoso-Cavallini, 1996). Smit and Nasr (1992) have outlined the role that idle land and water areas in the city can play in the exploitation of natural resources for urban agriculture. Perhaps more importantly, however, are their recommendations for the use of waste water and solid waste as recyclable resources, thus converting what is primarily an open loop system (resources in and waste out) into more of a closed loop system where the definition between resources and wastes become blurred. The peri-urban rather than the urban area *per se* is the place where this resource loop closure is more likely to happen but there are other important inputs to this system which are needed, not least of which is careful monitoring of pollutants and an effective distributive and redistributive system.

3.5.5 Urban Agriculture Policies

What does all this research and associated literature imply for policies toward urban agriculture? There are some, such as Mbiba (1996), who feel that sufficient information is now available on urban agriculture (in Southern Africa) and yet rigorous promotional policies are not in place. Both statements are contentious. Certainly there are many areas even in Africa where little information is available (see Obudho, 1997). Moreover, as we have seen, there is more to urban agriculture than natural resource use/constraints, there are economic, social, culture and, perhaps most important, political dimensions**.** In order that urban agriculture can develop there needs to be a positive climate at the management and policy levels. Lewcock and Schippers (1994) recommend policy evaluation and formation at a macro-level with implementation of biotechnical changes at the micro-level of the community and household. Smit (1996), in contrast presents four levels at which roles are identified (Figure 3.11). He feels that, to date most progress in developing urban agriculture has been at the city and national level, whilst international agencies are lagging behind in their support for urban agriculture. An overview of the literature to date would find it difficult to support such a statement (IDRC, 1997). National level policies are mostly oriented towards economic growth via exports and urban agriculture constitutes an insignificant part of such activities. At the municipal level, often encouraged by national petitions, altruistic attitudes persist on a widespread basis and whilst urban agriculture may be tolerated, at present few administrators approve of its persistence in the city leaving producers with a usufruct rights in an insecure position (Mwangi, 1997). In the peri-urban areas this may be a different matter but often the continuum of urban to rural food production is fragmented under differing authorities with varied and uncoordinated policies.

Figure 3.11: Community, City, National and Global Policy Roles in Urban Agriculture

	Community	City	Nation	Global
Survey, document	*	*	*	*
Access to land	*	*	*	*
Integration with education	*	*	*	*
Extension and credit services	*	*	*	*
Establish partnerships	*	*	*	*
Food security targets	*	*		
Integrate with waste management	*	*		
Support the disadvantaged	*	*		
Environmental sustainability	*	*	*	*
Adopt policy		*	*	
Information services		*	*	*
Regulation		*	*	
Worker and public safety		*	*	
Enabling legislation			*	
Research			*	*
Tax relief, subsidy		*	*	
Model codes/standards			*	*
Enabling public authorities			*	
Global and regional co-operation			*	*

Source : Smit (1996)

It would seem from the recent surge in research by UNDP, IDRC, NRI, GTZ and other agencies that the driving force behind the recognition of the importance of urban agriculture has come from outside agencies working with local NGOs and communities. Increasingly, such research has emphasised the broader nature of urban agriculture viz. the social, economic, culture and political dimensions which must be addressed alongside those related more directly to natural resources. The main problem still remains in translating our increasing knowledge into policy at the urban-national levels. However, Ellis and Sumberg (1997) warn that the case is still to be proven for the direct support of urban agriculture on the grounds that its overall contribution to household well-being at the *city* level is stilt to be established and that direct policy intervention is likely to be as limited in success for urban agriculture as it has been for agriculture in general. Certainly the diversity of urban agriculture warns against simplistic advocacy in policy reformulation.

3.6 Agriculture, Agricultural Markets and Urban Food Production

Research specifically focusing on agricultural change in peri-urban areas of developing countries is growing rapidly. Sectoral developments occurring within peri-urban regions may exist, but access to this material is best obtained from sectoral specialists, for example horticulture, floriculture, aquaculture,. poultry farming and dairying. The available literature concerning commercial peri-urban agriculture suggest common factors including land pressures, increasing costs of production with growing markets and access to markets. The tendency is towards the intensification of farming practices and the production of perishable goods such as vegetables, eggs and milk.

3.6.1 Peri-Urban Agriculture in Dar es Salaam

In Dar es Salaam, a study of peri-urban agriculture and farmers' crop choices shows that the majority of farmers grow between three and five different species of which the most popular were cassava, bananas, maize and rice (Briggs, 1989). Briggs notes that at the time of the study there was little commercial orientation but those grown for sale were mostly fruits and vegetables including tomatoes, oranges, pineapples, sweet potatoes, mangoes, bananas, pawpaw and some sugar cane and coconut. The most commonly grown crops were for home consumption and these crops attracted the majority of land and labour inputs while the minority was dedicated to cash crops, despite easy market accessibility. This lack of commercial participation is attributed to the political economy of Tanzania at the time and Briggs (1989) concludes that with `liberalisation' farmers were slowly investing more resources into commercial production.

Poultry production in and around Dar es Salaam is described by Sumberg (forthcoming) with a particular focus on the interaction between small and large scale producers. The study reveals there is considerable complementarity between producers in that the larger producers supply feed and chicks while many small scale producers become feed agents or millers. Also, other synergistic benefits such as the input of chicken manure to vegetable production suggest that intensive small scale production has a future. However, it is suggested that little in the way of policy can be recommended except perhaps by improving the regulation of feed quality in order to reduce producers costs and improve their profits (Sumberg, forthcoming). It is concluded that research into the cause of chicken mortality and low productivity is needed, but that attempts to focus development intervention on egg and broiler production for poverty alleviation would be fruitless.

Three different milk production systems in and around Dar es Salaam are found to supply milk for urban consumers. These systems have a distinct spatial distribution in which part time

producers are located in high density urban areas, commercial enterprises are located in lower density peri-urban areas and rural producers are located more than 60km from the city centre (Sumberg, 1997). Sumberg finds that the peri-urban producers face significant agro-ecological constraints such as high temperature and humidity, with an extended dry season affecting fodder quality and availability and especially the incidence of tsetse flies carrying trypanosomiasis. Commercial production is only viable if additional premium can be captured to compensate for these constraints and new technologies are adopted to improve productivity (Sumberg, 1997). Sumberg points out that following the example of successful small scale dairy producers in Kenya, milk can be produced more easily and efficiently in areas outside Dar es Salaam if these more suitable agro-ecological areas can be serviced with better transportation links to the urban markets. Another study focuses on smaller Tanzanian cities in which the interactions between urban grade dairy cattle and hinterland indigenous cattle production systems are explored (Nyamrunda and Sumberg, forthcoming). The authors consider the system to be dynamic and the best policy option for dairy development, is the option of no-interference.

3.6.2 Development Approaches Involving Rural Agricultural Change

Development approaches have changed from 1960s urban to 1970s rural biases. The 1980s, witnessed shift towards the *"interdependence and symbiosis of rural and urban"* concerns (Baker and Pedersen, 1992). Literature pertaining to agricultural change in developing countries is generally viewed from a rural perspective and is both historic and extensive. Increasingly it has been recognised that rural development is inextricably linked to urbanisation and the prevailing socio-economic and political forces. Equally, agriculture is central to rural life so that the many factors (e.g. social, natural environment and physical infrastructure) which affect agricultural change have, for long, been matters of research and debate.

Within rural development literature there has been a trend towards the broader more holistic view of change processes. This material embraces spatial and temporal aspects of change so that case studies are embedded in an historic context and investigate the interdependencies and linkages within and between agroecosystems of a region. Two excellent volumes using this approach are `More People Less Erosion' (Tiffen *et al.,* 1994) and `Hazards and Opportunities' (Scoones *et al.,* 1996). These volumes explore the interaction of rural, urban and peri-urban areas, over time, in an integrated way. Themes which emerge from these studies and which may be relevant here, are the developments in farming practice which occur as a result of increasing populations and decreasing land availability. Practices are low input but tend to become more mixed, diversified and intensive so that farmers keep livestock, smallstock and poultry using the by products as inputs for their crops which may involve a complex mix of species sown together or rotated over time. Some farmers may include fish ponds in their systems. Soil and water conservation techniques are used for example, the use of terraces or trees on upland areas.

Approaches to understanding rural agricultural change have tended towards this holistic view whereby the sphere of influence is far greater than the local physical environment and includes complex factors related to urbanisation. For example, off-farm employment and remittances from urban relatives are among critical factors which affect the inputs and practices on rural farms. Equally, for those residing in or near cities the links with rural family may be critical for maintaining supplies of affordable food and seed but still little is known about the flow of these resources. However the flow of resources between rural, urban and peri-urban areas is relevant to the change in agriculture and agricultural markets wherever it is located. Attempts to analyse agricultural change in peri-urban areas should be conducted within this wider and more fluid context and not within the strait jacket of urban bias.

3.7 Conclusion

Research and literature focusing on farming systems situated in the peri-urban areas of developing countries is growing. On the other hand material concerning agricultural change in rural areas is historic and extensive. Changes occurring in rural farming systems and the methods and approaches adopted by agricultural research and extension, may be relevant for investigation of agricultural change at the peri-urban fringe.

Common factors for production in peri-urban areas are land availability, or scarcity, and access to markets so that production becomes more intensive and produce is orientated to supplying perishables to urban consumers, usually fruit and vegetables, eggs and milk. Similarly many rural areas face increasing populations and decreasing land availability with a resultant decline in fallowing and a trend towards intensification and diversification of production. Each situation whether rural, urban or peri-urban must be reviewed in the context of its own unique set of physical, social and economic conditions. The interactions and resource flows between rural and urban areas are critical for understanding agricultural change which is a pre-condition for specific policy recommendations especially if the ultimate aim is towards poverty alleviation.

4 SOCIAL ISSUES

4.1 Introduction

Having discussed economic activities in peri-urban areas, this section investigates resource implications of social activities, focusing on housing, infrastructure provision, health and leisure. While all clearly relate to income levels, their social dimension has been considered most important because the resource implications are related to activities not concerned with income-generation, or subsistence activities *per se.* Throughout this section the degree to which poverty levels and particular natural resource problems are interrelated will be apparent, again highlighting the ways in which `natural' processes cannot be separated from the social, economic and political context of the peri-urban area.

4.2 Housing in Peri-Urban Areas

4.2.1 Introduction

As this report has highlighted, there is relatively little work on the peri-urban interface as such, with general work being aspatial. Shelter is an exception probably because the physical location within a city affects land and house prices so restricting land use and housing type, as well as holding attractions for different segments of the population. Resource implications of housing in peri-urban areas can be broadly categorised into three types:

(1) **Land** as a **resource** and its transformation to a residential land use from non-residential
(2) **Physical construction resources** used for housing
(3) **Environmental** effects of increasing, often poor, populations on the urban fringe

This section concentrates principally on the first two (with the third dealt with in section five). However, first, we discuss literature relating to broader housing market developments encompassing the urban**.**

4.2.2 City-wide Housing Markets

While it is clear that the cost of land and housing varies greatly across the physical expanse of the city, it must also be recognised that the choice of housing type and location is not merely constrained or determined by finance. A number of factors influence the demand and supply for housing within any city (Figure 4.1). Demand factors beyond population size include household income, access to finance and household priorities. While supply factors encompass land price, government policy and cost of building materials and labour. Combining these factors results in a variety of sub-markets within the overall city housing market, including divisions between owner-occupation and renting, public and private provision, and formal and informal/ illegal accommodation. However, in spite of these sub-divisions, it is important to recognise the interlinkages between different aspects of the housing market (Rakodi, 1992). The movement of households between different sub-markets is also of crucial importance.

A major trend in the housing markets of developing nations' cities is the dominance of informal housing; including squatting, illegal subdivision (where land is divided into plots and sold to individual households without legal authorisation), illegal rental, or housing which does not meet legal building or planning requirements (Hardoy & Sattherthwaite, 1987, 1989; Gilbert & Gugler, 1992). The predominance of such housing is through the inability and unwillingness of both state and private sector to provide either cheap housing appropriate for low-income urban households or suitable affordable plots for legal construction.

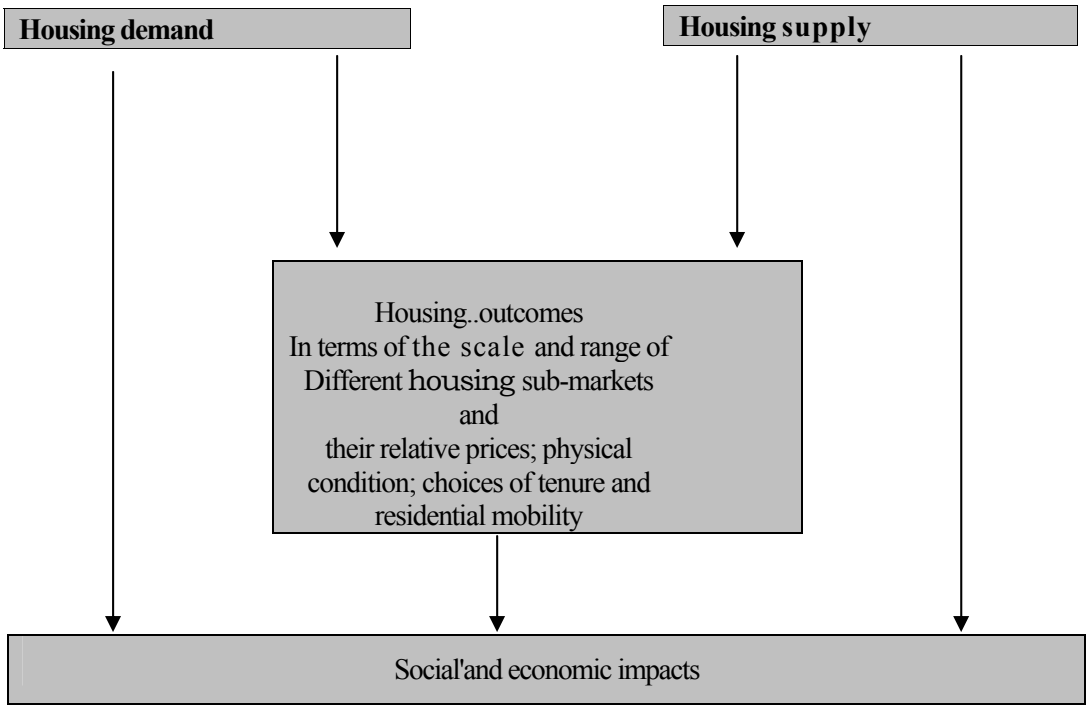
Figure 4.1: Factors that influence housing supply and demand

The factors that influence housing demand

- **Disposable income** available to households (which in turn is influenced by government fiscal policy) and its distribution within the population. Lower income groups having little or nothing to spend on housing
- **Nature of employment** (secure long term employment perhaps more associated with desire for home ownership? Also with possibility of obtaining mortgage or loan)
- **Household priorities** the extent to which individuals and households want to own their own shelter that is also influenced by whether owning a house, apartment or land site is considered a good investment or has tax advantages
- **Availability of household finance** for different income groups and types of household or other means to permit entry for all individuals and households (gender biases may restrict women's access)
- **Age and household size and structure** (including number of individuals or households seeldng housing)
- **Occupation** (adult students and those wanting to remain mobile not wanting owner occupation or long-term tenancies).

The factors that influence housing supply

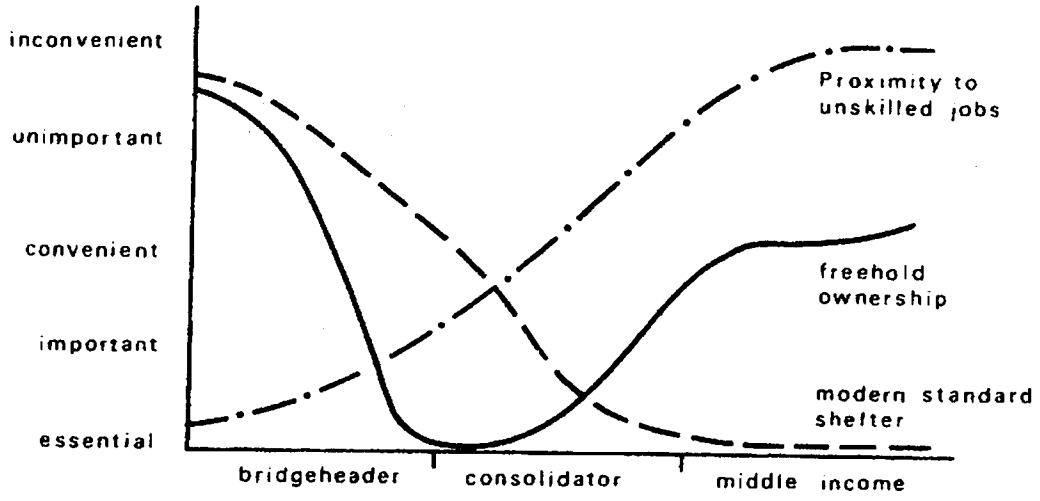
- **Price and availability of land** for housing (that is influenced by ease with which it can be bought or sold and subdivision/minimum plot size regulations; also by demand for land from other sectors); also by the scale and nature of road construction and public transport provision
- **Price and availability of skilled and unskilled labour** for housing (also influenced by demand for labour from other sectors)
- **The efficiency of the official framework** supervising the construction and purchase/sale of housing including the time and cost involved in receiving official permission or sanction to buy or sell housing or land or build housing
- **Official standards** on building, building materials, infrastructure and services and land use development
- **Extent to which illegal or informal housing and land development are** tolerated (in many urban centres in the South, this is the most critical influence on the possibilities of lower income groups of ever owning or building their own house)
- **Building material and component costs**
- **Availability and price of infrastructure and services for housing**



Source: UNCHS, 1996, p.208

As discussed in section three, the work of William Mangin (1967) and John Turner (1968) has been highly influential in highlighting the changing requirements of urban households and how this results in spatial mobility through different housing markets over time. While households lacking capital, city-based contacts and requiring access to informal-sector employment may be concentrated in the city centre in rental housing, better-established, often larger, households will tend to move towards owner-occupation in informal settlements. Turner classically named these two different groups as 'bridgeheaders' and 'consolidators' (see Figure 4.2). An important outcome from early research on squatters was the rethinking of policies towards informal settlements. This saw a move from viewing such settlements as threatening health, safety and public order, to understanding how they represented a type of housing accessible to poorer sectors of society and allowing households to improve housing conditions as and when able. An important acknowledgement of their work was the existence of social, economic and political order in many such settlements, although it is not clear the extent to which this is reproduced in peri-urban settlements today. As Eckstein (1990) demonstrates with reference to Mexico City, we should guard against viewing all such settlements as 'slums of hope'.

Figure 4.2: Housing priorities of middle-income groups, consolidators and bridge-headers



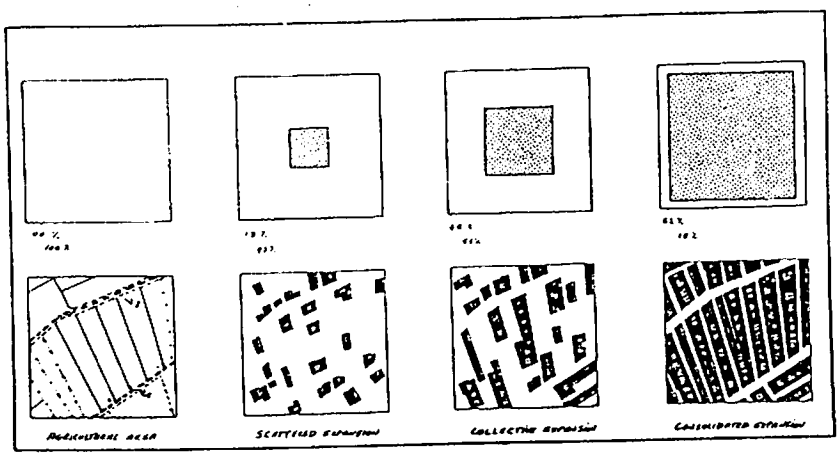
Source: J.F.C. Turner (1972) in Alan Gilbert & Josef Gugler (1992, p.120).

4.2.3 Self-help housing

In most developing world cities, most low-income and many middle-income households have chosen, or have been forced, to make their own housing arrangements, relying on informal sector provision in the form of squatting or buying plots of land in illegal subdivisions. UNCHS (1996: 199) estimates that between 30% and 60% of households in such cities have illegal tenure. Informal settlements can be found anywhere in a city where there is 'empty land'. However, while such developments are citywide, the majority of land invasions and informal subdivisions take place on the urban fringe. As Gaye (1992: 102) states; *"Unplanned and unsupervised urban growth is particularly evident on the outskirts of capital cities."* Informal settlements are most likely found on a city's periphery because land is, on average, of lower commercial value. It is also here that illegal occupation is more often tolerated by governments and urban elites (Izeogu, 1993 re: Port Harcourt; Varley, 1994 re: Mexico; Dredge, 1995 re: Xalapa; UNCHS, 1996: 239).

An excellent example illustrating how self-help housing in the urban periphery has provided accommodation for large numbers of urban poor is provided by Soliman (1996) in his discussion of Alexandria. While the different needs of residents are identified and the variation of housing markets highlighted, it is clear that for many longer-term residents, as well as the government itself, what Soliman terms *"semi-informal"* housing is an appropriate solution to housing shortages. Semi-informal housing usually involves the illegal sub-division of agricultural land on the urban fringe by private developers operating with the tacit approval of government. Households purchase plots and build their own dwellings as and when they can afford them. Movement to the periphery is often after years of squatting or renting in the city centre (Figure 2.4, section 2), illustrating that peri-urban housing pressures come from suburbanisation as well as rural-urban migration. Using the case study of the settlement Hagar El Nawateyah, Soliman (1992) describes the process of conversion from agricultural to non-agricultural land use (Figure 4.3). In 1961 the land on which the settlement now stands was agricultural and divided into small plots among households following land reform. However, as Alexandria's population grew, demand for housing increased and households sold their plots to individuals or to speculators until the whole area was built up and housing consolidation had taken place.

Figure 4.3: Stages of Growth in Hagar El Nawateyah, Alexandria



Source: Ahmed M. Soliman (1992, p.193).

The balancing of the needs and interests of different groups is an important aspect of all land use decisions (Pacione, 1993), but is particularly complicated in peri-urban areas where rural and urban land uses meet. Although land invasions are often described as involving `empty land', in reality, the land is being used for other purposes. For example, Gaye (1992) describes how the district of Guinaw-Rail in Dakar, Senegal was transformed from communally held farming land containing a few shacks in 1961 to *"an 'illegal' district with 50 000 inhabitants and with 98% of the houses made of brick"* in 1988. In a similar vein Roberts (1992) describes the I990 government-sanctioned invasion of ranchland on the outskirts of Parauapebas in Brazilian Amazonia. Although he does not comment on the effect of this invasion on the destruction of forest elsewhere, it is likely that as land is removed from ranching for urban expansion, ranchland will be expanded elsewhere with concomitant environmental impacts.

The expansion of residential districts into previously agricultural areas thus has both direct and indirect land use implications. Changes in land use from rural to urban are associated with environmental problems such as air and water pollution. This is because many households in peri-urban areas can be classified as low-income, and the expansion of housing districts is not usually accompanied by the expansion of urban services, as these are acquired gradually as settlements are upgraded (Hardoy & Sattherthwaite, 1989; Hardoy, Mitlin & Sattherthwaite, 1992; Firman & Dharmapatni, 1994 re: Jakarta). These issues are further discussed later in section five.

4.2.4 Sites and Services Schemes

The realisation that self-help housing was a cheaper and more flexible option than purpose-built public housing has led to many governments, and international multilateral agencies, incorporating such approaches in low-income housing policies. Rather than providing complete housing units, site and services schemes have often been adopted. These involve the selling or leasing of plots of land with appropriate infrastructure such as water, drainage and electricity. In some cases `core units' of a bathroom and kitchen are provided as a basis for further self-help building.

Throughout the developing world, such schemes have tended to be located in peri-urban areas where land is available and plots can be sold or rented at reasonable price. For example, Acioly (1994) outlines the role of government housing schemes in Brasilia. The exceptionally high cost of living in the Brazilian capital, mirrored internationally, has forced many low-income residents to invade empty land within the city, or on the fringe: In response, the government has implemented relocation schemes to `satellite cities' such as Samambaia where households can buy serviced plots. While providing housing for 22 000 households by September 1990, the scheme has, like most site and service schemes, experienced problems with infrastructure provision. It has also excluded the very poor who are unable to afford even subsidised prices, leaving them to seek illegal shelter elsewhere. This pattern of sites and services schemes failing to benefit the very poorest households is found throughout developing nations (see, for example, Campbell, 1990 re: East Africa; Kironde, 1995 re: Dar es Salaam). It is of particular note that women-headed households often lose out in such schemes because of gender-biased qualifications for participation (see Machado, 1987 re: Brazil; Nimpuno-Parente, 1987 re: Nairobi; Moser, 1992) and limited funds for self-build housing.

4.2.5 Renting

While there are clear regional differences in the scale of the rental market, relating particularly to city size, environmental conditions and government attitudes to squatting, a general infra-city pattern of rental housing is apparent (see Edwards, 1990 for a summary of differences between Latin America and Africa). Rental accommodation is usually concentrated in the city-centre, providing accommodation for those sectors of the population requiring access to city-centre employment and support networks, or those unable or unwilling, to move to owner-occupation/ squatting in more peripheral areas. Female-headed households exemplify groups disproportionately found in rental housing (Gilbert, 1993; UNCHS, 1996). This provides tenure insecurity and of course ongoing demands for cash income for rents.

However, a noticeable trend, particularly in Latin American cities, is the increase in rental housing outside the city-centre, often in upgraded self-help settlements (Gilbert & Ward, 1982; Jacobi, 1990; Gilbert, 1993). The effect of this trend on resources in the peri-urban area can only be speculated upon because, as yet, there has been little research (including the quality and type of housing in the rental sector on the urban periphery). It is a clear area for priority research in the context of the peri-urban interface.

4.2.6 Marginal Environments

Environmentally-marginal land (in terms of slope, swampiness and flood risk for example) is usually predominantly occupied by the urban poor, as it is of low commercial value and low-income households have few alternatives. As urbanisation levels rise, populations are increasingly living in *"hazard-vulnerable areas"* (Drakakis-Smith, 1995: 667). These can particularly include flood plains in areas such as Calcutta or Kingston (Jamaica). Main and Williams (1994) identify a range of marginal residential environments and their site specificity within the city (see Figure 4.4). Certain physical features, particularly steep and unstable slopes are often, by their very nature, concentrated on the urban fringe and the city will not encroach on them, until the population is desperate for cheap land for accommodation. Klak (1993), for example, discussing self-help housing in Ecuador, highlights the construction of housing in the mangrove swamps in Guayaquil and on precipitous slopes in Quito. The construction of housing in vulnerable areas may contribute to environmental destruction with the associated threats to human survival (see Jimenez-Diaz, 1994 on slope failure in Caracas as an example).

4.2.7 Middle-Class Housing

Internationally middle and high-income householders have some choice of housing location, leaving less desirable sites to lower-income populations. As Ward (1993: 1152) states regarding upper-income groups in Latin American cities, *'for these heavily class preoccupied groups, housing location is the key. "* The more preferable locations will include those with a good view, good service provision and districts away from polluting industries (see Madaleno, 1996 re: Brasilia; Soliman, 1996 re: Alexandria). In some cities of developing countries (but not most) as many Western cities, the urban fringe is preferred.

Leaf (1994) outlines Indonesian trends where real estate development only produces 15% of new housing, with the majority being suburban middle-class developments. The low-density, single-family dwellings with driveways and walled compounds are a very land intensive form of housing only accessible to a small proportion of Jakarta's population. Indeed, Leaf suggests that saturation point may already have been reached as sales of new houses have plummeted.

Figure 4.4: Negative externalities and threats of disaster as determinants of marginal urban residential environments

	Ongoing problem		Threat of disaster	
Negative externality	***Problem***	*Site specificity within city*	***Disaster***	*Site specificity within city*
Tectonic cone	Construction	Low	Earthquake/Volcano	Low
Steep slope	Construction	Very high	Landslide	Very high
	Access	Very high		
Swampy land	Construction	Very high	Flooding	High
	Access	Very high		
	Insects/disease	High	Epidemic	High
Floodable land	Insects/disease	Very high	Epidemic	Very High
	Construction	Very high	Flooding	Very high
	Access	Very high		
Industrial production zone	Airborne pollution	High/low	Gas leak/Explosion	Very high
			Epidemic	
	Waterborne pollution	High		High
	Noise	Very high		
	Crowds of workers	High		
Rubbish dump	Airborne pollution	High/low	Methane Explosion	Very high
	Waterborne pollution	High	Epidemic	High
	Insects/disease	High		
Burial ground	Waterborne pollution	High	Epidemic	High
	Superstitious fears	High		
Borrow pit	Insects/disease	High	Epidemic	High
	Construction	Very high		
Airport flight Path	Noise	High	Crash	High
High tension electricity cables	Noise/illness	Very high	Electrocution	Very high
Railway line, main road	Airborne pollution	Very high	Crash	Very high
	Noise	Very high		
Sewer	Waterborne pollution	High	Gas leak/Explosion	High
	Insects/disease	High	Epidemic	High

Source: Hamish Main & Stephen Wyn Williams (1994, p.154)

As well as suburban sub-divisions, the Jabotabek region of which Jakarta is part has also experienced the development of new towns, such as Cikarang Baru and Lippo City providing housing for middle- to high-income groups on what was previously prime agricultural land. Most of these are private developments linked to industrial estates, but there is direct government involvement in a number of projects (Firman & Dharmapatni, 1994). Approval has been given for an estimated 60,000 ha to be converted from agricultural to residential or industrial use in Jabotabek (West-Java Office of The National Land Agency in Firman & Dharmapatni, 1994: 83) although illegal housing developments obviously represent an additional significant area of land use change. As outlined in an earlier section, the physical growth of mega-urban areas such as Jabotabek is often along transport routes, creating pen-urban development, but with great pressure on transport routes.

As with low-cost housing, there are severe environmental impacts which need considering in relation to middle and upper-income housing in peri-urban areas. While such residential developments will at times be amply supplied with water and sewerage systems so will not always lead to pollution in that sense, the removal of vegetation and top-soil for large-scale housing developments will lead to soil erosion and potential water and air pollution (Choguill, 1993). The interaction of housing development with natural processes in the peri-urban area is discussed in section five.

4.2.8 Construction Materials

As well as the actual land on which housing is built, the main resource implications for housing in peri-urban areas concerns the construction materials themselves. This relates both to housing on the urban fringe and citywide. The peri-urban area provides a source of building materials for self-help builders and the construction industry, both formal and informal. Construction materials can be classified according to the degree of processing:

- Unprocessed or raw materials (such as wood, bamboo, grass, stone and sand)
- Elementary-processed materials (including bricks, cement and steel)
- Highly-processed goods (such as nails, screws and pipes)
- Recycled materials (including plastics, tins and cardboard boxes)

(Guaraldo Choguill, 1995: 596).

Building materials constitute an estimated 80% of the value of a simple house (UNCHS, 1996: 225). Although all these materials are found in places other than the peri-urban area, minimisation of transport costs and ease of access make the resources nearest the city most susceptible to exploitation by urban dwellers.

Organic materials, which make up a substantial component of the unprocessed construction material, are the main source of building materials in low-income households in Sub-Saharan Africa and South Asia (Wells, 1995). While their use is greatest in rural areas, urban households still make use of materials such as timber and bamboo. Islam (1996) estimates that nearly 50% of urban houses in Bangladesh are made of temporary materials such as bamboo, straw and mud. Greater demand for organic materials in urban areas has resulted in a breakdown of sustainable resource management practices, with Wells, (1995: 83) commenting *"In the vicinity of cities, the breakdown of traditional practices of tree management is more advanced than in the countryside. "* Timber is used by poor households living in the pen'-urban area, but is also felled for construction within the city proper, and demand is set to increase. In the Philippines, for example, UNCHS (1996: 228) estimates that demand for wood for construction will rise from 173,000m^2 in 1990 to 433,000 m^2 by 2000.

Non-organic raw materials are also collected from the urban fringe. Guaraldo Choguill (1995) in her study of the construction industry of Campo Grande, Mato Grosso do Sul, Brazil describes how sand and stone are collected from the city's outskirts by small-scale excavators. However, she also indicates that other raw materials are brought in from other parts of Brazil, or even from abroad because of consumer preference or because of costs (see also Section Three for discussion of brick-making in Bangkok). Choguill and Rezende (1994: 11) also highlight how self-help builders in peri-urban districts of Campo Grande use sand from the banks of local streams.

Construction materials also have indirect natural resource implications because of the fuel needed to produce processed materials. Direct fuel costs constitute over 20% of the cost of cement and over 50% of the cost of bricks and lime (UNCHS, 1993: 5). For some (see Murison, 1979; Thiedeke, 1979) the response to **an** overreliance on energy-intensive construction material production is to use less energy-intensive, indigenous building materials such as earth, timber and bamboo, while for others (see UNCHS, 1993) energy-efficient production processes and building designs are more appropriate because of the goal of sustainable resource management.

The production of building materials also leads to pollution on a number of levels. Spence and Mulligan (1995) identify local-level air pollution such as dust and toxic gas emissions, regional-level pollution from the emissions of nitrogen and sulphur oxides, and global-level pollution through greenhouse gas emissions. Specific examples include Islam (1996), who discusses the pollution produced by brick kilns in Dhaka**.**

A final point with reference to construction materials is that as cities expand physically, previous sources of building materials may be engulfed with knock-on effects on building material costs. For example, UNCHS (1993) highlights how quarrying areas near cities are converted to residential districts, so increasing the cost of stone, sand and gravel. Similarly, Dharmapatni (1991, in Firman & Dharmapatni 1994: 86) describes how the expansion of the urban area of Bekasi in Jabotabek meant the removal of thousands of residents who earned their living from the construction of bricks and roof tiles, as well as agriculture.

4.29 Conclusions

This section outlines the role of housing within resource utilisation in peri-urban areas. The peri-urban is probably the most important district for providing accommodation as urban populations increase, but land is not the only resource needing consideration. Building materials of many different kinds represent resources which are both needed by peri-urban populations and are found on the urban fringe. Finally, increased residential populations in peri-urban districts have important impacts on the natural environment because of increased waste and the burning of fossil fuels.

4.3 Infrastructure and the Peri-Urban Area

Increasing residential populations in peri-urban areas not only have effects on land use housing resources, but also natural resource implications because of the need for associated infrastructure, particularly water and sanitation facilities. As with land for housing, infrastructure impacts resources in three ways:

(1) **Land** used for infrastructure projects
(2) **Materials** used for infrastructure
(3) **Potential pollution** resulting from inadequate or non-existent infrastructure to deal with increasing peri-urban populations

As McGranahan (1993: 105) argues, environmental problems in low-income districts of poor cities *"tend to stay close to home ",* resulting from inadequate infrastructure.

Insufficient infrastructure provision, as with formal housing shortages, is a reflection of rapid urbanisation and the inability of governments or the private sector to provide appropriate services (McGranahan, 1993). However, unlike self-help housing, community-led infrastructure initiatives have been less widespread because of the perceived need for external technical and financial help, and also the nature of infrastructure provision which needs overall co-ordination for successful completion. Because of this, millions of households live without access to piped water or sewerage systems.

Although these households may be found anywhere within the city, they are disproportionately concentrated on the outskirts in the self-help settlements described above. Because of the cost of extending drainage systems from the city centre grid, and the potential difficulties because of steep slopes, or unsuitable ground conditions, peripheral locations are usually the last to be hooked up to water and sanitation systems. Of course, purpose-built middle-class suburban developments and low-income site and service schemes will be exceptions.

4.3.1 Water Supply

Approximately 245 million urban residents do not have access to potable water (UNHCS, 1996: 264). Although most Southern cities have inadequate water supply systems, the shortage is particularly severe in sub-Saharan Africa. In Kinshasa, for example, approximately 50% of the population is not served by piped water (Mbuyi, 1989 in UNHCS, 1996: 267). Structural adjustment policies may also have aggravated the problem because of declining government expenditure on infrastructure and reduced incomes for the majority of the population. Glewwe and Hall (1992, in Gilbert 1994: 609) for example, describe how Lima's public water services deteriorated in the late 1980s because of public expenditure cuts. In terms of natural resources, this lack of water can have a number of impacts, primarily related to pollution of natural water supplies as householders resort to washing themselves, their clothes and dishes in lakes and rivers.

When water supplies are available, whether to standpipes in communal areas or piped to householders plots, there are obvious implications for the water resources of the city and wider catchment. Although water quality is of great importance, water quantity should also be considered in the drive for improved health and living conditions (Caimcross, 1990). Ever increasing populations in both numerical and density terms will increase the demand for water in urban areas. This can lead to water shortages, but it can also have other impacts on natural resources, with subsidence due to groundwater depletion, being a serious result. Mexico City is a high-profile example of this process, with the Metropolitan Area having fallen an average 7.5m this century (WRI 96/97).

As with housing, there are both formal and informal systems of water supply provision (Choguill, 1996).

• **Formal sector provision** is through municipal water authorities, or private sector developers who lay grids and pipelines to supply middle-class residential districts, or sites and services schemes. Such projects are usually beyond the financial means of the majority of the local residents (Caimcross, 1990). Beyond the economic costs of such a process, there will be resource implications because of the land taken up and the materials used for the pipes.

- **Informal provision** of water supply systems are becoming increasingly common as communities, often with the assistance of NGOs, attempt to address their own problems using low technology, cheap solutions. Choguill (1996) outlines the features of sustainable infrastructure in developing countries, stressing the importance of security of tenure, the involvement of the community and the gradual improvement of services over time using government and technical assistance where appropriate. Choguill and Choguill (1996) use the example of Bagumbayou in Quezon City, Manila to exemplify a community organisation which built a water supply system at low cost using government assistance for training and technology.

4.3.2 Sanitation Systems

As with water supplies, there are resources implications both for peri-urban residential districts that have and do not have sewerage systems. UNHCS figures (1996: 268) state that *"at least a third of the South's urban population... have no hygienic means of disposing of excreta and an even greater number lack adequate means to dispose of waste waters. "* The absolute number of people affected by this has increased since the early 1990s and looks set to continue increasing as urban populations grow and economic problems persist.

The spatial distribution of sanitation systems parallels that of water systems, with the periurban areas much more likely to be without formal sanitation provision. For example, Calcutta's sewage system only covers 33% of the urban core (Sivaramakrishnan and Green, 1986, in UNHCR, 1996: 269), and only 25% of Allahabad is covered (Misra, 1994).

The lack of a sewerage system for waste disposal means that pollution, particularly of local rivers, is common. Even if sanitation facilities are provided, in some cases they are culturally inappropriate. Health problems are greatly linked to this lack of sanitation infrastructure. For example, in Dakar, one third of peri-urban dwellers tested positive for roundworms, compared with less than one percent of the rural population (Sinnatamby, 1990). The impact of poor living conditions on health is discussed more fully in the following section.

A water-borne system as found in most northern cities, is arguably the most convenient solution to human waste disposal, but it is expensive (Sinnatamby, 1990). Agencies and communities have, therefore, sought to adopt other systems such as ventilated pit latrines.

Septic tanks are common, but require low population density and tend to be found in middle-and high-income areas because of the cost. They also need a regular water supply.

Another point which needs to be considered throughout cities, but particularly in the poorer districts, is the cost of maintenance. Absolute figures for sanitation service provision often fail to recognise whether all aspects of the system are working or not. For example, Abelson (1996) in a review of the Slum Improvement Programme in Visakhapatnam, India 1988-1992 describes how communal latrines were not maintained.

4.3.3 Storm Drainage

Cairncross and **Ouano** (1990) highlight how the provision of storm drainage infrastructure is often ignored, but is often of crucial importance. This will be particularly the case on marginal, often spatially peripheral lands with steep slopes where rapid and intense rainfall can have **a** devastating effect on slope stability and soil quality if appropriate drainage channels are not provided. Poor drainage can also contribute to health problems.

4.3.4 Solid Waste Collection

"Households probably account for about half of the solid waste load generated in Third-World cities, and the bulk of the waste that actually threatens the household and neighbourhood environments" (McGranahan, 1993: 116). Given this estimate, it is crucial to examine waste disposal systems in this discussion of resource issues in peri-urban areas.

Solid waste collection systems are very sparse, with middle- and upper-class districts and the urban core often being the only areas served. In Dhaka, for example, regular garbage collections only take place in 10% of `slum' areas (Momin, 1992, in UNHCS, 1996: 270) and only 50% of waste generated in Bogota is collected by municipal authorities (Castaneda, 1989). This lack of service provision, particularly in peripheral settlements, can be a reflection - of poor roads in such districts which make garbage collection by trucks almost impossible, but it may also demonstrate the lack of political clout such settlements have when negotiating with municipal authorities (UNHCS, 1996: 270). Of course, not all waste which is not collected ends up polluting the local environment; low-income populations are adept at recycling such materials, either for income generation, or for household use.

4.3.5 Fuel

Just as sanitation and water systems often fail to extend to peri-urban areas, so too are gas and electricity supplies restricted to more centrally-located zones. This means that peri-urban populations must use other sources of fuel for domestic use. The choice of fuel has resource implications as wood and charcoal represent major sources of domestic fuel.

The use of charcoal for fuel represents a severe threat to the sustainability of forest resources. For example, charcoal production in Senegal accounts for between 11% and 12% of annual deforestation, with most charcoal being used by urban residents (R.ibot, 1993, in WRI 96197). Peil (1994) outlines urban fuel consumption in Nigeria, demonstrating regional differences. Kerosene and wood are the most commonly used fuels, as electricity *and* gas are expensive and often unavailable. Wood is most widely used in Northern Nigerian cities and is collected daily from surrounding villages, while kerosene is popular elsewhere because of wood shortages. As in Senegal, charcoal use has led to the destruction of forest resources at faster than replacement rate.

4.3.6 Infrastructure Improvements

As with housing upgrading, investments and improvements in infrastructure provision in a peri-urban area can contribute to continual intra-urban population movements. Infrastructure improvements usually lead to an increased cost of living because of utility bills and an increase in rental costs. They may also lead to an increase in land prices because the district becomes more desirable to live in. However, Abelson (1996) in his discussion of slum improvements in Visakhapatnam argues that increased property and land values do not necessarily accrue from such improvements because of factors such as price controls and outsiders' perceptions of the area. He does, however, then go on to demonstrate that, on average land and house prices did increase as a result of the improvement programme.

4.3.7 Conclusion

We have seen the ways in which infrastructure provision, or the lack of certain elements of infrastructure have resource implications for peri-urban areas. The peripheral location, combined with low incomes of most peri-urban residents means that water and sanitation

systems, waste disposal and electricity supplies are absent, or are provided in an *ad hoc* way. In both cases natural resources such as land, water and forests are affected, with concomitant implications for the health and well-being of residents.

4.4 Health And The Peri-Urban Interface

4.4.1 Introduction

The literature pertaining to health issues in developing countries, although voluminous, rarely specifically relates to the peri-urban environment, but does focus on the situation of the urban poor. However, given that the many residents in peri-urban areas live in some degree of poverty, it is fair to draw inferences from discussions of health and the urban poor. Given the very recent and extensive NRI Review of the Health Impacts of Peri-Urban Natural Resource Development conducted by Birley and Lock, this section serves only to highlight the major resource, environmental and health issues. Reference will be made to the more extensive review.

As noted by Harpham *et al. (1988),* health issues in peri-urban environments *are "a manifestation of'the larger syndrome of poverty",* that is inadequate housing, sanitation and infrastructure, all of which are issues discussed earlier in this section. However, it would be impossible to fully understand the health impacts of processes operating within peri-urban environments without acknowledging the role that these fundamental issues have to play.

Figure 4.5, adapted from Harpham *et at* (1988) provides a useful entry point into a discussion of peri-urban health problems. This diagram illustrates how the urban poor are beset not only with `traditional' rural health hazards (typical of communicable diseases such as diarrhoea and malaria), but now face a double burden of `modem' health hazards (typically non-communicable diseases associated with the stresses of urban life) (Harpham *et al., 1988;* Rossi-Espagnet, *1984; Phillips,* 1990; *WHO,* 1991; Phillips and Verhasselt, *1994).*

> *"The urban poor are at the interface between underdevelopment and industrialisation and their disease patterns reflect the problems of both. From the first, they carry a heavy burden of infectious diseases and malnutrition, while from the second they suffer the typical spectrum of chronic and social diseases. "*
> (Rossi-Espagnet, *1984).*

Citizens of the developing world are in effect experiencing the `worst of both worlds' of the epidemiological transition (Harpham *et al.,* 1988). Therefore, contrary to the popular belief that urbanisation is synonymous with improved public health, disparities have been noted between city regions, with residents of the urban slums associated with peri-urban areas suffering worse health conditions than their rural counterparts (Hardoy *et al.,* 1990; WHO, 1993).

Figure 4.5: Health and Poverty

..... POVERTY .....

Direct problems of poverty	*Environmental problems*	*Psycho-social problems*
Unemployment	Inadequate water and	Stress
Low Income	sanitation	Alienation
Limited Education	Overcrowding	Instability
.	Poor housing	Insecurity
.	Lack of land to grow food	.
.	Lack of garbage disposal	.
.	Traffic	.
Inadequate diet	Hazardous Industries	.
Lack of breast feeding	.	
Prostitution	.	
Consumption of junk foods	.	.
Crimes of poverty e.g theft	.	
	Infectious diseases	
	Pollution	
	Accidents	

Source: Harpham, Lusty and Vaughan (1988)

4.4.2 Direct Problems of Poverty

The `Direct Problems of Poverty' described by Harpham *et aL* (1988) can be equated with the conditions that Birley and Lock (1997) report face populations which are resettling in periurban areas. Economic development at the peri-urban interface has traditionally been accompanied by labour mobility as workers are drawn from the underdeveloped hinterland (see section three). For many, their employment expectations are never met and, if they are, wages are low and occupational hazards many (Drakakis-Smith, 1995; Birley and Lock, 1997). For women in particular, it is difficult to find employment (Browner, 1989; Phillips, 1990; Drakakis-Smith, 1997), forcing many to prostitution and associated sexual health threats. Women who do work experience pressures of paid employment, compounded by lack of knowledge, leading to abandonment of breast feeding in favour of prepared formula (Harpham *et al.,* 1988; Harpham, 1994), This not only involves unnecessary expenditure, but can lead to raised fertility levels and malnutrition in babies when the formula is left to be prepared and administered by siblings (Birley and Lock, 1997). Sexually transmitted disease too, including HIV, presents serious health threats to migrant populations worldwide (Zwi, 1991). Labourers (predominantly single men), often separated from homes and families seek companionship from women living near their place of work (Birley and Lock, 1997).

Additionally, migrant labour systems, and the general encroachment of the rural by the urban, is leading to a continually greater presence in urban areas of diseases common to the rural (Satterthwaite, 1993). For example, Schistosomiasis associated with water reservoirs and irrigation channels of rural areas, has been brought to cities by migrants. Conversely, expanding urban areas produce changes in local ecology that favour the emergence and multiplication of vectors. Peri-urban environments, especially closed agricultural and forest areas, once development begins, often expose residents to new zoonotic and vector-borne diseases. This is believed to be the reason behind the increase in lymphatic filaraisis and malaria in urban populations (Satterthwaite, *ibid).* In addition, Chagas disease, traditionally associated with poor rural households where the vectors breed in cracks in house walls, is increasingly becoming an urban and peri-urban problem, both through the influx of infected migrants and the growth in poor quality peri-urban settlements where the insect vector has been found (Satterthwaite, 1993; Birley and Lock, 1997).

Drakakis-Smith (1996) draws a direct comparison between poverty and (ill)health in his observation that structural adjustment programmes have hit the poorest sector of the population hardest by removing subsidies on basic needs such as food and housing. Not only does this act to increase the likelihood of the poorest groups contracting `traditional' diseases related to inadequate housing and malnutrition, such as diarrhoea and typhus, but also renders them vulnerable to sudden changes in their economic circumstances, thus increasing the likelihood of psycho-social problems (see also Asthana, 1994). Additionally, inability to access healthcare (even of poor quality) will have obvious affects on an individual's state of health. Poor sectors of the population are usually subject to the vicissitudes of what resources are available locally. This may be very little in peri-urban locations (Phillips, 1990; Phillips and Verhasselt, 1994). A study by Bailey and Phillips (1990) of Kingston (Jamaica) shows that all suburban peripheral populations must travel far to obtain healthcare, regardless of social status. Thus financial resources play more of a factor than actual location.

4.4.3 Environmental Problems and Health

Well documented are how changes in the environment of peri-urban populations can have serious impacts upon health. Studies by Bryant-Tokalau (1995), Omer (1990), Jacobi (1990), Harpham *et at* (1990), Satterthwaite (1993) and Osteria (1989) have recognised the deleterious and far-reaching effects of overcrowding in the squatter settlements of peri-urban populations.

Accidents are another major threat to health in peri-urban environments. A report by the World Health Statistical Quarterly of accidents in 10 `Third World' nations, found accidents the main cause of death amongst children aged between 5 to 14. Additionally, accidents are reported to be a major cause of mortality in `Newly Industrialising Countries' (Phillips, 1990). Many such accidents are Iinked to innappropriate and poor quality construction materials and overcrowded housing; with bums, scalds and accidental fires particularly prevalent. (Birley and Lock, 1997). Additionally, indoor and outdoor crowding in poor urban communities means transmission rates of infections are high (Harpham, 1994).

The poor quality of indoor environments is also reported to be responsible for the prevalence of acute respiratory infections in peri-urban populations. Jacobi's study of squatter settlements in Sao Paulo reports that the houses are so poorly constructed that they quickly become cold and damp, inducing acute respiratory infections (ARI) (Jacobi, 1990). Satterthwaite (1993) notes that indoor pollution from coal and biomass combustion for cooking and heating adds to the prevalence of ARI in poorly ventilated slum dwellings. Housing patterns and the domestic environment have been identified as important elements in health and disease (Phillips, 1990).

As a useful summary, Figure 4.6 presents Abaleron's case study of Bariloche, a peri-urban area of Argentina, which demonstrates the health consequences of living in inadequate housing.

Figure 4.6:
The Problems and Consequences of Living in Inadequate Housing in Bariloche, Argentina

A case study of inadequate housing in Bariloche shows that: dwellings offer insufficient space to their inhabitants; dwellings do not insulate against the cold or the wind because of their precarious structures; air is often polluted from the burning of fuel (mainly wood) and poor cooking equipment used; dwellings are inadequately exposed to direct sun and light; and they do not provide adequate protection against rain and snow.
These conditions result in physical and mental disorders both for individuals and the community at large:

• **Overcrowding** can lead to psychological stress and an increased transmission of communicable diseases including tuberculosis, pneumonia, bronchitis, gastro-intestinal disorders, meningitis, rheumatic fever, flu, common cold, measles, German measles and whooping cough.
• **Lack of drinking water** can result in typhoid fever, cholera, hepatitis, gastrointestinal disorders, parasites and infections of the skin.
• **Toilets without running water** and shared with other families can cause or contribute to infantile diarrhoea, gastro-intestinal disorders, parasites and cholera.
• **Insufficient protection against excessive cold** alters the body's thermal regulation, resulting in a series of pathologies such as colds, pharyngitis and neuralgias.
• **Excessive humidity** (+ 65°/a) compounded by air temperatures below 16 degrees Centigrade, can lead to further illnesses such as arthritis, breathing disorders and allergic reactions to mould and fungus.
• **Stagnant air inside the home** contaminated by metabolic processes which produce carbon dioxide, by bacteria in suspension, and by emissions from different domestic fuels, suffers further deterioration caused by cooking and heating appliances that often have inadequate provision for venting smoke within houses with inadequate ventilation.
• **Insufficient exposure to sun** may reduce the natural ability of the body to **produce** vitamin D and gives rise to tooth decay, rickets in children and osteomalacia in adults.
• **Houses that do not provide protection from rain and snow produce** an excess of cold and humidity, an increase in condensation and internal water vapour pressure, while some materials lose their insulating capacity, for example blankets, which leads the body to burn calories faster.

Source: Abaleron (1995)

Where there is sanitary provision and infrastructure in peri-urban areas, population pressure undoubtedly overwhelms this scarce resource clearly having implications for the management of natural resources (see Part II). Bryant-Tokalau (1995) notes how insufficient piped water has led to water being collected in drums, providing an ideal breeding ground for the Anopheline mosquito, the malarial vector. Insufficient sanitary infirastructure leads people to defecate openly in areas around their homes (Omer, 1990) and even where latrines are provided, shortage of water makes it difficult to keep them clean, exposing the population to biological pathogens causing diseases such as cholera, diarrhoea and typhus (Muthakar, 1995). For a succinct review of the effects of water regime alterations, see Phillips (1990).

The interwoven nature of problems facing the peri-urban population is highlighted in Areola's study of urbanisation in Nigeria. It is reported that in slum areas where drainage is provided, the inadequate facilities for the removal of garbage results in rubbish collecting in and blocking drains. Whilst this in itself presents a health risk; it also results in drains being unable to cope during heavy downpours, consequently storm water is blocked and waste carried onto the streets (Areola, 1991). Hardoy *et at* (1992) have, in fact, estimated that between one and two thirds of waste generated in developing countries is not collected. In many cases, local governments are unwilling or unable to extend services to these areas as such action could be seen as conferring legal status upon what are considered illegal settlements (Satterthwaite, 1993; Douglass, 1992). Whatever the reasons, lack of services increase the risk of intestinal infections and other communicable diseases (World Bank, 1993).

As populations settle, or become assimilated in to the peri-urban area, changes in land use inevitably occur, either from agricultural production to extractive or industrial processes, or from one agricultural system to another - usually subsistence farming to cash-cropping (Harpham *et al.,* 1988; Satterthwaite, 1993; Birley and Lock, 1997) (see section three). Such changes precipitate substantial differences in the diets of peri-urban populations. If land is removed from cultivation, it forces the purchase of foodstuffs, or if the emphasis of agricultural production is moved from subsistence to cash-cropping, money earned is used to buy inappropriate, highly processed food from the city (Birley and Lock, 1997). Such changes involve a cultural transformation in the attitude towards foodstuffs. Drakakis-Smith (1997) notes a common shift from local staples to bread (often using imported flour as wheat cannot be grown locally). Such dietary changes, as well as being economically unsound, give rise to a host of new health problems relating to inappropriate diets, such as obesity and diabetes. Birley and Lock's review also highlights how these changes have differential effects upon different sectors of the population, for example, the switch to cash-cropping increases the workload of women, whilst reducing their calorie intake through the marginalisation of subsistence farming, thus resulting in a negative energy balance. The `double work' of women has also been recognised by Phillips (1990), and Davis, Lewis and Kieffer (1994) bring attention to the need for women's health issues to be treated as a separate entity.

With regard to changes in agriculture, Birley and Lock also identify literature which discusses the adverse effects of the use of pesticides, fungicides, agro-chemicals and machinery in commercial farming practices and the associated pollution, injuries and respiratory diseases that they can cause. For a review of the differential impact of environmental problems upon vulnerable groups, particularly women and children, see World Resources Institute, 1997.

Land use changes in the peri-urban area also have the effect of increasing traffic, causing a corresponding increase in road traffic accidents (Birley and Lock, 1997). The issue of traffic and road traffic accidents are very problematic in peri-urban areas, as arterial roads almost inevitably cut through them, bringing heavy volumes of traffic into contact with roadside residences.

The available literature also reveals that changes in land use can have a deleterious effect on health as it induces changes in vector breeding sites *and* frequencies with which people and vectors come into contact (Phillips, 1990; Satterthwaite, 1993; Birley and Lock, 1997). Birley and Lock also note the importance of the change of animal host reservoirs. For example, Coimbra's (1988) study of Brazil illustrates how the opening up and colonisation of new land on the edge of the city led to a malaria epidemic as the population was brought into contact with the Anopheline mosquito for the first time.

Finally, with regard to environmental issues, the literature addresses the problems associated with hazardous industries in which many of the ex-rural population work. The risks include the effects of noise and vibration, associated with industrial processes, on general well-being, hearing and vision, and also the specific effects of industries such as tanneries which use hazardous chemicals and produce hazardous wastes which commonly cause diseases of the skin and respiratory tract (Birley and Lock, 1997), in other words, the `health by-products' of industrialisation (Phillips, 1990). It should also be noted that urban workers face the additional psycho-social problems of long hours, low pay and *job* insecurity (Birley and Lock, 1997; WRI, 1997).

Harpham *et at* (1988) note how pollution associated with industry disproportionately affects peri-urbari populations as noxious industries are invariably decanted to the periphery. Davis (1984) demonstrates the vulnerability of the urban poor living on marginal land in the periphery in his study of the fate of squatters who `lived next door to disaster' following a gas explosion in a factory on the outskirts of Mexico City.

4.4.4 Psycho-Social Problems

Psycho-social problems are the least documented of the health problems associated with peri-urban environments, although there are a few exceptional publications (Zwingmann, 1978; Harpham and Blue,1995). For example, many inhabitants of peri-urban areas will be rural migrants. Considering the changes that an individual will encounter in the transition from rural to urban habitat and the pressures of migration, it is not surprising that the psycho-social effects are severe. In the process of urbanisation, an individual faces a variety of political, social and economic instabilities in that his or her environment transforms from a *stable,* homogeneous rural life with extended family and community support, to a transient, heterogeneous culture (Harpham *et aL,* 1988)

Harpham and Blue (1995) have identified with a number of stress factors associated with urbanisation:

• Poor physical environment, including lack of open space, overcrowding, noise •
Switch from subsistence to cash cropping
• Insecure tenure
• Women's labour force participation
• Under employment
• High levels of violence and accidents
• Pressures associated with migration
• Lack of control over events and lack of community support
• Negative life events such as unemployment

The above factors are reported to induce social and mental illnesses such as drug and alcohol abuse and violence. Indeed, violence has reached epidemic proportions in some developing countries (Harpham *et al.,* 1988; Harpham and Blue, 1995; WRI, 1997). Unfortunately these negative `stressors' are often compounded by lack of resources to overcome them, which emphasises the point made in the introduction regarding the double impact that processes operating in the peri-urban area have upon the health of its inhabitants who have to face the threats of `modern' and `traditional' diseases. Harpham (1994) also comments upon a gender bias in mental ill-health because of the affects of:

(1) Erosion of extended family support
(2) Marital breakdowns resulting in high numbers of female headed households

(3) The `double burden' of productive and reproductive roles
(4) Environmental stress including high levels of violence.

The full impact of `modern' diseases, as reported in Birley and Lock's extensive review, is not wholly understood. It is a new, though steadily emerging, area of research.

4.4.5 Conclusions

The above discussion demonstrates how the process of urbanisation impacts upon natural resources to produce health hazards for peri-urban populations. Throughout the literature, indisputable evidence is presented which ties ill health to deficiencies in the physical environment, including inadequate water and sanitation, overcrowded housing, air pollution, uncollected garbage and dangerous workplaces (WRI, 1997). These are conditions prevalent in pen-urban areas as the urbanisation process proceeds and the reasons why infectious and parasitic diseases continue to exact an enormous toll on human health. Evidence is also emerging of the correlation to health of social factors - including alienation, unemployment and poverty, These social factors are interrelated with the physical, but are less well documented (WRI, 1997). The political and economic structures within a city determine the distribution of and access to physical, biological and social benefits that cities provide. Ultimately, the cities poorest groups face greatest exposure to physical and biological threats and have least access to protective services (WRI, 1997).

4.5 Leisure and the Peri-Urban Interface

In some developing countries large-scale sports projects are increasingly becoming a development focus as they represent one mechanism by which greater regional and national unity may be achieved (Bale, 1993). In the absence of national affluence, sporting achievement can become a vehicle to foster feelings of regional or national pride as well as unity and togetherness. Sport also represents a vehicle for national prestige. Indeed, both sporting achievement and sporting facilities can give heightened international recognition and credibility to the smallest or poorest of nations, for example in Kenya. Sport and other recreational developments also represent a valued source of economic activity both during and after construction. For these reasons, some governments have actively encouraged recreational developments and have, in many cases, relaxed planning controls (Bale, 1993). Conversely, a combination of inexpensive labour and available and cheap land makes developing countries particularly attractive to both internal and external development interests. Indeed, sport is a cultural form which is of importance economically and in terms of planning and land use change (Bale 1993).

The existence of individual development projects, particularly in Pacific Asia, confirm the peri-urban as a location for sport and recreational developments. Certainly, peri-urban areas possess many of the characteristics *which* attract such development - land is relatively cheap and available, there is often a source of cheap labour and the more affluent city regions are in close proximity. However, published research on *such* development projects in peri-urban areas is uncommon. Consequently, knowledge of the extent and character of developments remains limited.

4.5.1 Golf

Golf courses are, without doubt, the most frequent form of sports development in peri-urban areas and the last two decades have witnessed the most rapid expansion of such facilities. Hiebert (1993) suggests that golf is now Asia's fastest growing sport. Much of the investment

in golf in Asia has come from developed countries and most golf courses are owned by foreign companies or local elites (Elliot, 1998). For many businessmen golf courses have become new sites of business transactions. Asian business leaders recognise the value of golf courses as sites for political and commercial decision making *(ibid)*. Indeed, Tasker (1995) suggests that many in Pacific Asia closely correlate golfing prowess with business ability. As a result, in many developing countries, golf is in great demand. In Thailand, for example, 200 golf courses have been developed since 1987, mostly around Bangkok where on average they consume 100 ha of land. Between two-thirds and three-quarters of these are located on agricultural land and most of the remainder on classified forest land. The impacts of golf courses on natural resources can be divided into four main areas:

- Destruction of forests and removal of agricultural land
- The disruption of soil and hydrological systems
- The consumption of often scarce water supplies
- Soil pollution through the application of pesticides and fertilisers

The average Thai golf course uses between 3 and 6.5 million litres of water per day, a major contribution to the reduction of aquifer resources. Meanwhile use of chemical fertilisers and pesticides to maintain green and fairway standards not only pollute natural resources, particularly soil and water, but also affect human resources. In Japan over 40% of agricultural poisoning cases involved people working at, living near or playing on golf courses (Elliott, 1998).

Bale (1993) highlights that sports landscapes can be socially divisive and thus problematic. The author suggests that sports landscapes do not `just happen', but are a result of the exercise of power by one group over another. This may, in turn, lead to the exclusion of certain people from particular geographical places and spaces. Golf is no exception and, indeed, is perhaps one of the most socially divisive and elitist sports. Some authors challenge the existence of such icons of affluence in regions where so many people lack the basic necessities of life (Elliot,1998), others highlight the potential environmental consequences of such developments. Pearce (1993: 33) comments *"Golf courses are emerging as one of the most environmentally rapacious and socially divisive forms of tourist and property development"*. The author suggests that they have the potential to destroy forests and remove land from agriculture, disrupt soil and hydrological systems, consume vast amounts of scarce water supplies and pollute soil and water through the application of fertilisers and pesticides. Also highlighted is the fact that local populations have had land forcibly taken (Pearce, 1993) and have often received inadequate compensation (Pleumarom, 1992).

4.5.2 Stadia

The other form of large-scale sports development near urban centres in developing countries is stadium developments. In general, stadium developments are less common than golf course developments and have not been subject to the same degree of criticism. This is because, generally, they have not used as much land, the effects on the natural environment are considerably less and, unlike golf-courses, stadia have not reinforced social inequalities. In many cases they are revered as icons of the region or nation. There is an emerging literature which considers stadium development and the process of `stadiumisation' (see Bale, 1993), however, as yet, little is known on the specific impacts of stadia on peri-urban areas, other than the fact that, unlike golf course development (which is more common in the affluent regions of Pacific Asia and parts of Latin America), stadia construction has a more geographically even spread, often comprising part of an `aid' package. For example, the national stadium in the peri-urban area of Harare was constructed with the assistance of Chinese aid and labour.

4.5.3 Forestry

More recently, research by the Forestry Department of FAO has indicated that forestry in peri-urban and urban areas is increasingly being researched as the growing urban-rural links have spread to enmesh forestry. In terms of leisure and recreation, forests and woodlands have an increasingly important role to play in urban greening programmes, usually **in** the more developed economies, such as Singapore and Malaysia (Webb 1996). One obvious management problem in this context is that the responsibility of forestry departments usually ends at the municipal boundary. Clearly, FAO feel that they have an important role to play in the management of urban and peri-urban woodland, particularly if leisure and recreation are to be combined into other multiple uses, such as the provision of fuel wood, building wood and food (Braatz nd).

4.5.4 Conclusion

The principle operating within both golf and stadia developments is similar to other changes in the peri-urban area; in that low-value land uses are replaced by high-value land uses, and low income populations are replaced by middle or upper income groups. Sports landscapes in all geographical contexts have received only limited academic attention (Bale, 1993). Golf course and stadium developments seem to dominate at present. However, there is an obvious need for future research.

4.6 Conclusion

This section has illustrated how `natural' processes cannot be separated from the socio-economic, cultural and political contexts of the peri-urban interface. The peri-urban is the prime area for locating new populations and for accessing related construction materials. Conversely, increased populations increase natural resource depletion and pollution (e.g. land, water and forests) having implications for the health and well-being of peri-urban (and urban) residents. Especially relevant to developing nations is the overcrowding, poverty and non or mis-management particularly prevalent in peri-urban areas. These have both physical (e.g. parasitic disease) and social (e.g. psycho-social disease) implications exasperating ill health and reducing existence, access and utilisation of health care facilities. Of particular relevance to newly industrialising nations are recreational developments (such as golf courses or stadia) precipitating significant natural resource change and damage.

5 ENVIRONMENTAL IMPACTS

5.1 Introduction

In this review we attempt to characterise some of the key biophysical expressions of human activities which originate within the urban zone, but which impact upon the pen-urban environment. We consider whether environmental impacts in the peri-urban zone are different in kind from those elsewhere, and whether such areas are distinctive in terms ofthe suite of environmental impacts they experience.

The natural processes in a peri-urban environment do not normally differ from those in geographically similar rural or urban environments. There are no models in the literature which describe a separate set of natural processes for peri-urban areas. In fad, it is based only on the understand'ng that natural processes in the peri-urban are no different from elsewhere that we can assess the impacts and changes to the pen-urban environment brought about by human activities.

Attention has been drawn (see Section 2) to the problems inherent in defining the peri-urban zone. The peri-urban can not be separated from the urban area proper as it is shaped by a combination of activities, many of which originate from the urban zone. While the nature of these activities, and their biophysical manifestations inevitably vary considerably from place to place, there are categories of activities which characterise the pen'-urban.

In this section we are concerned primarily with the terrestrial environment and freshwater. However we recognise that urban areas in coastal locations have very significant impacts on the local marine environment (Hardoy *et al.,* 1992). In this context it is worth emphasising that some 60% of the world's urban population is located within 100 km of marine coastline (Park, 1997). Such impacts may be expressed in reduced yield of fish and shellfish, elevated levels of toxic substances within harvested marine organisms, fouling of beaches, loss of biodiversity and ecological value, and a reduction in amenity value.

We approach this review by identifying those activities which are either typically located in the pen-urban or which are located within the urban area but which 'centrifizgally *(sensu.)* impact upon the peri-urban zone by the transfer of waste or by the acquisition and degradation of resources. We recognise Satterthwaite's (1996) argument that improvements in the quality of the urban environment are frequently made at the expense of the extra-urban area and suggest that the peri-urban area is likely to carry a disproportionate share of the environmental burden.

Our review is particularly concerned with environmental degradation and the loss of resource value. It is very important to appreciate, however, that linking cause and effect can be very problematic in discussing human impacts upon the environment. For example, while the relationships between pollution loading on ecological systems may be understood in a general way, the detailed quantitative responses are usually much more difficult to evaluate. This degree of uncertainty is magnified when a variety of substances are involved. Furthermore, it must be appreciated that responses are determined by numerous environmental variables and are *therefore* location specific. Moreover, the nature of the environmental burdens differ very considerably from place to place depending on the profile of human activities.

Natural resource problems in a peri-urban area are not significantly different to those in the core urban areas in terms of their causes and effects. This has been best summarised by Bartone (1991, in Leitmann *et al.,* 1992) (Figure 5.1). However, it should be noted that there are distinguishable patterns of activities.

Figure 5.1: Summary of Problems, Effects and Causes of Pollution

Problem Area	Effects	Causes
	AIR	
AMBIENT AIR POLLUTION community city-wide regional transnational	• health problems • economic costs from health care costs & productive losses • amenity losses (aesthetic, cultural and recreational)	* industrialisation with urbanisation * increase in motorised fleet and congestion * use of highly polluting fuels (leaded gas and high sulphur coal) * energy pricing policies
INDOOR AIR POLLUTION household workplace	• health problems (chronic obstructed lung disease, ARI, low birth weights, cancer) • economic costs from health care and productivity losses	* use of low quality foods for cooking or heating (biomass and high sulphur coal) * poorly ventilated dwellings and workplaces * passive smoking * cottage industry activities
	WATER	
SURFACE WATER POLLUTION community city-wide regional	• health problems . economic costs (additional treatment, new sources of supply, health costs) • amenity losses	* topography and climate * pricing policies * `tragedy of the commons' * poor regulations and/or enforcement * municipal and industrial waste disposal practices * urban runoff * irrigation practices
GROUNDWATER POLLUTION AND DEPLETION community city-wide regional	• reduced water quality from saline intrusion, biochemical seepage • health impacts * economic costs (damage form land subsidence, health costs, increasing marginal costs of supply	* pricing policies * `tragedy of the commons' * poor regulations and/or enforcement * unsustainable extraction * sanitation, municipal & industrial waste disposal « or demand management
COASTAL / LAKE POLLUTION community city-wide regional transnational	• health effects • loss of recreational & tourism resources, revenues • damage to fisheries • amenity losses • eutro hication	* `tragedy of the commons' * poor regulations and/or enforcement * municipal and industrial waste disposal practices * shipping related pollution
	LAND	
DEGRADATION OF FORESTED AND AGRICULTURAL LAND peri-urban regional	• declining agricultural productivity • reduced renewable resource base (deforestation, lost soil fertility) erosion and siltation • amenity losses • loss of natural habitat	* changes in relative value of land uses * uncontrolled urban growth (no zoning/enforcement, no alternatives for squatters) * land tenure system * woodfuel and land pricing * mining activities * heavy metals pollution
LOSS OF CULTURAL AND HISTORICAL PROPERTY community city-wide	• loss of heritage • loss of tourism revenues • damage to culturally-valued buildings, monuments, natural sites	* land prices do not reflect social valuation * lack of regulation and/or enforcement * air pollution * solid waste mngmt. practices * land subsidence

Figure 5.1: Summary of Problems, Effects and Causes of Pollution

DEGRADATION OF RURAL ECOSYSTEMS regional	• health hazards • Resettlement costs • Loss of habitat • Air, water, land pollution	* Failure to anticipate effects in planning and development * Pricing policies * Lack of rural political power
	CROSS-MEDIA	
SOLID WASTE POLLUTION community City-wide	• health impacts • costs related to blocked • drainage and flooding • water pollution from leachates • air pollution from burning • amenity losses	* poor management (improper collection & disposal, little resource recovery) * pricing (no cost recovery) * disposal impacts external to the community
HAZARDOUS WASTE POLLUTION community city-wide	• surface, ground, coastal Water contamination • related health, economic and resource impacts • accumulation of toxins in the food chain •reduced property values	* inadequate regulations &/or enforcement * no incentives for treatment * input pricing for waste-producing industries * low visibility, non linear, long term effects * dispersed small-scale and cottage industries
EXPOSURE OF ENVIRONMENTAL HAZARDS community city-wide regional	• health effects • economic costs (loss of lives, property, infrastructure) • land degradation (flooding landslides, earthquakes • amenity losses	* natural forces * failed land markets (lack of alternatives for squatters, artificially constrained supply) * land policies (no taxation, no/unenforced protection of high-risk lands)
INADEOUATE SANITATION household community city-wide regional	• health impacts (diarrhoeal diseases, parasites, high infant mortality, malnutrition) • related economic costs • eutrophication • amenity losses	* inappropriate technology * pricing (no cost recovery) * poor management (lack of operations and maintainence, uncoordinated investments) * household hygiene

Source: Bartone (1991

A variety of infmstmdural developments and activities are characteristically situated within the pen-urban zone. Their location is dictated by a number of factors, notably the amounts of land which they require, the price of land, pollution and safety considerations, location of natural resources, and environmental benefits. Airports, reservoirs, drinking water and sewage treatment plants, power stations, quarries and brickfields, industrial plants, golf (and certain other) clubs and military installations all provide obvious examples. All of these developments have biophysical impacts, which extend beyond their immediate boundaries.

5.2 Agricultural Land Loss and Degradation

One of the most conspicuous manifestations of urban expansion is the irrevocable loss of agricultural land. These direct losses are compounded by two other processes (Douglass, 1992).

- The abandonment of farming on the urban periphery in the face of land purchases for speculative purposes
- The occupation, often illegal, of land for temporary housing

In addition, the agricultural land that remains in the peri-urban area is subject to a loss of productive potential by a variety of activities, many of which are located within the urban area. The factors responsible for the loss and degradation of agricultural land in the peri-urban zone are considered in more detail below, h is worth emphasising that the location of urban settlements is usually such that pen-urban developments are likely to take place on relatively fertile agricultural land (Main, 1995). Nowhere is this better illustrated than by developments around Cairo. One consequence of the displacement of fanners from the peri-urban zone is their occupation of land which, for topographic or other reasons, is not suited to crop production. Such a scenario has been described for metropolitan Jakarta (Douglass, 1989, 1992) and in some Nigerian cities (Areola, 1991).

The loss of good agricultural land due to urban expansion is most serious in those developing economies with a precarious food-population balance and where expansion consumes the most productive agricultural land. Loss of agricultural land in China, largely as a result of urbanisation, has received considerable attention, at national and local levels (Shi & He, 1996). Although opinion is divided as to the consequences for China's national grain output and international grain flows (Brown, 1995; InformatioRn Office of the State Council of the PRC, 1996), it is incontestable that the amount of cultivable land per capita is decreasing in China, and that large tracts of productive farmland continue to be lost around major cities, such as Shanghai and Guangzhou, as well as around medium sized cities and thousands of sub-municipal settlements (Gu *et al.,* 1995).

Impacts on the remaining agricultural lands are likely to include:

- **Productivity** decline due to the heavy pollution of soil and water by industries
- **Degraded soil quality** because of the use of fertilisers, pesticides and insecticides
- **Land degradation** in the areas surrounding agricultural lands

For example, higher vegetables demand in core urban areas leads to intensive and increased cultivation and heavy use of fertilisers and pesticides to optimise production. Jansen *et al.* (1996) reported that urban Vietnamese populations are growing four times faster than rural, fuelling the demand for timely supplies of fresh vegetables to cities. Much of this increased demand, particularly for more perishable goods is satisfied through peri-urban production, which has significantly increased since the change from centrally planned and collective systems to a market economy. Around Ho Chi Minh City farms are small (on average about 0.8 ha), two-th irds of which are *de facto* owned and with about 60% dedicated to vegetables. Most vegetable farmers also grow rice and/or groundnut, while cabbage is the most commonly grown vegetable. Bowyer-Bower (1996) reported the issues of conflict between agricultural development and environmental protection in a case in the urban and pen-urban zones of Harare.

5.3 Water Resource Exploitation

A variety of water supply facilities are located in the pen-urban zone. Around low-lying cities, reservoirs are frequently constructed alongside existing rivers. This location permits the ready receipt of water during periods of high flow, and provides a store of water for periods of low flow. While the construction of such reservoirs usually represents a loss of agricultural land there may be the potential for positive benefits in terms of aquatic recreational pursuits (fishing, boating), aquatic food resources, and ecological value (e.g. wildfowl breeding, freshwater community conservation).

In some situations, upland reservoirs, may be situated within the peri-urban zone. This can occur where a relatively narrow coastal zone is backed by hills into which the contiguous urban area is spreading. While the potential benefits of upland reservoirs are similar in kind to those in lowland locations, there are also potential problems associated with the release of large quantities of water during periods when the reservoir's capacity is exceeded. The dangers of dam collapse also demand consideration, particularly in seismically active areas.

The problems associated with subterranean water abstraction are well documented and vividly demonstrated. A key resource issue is the balance between abstraction and replenishment. A large deficit is particularly serious in situations where the water represents an effectively non-renewable resource. However even in humid climates the overdraft can be considerable. Widespread pumping of groundwater in Bangkok, mainly for industrial use, has led to an average annual subsidence rate of nearly 60 nun (Setchell, 1995). The difference between abstraction and replenishment is accentuated by covering soil with hard surfaces such as concrete and bitumen because they markedly reduce infiltration. Furthermore, progressively greater energy costs are incurred in pumping with increasing depth of the water table. A major hazard of extensive abstraction is surface subsidence caused by the loss of pressure within the water-bearing strata. A variety of costs are incurred where subsidence occurs. The direct consequences of subsidence may be damage to buildings and the disruption of communication networks. In addition, the risk of flooding is increased by subsidence.

In coastal localities, a lowered water table encourages sea-water incursion with a consequent decline in water quality. This has occurred in Dakar (White, 1992) and elsewhere in West Africa (Main, 1989), in Jakarta, Katowice and Tianjin (Leitmann, 1995). We note also the particular problems of land subsidence in coastal location because of sea-level rise, and emphasise the need for inexpensive coastal defences in such situations.

Where water is in short supply, urban/industrial users will inevitably out-compete agricultural water users, which may well lead to the transference of land out of productive agriculture.

Aquifer water acts as a sink for substances leached from the surface and therefore may not meet quality standards considered desirable for drinking water. Such sources, often being diffuse in nature, are extremely difficult to detect. In Jakarta, the contamination of ground water by seepage from septic tanks is a major problem (L,eitmann, 1995). Another issue is the time lag between the removal of substances from the surfaces and their deposition in the aquifer water. As aquifer water levels drop such substances may well be concentrated. Also, water from aquifer has been traditionally regarded as purer than that from surface sources. As such it may not be treated prior to use. As boreholes may be used on a local basis, often in essentially rural areas, there is little opportunity for the routine monitoring required to ensure that the water quality is of an acceptable standard.

Venter *et al.* (199[7]) carried out a situational analysis of a peri-urban catchment in South Africa which experiences microbial water quality problems using data collected over two and a half years. The water and land use in the area was determined and the main sources of pollution identified. Certain areas of the catchment are densely populated and both developed and informal settlements exist. Water is mainly used for domestic and recreational purposes. The river receives diffuse source discharges as well as point source discharges from four wastewater treatment plants and an industrial site. Assessment of indicator organism and pathogen analyses indicated that the main factors affecting the microbial quality were discharges from the sewage plants and runoff from informal settlement areas.

5.4 Exploitation of Aggregate Resource

Brick-making, sand-dredging, rock quarries are some of the most common scenes in peri-urban regions. The advantages of such aggregate resources in peri-urban locations in comparison with a remote rural location in terms of accessibility, production cost and time have often resulted in widespread aggregate resources exploitation at the peri-urban interface. Many of the resources mined are typical of small scale, low technological and un-regulated operations. The implications on the natural resources and resource management include:

(1) The nature of small operations often means there is no form of EIA at *any* stage of the project, as would be the case at any other location. The denser the distribution of these operations in the peri-urban area means the greater are the impacts.

(2) **Occupation** of fertile agricultural lands, soil erosion, pollution of local water resources are common cited problems associated with aggregate resource exploitation.

5.5 Energy and Power Generation

Power generating facilities are frequently Iocated in the pen-urban zone. In addition to occupying quite large tracts land, such facilities potentially impact upon the environment in a number of ways. Power stations are frequently situated adjacent to rivers or lakes from which large quantities of water are abstracted for steam generation and for cooling turbines. Although water emitted as steam may be partially recovered by condensation in cooling towers, the waste water which is returned to water bodies is at temperatures several degrees in excess of that abstracted. The temperature enhancing effect of cooling-water discharges in the aquatic environment is likely to be greatest where water temperatures are in excess of about 20°C, and where water movement is relatively slow.

The reasons why high water temperatures are undesirable relate to the response to temperature of oxygen in solution and the oxygen requirement of most organisms for respiration. The capacity of water to hold oxygen in solution is negatively related to water temperature. As fish and virtually all other multicellular organisms have an obligatory requirement for oxygen, temperature increases have ecological and resource implications. Furthermore, warm, nutrient rich water is typically very productive biologically. An increase in aquatic biomass raises the biochemical oxygen demand, which exacerbates the direct temperature-induced oxygen depletion. In addition, in seasonal environments lake waters typically stratify in summer when a layer of warm, low density water (the epiiimnion) forms at the surface and rests upon a cooler, higher density water layer (the hypolimnion) beneath. Under these relatively stable conditions there may be little exchange of water between the two layers. When ambient temperatures cool, the density of the epilinmion approaches that of the water beneath and the stratification breaks down with a consequent downward movement of water which carries oxygen to the lower parts of the water column. If surface waters are relatively high, as in subtropical areas, discharges of hot waste water may produce a permanently stratified water body which is thus deprived of oxygen at the bottom. In this situation the ecological and resource value of the water body are seriously diminished. Alternatively, the technology is available to use waste hot water from power stations to provide heat, in combined heat and power operations. While the technology involved is relatively sophisticated, this option offers a number of environmental benefits as well as being more efficient in terms of power generation. The critical factors determining the effects of thermal pollution are the amount of water discharged and its temperature, the size of the water body and the turnover time of the water and the ambient temperature regime.

Fossil-fuel powered electricity generating installations are potentially major sources of gaseous and particulate substances. Major gases emitted are oxides of sulphur and nitrogen, some of which form acidic derivatives in solution. Concentrations of these substances tend to be highest in urban core

areas, but even at low concentrations they can directly reduce crop yield and result over time in the acidification of soils and water bodies. Power stations are also a major source of fly ash, a particulate emission with a major effect on air quality because of its role in respiratory diseases.

The loss of woody biomass, is a feature of peri-urban zones (Campbell, 1989). Leitmann (1995) reported the reduction of forested land in the pen-urban zones of a number of cities, although for different reasons. For example, around Accra, forest loss is attributed to the demand for biomass energy; around Katowice it is due primarily to air pollution; around Sao Paulo it is due to clearing by illegal settlers, whilst around Singrauli it is mining and associated soil erosion that is primarily responsible (Bose and Leitmann, 1996).

Walsh *et al.* (1993) review the changes in the ecology of vectors and epidemiology of vector-bome diseases *which* result from deforestation. Selected examples are considered from viral and parasitic infections (arboviruses, malaria, filariases, Chagas Disease and schistosomiasis) where disease patterns have been directly or indirectly influenced by loss of natural tropical forests. A wide range of activities have resulted in deforestation. These include colonisation and settlement, transmigrant programmes, logging, agricultural activities to provide for cash crops, mining, hydropower development and fuelwood collection. Each activity influences the prevalence, incidence and distribution of vector-borne disease. Three main regions are considered - South America, West & Central Africa and Southeast Asia. In some circumstances destruction of the forest has reduced or even removed disease transmission (e.g. S. neavei-transmitted Onchocerca in Kenya). Whilst the process of deforestation can be expected to continue, hopefully at a decreased rate, it is expected that unpredictable and sometimes rapid changes in disease patterns will pose problems for the public health services. This is an issue which is discussed in more detail in section four.

5.6 Transportation

The construction and extension of airports is a characteristic feature of city development throughout the developing world, and for operational and safety reasons typically takes place within the peri-urban zone *which* has larger tracts of land available than the city centre see also section three). The growth in air traffic and the demand for new airports is most conspicuous at present in east Asia, particularly China. In China it is estimated that 47.5 billion yuan (about £3.7 billion) was spent on airport construction during 1980-95. During the five year period of 1990-94 19 new airports have been constructed and 15 expanded. Twelve new airports are under construction and China is expected to invest 120 billion yuan (roughly £1 I billion) between 1995-2000 on the expansion of 402 airports, 137 of which provide regular scheduled flights (Bao, 1997). The city of Wuhan in China provides a good example of this kind of phenomenal airport development - the city already has two airports capable of handling modem jet aircraft, yet a new airport is nearing completion.

To satisfy operational requirements, airports generally consume extensive tracts of land which is of high agricultural value. In addition to the obvious loss of agricultural production such developments are likely to incur the social costs associated with the displacement of farmers. The ongoing bitter conflicts which have arisen over new runway construction in Tokyo graphically illustrates this dimension of airport construction. The loss of land for new airport facilities is frequently supplemented by the construction of roads, particularly to the city which the airport serves and often more widely. Because of the symbolic status attached to a modern airport as a 'gateway' to a nation and its major urban centres, such feeder roads may also consume large areas of land. Airport operations involve other environmental burdens in addition to land consumption, most notably the leakage of aviation fuel and the noise generated by aircraft movements. In turn, airports are vulnerable to certain environmental phenomena, such as land subsidence, caused by water abstraction, and earth movements in tectonically alive zones.

5.7 Waste Disposal

5.7.1 Industrial Waste

Industrial wastes merit separate consideration because of the large quantities of potentially hazardous materials that are often involved, and the fact that the enterprises responsible for their generation are frequently located within the peri-urban zone.

Environmental impacts of the industries have grown at an increasingly rapid rate in the Third- World Cities and their surrounding areas. This is an integral part of the processes of urbanisation and industrialisation which is currently affecting these areas. The nature of the pollution to the atmosphere, water resource, soils and the general environment in the peri-urban interface is not significantly different to that which might be expected in the urban area proper.However, the peri-urban interface may be subject to a greater degree of pollution to its resource base than the urban area as a consequence of the re-distribution of industry and its poor management in certain areas:

1. There is an increasing tendency towards relocating heavily polluting industries (toy factories, plastic factories, oil refineries, paint factories etc.) from urban areas to the periurban region. This is partially due to the toughening of pollution control requirements in urban areas. The peri-urban zone has become the preferable location for such industries due to many factors, including good transportation networks, a well educated workforce in comparison to rural areas, better energy supplies and less rigid pollution control requirements (patterns, rate of processes, etc.)

2. In urban areas, it is often a requirement that waste liquids are treated before being discharged into the environment. Such regulation may not be in place in the pen'-urban area and if -it is, may not be implemented rigorously. In spite, and probably as a result of this, many of the treatment factories for waste are actually located in the peri-urban region as has already been discussed

3. Capital resources invested in environmental quality monitoring and management facilities are fewer in the peri-urban area than in the core urban area.

The transformation of such relocation in many developing countries, especially in the economically booming areas of South and East China and Southeast Asian is typical. Many experiences and lessons can be leamt to avoid future misuse and mis-management of natural resources in peri-urban regions.

Important contributors to pollution loadings of land, water and the atmosphere are industries dealing with petrochemicals, iron and steel, metal smelting, electroplating, cement and brick production, tanning, heavy and light engineering, machinery and motor manufacture, fertiliser and pesticide production, pulp and paper industries, glass manufacture, white goods manufacture and food processing. Collectively such operations generate a large variety of by-products. These include solid, essentially non-toxic materials, heavy metals, inorganic reducing agents, organic matter, synthetic organic substances, acids and alkalis, petroleum hydrocarbons and inorganic nutrients. The acidic derivatives of sulphur and nitrogen oxides can directly reduce crop yields and acidify soils as noted earlier. Some solid and liquid by-products may be discharged into the sewage system, but in the peri-urban zones of developing economies most waste is discharged untreated into water courses or alternatively onto land or in to lagoons. The particular mix of substances varies considerably from place to place, but the overall result is a drastic lowering of water quality and increase in public health hazards. Much of the waste generated by industrial process is discharged to designated areas

of land which are thereby rendered useless for agricultural production, although such land may not be without conservation value. Such sites cannot be regarded as closed systems with regard to the export of disposed substances, but inevitably leach substances to nearby surface waters and to aquifers as well.

In an extreme case, the impacts of 978 small paper mills on the environment along the Huaihe River in China was so devastating that the Chinese government announced a `death penalty' in 1996 to close down all of them after several attempts to enforce regulations failed (Jiang, 1997). Paper products are in high demand in the Chinese market and small paper mills are regarded by the people in the peri-urban areas as a mean of industrial opportunity. A typical small water mill generates only 5000 tons of paper annually. Paper making uses three basic components: cellulose, lignin and saccharide. However, only cellulose, which makes up 40% of the total, is needed for paper. The other ingredients are discharged as waste. A paper mill with an annual output of 10 000 tons would commonly discharge 40-50 tans of such waste each day.

So far we have focused on the disposal of waste materials in central, usually officially designated sites and facilities. These are usually referred to as point sources. However, much of the waste disposal in the pen-urban *zone* is likely to be of an unofficial nature and carried out on an *ad hoc* basis. Setchell (1995) has contrasted the situation in the Bangkok metropolitan area, where some 90% of garbage is collected and disposed of, with that in surrounding *Changwat,* where much of the waste is either dumped into waterways or burnt. In this area the rapid growth of manufacturing has resulted in an increase in the potentially hazardous nature of these waste materials. It is telling in this context that Bangkok possesses only one hazardous waste treatment plant (Setchell, 1995). Olu Sule (1981) linked increased domestic consumption in Calabar, Nigeria with the inadequacies of the official waste-disposal services in the city. The result is an accumulation of consumer durable on open ground and in water, often blocking stoma drains. The public health impacts of such a situation have already been discussed in section four.

5.7.2 Sewage

The problem of waste disposal, which occurs wherever there are large aggregations of people and industrial activities, is likely to be particularly severe in peri-urban environments because of low transport distances from the urban core and the availability of open space. Here we categorise wastes by origin, i.e. as domestic or industrial, and consider major classes of substances, together with their origins, within each of these two major categories. In practice there is considerable overlap between domestic and industrial sources, both in terms of the substances involved and their point of entry into the environment.

One of the major components of domestic waste is human sewage. While much urban sewage is discharged locally into estuaries and near-shore marine environments, often with undesirable environmental consequences, our concern here is with sewage which is discharged to terrestrial and freshwater environments in the pen-urban zone. Both the organic and inorganic fractions of sewage potentially effect a deterioration in water quality. High organic matter loadings increase the biochemical oxygen demand (BOD) of aquatic ecosystems. This is caused by an increase in decomposer activity (principally bacteria) in response to elevated organic matter loadings and results in a depletion of oxygen. The ecological consequences are therefore broadly similar to those of thermal pollution. Again, such changes have important implications for fish and shellfish, usually the most valuable aquatic resources. Anaerobic metabolism generates a variety of gaseous by-products some of which are undesirable on aesthetic grounds. In addition, sewage always contains organisms such as bacteria and protozoa which may be pathogenic. The public health implications of using the same water body for both sewage disposal and domestic water abstract in is well known and is also discussed in section four.

The release of inorganic nutrients, principally nitrogen and phosphorus, from sewage, raises the productivity of freshwater. Nutrient enrichment as a consequence of human activities is termed 'cultural eutrophication' and is a major problem worldwide. Advanced eutrophication gives rise to algal blooms, which incurs costs in terms of aesthetics, amenity and recreation, conservation value, human and livestock safety (some primary producers release toxins), water treatment, and, if severe, difficulties for water transport. Advanced eutrophication also leads to oxygen depletion by substantially increasing biomass production and thereby increasing BOD. Nutrient stripping from sewage is rarely carried out, particularly outside the developed world. However, there are relatively low cost biological alternatives to physicochemical nutrient-stripping techniques, particularly the encouragement of wetland grasses and sedges.

Where sewage is treated at a central facility, the discharged material usually contains a variety of potentially hazardous substances. This is because most sewage works receive effluents from factories, chemical plants and workshops via the main drainage network. Such effluents typically contain heavy metals, synthetic organic compounds, acids, alkalise, pesticides and hydrocarbons. It is not easy to remove such substances once they enter the sewage network, although bioremediation offers considerable potential in some situations. In practice, of course, the proportion of sewage that is treated, even at primary level, before disposal from nearly all Third World towns and cities is very low, and may be zero.

The use of sewage to aid soil structure and fertility remains widespread. However, the advent of relatively cheap inorganic fertilisers and the increased distances involved in disposal from urban areas have led to a general reduction in this practice. In industrial areas, sewage disposal to land is also constrained by the presence of the extraneous substances referred to earlier, particularly heavy metals such as copper, zinc and cadmium. In situations where sewage passes directly from household to field, rather than through an effluent treatment works receiving industrial effluent, disposal to land can offer a satisfactory method of disposal. However there are public health implications associated with this practice due to sewage-borne pathogens.

Demands for stricter controls on the dumping of sewage at sea (the introduction of new legislation in the European Union in 1998 provides an example), prompted largely by increasing evidence of its deleterious effects on the marine environment, is likely to increase pressures to find alternative methods of disposal. This will undoubtedly increase pressures on the peri-urban environment.

5.7.3 Other Domestic Waste

In addition to sewage, households generate a variety of other wastes which vary both in degree of biodegradability and environmental impacts, A useful distinction is between organic waste (mostly uneaten food and food by-products, paper and wood) and inorganic and plastic wastes. An overall increase in affluence is accompanied not only by increase in consumption and the generation of such wastes, but also a shift in waste composition, which effectively raises the amount of material which is not readily biodegradable. Disposal of domestic solid waste is a worldwide problem, and the costs of transporting these materials dictates that the principal sinks for materials generated in the urban core is in surrounding, relatively open areas. The amount to be disposed of can be reduced by recycling. Even in the developed world, official recycling facilities are uneven, but in the developing world they are virtually non-existent. However, there is considerable unofficial, although often highly organised, recycling in Third World urban areas (Campbell, 1989; Pacheco, 1992). Furedy (1992) has described waste economies in Asian cities in which there is division of labour amongst buyers, pickers, shop keepers, market traders and transporters. The trends in consumption patterns towards more recyclable waste renders such activities more attractive, despite the hazards associated with such work (Furedy, 1992). Despite the efficient recovery of waste which has a monetary value, large piles of garbage are a feature of third world cites worldwide. Where official facilities are inadequate,

as in Nairobi (Alder, 1995), those in higher income groups frequently employ private garbage collectors. In such situations it is quite likely that the ultimate destination of the waste material is in the transitional zone between the urban core and surrounding rural area.

Where there are official disposal facilities, most urban refuse is deposited in dumps or landfill sites, the availability of which is determined by, inter alia, local geology. The increased requirement for urban refuse disposal is likely to be one of the most significant environmental issues in the fixture for peri-urban zones in those economies where affluence and consumption are rapidly rising. Such sites are the source of local air and surface water pollution, and in some situations for aquifers also. As an example, the largest municipal dump serving Dakar is on the city's periphery, around 15km from the centre. The dump is the source of leached contaminants for nearby lakes and for the underlying aquifer from which local residents draw their water (White, 1989).

Although covered landfill sites may be useful for some purposes, the range of options is frequently constrained by instability and gaseous emissions, particularly of methane. Methane, however, at least theoretically, may be used as a source of energy provided its content in the gas stream is sufficiently high and its flux is sufficiently reliable.

Incineration of waste materials, including sewage and household refuse, provides an alternative strategy for disposal. However it is an expansive process in energy terms and does not provide a low-cost alternative to more conventional disposal options. If the heat energy released can be recovered efficiently then the economics of mcineration begin to look more favourable. However incineration plants do generate local environmental costs in terms of amenity, air pollution and public health.

5.8 Implications for Management of Natural Resources

Much of existing literature and on-going studies have a strong African context.

NRI (1995) in its workshop proceedings of Peri-Urban Interface Research identified major natural resource issues as energy, agriculture, urbanisation and land use, labour and employment and social services. Whilst labour, employment and social services are hardly natural resource issues, the problems of water, sanitation, drainage/erosion are listed under the social services subheading. Important management themes identified by the workshops are:

- Development of sustainable agriculture
- The need for comprehensive watershed management in the peri-urban area
- Waste management strategy
- Management to mitigate environmental damage resulting from activities such as sand-mining and indiscriminate tree-felling

Priorities for research were also identified as follows:

- Analysis of the stakeholder environment
- Comprehensive baseline studies (inventories of natural resource and social economic information)

There is a clear gap in the literature on the Asian experiences regarding the peri-urban natural resource issues and management. While some of the results from the African studies may be consulted for the peri-urban environmental and resource management in Asia and South American regions, the differences in political, economic, cultural, social and environmental conditions between them make it difficult, if not impossible, to apply the African experience to an Asian or South American setting. Yet Asia is the region that is currently subject to the most

rapid rate of urbanisation and industrialisation, and hence rapid changes in the peri-urban area. Research on the environmental impacts and natural resource management in Asia and other regions is urgently needed.

Greater attention needs to be paid to the more critical and immediate problems:

Break-down of traditional management systems (e.g. sewage storage-collection-recycle, the dyke pond agro-fishery ecological system in South China).

Differences between large cities and small cities is poorly researched. Hardoy (1992: PAGE) commented 'there is a remarkable lack of documentation on environmental problems in small cities' other than those with population of greater than 1 million.

Specific problems such as lack of piped water supplies, contaminated water resource, poor drainage facilities, poor garbage collection and disposal.

Environmental Impact Assessments are patchy. Where they exist, they are specific project-orientated by central government or external funding agencies using a top-down approach and often there is no in-project monitoring and after-project review. Legal frameworks and institutional mechanisms that allow wider public participation do not exist. The peripheral geographical position makes it easy for projects in peri-urban areas to get away from this.

The rapid rate of deterioration in the natural resource quality results from the impacts of the rapid urbanisation and industrialisation processes, especially in East Asia and Southeast Asian countries.

5.9 Conclusion

The preceding discussion has emphasised the environmental impacts of the urban processes on the urban-rural interface zone. In terms of loss of productive potential, greater resource exploitation, and increased public health risks, such impacts would normally be construed as negative. Indeed, most accounts of Third World urbanisation is broached in such terms (see for example Hardoy et al., 1992). We recognise, however, that a wider analysis of the environmental cost of a nation's development process should incorporate an environmental impact assessment of developmental scenarios that achieve similar levels of GNP growth with lower levels of urbanisation (Main, 1995). Thus, the environmental costs of urbanisation in urban and peri-urban zones should be set against possible positive impacts in rural areas. In an African context, for example, Main (1995) has identified as possible positive effects, reduced pressure on land resulting from migration to urban areas, a rising urban demand for rural resources and the spatial concentration of population and production. This is not to play down the enviraunerrtal costs of urbanisation, but rather to point out that all development trajectories carry environmental costs.

PART 2

MANAGEMENT APPROACHES

PART 2: MANAGEMENT APPROACHES

6.1 Introduction

Attention during the past decade has increasingly become focussed on the problems faced by urban areas in developing countries and the need to promote sustainable development. These two priorities have come together through the increasing recognition given by multilateral and bilateral agencies of the significance of urban environmental problems, and through the local applications of environmental planning and management approaches to tackle urban environmental problems. Although the peri-urban interface is very rarely specifically mentioned in these studies, it has become clear that many of the analyses and activities are actually concerned with the rural-urban fringes of cities in developing countries. As much of the limited literature available on these management issues is 'grey' literature and reports not readily available, the emphasis of the review of management issues will be placed on producing extended summaries of the material before drawing their inferences for the periurban interface.

Following broad introductory outlines of changing approaches to planning, changing attitudes to urban problems, changes in emphasis on urban environmental problems, and the growth of concern with sustainabihty, Section 2 will outline the methodology adopted by *the* World Bank/UNDP/UNCHS Urban Management Programme. This will be followed by the initial UNEP/UNCHS Environmental Planning and Management approach in Section 3 and the current UNCHS Environmental Planning and Management Guidelines in Section 4. This approach has been adopted by the UNCHS Sustainable Cities Programme, and by the World Bank's Metropolitan Environmental Improvement Programme in Asia, covered in the next sections, 5 and 6. The work on urban environmental management by the German Agency for Technical Cooperation (GT2) will then be examined (Section 7) since it develops a similar underlying approach from its practical applications in Nepal and Thailand. Section 8 covers the work of the International Council for Local Environmental Initiatives which has publicized improved planning and management techniques for local authorities aiming to promote sustainable development and implement Local Agenda 21. The UNDP Local Initiative Facility for the Urban Environment Programme (LIFE), a community-based initiative to contribute towards meeting Local Agenda 21 objectives through projects to solve urban environmental problems, is discussed in Section 9. Urban and sustainable indicators are outlined in Section 10. Finally, the use of Environmental Impact Assessment as a management technique in developing countries is briefly reviewed in Section 11, together with other selected management issues relating to decentralization and jurisdictional complexity affecting peri-urban areas in developing countries.

6.1.1 Planning:

Approaches to planning in general in developing countries have undergone fundamental changes in emphasis during the last three decades. The master plan approach, promoted in many developing countries during the 1950s and 1960s when national economic planning was also fashionable, attempted to co-ordinate development across sectors and space and formulate long-term policies. It resulted, however, in a rigid, static, land-use oriented, end state document, typically produced by a single office or consultants, which often failed to channel urban growth. Economic, demographic and social issues often received superficial treatment, while consultations with other government agencies or the affected populations in determining objectives, needs, constraints and priorities were weak or non-existent, with feedback and adjustments during implementation equally rare. Unfortunately, many zoning plans, such as those of some metropolitan development authorities in South Asia, for example, still tend to adopt many of the underlying features associated with master planning. Peri-urban areas are seen simply as areas of future urbanization without considering the environmental implications or the needs or activities of existing residents. Nick Devas has outlined the general weaknesses of master planning and the reasons why it continues to be the dominant approach. (Devas and Rakodi, 1993, pp.72-74). In a valuable case-study illustrating the limitations of the master planning approach, John Soussan has documented the defects in the Delhi Master Plan approach and in its implementation. (Soussan, 1982)

From the late 1960s the master plan approach was gradually replaced by the action plan approach. This was based on shortterm, dynamic, implementation-oriented public action involving projects selected through the use of project appraisals, primarily involving a review of the internal rates of return and a comparison of the economic and social costs and benefits. The major emphasis was placed on public finance and the capacities of sectoral agencies to produce projects to rapidly overcome the backlog in urban service provision and address the health and environmental conditions of the urban poor. Action planning involves identifying key urban problems amenable to immediate action and determining those which could be implemented using an authority's resources and capacity. Devas (in Devas and Rakodi, 1993, p.87) summarises the series of steps involved as:

- ***reconnaissance*** (rapid appraisal of the dominant features in an area to identify the strategic issues and problems);
- ***guiding concept*** (principles to be applied in approaching the issues and problems and the framework to be used for initiatives on such topics as infrastructure, transport, housing, services);
- ***action programme*** (tackling the identified problems and making the best use of scarce resources by selecting a series of interconnected development strategies involving investment, land use and other resource use);
- ***role casting*** (detailing the roles of the various agencies involved in the planning and implementation of the components of the action programme);
- ***monitoring and feedback*** (gathering information on the progress of information, the problems encountered, and public responses for use in programme revision).

Although action plans have been developed for a few peripheral squatter housing areas, the general tendency to emphasize the most urgent urban problems has often led to a bias towards the densely-settled, overcrowded, older core or inner areas of cities in developing countries.
Rarely has attention been paid to dealing with the future problems in peri-urban areas, such as those resulting from inadequate or missing infrastructure, the lack of suitable job or income opportunities, adjustments in activities in response to land use changes, etc.. Often, the economic appraisals of physical development projects have not led to their integration with socioeconomic programmes. Also, the reality has also tended to be that an over-emphasis on 'getting-things-done' has meant that intersectoral linkages, environmental impacts and institutional coordination have frequently been neglected, as have long-range and area-wide

strategies that can tie projects together into an efficient pattern of development. Peri-urban areas particularly suffer from the neglect of these aspects, and it could be argued that they are perhaps in the greatest need of protection in a dynamic situation when faced with urban encroachments and changes to non-farm activities. Although action planning has achieved many successes and been popular with donor agencies who could divide up the task of urban improvement into manageable and fundable projects, the risk has been that a series of disconnected interventions fail to deal with the underlying problems in the absence of an adequate strategic planning framework.

Interest has been growing in strategic planning and management, which places public investment programmes and projects in a broader context. A balance is sought between the formulation of long-term, cross-sectoral, dynamic spatial strategies and the development of short-term action programmes or projects within this framework. Individual sectoral development programming is supplemented with activities that focus on inter-sectoral area-wide urban concerns, such as urban transport, shelter, health and sanitation, to achieve better spatial co-ordination of development activities. Strategic planning and management adopts a 'systems approach' in which planning is seen as a complex iterative cyclical process. Although there are many different models or interpretations of the planning cycle, there is general agreement that it is an iterative process rather than a linear sequence of stages, and stresses flexibility in which some activities can be repeated while others short-circuited. Nick Devas and Carole Rakodi (in Devas and Rakodi, 1993, p.45), for example, suggest that the planning cycle includes:

- ***survey and analysis*** activities which estimates current and future needs and is based on surveys of the existing situation, available resources, the evaluation of previous activities, analyses of future potentials, as well as responses from the public.
- ***Development of strategies and policies*** in which goals and objectives, key issues and problems are identified, and alternative strategies put forward. Preferred strategies are selected, based on analyses of costs and benefits and of likely impacts and consequences of the various alternative courses of action, to achieve a balance between the achievement of targets and resource utilization.
- ***Implementation*** includes the identification of implementing agencies and their responsibilities, the mobilisation of resources, the specification and co-ordination of activities, the specification of programmes and projects with appropriate budgets, performance measures, and the supervision of routine operation and maintenance functions.
- ***Monitoring and evaluation:*** requires the regular monitoring of performance against targets, the ex post evaluation of performance and impact, and the feedback of results through an effective information system.

In Malaysia, for example, the strategic or structure plan preparation process was found to be too lengthy, due partly to a shortage of skilled planning staff, but also to the tendency to be too comprehensive, collect too much data and involve too many committee stages. The structure planning system, however, was found to be more comprehensive, flexible, and responsive to community needs and aspirations than the previous planning system. (G.B.Lee, 1991, in Devas and Rakodi, 1993, Box 3.6, pp.85-86). In order to increase efficiency, transparency and accountability**,** the strategic planning and management approach is often associated with the parallel introduction of a corporate approach through the appointment of a chief executive to co-ordinate management and integration, with a key policy and resources committee to increase political accountability. The development of improved management information systems further strengthens the strategic planning and management process.

6.1.2 Changing Attitudes to Urban Problems:

The United Nations has been involved in the promotion of environmentally-sound planning and management of human settlements for nearly three decades. The UN Conference on the Human Environment, held at Stockholm in 1972, led to the creation of the United Nations Environmental Programme (UNEP). In 1976 the UN Conference on Human Settlements held at Vancouver, which resulted in the establishment of the United Nations Centre for Human Settlements (UNCHS or Habitat), also reaffirmed the importance of environmental considerations in planning for human settlements. It was the publication of a Strategy Paper of the United Nations Development Programme (UNDP) in 1991 (UNDP, 1991), however, which appears to have been particularly influential in changing attitudes towards cities among multilateral agencies, leading to policy changes. This pointed to the soaring urban population growth, the increasing share of world urban population in developing countries, and the rapid expansion of large cities, and noted that *"the relentless growth of cities is inevitable and irreversible"* (UNDP, 1991, p.l). Cities in developing countries are seen both as engines of economic development and centres of poverty. The efficiency advantages tend to be offset by the negative consequences of urbanization on low income groups and on the environment. The figures used to illustrate rapid urbanisation in developing countries, however, are all expressed in terms of population-sizes, yet many of the real problems are due to the spread of urban areas. Although larger populations will discharge more waste into the surrounding areas, it is this urban sprawl, whether planned or unplanned, which is responsible for creating some of the problems in the peri-urban interface, yet this dimension is never clearly addressed.

In the past, government policy and international assistance had given greater attention to the countryside since the prevailing views were that cities had already benefited disproportionately from national development efforts, urban development was more costly than rural development, and the growth of cities merely added to unemployment. Consequently, governments and donors followed three successive, overlapping approaches. They initially tried to control the pace and shape the pattern of urban growth. Some discouraged rural-urban migration, others forcibly removed urban dwellers, or tried making villages more economically viable. The promotion of growth poles, or of small and medium- sized secondary cities, rural industrialization efforts and locational controls or incentives for industry also failed to stem the urban tide. Secondly, they tried to provide low-cost shelter and services. Fashions in policies moved from slum clearances and squatter evictions, to a second policy stage of the provision of public housing, then a third approach of providing basic services for existing slum and squatter settlements. The fourth policy stage, adopted during the 1980s, involved extending tenure security and upgrading slum housing to encourage greater involvement of squatters and slum dwellers in maintaining their settlements, including giving tenure, access to credit, promoting affordable housing, or appropriate building materials and techniques. UNICEF stressed that local groups and individuals had to be involved in planning and implementing urban basic service projects, community workers had to be selected by the community, supported by government personnel and given simple training., and services had to be simple and low-cost, and the planning and implementation had to be appropriate for the needs of low-income urban communities and the urban environment. In the third broad approach adopted, efforts were focused on strengthening local government by upgrading the management of urban institutions, promoting decentralization of financial and managerial authority, and increased mobilisation of local resources for urban development. Significant results were claimed, and the most frequently identified impacts were inducing organizational change, having catalytic effects, focusing public attention on urban development issues, increasing the professional institutional capacity to deal with urban development problems, creating new processes for dealing with urban problems, and solving specific urban development problems. (UNDP, 1991, pp.34-36) Despite this emphasis, a review of evaluations of over 50 urban development projects indicates that,

"in design and implementation, they often focused more on technical outputs than on institution-building and sustainability objectives explicitly stated or implied In many projects, the institutional strengthening components were largely ignored or dealt -with superficially." (UNDP, 1991, p.36-37)

Foreign technical experts often handled operational tasks themselves, and little attention went to developing the skills of the project staff. Consultants carried out studies or implemented projects without coordinating closely with the project organisation, and on-the-job and formal training programmes were frequently ill-conceived or ill-suited to the needs of the counterpart agency. Overall, it was recognised that even if all projects had been designed well and implemented effectively, their impact could have been only modest.

"Over the past 20 years, when the developing world's urban population more than doubled and more than a billion people were added to cities and towns, UNDP devoted only about 2% of its spending to directly targeted urban development projects." (UNDP, 1991, p.80)

A rethinking of the model of urban development required a *"clear vision of the socially just, ecologically sustainable, politically participatory and economically viable city"* (UNDP, 1991, p.43), with a focus on programmes and policies rather than on 'projects, and an emphasis on income generation, education and skills training.

In its new framework for urban policy, the Agenda for the 1990s, which focused on a human development approach, five urban challenges were identified as being critical to receive priority attention:

- *"Alleviate urban poverty by promoting income-generation activities and transforming the role of the informal sector.*
- *Promote enabling and participatory strategies for the provision of urban infrastructure and affordable shelter.*
- *Promote the protection and regeneration of the urban physical environment, especially in low-income settlements.*
- *Improve urban management, including expansion of local governments' revenue-raising capacity and decentralize authority and responsibility for urban development from central government agencies and ministries to local governments and NGOs.*
- *To achieve the above, draw on the full complement of human energy in cities. This means wider recognition of the role of women and full government collaboration with the private and voluntary organizations."*

(UNDP, 1991, p.45)

UNDP proposed focusing on building and strengthening national capacity in five areas: alleviating policy, strengthening urban local government and administration, providing urban infrastructure, shelter and services, improving the urban environment, and promoting the private sector and NGOs. Each of these five topics might have been expected to have had significant implications for the management of pen-urban areas, but the spatial dimensions of these issues are never clearly addressed. The underlying emphasis appears to be on management of existing built-up areas or city-regions rather than any specific focus on the peri-urban interface. The key implication for the management of peri-urban areas is the priority placed on the urban physical environment and on tackling urban environmental problems, as well as the aim of improving urban management.

6.1.3 Changing Environmental Priorities:

The United Nations Conference on the Environment and Development (UNCED), the Earth Summit held at Rio de Janeiro in 1992, broadened the environmental debate to focus attention on urban priorities. The World Commission on Environment and Development, the

Bruntland Commission, which reported in 1987, (WCED, 1987) had promoted the cause of sustainable development, but attention had tended to be concentrated on such macro concerns as global audits, global risks assessment and global warming. The main concern of those living in cities in developing countries, however, is with the 'brown agenda' - involving pollution problems, environmental hazards, and poverty. This focus represents a shift in emphasis from the prominence given to 'green' issues by urban populations, planners and environmental managers in cities in developed countries, in which ecological considerations, the provision of open space and recreational areas, or making the city more beautiful are viewed as priorities. The quality of their immediate environment affects the living conditions of the vast majority of the urban poor more directly than global environmental changes.

According to the Urban Management Programme of the World Bank/UNDPIUNCHS, (Bartone et at, 1994), the most important environmental problems facing cities, collectively known as the 'brown agenda', relate to

- *"Access to basic environmental infrastructure and services;*
- *Pollution from urban wastes and emissions;*
- *Resource losses such as groundwater depletion and land degradation; and*
- *Natural and man-made environmental hazards".*

(Bartone et at, 1994, p.11)

They state that rapid urbanization frequently poses a threat to health, the environment, and urban poverty:

> *"The critical and most immediate problems facing developing country cities are the health impacts of urban pollution that derive from inadequate water, sanitation, drainage and solid waste services, poor urban and industrial waste management, and air pollution, especially from particulates.*
> (Bartone et at, 1994, p, l)

Illustrations are provided of the breadth and depth of environmental degradation (Bartone et at, 1994, pp.25-32), before outlining the factors aggravating environmental degradation:

> *"These problems are caused in large part by lack of public and political awareness, inadequate governance, inefficient and inadequate economic and regulatory policies, and insufficient knowledge and information".*
> (Bartone et at, 1994, p.25)

The 'brown agenda' disproportionately affects the urban poor and takes a heavy toll on urban health and productivity.

> *"As the physical environment in and around cities deteriorates, the urban poor are hit the hardest... Because the poor lack the financial resources to compete for serviced land and adequate housing, they often occupy illegal settlements on hazard prone or environmentally fragile lands. "*
> (Bartone et at, 1994, p.10)

The survival of the urban poor is strongly linked to the functioning of urban labour markets and to the markets for land and housing. Increases in land prices tends to either push the poor to outlying areas where they will be further from job opportunities and urban services, or else leads to overcrowding of accessible inner city areas. This lack of access by lower income families to serviced land, affordable shelter, and basic environmental infrastructures and services has plagued fast-growing cities in developing-countries for several decades.

Distortions in urban land markets and ineffective land management policies and practices in developing countries have resulted in the spread of cities. By failing to integrate land use planning with an effective transport strategy, many developing country cities have allowed transport activity to shape their growth and development. This has resulted in

- Increased traffic movements, with more congestion, air pollution; and accidents;
- degradation of environmental fragile land, such as wetland or coastal resources,

- the occupation of hazard prone areas, like steep slopes, flood plains, vacant land adjacent to polluting industries or waste disposal sites;
- the loss of cultural resources, open space, and prime agricultural land.

Its horizons are not confined entirely to the existing areas of cities, however, since it states that the urban demand for food, water, minerals, fuelwood, fossil fuels and other resources often affects distant populations, forests, and watersheds. Also, solving the brown issues in cities has crucial implications for resolving many natural resource or green issues that extend beyond urban boundaries.

Among the factors aggravating urban environmental degradation, which are important for urban environmental management, the study notes that:

> *"To reverse urban environmental degradation in most developing countries, it is essential to understand and specify the factors that perpetuate the lack ofappropriate preventative and curative environmental actions. In large part, urban environmental problems can be attributed to institutional deficiencies, inadequate policies, and actions (or inaction) by public and private actors. Among the prevailing factors are the absence of full participation, inadequate governance, inadequate regulatory and economic policies, and insufficient knowledge and information"*
> (Bartone et at, 1994, p.32)

This valuable Urban Management Programme study provides a clear analysis of the urban environmental problems and their causes, but rarely discusses the spatial incidence of these urban environmental management issues within cities and their fringes. It presents a general overview of urban environmental problems, underlying causes and relevant policy reforms (Barton et at, 1994, Table 2. 1, pp.39-40). It produces an economic-environmental typology of cities to show that the level of economic development is a significant determinant of environmental conditions in any city. The different problems and severity of impacts are shown for cities in four different income strata (Barton et at, 1994, Table 1. 4, p.19). Many of the environmental problems, however, could have equally significant implications for the peri-urban interface compared to the existing built-up areas of cities. Settlements in periurban areas frequently lack adequate access to sanitation and sewerage, drainage, solid waste collection and disposal, and urban transport services, and the environmental health hazards facing peripheral slum or squatter housing areas can often be as serious as those in the inner areas. Areas downstream or downwind of sources of urban pollution in areas surrounding the built up areas are equally likely to *suffer* from water and air pollution as the low-income areas within the cities. Groundwater contamination and depletion also affects the rural-urban fringes, while environmentally inappropriate land developments may be more likely to exert direct pressure on ecosystems surrounding the city than on areas within cities. Watershed depletion to meet the demands for energy in the cities through deforestation for firewood or charcoal or for hydropower or water storage projects may occur close to the city as well as substantial distances away. Natural and man-made hazards are unlikely to discriminate against the-peri-urban areas. What appears to be missing is an appreciation of the impact of urban growth and sprawl on the renewable natural resources in the peri-urban interface, and the adjustments to land uses, practices, occupations, and activities of those already living in theseareas surrounding growing cities. Consequently, nothing is said about the problems encountered or management required for changes in agricultural productivity, agricultural use of urban waste, or options for energy efficiency.

6.1.4 Local Agenda 21:

The 1992 Rio Earth Summit, intended to take stock of the world twenty years after the first major earth summit at Stockholm in 1972, led to a global action plan for sustainable

development called Agenda 21. The United Nations Commission on Environment and Development (UNCED) Earth Summit was also preceded by four two-week preparatory conferences each attended by nine stakeholder groups - local governments, as well as indigenous people, environmental organizations, science, business, farmers, trade unions, youth and women. Agenda 21 is a 40-chapter report on what is wrong and what should be done to correct it. Each chapter deals with goals, priorities for action, a programme of follow-up and a cost estimate. These form the basis of sustainable development strategies that are now sent annually to the UN Commission on Sustainable Development. Two global conventions were signed, one on climate change and one on biodiversity

Chapter 28 of Agenda 21 is concerned with local government and states that

> *"so many of the problems and solutions being addressed by Agenda 21 have their roots in local activities, the participation and cooperation of local authorities will be a determining factor in fulling its objectives. "*

Chapter 28 also states that

> *"By 1996, most local authorities in each country should have undertaken a consultative process with their populations and achieved a consensus on a 'Local Agenda 21' for their community"*

It also contains a direct call to all local governments to create their own action plans for sustainable development. Local Agenda 21 has been defined as

> *"a participatory, multi-sectoral process to achieve the goals ofAgenda 21 at the local level through the preparation and implementation of a long-term, strategic action plan that addresses priority local sustainable development concerns. "*
> (ICLEI, 1997)

Perhaps significantly, however, one of the leading environmental management textbooks (O'Riordan, 1995), contains no mention of Local Agenda 21, yet this new emphasis is likely to have significant implications for environmental planning and management in peri-urban areas as well as in urban and rural areas of developing countries. The necessary longterm framework and short-term focus on action planning has now been added to the activities of local communities. In another significant event affecting planning and management, the United Nation's commitment to the Local Agenda 21 process was renewed at the UN.Conference on Human Settlements (Habitat fl) held at Istanbul in 1996.

As a result, the 1990s have seen a shift in emphasis in planning, attitudes towards urban areas, a change in priorities given to environmental issues, and towards community action and improved environmental planning and management processes to deal more effectively with environmental problems. Management activities are now being seen to have a much wider focus than sectoral management alone. These changes in emphasis will have significant implications for the Peri-Urban Production System Research Programme if it is to meet the purpose originally stated in its log frame: *"By 2002 in two peri-urban areas, draft management plans developed for land use resource management and development in collaboration with appropriate authorities".* A more recent draft (October, 1998), refining the log frame, states one of the outputs as being: *"impacts of urban growth on land use patterns and natural resource degradation identified and incorporated into strategies for - per!-urban planning and management. "* Planning and management strategies for peri-urban areas, therefore, will need to show an awareness of the ways in which environmental planning and management approaches have developed during the past decade, even if these have not been specifically targeted at the pen'-urban interface of cities in developing countries.

6.2 A Strategic Approach to Urban Environmental Planning & Management:

The aim of urban environmental planning and management is seen as

> *"to identify urban environmental issues (ideally before they turn into costly emergencies), to agree on strategies and actions to resolve these issues among all those whose cooperation is required, and to implement these strategies through coordinated public and private actions. Overtime the process should improve health and productivity in cities, reduce environmental hazards, and protect natural resources so as to sustain economic and social development."*
> (Bartone et at, 1994, p.64)

The Urban Management Programme (UMP) of the World Bank/UNDP/UNCHS has developed a strategic approach to urban environmental planning and management. This overview framework has been tested as part of the Urban Management Programme in Accra, Jakarta, Katowice, Sao Paulo, Singrauli, Tianjin, and Tunis (Leitmann, 1994a, Leitmann, 1994b, Bartone et at, 1994). The approach combines elements of strategic planning and of action planning within a focus on urban environmental issues. Although the overall purpose is to strengthen local capacity, the process emphasizes participation and building effective partnerships.

The approach is based on three inter-related activities:

- Informed consultation involving the conduct of rapid assessments, clarifying environmental issues, achieving political commitment through key actors, and setting priorities;
- The formulation of an integrated urban environmental management strategy incorporating the setting of long-term goals and phased targets for achieving them, agreement on issues-oriented strategies and actor-specific action plans for achieving the targets, incorporating the identification of least-cost project options, policy reforms, and institutional actions;
- Follow-up and consolidation, with the initiation of agreed programmes and projects, backed up with policy reforms and institutional arrangements, and the establishment of monitoring and evaluation procedures.

Nine basic elements are involved in this process:

- *"Clarifying environmental issues to be addressed;*
- *Involving those whose cooperation is required,*
- *.Setting priorities;*
- *Negotiating issue-.specific environmental management strategies;*
- *Formulating an urban-wide environmental management strategy;*
- *Agreeing on environmental action plans;*
- *Initiating priority programmes and projects;*
- *Monitoring and evaluating progress and making periodic adjustments; and*
- *Strengthening environmental planning and management capacity."* (Barton et at, 1994, pp.64-65)

The initial step recommended in the environmental planning and management process is the organization of a environmental forum to clarify the environmental issues that need to be considered and to set priorities. This involves those stakeholders whose cooperation is required, and it is intended to gain political commitments, build up public awareness, and also achieve a sense of ownership among stakeholder groups through full consultations throughout the process. Although this meeting can be initiated by any of the interested parties, such as. a local environmental activist group, the active involvement of a key local political leader or the urban authority becomes essential. The Urban Management Programme paper outlines the key actors involved, together with their strengths and limitations, (Barton et at, 1994, p.21) as including:

- Environmental protection agencies which are responsible for setting environmental regulations and standards and for monitoring and enforcement; but are often relatively weak bodies with only coordination functions;
- Planning agencies whose staff are often unfamiliar with environmental analysis and information and how to apply it to local development planning,
- Politicians who often take a short-term view when allocating resources since they are usually preoccupied with maintaining their power *and* influence;
- Sector agencies (public and parastatal) which often lack experience in cross-sectoral collaboration, give scant consideration to the interrelationships between projects; and often will promote infrastructure and development projects that lack basic environmental considerations;
- Concerned residents and community-based organisations whose members and leaders are acutely aware of the impacts of environmental problems at the household and neighbourhood level, but typically have had few opportunities to participate in the preparation of urban infrastructure or industrial projects that affect them;
- Non-governmental organisations, which can be effective agents for building local awareness, for mobilizing community action, and for voicing local concerns, but often environmental NGOs are focused exclusively on green and global issues and pay insufficient attention to brown issues;
- Private and informal sector enterprises which are generally concerned about constraints placed on their businesses by environmental regulations and the costs such rules incur, particularly when enforcement is lax or inconsistent; but members of business community seldom wish to be perceived as environmental villains and should be co-opted into the search for solutions;
- The News media can voice concern for the environment and report on those affected by environmental conditions; but this role can be negative if they sensationalize environmental topics rather than focus on real local priorities,
- The Scientific and engineering community may play a pioneering role in shaping the environmental agenda; but often sets its agenda for environmental research and monitoring on the basis of its own scientific interests without giving due thought to vulnerable populations, or may publish results in scientific journals in technical language so needs to ensure that data communicated in less scholarly form to wider audiences, including environmental policymakers, planners, managers, and the media;
- External support agencies may be the key source of funding for large environmental projects and are important donors of technical assistance and other support; in some instances may give high priority to the environment and poverty reduction, but many have only recently recognised the critical importance of urban areas to overall national development.

Adequate environmental data for urban areas are usually lacking, however, and it is rarely possible to value the externalities and impacts associated with environmental problems related to health and safety, productivity, equity, ecology and amenity. According to the UMP,

> *"The challenge of environmental planning is to value the effects of and rank urban environmental problems in terms of health effects, productivity, amenity, ecological values, and other key indicators"*
> (Barton et al, 1994, p.37)

Alternative methods of ranking urban environmental problems are needed in order for the stakeholders to set priorities for action. The urban environmental forum generally needs to be preceded by a rapid environmental assessment exercise to screen those environmental issues that:

- *"Harm the health and quality of life of urban dwellers;*
- *Reduce the efficiency and productivity of cities;*
- *Threaten permanent damage to local or regional ecosystems;*

- *Cut across conventional lines of authority or responsibility, geographical boundaries, or time horizons; and*
- *Require coordinated responses. "*

(Bartone et al, 1994, p.68)

6.2.1 The Assessment and Start-up Phase:

The initial consultation phase, - which involves clarifying the environmental issues to be addressed, involving those whose cooperation is required, and setting priorities, - revolves around a rapid urban environmental assessment methodology. Drawing its inspiration from rapid rural appraisal, developed in the 1970s, and participatory rural appraisal from the 1980s, but much less anthropological and community focused, the UMP rapid urban environmental assessment approach adopts a three-stage process to enable local experts and city residents to assess rapidly the state of the urban environment:

(1). **An Urban Environmental Data Questionnaire** is used to **obtain a** consistent set of data for three spatial levels - the city proper, the metropolitan area and the urban agglomeration;

(2). **An Urban Environmental Profile has** been developed for preparing the framework for covering the nature, trends, and factors that influence environmental quality in the cities. Four areas are covered:-

- a) a ***background*** section providing a historical, geophysical and socio-economic perspective on urban development and how developmental activities and the environment have interacted over time;
- b) a *status* section summarizing the quality of natural resources (air quality, water quality, and land), and briefly analyses the key environmental hazards (natural risks and human-induced risks);
- c) a ***development-environment interactions*** section, describing how activities and services in the public, private and informal sectors influence environmental quality and how environmental factors constrain or promote development.
- d) the ***setting for environmental management*** section identifies the key public and private sector actors engaged in environmental management, the existing management functions, constraints on effective management, and the ongoing initiatives for institutional strengthening to improve environmental management.

(3). **Consultations,** based on the questionnaire and profile, with three categories of stakeholders:

(i) those whose interests are affected by environmental degradation;

(ii) those who control relevant instruments for environmental management;

(iii) those who possess relevant information and expertise needed for addressing the wide range of urban environmental issues.

These consultations should culminate in an environmental town meeting or forum aimed at reaching consensus on priority issues and building political momentum for follow-up actions. Participants from the public, private and non-governmental sectors should then be able to consider possible responses to the environmental issues at three levels of intervention - technical and operational, institutional and managerial, and political.

A technical working group on urban environmental data, consisting of representatives of many international agencies and specialist institutions designed the questionnaire over a one-year period in 1989-90, The purpose of the exercise is not to undertake original research or the collection of new information, but for the consultants or local researchers to assemble and analyze such readily available information as data on:

- the natural ecosystems within or surrounding the urban area;

• demographic, epidemiological and socioeconomic characteristics; •

existing environmental infrastructure and services;

• routine environmental quality monitoring information, where available; and
• information on existing environmental policies, regulations, and institutions;

Analytical tools, such as geographic information systems, could be used to help interpret the information gathered in this rapid assessment exercise.

Data are sought at three spatial levels:

- The City Proper (the principal political jurisdiction with the historical city centre);
- The Metropolitan Area (a politically defined urban area set up for planning or administrative purposes which may combine several jurisdictions);
- The Urban Agglomeration (the total contiguous built-up area which may spill over defined political boundaries).

The following maps are suggested showing:

- the city and its boundaries;
- population density;
- land use within city;
- land ownership within city;
- treatment plants, sewer collectors, interceptors and sewage disposal points;
- municipal solid waste *and* hazardous waste disposal and/or treatment facilities.

Although modifications are expected to suit the needs of individual cities, and many blanks are anticipated in most cities since the data are just not available, the UMP provides detailed guidance for collecting data on the urban environment using the Urban Environmental Data Questionnaire. (Leitmann, 1994b) It is also made available on a diskette. This data collection exercise is expected to take two staff-months. The UMP paper summarises this Urban Environmental Data Questionnaire (Bartone et al, 1994, p.69), reproduced here as Table 6.1.

Early in the consultation phase, the UMP recommends the establishment of a steering committee to help define and delineate the roles of key stakeholders, organize working groups around priority environmental issues, oversee the operations of the process, and ensure the required political support and resources. Available information is brought together and circulated as the draft urban environmental profile, which becomes the starting point for dialogue among stakeholders and helps identify information gaps. Two staff-months are allocated for preparing the urban environmental profile, which should not exceed 50 pages, including an executive summary. A generic outline is provided (Leitmann, 1994b), which also provides guidance on how to undertake the exercise, a checklist of actions required to prepare the urban environmental profile, and sample terms of reference for its preparation. This is summarised in Bartone et al, 1994 (p.70), and reproduced here as Table 6.2.

The UMP outlines the assessment methodology, presents the preliminary findings from its work in the 7 cities, together with a synthesis of the results from these case study areas. (Leitmann, 1994a). The general findings are that

- Urban environmental strategies should have an explicit focus on the problems of the poor;
- City-specific strategies should be guided by the configuration of key economic variables;
- Solutions that are not heavily dependent on institutional performance may be necessary in the short run;
- Enhanced public awareness, consultation, and participation can improve environmental management;
- Pay careful attention to the relationship between problem areas, their spatial scale, and institutional capacity when designing interventions. (Leitmann, 1994a, pp.42-43)

Table 6.1: Outline of Urban Data Questionnaire, UMP

I. Socio-economic background conditions
(Urban populations, Demographic statistics; Income and Poverty; Employment; Municipal services provided; Municipal expenditures)

II. Housing Conditions
(Ownership of occupied dwelling units; Dwellings with Special Facilities; Size of dwelling units; Marginal dwelling units)

III. Health Conditions
(Basic statistics; Mortality rates)

IV. Natural Environment
(Location of city centre; Ecosystem type; Meteorological data; Dispersion conditions; Topography; Environmental hazards)

V. Land Use
(Urban land use; Newly incorporated urban land; Land ownership; Land registration; Land use regulation; Land market)

VI. Urban Transport
(Basic statistics; Vehicle stocks; Motorized travel by mode; Emissions from public transport:: Injuries & deaths resulting from vehicle accidents: Passenger car restrictions)

VII. Energy use
(Annual gross energy consumption; Emissions from combustion; Interconnected electricity grid generation; In-city electricity generation; Urban electricity self-generation; Household energy consumption; Other energy indicators; Energy pricing)

VIII. Air Pollution
(Emissions intensity, Emissions control; Policies/regulations being implemented; Ambient concentrations; Monitoring network; Environmental health)

IX. Noise Pollution
(Noise levels; Noise pollution control)

X. Water and Sanitation
(Water resources; Groundwater abstraction problems; Future resources; Water consumption by users; Water delivery; Household sanitation installations; Drainage network coverage; Sewage flow rates; Sewage treatment plants; Sewage disposal; Industrial effluent; Water pollution policy instruments; Water quality monitoring; Monitoring agencies)

XI. Solid and Hazardous Wastes
(Total solid wastes; Municipal solid wastes; Disposal of municipal solid wastes; Municipal expenditures for solid waste management; Dumpsites; Hazardous waste facilities; Hazardous waste policies being implemented)

Jource:
Barton, et al, 1994, Box 4. 1, p. 69.

Table 6.2: Generic Outline of an Urban Environmental Profile, UMP

I. Introduction
Background
Geophysical and land use
Socio-economic setting (demographics; economic structure; urban poverty)
City history: Environment-development linkages Over Time

11. Status of the Environment in the Urban Region
Natural Resources
Air quality
Water Quality - surface; ground; coastal; fisheries
Land
- Forests and natural vegetation
- Agricultural land
- Parks, recreation and open space
- Historic sites and cultural property

Environmental hazards
- Natural risks
- Human-induced risks

III. Development-Environment Interactions
Water Supply
Sewerage and Sanitation
Flood Control
Solid Waste Management
Industrial Pollution Control/Hazardous waste management
Transport and Telecommunications
Energy and Power Generation
Housing
Health care
Rural-Urban Linkages
Other

IV. The Setting for Environmental Management
Key Actors
- Government (Central; Regional; Local)
- Private Sector
- Popular Sector (Community groups and NGOs; Media)

Management Functions
Instruments of Intervention
- Legislative and regulatory;
- Economic and fiscal
- Direct investment
- Planning and policy development
- Community organisations
- Education, training and research
- Promotion and protest

Environmental Coordination and Decision-making
- Mechanisms for public participation
- Inter- and cross-sectoral coordination
- Public-Private sector linkages
- Inter temporal
- Information and Technical Expertise

Constraints on Effective Management
Ongoing Initiatives for Institutional Strengthening

Source:
Bartone et al, 1994, Box 4.2, p.70

6.2.2 Strategy and Action Planning Phase:

The central stage of the environmental planning and management process involves negotiating issue-specific strategies that respond to the environmental priorities selected and fitting them into an overall, coordinated urban environmental management strategy. A framework is needed within which short- and medium-term sectoral action planning and investments can occur, achieving the coordination of both public *and* private decisions and actions. Previously, planning has often been short-term, incremental, compartmentalized with little coordination across institutions, and commonly neglects the private and voluntary sectors. Long term environmental goals have to be set for the urban area or region, together with more specific environmental objectives to guide phased investments and reforms. Extensive negotiations and conflict resolution among the various actors is needed to rank environmental problems and strategic interventions and evaluate them on the basis of their health effects and environmental damage, regional economic efficiency, financial feasibility, institutional feasibility, and the policies and instruments. More detailed information will be needed to clarify the environmental problems and their solutions, perhaps requiring 6 - 9 months or several staff-years for a large city and more for a mega-city or metropolitan region. The strategies need to be agreed upon by all the key actors involved, so issue-specific, intersectoral working groups are important, continuing the stress already placed on the participatory approach. The steering committee should include *"key decision-makers from local authorities and related national and regional sector agencies, ... leading politicians, community and business leaders, and representatives of important NGOs and the news media. "* (Barton et al, 1994, p.74) Each issue-specific working group, set up to tackle specific priority problems, should include key stakeholders with direct access to the policy and decision-makers in the public sector, supported by technical specialists.

Coordination of an urban environmental management strategy needs to be developed and coordinated with other plans for the area. This is aided by the production of a consensus document, the urban environmental management strategy report, for use by those concerned with development and growth, such as the local authorities, community groups, national and regional sector agencies, or the business community. The strategy should guide future urban planning, economic development planning, infrastructure or sectoral plans, natural resource and energy planning, water resource management plans, etc. The strategy report should include:

- *"A review of the environment/development issues, including a complete description of the environmental system from which each originates, the development concerns that are affected, and the stakeholders that should be involved.*
- *A summary of the possible responses to each issue, the pros and cons of each option for various stakeholders, and the assumptions and procedures that led to agreement on the selected options (including relationships and needed coordination with other issue-specific strategies, existing legislation, and ongoing programs).*
- *The set of agreed long-term environmental goals for the urban region and a set of interim objectives and targets to guide phased investments (this could include for each issue a ranking of environmental improvement measures, a preliminary outline of project profiles, and the identification of priority geographic areas and sectors for channeling investments).*
- *The associated policy reforms, economic and regulatory instruments, and institutional strengthening measures selected to support the implementation of the strategy. "* (Bartone et al, 1994, p.75)

The environmental management strategy is intended to be a dynamic process, incorporating changing priorities or emerging environmental issues, so periodic evaluation of the impacts of decisions and interventions is required in order to make incremental adjustments to the strategy.

Within this framework for coordination to ensure consistent actions across time, sectors and levels of government, and geographic areas, actor-specific environmental action plans need to be defined for specific actors, containing time schedules, geographic focus, and priorities. Effective action plans are expected to include a mix of regulatory mechanisms, economic incentives, technical assistance for capacity building, education and information campaigns, and strategic use of capital improvements. The success of strategic investments in urban environmental infrastructure and services will be determined by

- Standards and affordability: technologies and service standards within a city need not be uniform, but will vary by neighbourhoods according to the users' willingness and ability to pay;
- Innovative institutional arrangements: low-cost technologies may be combined with new institutional forms of participation, including community efforts;
- Cost-effective solutions.

These action plans are then brought together into an urban wide consolidated environmental action plan.

6.2.3 Follow-up and Consolidation Phase

The focus is on initiating programmes and projects, building environmental planning and management capabilities, and monitoring and evaluating progress in order to reach the long-term environmental quality goals. Proposed projects developed during the action planning stage can be developed to the pre-feasibility stage to determine their ranking relative to other proposals and their technical, economic and institutional soundness, so that detailed project designs and the final appraisal can be completed. Projects developed through this environmental planning and management approach should be able to attract national and international support since they result from a broad-based consultative process and are supported by all stakeholders whose support is essential for successful project implementation. Performance indicators need to be monitored and evaluated regularly so that the steering committee can systematically analyze, assess and revise the environmental planning and management process. Effective implementation of the strategies and plans should also include monitoring the implementation of prevention and mitigation measures, and the compliance with long-term environmental standards.

In addition to the issue-specific working groups and the steering committee, a centrally located technical support unit should help organize and support the activities of the public and private partners. Although institutional strengthening of the key partners should have been addressed in each stage of the planning process, it is particularly important to ensure that local capacity building is strengthened. This should cover improved institutional arrangements and organizational structures, trained professional and support staff, adequate facilities and equipment, and resources to cover both capital and recurrent costs.

6.2.4 Lessons for Peri-Urban Interface Research:

Leitmann has suggested some possible directions for research (Leitmann, 1994a, pp. 24-25), which might be considered to see if they can be incorporated into the DFID Peri-urban interface research programme:

- Gathering data on low-income communities;
- Linking health effects with environmental conditions;
- Valuing the economic costs and benefits of urban environmental activities;
- Alternative methods of assessing public priorities;

- Relating jurisdictions to ecological boundaries;
- Comparing policy instruments for environmental management;

The Urban Management Programme's own evaluation of the methodology is that overall its main advantages are that it is rapid, costs relatively little, identifies gaps in knowledge, centralizes diverse environmental information, *and* benefits from local contacts or access to information. (Leitmann, 1994a, p.22) However, the general methodology was felt to generate purely descriptive information which might provides a little guidance on what might be a priority problem but gives little or no indication of the ranges of possible solutions. In addition, the approach relies on existing sources of information, and so the data, analyses and discussions are determined by the range and quality of work already carried out. (Leitmann, 1994a, p.23). Their other criticisms are less compelling for application to a single urban area: results cannot always be used for comparison between cities since the information applies to different time-periods, etc., and the sample of cities is neither large enough or randomly chosen so as to be statistically representative.

The urban data questionnaire is seen as a straightforward guide to gathering a comprehensive set of data on a particular urban area. Data is brought together from many different sources, permitting intea- and inter-sectoral comparisons that would not otherwise be possible from a single source of information. Another benefit is that the data not only generates information for preparing the urban environmental profile, but it also facilitates consultations, together with inter-city comparisons. In contrast, some of the questions were subject to misinterpretations, requiring substantial effort in correcting these errors. Also, in each city, certain data were simply not available from secondary sources, suggesting that funds should perhaps have been made available to support primary data collection. (Leitmann, 1994a, p.23)

The benefits of preparing the urban environmental profile were that it summarized information on causal relationships between environmental quality and development activities and the institutional dimension of urban environmental issues that were not collected in the questionnaire. It brought together conclusions from reports on different sectors or time periods that referred to a common problem, and served as a useful background document for the consultation process.. Its principal drawback was that it was a static document, with no provision for updating it. (Leitmann, 1994a, p. 23). Practical problems were also found - information was missing, or initial drafts needed rewriting. Other common errors were that the questionnaire data was not fully used and analyzed, or relevant information and reports available outside the city and country was not used and referenced. All points in the generic outline were not covered or addressed in sufficient detail, and maps, especially those showing the city location and administrative boundaries, were not included. In addition, recommendations tended to be included, even though it is intended to be a descriptive, rather than a prescriptive document to aid the consultative process. (Leitmann 1994b, pp. 85)

The consultation process, organized locally according to local traditions, successfully involved a broad spectrum of stakeholders, and generated meaningful discussions for the participants to enable them to reach a consensus in each case. Attention is also drawn, however, to some common errors found in carrying out consultations in the case study cities. There was some failure to make use of earlier work done as part of the rapid assessment. One or more of the key stakeholders was overlooked in the process, and the key issues and priorities of particular stakeholders were misinterpreted or not included in the preparation of the agenda for the final forum. A danger was also noted that the consultation process could become over-politicized; although a top local official should be informed and involved in the process, especially the final forum, an arms-length relationship was needed when it came to managing the consultations. Premature assumptions tended to be made about the existence of a consensus; ideally consultations should continue over time to allow stakeholders to clarify their positions and inform others about them. Finally, the consultant/team did not synthesize

the list of priorities before the final public forum, making the task of prioritizing and building consensus difficult, lengthy, and possibly unmanageable. (Leitmann, 1994b, pp. 91-92)

The overall conclusion that has to be reached, however, is that the UMP's environmental planning and management approach provides an extremely valuable strategic framework for tackling urban environmental problems. Encouraging local stakeholders to work together to - prepare and implement environmental action plans and coordinate their practical activities offers exciting possibilities. Research, however, is seen simply as a means to an end, just an introductory step to facilitate the solution of urban environmental problems by the local stakeholders. Ways might be sought to build on the UMP approach by incorporating DFID's peri-urban interface research into providing a fuller consideration of the renewable natural resource implications of urbanisation. Using as its overall framework the UMP strategic environmental planning and management process should lead to implementable development projects needed by urban and peri-urban community groups and other stakeholders.

The UMP emphasis has been placed on urban environmental issues rather than on renewable natural resources. It has to be accepted, however, that without urban growth and expansion, many of the problems of the peri-urban interface in developing countries would not exist, or would simply be no different from those found in other production systems. The underlying rationale for the UMP is the environmental problems created by poverty, and the need to overcome 'brown agenda' issues, plus a more limited consideration of 'green',issues. This emphasis, together with a stress on livelihoods as well as developing public-private partnerships, now appears to fit into the new DFID approach put forward in the White Paper, increasing the potential complementarily of the UMP with DFID's pen'-urban interface research programme.

A weakness in the UMP, however, appears to be its relatively narrow spatial definitions of urban areas. Instead of considering the city-region, the only spatial breakdowns included in the data questionnaire are for the city proper, the metropolitan area and the urban agglomeration, so the focus of analysis tends to be on existing built-up areas. Some, but not all, parts of the peri-urban interface may be incorporated into these areas, particularly in the latter two areas, depending on where the administrative boundaries are currently drawn. Only a partial picture, therefore, is presented of some of the issues affecting the peri-urban interface of cities in developing countries. Although the UMP analyses demonstrate an awareness of some of the implications for renewable natural resource management, they are only briefly listed as regional impacts, such as air and water pollution, land degradation, degradation of ecosystems, etc. More specifically, declining agricultural productivity, the reduced renewable resource base, erosion and siltation, amenity losses, and loss of natural habitat and species, etc appear as environmental problems, summarised in an annex table showing environmental problems by problem area, effects, causes, and management options (Leitmann, 1994a, Table A.3.2, pp.74-76). The environmental planning and management process also appears to give little consideration to the constraints or opportunities for developing more effective or " efficient urban/peri-urban linkages, such as making productive use of urban waste for agriculture, or supplying urban needs for food, energy, etc. No specific mention is made of urban agriculture, either within the built-up areas or in those peri-urban areas adjacent to existing built-up areas. The roles of open space provision, green wedges within cities, or green belts around cities, are not given prominence.

Definitions of city regions are difficult but might be expected to be based on definitions of the public transport network around cities and the foodshed or the commuting zone around a city. In the Kumasi Peri-urban project Inception Report it is based on contiguous districts to KMA served by public transport (trotros) enabling commuting or daily movements of food to the city to take place. In the Hubli-Dharwad Baseline Survey, the city region included those neighbouring taluks served by city buses, which enable daily journeys to work or for

commercial activities to take place, and enabling farmers to directly carry their produce to market in the city.

Another weakness is that the approach adopted by the UMP tends to be rather generalized and aspatial, making little distinction between environmental problems in different types of areas. The urban data questionnaire and environmental profile are not targeted at revealing the spatial incidence of environmental problems. Contrasts are consequently not drawn between difficulties arising from increasing activities in the densely-populated inner cores of cities, slums on the peripheries of the built-up areas, or through urban sprawl extending beyond the margins of the existing built-up areas into more rural areas. Perhaps inevitably, given that the aim is to develop a strategic approach, the information requested in the data questionnaire and the urban environmental profile tends to be aggregated rather than broken down into constituent small areas. Initially no distinctions are made between **neighbourhoods** or parts of a city, let alone peri-urban villages. Environmental profiles perhaps need to be broken down into small-area profiles to facilitate community participation in defining localised priorities or finding solutions for their own areas. The consultation process means that only those periurban residents within the boundaries will be classed as stakeholders and involved in the participation process. Since they may form only a minority of residents, their views may not be effectively heard, so peri-urban problems are likely to be given low priority, perhaps only as spillovers from the built-up areas. Politically, the more urbanised political elite may neglect the former traditional rural structures and leadership. The implications of urbanisation on more rural activities, and the changes required to respond to these urban opportunities or pressures may not be perceived as high priority problems by the urban majority. Many of the environmental problems, such as inadequate infrastructure and services, are currently suffered by relatively small numbers, or lie in the firture as incipient or future "slums, with the difficulties experienced by populations not yet living in the peri-urban areas.

The urban data questionnaire appears likely to have very limited value for peri-urban areas since secondary data sources rarely exist for these areas. Local authorities outside the urban areas in many developing countries are frequently unable to provide information on small area population distributions within their areas, let alone on environmental indicators like levels of air, noise or water pollution, solid and hazardous waste, energy use, etc. Information sources, for example, were investigated during the preparation of the Kumasi peri-urban Project Inception Report and the Hubli-Dharwad Baseline Survey. In fact, out of the seventy tables to be completed in the urban data questionnaire, virtually none could have been completed for the administrative areas around Kumasi (district assembly areas) or Hubli-Dharwad (taluks). Investment of substantial primary data collection efforts to complete the UMP data questionnaire for city regions in developing countries could not be justified as the tables required would not necessarily pinpoint peri-urban problems or lead on to the production of environmental profiles for these peri-urban areas. What is perhaps required instead is for the initial step of the consultation process to identify peri-urban environmental, poverty-related or renewable natural resource problems; then the stakeholder or local community groups themselves could collect primary data to illustrate the magnitude of each of these problems for use in drawing up an environmental profile for the area. for further discussion in an Environmental Forum to obtain consensus on priorities and actions. Although sensible to investigate fully the secondary information sources first, a similar modified approach might also be more relevant for the various neighbourhoods in the urban area itself.

In the Kumasi Natural Resource Management Project, the UMP data questionnaire has already been taken into account in advising the district planners on the provision of village information needs for planning to be displayed on a geographical information system for the Kumasi city region (Kuminfo). The population census was found to be out-of-date (1984), and complicated by district and village boundary changes. In Hubli-Dharwad, the 1991

population census contained village data on populations, occupations, and broad land uses, and these were displayed on a Hubli-Dharwad geographical information system.

In adopting the UMP methodology, unless carefully handled, there appears to be a potential danger that the stakeholders may be a limited group of existing politicians and technical officers rather than residents of low income areas or representatives chosen by the deprived groups themselves. Not enough is understood about existing public-private partnerships, and evaluations of the successes and weaknesses of the private voluntary sector, or the activities of community-based organisations, are rare. Lists of community groups are not commonly held within city administrations, and the leaders of these groups may be uneducated or communicate in indigenous languages. A significant gap, found in both the Kumasi and Hubli-Dharwad peri-urban projects was that no readily available information existed on stakeholders. Given that consultation and participation is stressed in the environmental planning and management methodology, more attention might be paid to developing inventories of stakeholders, including the contact points for their leaders, particularly for community groups. Assessments might also be made of their activities, linkages, resources and capabilities to facilitate their full involvement in the process from an early stage, and ensure that all key local groups can be invited to participate in the environmental forum, issue-specific working groups and area-based action planning groups.

In order to meet the NRSP Log-frame output, "the impacts of urban growth on land use patterns and natural resource degradation identified and incorporated into strategies for peri-urban planning and management", perhaps more attention needs to be given to the urban areas. This might be achieved through adopting the underlying approach and specific selected aspects of the UMP's strategic environmental planning and management process. DFID's African and South Asian case studies of peri-urban areas have tended to focus on rural issues and renewable natural resource aspects rather than the urban environmental issues, however, and have started with participatory rural appraisals and village-based studies.

One of the difficulties which will need to be addressed is that the peri-urban production system log frame calls for *"draft management plans developed for land use resource management and development in collaboration with appropriate authorities"* The use of the strategic environmental planning and management approach could assist in meeting this purpose. Assumptions are made, however, that the main local priorities in Kumasi and Hubli-Dharwad will be related to agricultural productivity, energy efficiency and agricultural use of urban waste, although setting of priorities should ideally emerge from the local consultation process within the cities.

6.3 Environmental Guidelines for Settlements Planning and Management

The United Nations Environmental Programme (UNEP) **and** the United Nations Centre for Human Settlements (UNCHS or Habitat) issued a three-volume set of environmental guidelines concerned with environmental planning and management (EPM) in 1987. This was seen as a programme of activities through which environmental considerations are incorporated into settlements planning and management (SPM). It summarised the distinguishing features of EPM as:

- *"EPM is a continuous programme that makes inefficient one-time environmental studies for specific projects unnecessary;*
- *EPM activities are fully integrated with SPM activities on an ongoing basis;*
- *EPM supports and strengthens SPM by helping to identify development opportunities and constraints, helping to formulate development policy, helping to determine the best means for implementing policy, and helping to coordinate among the actors in settlements development;*
- *EPM is oriented to maximizing the benefits to settlements development that can be derived from environmental resources and to minimizing the damage to metropolitan development from environmental hazards.*

  An EPMprogramme comprises three principal integrated functions:
- *Collecting and analysing information on the environment and related development activity;*
- *Forming coordinated policies for environmental resource and hazard management in the context of SPM;*
- *Supporting the implementation of these policies through SPM activities. "*

  (UNEP/UNCHS, 1987, Box VII, p. 20)

Environmental planning and management, is described as

> *"a continuing and dynamically evolving process that can be initiated and built up within any settlements administration. Its purpose is to make policy formulation and implementation progressively more responsive to environmental considerations."*
> (UNEP/UNCHS, 1987, p. iv)

The Guidelines outline *"the concepts, procedures and techniques for taking account of the environment in the course of planning and managing human settlements"* (UNEP/UNCHS, 1987, p, iv), and are organized in a series of tasks, each involving a number of activities. These tasks and activities are elaborated with guideline statements and brief explanations. Selected topics are expanded in greater detail in boxes in the text, and in special sections or appendices**.** Volume I focuses on the institutional structures and mechanisms that govern settlement planning and management, and the institutional provisions necessary to make these mechanisms more responsive to interactions between human settlements and the environment. Volumes II & III address the technical dimension of settlement planning and management, and concentrate on how to operate an EPM routine for metropolitan and for regional development, respectively. Approaches and procedures rather than particular solutions to environmental problems are emphasized since *"environmental issues differ from country to country in association with the environmental setting the characteristics of development, and national preferences and priorities. Similarly, capacities for dealing with environmental problems differ depending on institutional organizations and capacities. "* (UNEP/UNCHS, 1987, p. iv).

There are four tasks:

1. Defining purposes, approaches and strategies for EPM;
2. Determining the institutional requirements for EPM;
3. Designing EPM for specific circumstances;

4. Launching and expanding the EPM routine;

6.3.1 Task 1: Defining Purposes, Approaches and Strategies for EPM:

Settlement development interacts with natural resource systems and environmental hazards, and environmental concerns are added to other concerns like promoting economic development, achieving social objectives. Its purpose is to overcome political and institutional barriers to sound environmental planning and management. Settlement planning and management *"entails a continuous process of analysis, decision-making, organizing and controlling development activities, and evaluating results to improve future policies and their implementation."* (UNEP/UNCHS, 1987, p.1) Its characteristics are that it:

- addresses upgrading and expansion needs in specific places,
- relies on local authorities and private sector participants,
- is not oriented to producing a plan but at supporting a continuous stream of strategic decision-making and implementation, and
- is a framework for coordination among sectors, sub-areas and events at different points in time within a specific territorial context.

EPM should address environmental opportunities and constraints for achieving the overall goals of settlement planning and management, which are essentially similar to those of national development planning but for specific places:

- Settlement sustainability;
- Development efficiency,
- Satisfaction of basic needs for the local population;
- Equity in the distribution of development costs and benefits.

EPM aims to maximize the sustainable use of goods and services provided by local natural resource systems, and minimize exposure to local environmental hazards. Emphasis is placed on coordinating settlement development' activities among sectors, across space, and over time. Its primary functional elements are

- Information collection and analysis;
- Coordinated policy formation; and
- Coordinated policy implementation

Environmental systems extend beyond administratively defined boundaries, transmit effects from actions taken in one sector to other sectors, react and adapt over time to interventions and stress. It is not intended to simply be an 'add-on' to existing settlement planning and management activities, however, but to form a continuous integral component. It is intended to improve the efficiency and effectiveness of existing administrative resources and institutional arrangements rather than be introduced as an additional drain on scarce financial, managerial and technical resources. EPM should routinely provide practical input to project identification, evaluation, design, site selection and area-wide environmental compatibility. Three case studies, Jakarta**,** Lagos and Southern Jordan, are introduced to illustrate how EPM has been used.

EPM should be initiated by designating a task force to launch and monitor EPM activity. In order to launch EPM activity, the task force must formulate an action plan to establish the institutional requirements for an EPM unit, its functions and procedures, and its initial tasks. Its first activity is to conduct a preliminary review of local environmental and development concerns to ensure that the task force is properly representative and includes representatives of all major agencies with a significant role to play in environmental planning and management. It is expected to develop an action plan and budget for the EPM process, and establish a technical EPM unit to formalize interagency cooperation. Guidelines for the broad

tasks of determining the institutional requirements for EPM (Task 2), designing the functions and procedures of EPM for the needs of specific settings (Task 3), and launching *and* expanding EPM as an evolving routine (Task 4)

6.3.2 Task 2: **Determining the Institutional Requirements for EPM:**

- EPM activities should be initiated at a modest level responding to specific needs or opportunities and should be incrementally expanded as more information becomes available, potential benefits are better understood, and practical experience is gained. These circumstances might include as specific environmental problems (natural disaster, or acute natural resource shortage), major settlement development projects or environmental impact assessments required, new political commitments to environmental management
- The series of steps performed in traditional environmental studies should be transformed into component functions of a continuing EPM routine. These could include, for example, environmental impact assessment which involves collection of relevant information on priority environmental concerns and their interactions with existing and anticipated activities, analysis and assessment of interrelationships; diagnosis of existing problems and future concerns, with formulation of environmental management goals; formulation of policies and plans with long term perspectives, consider spatial interrelationships and coordination among major participants; implementation of plans; monitoring of environmental consequences of project implementation, evaluation and feedback.
- The operation of the EPM routine should be monitored, evaluated, and periodically upgraded. An EPM routine comprises 3 interrelated functions ompilation of facts on environmental characteristics and their interrelationship with settlements characteristics; formulation of coordinated policy for dealing with these interrelationships; and implementation of policy through government intervention.
- Environmental policy should be implemented by using existing tools for intervention in ongoing settlements activities. Four types of tools are available provision of information and public education; taxation, charges and other economic inventive/disincentive mechanisms; regulatory mechanisms; strategic capital improvements, maintenance and operation.
- EPM policy should represent binding agreement among actors in SPM that co-ordinates technology, location and timing of settlement activities. Policies should be documented in a form that permits easy access for planners and decision-makers. These should include maps, accompanied by texts that specify objectives and rules for settlements development (if available then long-range, area-wide, and cross-sectoral studies on a project-by-project basis become unnecessary). Commitments should then be made to the relevant actions
- Participants in decision-making should represent all agencies and interest groups significantly affected by the resulting policy and whose co-operation is necessary for policy implementation.
- EPM policy should be based on an understanding of options for managing environmental resources and hazards.
- EPM information should respond in content, format and organization to the needs of policy co-ordination and policy implementation. Box Vl, p.18, gives examples of EPM information requirements on natural resources and environmental hazards, land uses and networks and their compatibility with resources and hazards. EPM information should be

partitioned into separate modules, each covering a particular natural resource system or environmental hazard - each can be updated without major changes to the whole system

- EPM information should be collected, analysed and applied by an interdisciplinary EPM unit. Initially this should focus on collection and processing of existing information generated by ongoing sectoral development projects and routine monitoring. Once built up, this environmental database can become a clearing house without requiring additional surveys and research. The EPM support unit would have four technical functions:
  information collection (monitoring, surveys, research);
  information management,
  support for policy formation (plans, scenarios, policy options); and
  support for policy implementation (dissemination of information, input to project activities, drafting of codes and regulations, and establishment of fees and taxation mechanisms)

  Services may be performed by a single professional or by a very large and differentiated team; may be unified or dispersed in various agencies; or may work only at the central government level or it may have regional and local offices.
- The EPM unit should have close co-operation ties to sectorai and local executing agencies and to inter-sectoral and interregional coordinating institutions. Networks need to be built up with contact officers in the different agencies.

Box VIII, p.22 on the EPM Information System contains available facts and policies for determining compatibility between settlements activities and environmental concerns at specific locations in the study area. It is organized as follows

- Maps delineating critical areas for each environmental concern;
- Text accompanying each map describing characteristics, potential conflicts and means for dealing with the conflicts as well as established policies, objectives, codes and administrative provisions for their implementation
- A reference index to both maps and text in the form of an environmental zone maps (identifying for each location all critical resource/hazard issues) and an interaction matrix (relating environmental concerns and settlements activities).

It does not contain policies under preparation, environmental concerns under investigation, monitoring results under review and evaluation, or any of the background and source material that may have been used for developing the operational part of the EPM information system.

6.3.3 Task 3: Designing EPM for Specific Circumstances:

- Institutional provisions for policy co-ordination, implementation of policy, and technical support should respond to settlements priorities and critical environmental concerns. Interactions between settlements development and the environment can be analysed and displayed by constructing a simple interaction matrix. Environmental resource/hazards and settlement sectors are listed along the axes of the matrix, with each cell representing a potential interaction between the environment and development. This provides an easily understood and powerful representation of the environmental challenge facing SPM. This overview of the multiplicity of interactions serves as the basis for setting initial priorities for EPM.

- Institutional provisions for the EPM routine should be adapted to the ongoing settlements planning and management process rather than requiring extensive changes to this process. The task force establishing an EPM routine should take the administrative and institutional characteristics of the country into account , including resources available, existing planning and management capacity, how centralized is the SPM process, stability and continuity in key government positions, cultural bias or informal power structure or

strong influence of important personalities outside formal government structure, kind of environmental activity already being performed.

- Institutional provisions for coordinating environmental policy should be based on existing mechanisms used in SPM. A strong programming/budgeting process also provides an incentive to bring together agencies with conflicting interests in order to coordinate government expenditure. Coordination among sectors and across levels of government is more difficult under a centralized system. Also, community participation in the decision-making process, seen as critical to effective EPM, faces great obstacles under a highly centralized system.
- Institutional provisions for implementing environmental policy should be based on existing tools and practices used in SPM - education and provision of information; codes and regulations; taxation and economic incentives; and strategic government investment.
- Provisions for information collection and technical support should be based on existing resources and institutional structures in SPM.

6.3.4 Task 4: Launching and Expanding the EPM Routine:

- The task force should define the technical expertise required in the EPM unit and assist in bringing the interdisciplinary team together. Continuity is a critical condition for the EPM team's efficiency, but it could be supplemented by the secondment of professionals from cooperating agencies
- The task force should determine required training and help in organizing it. On-the job training enables local professionals to integrate EPM into their planning and budgeting procedures, but seminars and workshops could be run with the help of practical technical specialists.
- The EPM unit should formulate initial targets and organize routine functions. Working groups should be formed, with clearly-defined and documented responsibilities.
- Agencies co-operating in the task force should agree upon and clearly define their continuing responsibilities for EPM. Inter-agency linkages are clearly important for all three recurrent functions of the EPM routine -
- The task force should support and formalize the EPM unit and the required interagency co-operation through a legal framework. It is very useful for the longterm success of EPM that a comprehensive basic environmental policy law also sets the legal framework for an EPM routine. In some countries, land-use decrees and town and country planning acts, or prohibition of nuisances and noxious activities, already specify powers and responsibilities that can be used to implement environmental policies. A matrix can be drawn up to show environmental concerns to be addressed through regulatory mechanisms, listed on the left-hand axis, and existing legislation, listed on the top axis; the size of the bullet-point in each cell indicates the degree of applicability of a specific piece of legislation to a specific environmental management concern.
- The task force should identify and prioritize activities for which outside technical assistance is needed. Technical assistance (TA) can be obtained from international aid organizations for each of the three phases of integrating EPM with the settlements planning and management process.

  The task force should ensure that technical assistance is used sparingly and is carefully timed to realize fully its potential benefits. A strong component should be on-the-job training of a full time local counterpart who is a permanent member of the EPM unit. The unit should not become permanently dependent upon outside help.
- The task force should seize special opportunities for launching and expanding an EPM routine. Initial emphasis is likely to be devoted to organizing existing information and

establishing cooperative linkages among relevant agencies, so they could be performed by part-time secondments with a full-time director or coordinator.

- The task force should ensure that initial activities focus on environmental concerns for which solutions can be found quickly and where benefits of EPM can be demonstrated in a relatively short time. Collection of new information should not be seen as an end in itself at the expense of preparation of policy issues for decision-making. Initial focus on issues where the scope for policy options is limited may help decision-makers to take appropriate action.
- The task force should monitor and evaluate EPM activities in order to improve and expand them as needs become evident and technical capability and experience grow.

6.3.5 Metropolitan and Regional Development:

Volume H on Metropolitan Planning Management is split into six tasks:

- Defining the purposes of EPM;
- Getting Started;
- Collecting, organizing and analyzing information;
- Establishing coordinated policy for EPM;
- Implementing environmental policy;
- Making EPM an evolving routine.

Key ideas which later appear as part of the UMP strategic urban environmental planning and management process include:

- coordination of upgrading and expansion (para. 1. 1.2);
- known environmental issues into a systematic framework (para.2.2.1);
- concentrate on critical environmental issues (para.2.2.2);
- action plans (paras.2.3.1- 2.3.3);
- status reports for each sector (para. 3. 1. 1.)
- use of existing data (para. 3.2. 1);
- partitioning into modules (para.3.2.3);
- presenting costs and benefits of different policy options (para.4.3.1); and
- the importance of public knowledge and education (para.5.1.1)

Four steps are shown in volume III on regional planning and management:

- Defining the role of EPM in regional development;
- Relating regional programmes to the environment;
- Using environmental analysis to co-ordinate regional programmes; •

Organizing and EPM routine to support regional programmes.

Key guideline statements which introduce ideas developed later in the UMP approach, include:

- making projects part of a strategic programme (para. 2. 1. 1),
- resources and implications (para. 2.2. 1);
- evaluation of potential conflicts (para.2.2.3)
- inventories (para.3. 1. 1);
- use of existing **data** and reports as primary source of information (para.3.1.3);
- involving representatives of those affected (para.3.4.2)

In the overview, volume 1, thirty-six guidelines are put forward with expansions and illustrations in subsequent paragraphs. There are 58 guidelines in Volume 2 on metropolitan planning and management, and a further 45 guidelines in volume 3 on regional planning and

management. An executive summary, simply listing these 139 guidelines, might have been useful in stimulating the potential users to investigate more fully each of the statements, although this might reveal that some of the guidelines are simply very general statements, while others essentially repeat guideline statements made in other volumes.

Even though settlement expansion and upgrading, metropolitan development and regional development would have implications for the peri-urban interface, this is not directly mentioned at all. Perhaps the closest are two statements hidden in annexes in volumes two and three. Under the use of resources (farming, forests, mineral resources, building materials and technologies), it states that:

> *"Good-quality farming land ought not to be taken up for housing development. Farming on the peripheries of cities in developing countries usually contributes significantly to the supply of cheap food and the supply of this should not be adversely affected by an inappropriate choice of housing sites. "*
> (UNEP/UNCHS, 1987, vol.2, p.109)

Under agricultural resource management strategies, some general recommendations which are universally applicable, mention controls on deforestation, industrial air pollution, water quality, surface and ground water resources, etc, and include the recommendation to:

> *"reserve prime agricultural land for agricultural production and direct the expansion of non-agricultural land uses towards land with lower agricultural potential"*
> (UNEP/UNCHS, 1987, vol.3, p.97)

It also recommends that strategies should "*reduce population pressure on agricultural land by... improving productivity on limited land resources, enhancing profitability through development of the market system";* (UNEP/UNCHS, 1987, vol.3, p.97) but these issues are never elaborated further.

Perhaps the most useful information for developing countries is found in the annexes to each of the three volumes. These represent a clear synthesis of more technical reports available at the time, often with simple checklists of environmental issues to be considered or related policy implications. Volume one contains three case studies, covering Jakarta, Lagos, and Southern Jordan. In volume 2 on metropolitan planning and management, the special sections on sectoral considerations for initiating an EPM routine cover water supply and sanitation, solid waste management, industrial development, housing, and metropolitan transport, environmental hazards. There are also special sections on the prediction of interactions and effects, and on EPM routines for supporting the implementation of environmental policies, plus a detailed listing of environmental guidelines prepared by development aid agencies. Volume three on regional planning and management has special sections on considerations for initiating an EPM routine in four types of environment - humid tropical, and and semi-arid, coastal zones and islands, and in mountain environments. It also discusses natural resources in regional development, covering water resources, forest resources, agricultural lands, fisheries and aquatic resources, and natural heritage resources. Environmental hazards in regional development outlines floods, earthquakes and cyclones. Other special sections cover resource inventories and baseline studies, types of development regions (without any mention of the rural-urban fringes of metropolitan regions), and types of regional planning and management institutional frameworks.

6.3.6 Lessons for Peri-Urban Research:

While not presenting a dramatically new methodology for trained professional planners since systems thinking and the project cycle of planning has become conventional wisdom, its significance lies in bringing to the attention of politicians, administrators and other technical specialists the need to consider environmental issues within an organized systematic framework. It draws on case studies completed in the early 1980s, however, and a draft of the document appears to have been prepared as early as 1982. It stresses the importance of inter-

agency coordination and cooperation, suggesting the initial step is to create a task force to achieve this. The guidelines also stress the need for an environmental planning and management technical unit. Data collection and the use of maps to display environmental information is considered to be important. Although the use of geographical information systems are never mentioned but the clear implication is that a GIS would overcome problems derived from different agencies manually plotting relevant overlays at different scales. The environmental interactions matrices appears to be influenced by some of the ideas developed in environmental impact assessment methodology.

While it has probably contributed to the interpretation of environmental planning and management adopted by the Urban Management Programme, and UNCHS was one of the partners, the focus adopted by the UMP has been to stress the involvement of stakeholders, community participation, and a partnership approach. Data collection and mapping has become more focussed on producing an urban environmental profile in order to facilitate the consultation process. Instead of keeping open the option of a top-down approach with strong central government influence on settlement planning, metropolitan planning or regional development, the environmental planning and management approach has moved on to become more of a bottom-up approach led by local authorities. Thinking on EPM has clearlycontinued to evolve since the production of the guidelines. Jochen Eigen, a contributor to two of the case studies, was also a member of the UMP team, and is the UNCHS Coordinator of the Sustainable Cities Programme.

6.4 Habitat's Environmental Planning and Management Guidebook

The experiences of the cities in developing more effective approaches to dealing with the problems of urban development and environment and in understanding how better to achieve the aims of sustainable development have been brought together in an EPM Guidebook, made available on the UNCHS world-wide-web site (UNCHS, 1996b). A framework for action has evolved from examinations of the actual processes of urban environmental planning and management (EPM) in many cities and towns from a wide range of countries. Four closely inter-related aspects are incorporated into this EPM framework:

- Identification and prioritization of Urban Environmental Issues and Involvement of Stakeholders;
- Formulating Urban Environmental Management Strategies;
- Formulating and Implementing Environmental Action Plans; and
- Priority Issues.

The EPM Guidelines are grouped under five main headings:

- Better Environmental Information and Technical Expertise;
- Better Environmental Decision-Making;
- Better Implementation of Environmental Strategies;
- Enhanced Managerial Capacities for Environmental Planning and Management; •

More Effective Use of Available Resources.

A series of guidelines are presented, reflecting the lessons gained through the experiences of different cities, and identifying and describing the ways which cities have found to be effective in moving towards sustainable development. Each of the 21 guidelines are then briefly elaborated before being illustrated by concise examples from a few cities, usually each consisting of no more than two or three sentences. Table 6.3 summarises these guidelines and lists the city examples used in the EPM Guidebook.

After presenting general arguments and illustrations of the role that cities play as *"the key engines of economic and social advancement",* the Guidebook then provides a few city examples to show that *"the development potential of cities is increasingly threatened by environmental deterioration".* It notes that *"in terms of impact, it is usually the poor who suffer most cruelly and directly from environmental degradation"* It states that *'for development achievements to be truly 'sustainable, cities must find better ways of balancing the needs and pressures of urban growth and change with the needs and constraints of the environment. "* The fundamental challenge is seen as improving urban governance, *"learning how to better plan and more effectively manage the process of urban development, avoiding or alleviating problems while realizing the positive potentials of city growth and change. "*

6.4.1 Basic Overview Information

The EPM Guidebook's first four guidelines suggest providing basic overview information by systematically identifying and clarifying a city's environment/development issues, *'giving a better understanding of the complexities of the city's environmental problems, of their inter-linkages, and of the relationship between environmental and developmental factors. "* An effective way has been *through* the process of developing a City Environmental Profile, "a *compilation and synthesis of existing knowledge and data brought together in a form which-focuses on environmental and development management factors, especially in relation to the interests and roles of different stakeholders. "* This *is* seen as a non technical process involving extensive dialogue among the stakeholders of the city. The profile promotes a wider mutual understanding among the key actors and institutions involved and provides a valuable starting point and common information base which is normally dated regularly. A wide-ranging process of identifying and involving stakeholders needs to be undertaken since

Table 6.3: Guidelines and Citv **Examples used in the UNCHS EPM Guidebook**

Guideline	SCP Example Cities	Other City Examples
Why improve the urban environment	Concepcion; Dakar, Katowice *	Abidjan; Colombo**; Durban; Manila**
Need for sustainability	Ibadan; Ismailia; Katowice*	Colombo**
Overcoming environmental & economic damage		Durban; Gothenburg; Manila**
1.1 Preparation of basic overview information	Accra*; Dakar, Ibadan; Ismailia	Abidjan; Hanoi
1.2 Involvement of stakeholders	Chennai; Katowice *	Bamako; Nairobi
1.3 Setting of priorities	Accra *: Concepcion; Dakar	Abidjan; Cotonou; Hanoi
1.4 Clarification of priority issues	Dakar, Dar es Salaam	
2.1 Clarification of issue-specific policy options	Ibadan; Ismailia	Abidjan; Kenya small towns
2.2 Consideration of implementation options & resources	Concepcion; Ismailia	Bangalore; Cotonou; Kuching
2.3 Building broad-based consensus on issue-specific objectives & strategies	Accra *	Cape town
2.4 Coordination of environmental & urban development strategies	Dar es Salaam; Shenyang	Bamako; Belo Horizonte; Cape Town; Colombo**; Gothenburg, Tilburg
3.1 Application of full range of implementation capabilities	Chennai; Dar es Salaam;	Belo Horizonte; Colombo**
3.2 Agreement on action plans for implementation	Dar es Salaam	Kenya small towns
3.3 Develop packages of mutually supportive interventions	Concepcion	Ouagadougou
3.4 Reconfirmation of political support and mobilization of resources	Chennai; Ibadan	Kuching
4.1 Strengthening system-wide capacities for EPM		Colombo**; Kenya small towns
4.2 Institutionalizing broad-based participatory approaches to decision-making	Chennai	Abidjan; Nairobi
4.3 Strengthening cross-sectoral & inter-institutional coordination	Concepcion; Dar es Salaam; Shenyang	Colombo**; Durban
4.4 Enhancing institutional capabilities	Concepcion	Seattle
4.5 Monitoring, evaluation & adiustment of EPM system	Ismailia	Tilburg
5.1 Utilizing special opportunities	Chennai; Dakar; Katowice	Cape Town; Colombo**
5.2 Applying specific leveraging strategies	Dar es Salaam; Ibadan	Durban
5.3 Networking among cities	Chennai; Concepcion; Ismailia	Cape Town; Gothenburg; Kenya small towns
5.4 Strategic use of external support	Concepcion; Shenyang	Hanoi
Role & use of external support	Accra *: Dakar, air es Salaam; Ibadan	Abidjan; Cotonou; Nairobi; Kenyan small towns; Ougadougou

Source.
Based on UNCHS, 1996b.
*= UMP and SCP cities; **= Metropolitan Environmental Improvement Programme (UNDP)

successful EPM requires *"understanding, agreement and coordinated action by the full range of public and private and popular sector interests and groups and organizations at the . individual, neighbourhood, community, city and regional levels. "* Experience has shown that it is unrealistic to try to successfully tackle all of a city's environmental and development issues at once, so an agreed process for setting priorities is needed, *"so that attention and action may be focused on a limited array of problems and tasks in a strategic sequence. "* (UNCHS, 1996b). Priorities should be selected through the participatory process, normally derived from a *"consideration both of the impacts associated with each environmental problem and of the local capacities to respond. "* (UNCHS, 1996b) Appropriate criteria have included the following

- *'The magnitude ofhealth impacts associated with the problem;*
- *The size of urban productivity loss caused by the problem;*
- *The potential for local capacity-building;*
- *The potential for local resource-mobilization;*
- *The relative impact of the problem borne by the urban poor;*
- *The degree to which the consequences are short- or long-term;*
- *Whether or not the problem leads to an irreversible outcome;*
- *To respond to special circumstances;*
- *The degree of sociaUpolitical consensus on the nature or severity of problems;*
- *Whether the problem is significantly affected by local responses and actions; and* • *Short-run limitations posed by existing institutional and other resources. "* (UNCHS, 1996b)

Although not mentioned in the EPM Guidebook, there seems to be no reason why the problems faced by the peri-urban interface should not be added to this list of criteria if a city-region is being considered. A variety of formal consultation meetings or working group meetings, undertaken as part of a process for developing a **broad-based understanding** of the full nature of environmental questions, have been found to help clarify priority environmental issues, especially those involving conflicts of interest among different stakeholders, Selected priority issues can also specify geographically specific priorities as well as sectoral or thematic priorities.

6.4.2 Better Environmental Decision-Making:

Four guidelines are put forward under better environmental decision-making. The Guidebook suggests that political, social, technical and administrative activities proceed most effectively in relation to well-identified and relatively narrowly specified issues. Clarification of issue-specific policy options through a 'bottom-up' participatory approach brings *"a clearer understanding of costs and benefits for different stakeholders and of 'trade-offs' for the city as a whole* (UNCHS, 1996b), mobilizing stakeholder involvement and providing a more realistic basis for reaching a consensus on strategies. Technical and non technical presentations are helpful, covering such aspects as:

- *"a review of the environment/development issue, with a description of the environmental system from which it originates, the development concerns that are affected, and the stakeholders that have been involved;*
- *a summary of the options considered for responding to the issues, the pros and cons of each option for various stakeholders, and the assumptions and procedures that led to the agreement of the selected option (including relationships and coordination requirements with other issue specific strategies, existing legislation, ongoing programmes, etc);*
- *a summary of the analytical results comparing alternative approaches in terms of social and economic and environmental costs and benefits;*

- *both detailed and summary mapping information, to securely place the information and the proposals in a clear geographical context.*
- *the agreed long-term environmental objectives and targets as well as a set of interim- goals to guide phased interventions (this could include a preliminary outline of project profiles, an initial identification of priority geographic areas and development sectors for channeling investments, etc);*
- *the associated policy reforms and institutional strengthening that have been agreed upon to support the implementation of the strategy; and*
- *discussion of the indicators and statistics which could be used to track the progress of actions and their impacts. "*

(UNCHS, 1996b)

Implementation and resources implications need to be considered from the earliest stage to help stakeholders understand the limits and trade-offs and the distribution of gains among different groups of alternative options and chosen strategies. Effective processes of consensus-building were found to involve stakeholders in the process of analyzing issues and policy options, not just in identifying issues and setting priorities. Strategy-building is seen as *"an activity of consensus-building and compromise across a range of technical, political, social and economic factors and interests,... especially important for environmental issues, which cut across sectors, across geographical boundaries, and across time."* (UNCHS, 1996b) Diverse stakeholders acquire a sense of ownership and commitment, which assists in continued involvement in implementation. Strategies need to be coordinated across the separate issue-specific strategies to *"understand and incorporate the important inter-relationships among different approaches and strategies"* (UNCHS, 1996b), as well as with existing plans and strategies. This requires a framework which stresses 'connectedness' rather than 'comprehensiveness' (as in old-fashioned master plans).

6.4.3 Better Implementation of Environmental Strategies:

A further four guidelines deal with better implementation of environmental strategies. The Guidebook notes that *"implementation is almost universally a weak point"* (UNCHS, 1996b), but a firm foundation of *"broad-based stakeholder involvement and support makes it easier to mobilize resources and capabilities for effective implementation."* (UNCHS, 1996b) Valuable non-conventional resources provided by stakeholders include *"local knowledge and manpower, untapped human resources, in-kind economic and financial inputs, previously-unused private sector or household sector finance, etc. "* (UNCHS, 1996b) A multi-actor approach to implementation makes it possible to coordinate the use of a very wide variety of implementation instruments and techniques, including *"laws and regulations, fiscal and economic incentives, investment programmes, indicative plans to guide private investment, public information and education campaigns, and community action and mobilization."* (UNCHS, 1996b) Experience shows the importance of continuing with the participatory and consultative process to translate strategies directly into action plans. Clear and detailed agreements for coordinated action should show the commitments of each agency or stakeholder for priority actions within a well-defined timetable. These agreements include the allocation of staff time and resources, use of financial resources, detailed geographical focus, application of other relevant implementation instruments, and arrangements for monitoring the achievement of action plan objectives. Many of the mutually supportive interventions can be funded through regular annual public sector sources or through normal private and household sector channels, but special funding may have to be sought for some projects. Technical and financial feasibility studies can be conducted for these agreed priority projects to produce 'bankable' project proposals for negotiation with potential sources of finance. The successful maintenance of political and organizational support for the implementation of environmental action plans, especially through gaining the explicit or tacit support of key

administrators and managers in important institutions, makes it easier to mobilize and effectively apply the necessary technical and financial resources.

6.4.4 Enhanced Managerial Capacity:

In the EPM Guidebook, enhanced managerial capacities for environmental planning and management includes five guidelines. Capabilities should be built up 'system-wide' in all the organizations with a stake or influence in the success of urban environmental management, instead of simply concentrating on one or two institutions. Stakeholders should not only be identified and brought into the EPM process, but also need to be empowered with the knowledge, understanding and capability to effectively participate in an informed and constructive way. EPM activities have been found to work better if carried out through existing (but strengthened) local institutions, rather than imposing new institutional structures. Capacity-building needs to develop cross-sectoral collaboration, procedures and behaviour to achieve full cooperation. In addition, specific actions to enhance the structural capabilities of institutions and organisations involved in EPM, such as changes in legal foundations, revision of mandates and authorizations, and increases in budgetary allocations. Procedural strengthening, too, needs to be covered, including staff training and reorientation, enhancement of information flows and exchanges, and the provision of required equipment and facilities. Reinforcing the importance of systematic monitoring and evaluation has been found to be an integral part strengthening EPM, aiding the understanding of how well the EPM process is working and providing guidance on adjustments required. Databases, updated from the city environmental profile, can provide good statistical indicators. Involving all relevant stakeholders, backed up by specialist skills of coordinators, has been found to be more successful for monitoring and evaluation than an isolated technical unit.

6.45 More effective use of available resources:

The final four guidelines are discussed under the heading, more effective use of available resources. Often cities have found that 'special' opportunities can be used to 'kick-start' an EPM process or give it new impetus. These include radical changes in institutional or political structures, reconstruction after a major disaster, up-dating of an urban development plan, a major new investment programme, or a change in the local political balance. Specific strategies for 'leveraging' activities has been found to be helpful in maximizing the impact of existing resources and capabilities. These include the use of limited resources to demonstrate on a small scale an initiative designed to be repeated later. on a much larger scale, or the government can play the role of a facilitator to promote the use of non-public and non-traditional resources. Networking among cities to share experience and know-how, such as swapping expertise, twinning arrangements, or participating in technical cooperation programmes, can expand capabilities without requiring large expenditures. While local sources are expected to provide most of the technical and financial resources for EPM, external aid and technical assistance can play a valuable supporting role, perhaps by focusing limited external resources within a framework of complementary activities. Attempts to rely solely on local resources and voluntary implementation has its limits, however, but local counterpart support can be crucial. Excessive reliance on donor support can make the EPM process unsustainable, but the support organization needs to gradually withdraw from the EPM process for it to achieve sustainability.

6.4.6 Lessons for Peri-Urban Interface Research:

Perhaps not surprisingly since the SCP is *"an operational arm of'the UMP."* (Bartone et al, 1994, p. 82), it has closely applied the UMP environmental planning and management

approach. The use of the urban data questionnaire, however, receives no mention at all and has been dropped from the EPM process, since the exercise starts with the consultation and preparation of the city environmental profile. Although the initial origins of the EMP Guidelines can be traced back to the UNEPIUNCHS Environmental Guidelines for Settlement Planning (UNEPIUNCHS, 1987), there has been a substantial shift in emphasis as the EPM process has evolved. The 1987 process adopts a more technocratic approach, aimed at public sector agencies, with the technical unit playing a prominent role, and maps and data collection seen as important. The more recent interpretation of EPM in the EPM Guideline continually stresses community participation, full involvement of stakeholders, the significance of coordination, working together in the consultation process, and capacity-building.

The EPM Guidebook is perhaps the most straightforward, clearest account of the EPM process. The guidelines are concise, with the emphasis placed on illustrating recent practical experiences in a range of cities. With the brief elaborations, it presents a useful overview of the process. It is more of an advocacy document, intended to catch the interest of decision makers in other cities, rather than a 'cookbook' in which all steps are spelled out in detail, as in the UNEW/UNCHS 1987 document. None of the guidelines, however, mention specific locations of the city such as inner city slums, peripheral slum and squatter areas or rural-urban fringes, although the examples cited suggest that specific locations and geographical dimensions can be included in the EPM process. Although brown agenda issues are clearly given prominence, renewable natural resources in the peri-urban interface are neglected. The emphasis is on outlining the EPM process.

Stakeholders in Kumasi and Hubh-Dharwad might be provided with sets of the UNCHS EPM Guidebook to encourage them to adopt the environmental planning and management methodology. Research might be geared towards assisting in filling gaps in information to enable an overall strategic framework with long-term goals and objectives to be agreed by the local stakeholders themselves The identification of stakeholders to participate in a comprehensive environmental forum might be a productive method of disseminating research findings and initiating the broad-based participatory approach. Bringing together and involvement of all stakeholders in setting and clarifying priorities for the entire city-region, - not just the urban or peri-urban areas alone, - might be expected to lead to a broad-based consensus on issue-specific objectives and strategies. Once the EPM process has been successfully initiated, it might be expected to lead to agreement on action plans, and practical implementation of development projects to overcome environmental degradation and help relieve poverty in the city-region. If considered appropriate, DFID involvement could help ensure that peri-urban problems are not neglected in favour of concentrating on urban environmental problems in the existing built-up areas. The lessons from the experiences of cities illustrating the EPM Guidebook, suggests that a partnership approach with an external agency providing support and training of local counterparts can be a fruitful approach for achieving sustainable development.

6.5 The Sustainable Cities Programme:

The Sustainable Cities Programme (SCP) was launched by UNCHS (Habitat) in 1990 to provide municipal authorities and their partners in the public, private and voluntary sectors with an improved environmental planning and management capacity. According to the SCP web-page, it was established *"to put into practice the concepts and approaches developed in the UNEP/UNCHS document, "Environmental Guidelines for Settlements Planning and Management."* (UNCHS, 1998, p.2). It was the first international support programme for Local Agenda 21-style planning, before the Local Agenda 21 effort was mandated by UNCED**.** It promotes a broad-based, participatory process for the development of a sustainable urban environment, emphasizing cross-sectoral coordination and decentralization of decision-making.

6.5.1 Sustainable City Programme Aims and Activities:

A sustainable city is defined by SCP as

> *"a city where achievements in social, economic, and physical development are made to last.... (it) has a lasting supply of the natural resources on which its development depends (used at a sustainable yield) and a lasting security from environmental hazards which may threaten development achievements (allowing for acceptable risk). "*
> (UNCHS, 1998, p.1)
> *'7he planning and management for Sustainable City development requiresagreements and coordinated actions by a variety of public, private, and popular sector actors at the individual, community, city and national levels. "*
> (UNCHS, 1998, p.1).

Sustainable City development supports

> *"the achievement of conventional development planning and management objectives such as the following:*
> - *Economic efficiency in the use oj'development resources (including the goods and services provided by the natural environment)*
> - *Social equity in the distribution of development benefits and costs (with special emphasis on the needs of low income groups)*
> - *Avoidance of unnecessary foreclosure offuture development options".*
>
> (UNCHS, 1998, p.1)

The aim of the SCP is to build capacities in urban planning and management at the local, national and regional levels by putting into practice the concepts and approaches developed by UNCHS and UNEP during the 1980s (UNCHS/UNEP, 1987). This approach stresses the importance of providing a forum for incorporating the views of diverse stakeholders and mobilizing local resources to lead to sustainable and equitable development. Stakeholders are brought together to

- *clarify environmental issues,*
- *agree on joint strategies and coordinate action plans,*
- *implement technical support and capital investment programmes, and*
- *institutionalize a continuing environmental planning and management routine.*

(UNCHS, 1998)

The focus of the SCP's technical support is environmental planning and management, although the EPM approach is being continuously developed and refined to reflect local experiences and needs. Core elements of the programme are the cross-sectoral, issue-specific Working Groups, whose memberships are drawn from among the city stakeholders. In addition to reconciling *different* interest groups to permit sustainable development to take

place, the SCP aims to overcome the scarcity of management capacity by concentrating on building planning and management capacity among those whose cooperation is required, and on developing EPM as a continuous and on-going process. It adopts a resolutely bottom-up approach. The approach includes rapid urban environmental assessments, the preparation of city environmental profiles, and city environmental consultations, so it is essentially applying the UMP strategic environmental planning and management approach. It is primarily concerned with tackling 'brown agenda' issues.

The activities fall into six categories:

- operational support at city, national and regional levels;
- development of urban environmental management tools;
- networking among cities and international programmes;
- information and awareness building; and
- programme resource mobilization and management.

The SCP operates at four operational levels - the city, country, regional and global levels, - although 95% of its resources over its initial four years were spent at the city level. It acts as a technical cooperation programme to strengthen the capacities and abilities of municipal authorities and their partners in the public, private and community sectors in the field of environmental planning and management (EPM). A series of city demonstrations adapt and apply the concepts and approaches of the programme, leading to their institutionalization at the municipal level, and their subsequent replication regionally.

> *"SCP demonstration projects result in broad-based environmental strategies, priority investment projects, and system-wide urban management capacities to mobilize all the public and private sector actors whose cooperation is required for successful implementation."* (UNCHS, 1998).

These EPM concepts and approaches are applied, leading to their institutionalization at the municipal level, and subsequent replication to other cities in the country or wider region. The SCP also operates as an inter-agency programme to mobilize technical and financial resources and facilitate the implementation of technical expertise and knowledge as practical city level operations. At the global level, it assists in the exchange of knowledge and expertise amongst cities worldwide. *"At the global level, the SCP promotes the sharing of know-how between cities in different regions."* (UNCHS, 1998) The SCP is also a vehicle for inter-agency cooperation since it operates in collaboration with other bilateral and multilateral funding agencies to ensure that funding goes where it is most needed and most effectively applied. This leveraging of funding is extended to resources brought in from other sectors of the local economies. The SCP is currently working with nearly twenty multilateral and bilateral partners worldwide, mainly at the city level, as well as with national and international NGOs and associations of local governments.

Sustainable Cities Programme (SCP) activities, at various stages in the project cycle, supported by the UNCHS (Habitat), with UNDP funding, are currently underway in sixteen cities: Accra, Chennai (Madras), Concepcion, Dar es Salaam, Dakar, Guayaquil, lbadan, Ismailia, Katowice, Shenyang, Tunis, Wuhan and secondary cities in Indonesia. Table 6.4 brings together a summary of the population (with the estimated population growth rates and areas, where provided), the priority issues, working groups, and partners.

In some cities, city-level demonstrations have been completed and are moving on to national replications in other secondary cities; the Dar es Salaam SCP, for example, is about to be replicated in Tanzania's eight secondary cities. Other cities, such as Accra, Ibadan and Chennai, have just completed the preparatory phase and are about to start fully fledged demonstration activities. Yet others, like Lusaka and Maputo, have just recently started to participate **in** the SCP, Three cities (Accra, Katowice and Tunis) had been studied under the World Bank/UNDP/UNCHS Urban Management Programme. Technical information,

Table 6.4: Problems and Activities of the Sustainable Cities Programme:

SCP City.	Population	Priority Issues	Partners	Working Groups
Accra (Ghana)	1.6 m (4% p.a. growth rate)	• Sanitation - solid waste management, liquid waste management, drainage • Pollution of Korle Lagoon • Servicing urban land • Disarray in institutional arrangements • Enforcement of regulations & laws	• UNDP&UNHCS Denmark - Danish Technological Institute (waste as a resource) • DANIDA (financial support) • UNICEF (support to working	• Sanitation • Collection & transportation of solid waste • Disposal & recycling of solid waste • Disposal &treatment of liquid waste • Drainage & flooding • Public education & awareness
Chennai Madras Tamil Nadu, (India)	6.2 m	• Surface water pollution • Groundwater contamination & scarcity of potable water • Inadequate solid waste management Air & noise pollution	• UNCHS & UNDP • Canada, - International Centre for Sustainable Cities	
Concepcion	0.8 in 2,000 sqJmL	• Water management deficiencies • Urban land planning& management deficiencies	• UNCHS, UNDP • UNCHS (settlement upgrading programme; upgrading of Bank *Norte ofCoricepcior)* • UNEP - Office of the Environment (APELL Workshop) • UIN - IETC (recuperation of urban lakes) • CEPAL (technical support for project methodology) Communiclad de Madrid (technical support in Initial Consultation) • Italy (financial support) • US (tedinical support in APELL Workshop; Peace Corps	• Urban Management Agency • Recuperation of urban lakes • Recuperation & development of "Puerto Hundido" Industrial emergency plan for Talcahuano • City of Haulqui development strategy • Micro-enterprise development & tourism infrastructure in Lota
Dar es Salaam **(Tanzania)**	2.3 m (* % p.a. growth rate)		• UNCHS, UNDP • Urban Management Programme (preparation of City Environmental Profile) • Ford Foundation, the EU, 110, UNDP, UNV (Hanna Nassif community development • World Bank (Sinza wholesale frut & vegetable market) • Austria (livestock project) • Belgium (Vingunguti sanitary landfill site equipment) • Canada - IDRC (urban agriculture; open spaces management; protection of hazardous lands) • Germany (technical support for city environmental consultations) • Ireland (community infrastructure programme) • Japan - JCIA (reorganization & modernization of solid waste collection services) • Sweden (supporting GIS & remote satellite sensing) • SID0/GTZ (crafts & small scale enterprises promotion project	• Solid waste management • Upgrading serviced settlements • City expansion • Air quality management & urban transport • Surface water & liquid wastes management • Management of open spaces, recreational areas, hazard lands & urban agriculture Managing coastal resources • Coordinating city centre renewal • Management of environmental hazards • Management of recreational resources & tourist attractions

Table 6. 4 (Continued)

SCP City.	Population	Priority Issues	Partners	Working Groups
Dakar (Senegal)	1.7 m (4% p.a. growth rate)) 217 sq.km.	• Solid waste management • Natural & industrial hazards • Airpollution • Sanitation & Sewerage • Degradation of Hann Bay • Industrial risks - assessment & mitigation	• UNCHS & UNDP • UNEP - OCA/PAC, Industry & Environment Office -APELL programme (support to workiriggroups • Urban Management African Institute (technical support))	
Thadan (Nigeria)	2 - 3 m	• Sanitation & health • Solid waste inartapsnent. • Improving health - enhanced water • Institutional arrangements for improved solid waste & water supply management	• UNCHS & UNDP • UNICEF (technical & financial resources for sustainable development of natural spring water) • WHO (health issues) • World Bank (mapping & basic infrastructure improvements) • Denmard - Danish Technological Institute (waste as a resource)	• Natural spring water development • Base mapping Environmental improvement of market mesas • Waste recycling • Borcholes & deep wells development • Mini-water Schemes development
Ismailia (Egypt)	0.27 m	• Reusing waste water in new waste water treatment plants in Sarabiourn for irrigation &/or forestry • Solid waste management, including establishment of a compost plant to compost the city's solid waste & the sludge of waste water plant • Establishment of a common industrial water per treatment plant in industrial zone • Sewage network in the Nefisha area • Rehabilitation of the city's covered drainage pipeline • Introduction of quality management to meet ISO 9000 standard in existing agro-industries • Upgrading the informal settlement area in kilo 2 Upgrading the Bahtinti slum area Introduction of a treatment system at the in-flow point of Mahsama drain to protect Lake Timsah from further pollution • Establishment of a permanent unit to monitor the situation in Lake Timsah	• UNDP & UNCHS • World Bank (teclatiml support} • Denmark (institutionalization of the EPM process) • USAID (liquid waste treatment)	• Agricultural development (land reclamation; irrigation, water resource & drainage) • Industrial development (agro-industrial development; investment promotion, small scale industries development) • Urban development (future city expansion; upgrading of informal settlements 80 urban services) • Development of Lake Timsah (clean-up of Lake, protection of the Lake by addressing the problem at the source of pollution - tourism development) • Human resources development (literacy & skill development; creating job opportunities) • Water resource development (managing irrigation water; managing underground water; extension of water supply to deprived areas) • Institutionalization (institutionalization of EPM within Governate of Ismailia-, training of elected local councillors programme)
Katowice (Poland)	23m 1,250 sqkm	• Effective strategies in planning & successful environmental management • B i g local needs & environmental problems • Uncontrolled discharge of municipal sewage into rivers • Improvement of water system supply in municipalities • Revitalization of post-industrial barren arms • Creation of spatial order • Development of green areas within agglomeration • Improvement of living conditions of agoomeration's residents	• UNCHS/UNEP & UNDP • Canada - ICSC (financial • Japan - International Environmental Technology Centre (financial support)	Land Working Group • Revitalization of city structure • Integrated waste managerent • Post-industrial. Areas • Open green spaces Water Working Group • Potable water • Municipal sewage in Klodnica Basin • Municipal sewage in Przemsza Basin

Table 6.4 (Continued)

SCP City.	Population	Priority Issues	Partners	Working Groups
Maputo (Mozambique	1.7 m	• Local government capacity building on environment-development interaction • Coordination & integration of development initiatives • Settlements upgrading AIM, mans ement	• UNCHS & UNDP • FAO • World Bank • Denmark	
Nampubt (Mozambique	0.23 m	• Environmental awareness • Local government capacity building in environmental planning & management • Public health risks, epidemic threats • Mobilization of stakeholders to participate actively	• UNCHS & tM^{T}N1DP • FAO • World Bank • Denmark	
Tunis (Tunisia)	N/a	• Degradation ofSejoutni Lake • Loss of agricultural land • Poor drainage, crcating flooding and health hazards Integrated urban management of Sidi Hassine neighbourhood	• UNCHS & 1MDP • France • Tunisia	

No information for Guayaquil, secondary cities in Indonesia, Lusaka, Shenyang, Wuhan**,**

Source:

Based on UNCHS *SCP* city web pages, 1998

summarizing the activities for 14 of the SCP's project cities, can be found on the UNCHS world-wide-web site (UNCHS, 1998). For each of these cities, the web page provides general information on the sustainable city, lists the main dates in the SCP, the priority issues identified, the working groups and sub-activities, and the bilateral and multilateral partners. A contact address for further information on each city's sustainable city programme is also provided to facilitate further contacts and networking.

African cities predominate since seven of the SCP cities are in Africa, plus two in the North African part of the Middle East; only four SCP cities are in Asia, two in Latin America, and a single European city from the transitional areas. A variety of population sizes are covered, ranging from one of the megacities, Chennai (formerly Madras), with 6.2 million inhabitants, down to Narnpula (with a population of only 230,000), Ismailia (270,000 inhabitants), and Concepcion (800,000). Three urban agglomerations have populations greater than 2 million (Dar es Salaam, Ibadan and Katowice), with 3 more with populations over 1 million (Accra, Dakar and Maputo).

Out of the eleven SCP cities publicizing their priority issues, brown agenda' issues are clearly chosen as the dominant priorities by the sustainable cities. Three broad categories of activities - solid waste management, sanitation/sewerage/liquid waste management, and coastal/river/lake pollution are mentioned by eight of the cities, nearly three-quarters of those supplying information. The only other category mentioned by more than one or two cities is urban land planning, identified as a priority issue by 5 cities, and water supplies, and air and noise pollution, which are priorities for only three cities each. Drainage and flooding, public education and awareness, are priorities for two cities each, and single cities only selected industrial hazards, or micro-enterprises as priority issues. While brown agenda issues are known to impact most heavily on poverty groups, the environmental planning and management process of the Sustainable Cities Programme does not attempt to engage in poverty-eradication programmes. Providing employment or raising incomes of the low income, deprived groups might have enabled them to contribute their own resources towards eradicating urban environmental degradation in their communities. While the spillover effects of the brown agenda issues will affect the peri-urban areas of cities to some extent, depending on local circumstances, the SCP cities do not appear to be addressing specific periurban issues. The environmental degradation is generally initiated within the built-up areas of cities and the environmental health impacts affect specific localities of the city.

6.5.2 Lessons for Peri-Urban Interface Research:

Although not stated in these terms, the research programme is, in effect, attempting to promote sustainable city-regions in the long-term. A city could not be sustainable in the long-term if it had to rely on bringing in natural resources from long distances, incurring expensive transport costs and traffic congestion. While full local self-sufficiency is unrealistic, efforts might be made to encourage as much self-sufficiency within the city-region as possible for bulky staple products. Similarly, if urban development proceeds at the expense of degrading the environments of surrounding fringe areas and beyond, or if natural resources are continually wasted, then the city can never be truly sustainable. The flows and complex inter-relationships among different activities in the city-region means that problems or weaknesses in one component of the urban system have implications and impacts on the rest of the system, beyond the built-up or urbanised areas. Conflicts over the use of land and of air or water resources inevitably spill over from the existing built-up area into the surrounding peri urban areas. Poverty affects groups in the semi-rural areas as well as the occupants of built-up areas of the city since both are forced to undergo changes in occupations or economic activities as a result of urban growth. Classifications into urban, rural and peri-urban are artificial ones, which do not reflect the dynamic nature of urban changes or the responses of the human and natural environment in making adjustments. If the urban area is not simply

defined as a short-term administrative area but includes the city-region containing areas of current inter-dependence as well as areas likely to become more directly affected in the future, then the UNCHS Sustainable Cities Programme has direct relevance for the peri-urban interface research programme.

Kumasi and Hubli-Dha wad might gain advantages from approaching UNCHS with a view to joining the Sustainable Cities Programme, and exchanging lessons and experiences with a network of comparable cities. Kumasi would represent a replication of the experience of Accra to the second city of Ghana, following the precedent established in Tanzania when Dar es Salaam's experience is being extended to secondary cities there. In this case, DFID's periurban research programme could be tailored to complement the activities required by the stakeholders in Kumasi and Hubli-Dharwad if they wished to participate in the Sustainable Cities Programme. This probably means adjusting the research activities so that they fit into the environmental planning and management process being applied by cities in the Sustainable Cities Programme. DFID support might usefully complement the advisory or financial support provided by UNCHS or other bilateral aid agencies, and would enable the selected DFID African and . South Asian case-studies to benefit from drawing on the experiences of the network of cities in the Sustainable Cities Programme. This might involve other divisions of DFID complementing the renewable natural resources emphasis, and it would then be appropriate to cover more urban issues, not just those facing peri-urban areas or renewable natural resources. The research already conducted on peri-urban issues in the two peri-urban areas would open up an additional dimension which would have direct relevance for the other, existing cities in the Sustainable Cities Programme. Hitherto the SCP cities appear to have focussed on urban built-up areas to the neglect of environmental and poverty-related problems in their own surrounding peri-urban areas.

6.6 Metropolitan Environmental Improvement Programme

The Metropolitan Environmental Improvement Programme (MEIP), funded by the UNDP and executed by the World Bank, began work as a pilot programme in 1990 in five Asian metropolitan areas, Beijing, Bombay, Colombo, Jakarta and Metro-Manila. In 1993, this inter-country programme *began* its second phase, becoming a constituent partner of UNDP's Urban Management Program for Asia and the Pacific (UMPAP) and Kathmandu joined as the sixth MEIP city. (MEIP 1993 and MEIP 1994). In 1995, MEIP began work in Karachi, the Northern Economic Triangle of Vietnam, and in secondary cities in existing MEIP countries. MEIP entered its third phase in 1996, with multi-donor assistance, and launched new programmes in additional Asian cities. Bilateral funding became available, leading to new management arrangements and a more independent programme. Programmes were initiated in the Philippines, Indonesia and Sri Lanka, with the support and guidance of the World Bank. Dutch Trust Funds have been the mainstay of MEIP programmes and daily administration activities, and have also been used to leverage funds from other donors (Belgium and Australia) and to expand MEIP into new countries and secondary cities. MEIP objectives have remained unchanged, however:

6.6.1 Metropolitan Environmental Improvement Programme Activities:

The Metropolitan Environmental Improvement Programme has five programme objectives:

- *"assist urban metropolitan areas develop environmental management strategies and action plans in the context of urban and industrial development;*
- *strengthen the institutional and legislative framework for environmental planning, monitoring and enforcement;*
- *help to identify and prepare high priority investment projects and mobilize necessary resources;*
- *promote community-led efforts in improving the living environment; and*
- *initiate a process of cross-country exchange of information and of lessons learned."*

(MEIP, 1994, p. 3)

According to the MEIP Progress Report covering the first phase of the programme, (MEIP, 1993), a distinct MEIP approach has been adopted. The MEIP approach emphasizes the cross-sectoral nature of environmental problems and the failure of traditional sectoral development strategies to adequately address urban environmental deterioration or the linkage between industrial and urban development. This includes activities to strengthen the capacity of pollution control and environmental protection agencies, especially through working with powerful economic planning and sectoral agencies at the local and national levels. A broad region-wide perspective is adopted for the analysis of natural systems, for economic and regulatory policies and planning, and for major infrastructure investments to resolve some environmental problems. Metropolitan regions are seen as spatial systems in which development activities need to be planned, implemented, and monitored with focus on their impact across the region's air, water and land. At the same time, micro-problems are addressed in a more dynamic and efficient way at the community and individual enterprise level. Local environmental networks are built up to bring together government officials, advocacy organisations, private sector representatives, media, and community groups to strengthen knowledge on environmental issues and to act as pressure groups on decision-makers. Each city MEIP therefore works with local organizations to conduct studies, demonstration projects and workshops on environmental problems and pollution abatement techniques.

Six core areas of MET work in each city have therefore emerged to meet the programme objectives.

- Developing a regional Environmental Strategy (EMS) that provides the framework for activities by public sector agencies, the private sector, the NGOs and community groups. It assists urban metropolitan areas develop environmental management strategies and action plans in the context of urban industrial development;
- Strengthening institutions concerned with environmental protection to work more effectively with economic policy planners and sectoral agencies. Emphasis is placed on strengthening the institutional and legislative framework for environmental planning, monitoring, and enforcement;
- Identifying and preparing high priority investment projects and mobilizing necessary resources;
- Building a city-wide environmental network that links environmental management efforts of government to the private sector, NGOs, and adversely-affected low-income communities. This builds up the practical experience of grassroots organisations and makes then full partners in the discussion and implementation of the EMS;
- Assisting communities and private enterprises to prepare and implement small local-level projects to improve waste and resource management. Community-led efforts in improving the living environment are promoted; and
- Facilitating information exchange within and across countries. A process of cross-country exchange of information and of lessons learned has been initiated.

In each metropolitan region a Steering Committee is formed. This mainly consists of *"representatives from central and local government agencies responsible for environmental quality, budgeting and finance, sectoral development, urban planning, and land use"* (MEIP, 1993), but also includes private sector and NGO representatives, so it is not entirely a top down approach. Working groups oversee the technical aspects of specific MEIP activities, and include NGO, industry and academic representatives. A local environmental professional, the National Programme Coordinator, who forms a secretariat for the Steering Committee, coordinates all MEIP activities. A prime task of the Coordinator is to build the city environmental network to bring together different types of organisations. Learning from other cities and countries, such as environmental management in Japan (MEIP, 1996c and MEIP 1996d), has been important, and exchanges of information between cities have pooled ideas and practical experience, such as on wastewater treatment in Asian cities (MEIP, 1996a).

In 1990, a central office at the World Bank was set up to provide overall guidance to the programme, and its staff were involved with the design and supervision of those components of World Bank projects through which MEIP activities are carried out. The MEIP central office in Washington has a close relationship with the World Bank project investment divisions, encouraging early identification and preparation of projects to respond to high priority pollution problems. It is clear, however, that each of the six countries and metropolitan areas involved the participation of senior level officials and technical specialists, and teams of international consultants were involved. (MEIP, 1994). In keeping with the thrust developed by the other multilateral agencies, all six of the MEIP city programmes have made great efforts to develop effective consultation processes, develop partnerships and involve the communities themselves.

During Phase 1, interim reports on their Environmental Management Strategies and investment feasibility work were completed in all five MEIP cities. (MEIP, 1993). Each one organized in-country workshops and local-level demonstration projects with government, private sector, NGO, and community participants for the MEIP-city environmental network.

The Beijing EMS (conducted within the three-year, World Bank-supported Beijing Environment Project) focused on a framework for solid and liquid wastes, industrial restructuring, low-pollution energy production and delivery, and land use management. In Bombay, the EMS and Action Plan led to feasibility studies on solid waste management and integrated environmental management on industrial estates. In Colombo, the EMS study makes use of an ecological planning approach that maximizes the role of the region's natural systems in environmental management; priority is given to the restoration of the Beira Lake, and to feasibility studies on solid waste management, centralized waste water treatment, and institutional strengthening for industrial pollution control. The Jakarta EMS resulted in feasibility studies on waste reduction for small scale industries and joint waste water treatment at three industrial estates; demonstration projects were concerned with solid waste in rivers, urban greening and community upgrading, and organic waste resource recovery through neighbourhood-based composting centres, which led to an outreach programme to promote composting and recycling in seven other Indonesian cities. The Metro-Manila EMS led to institutional strengthening and industrial waste abatement projects, assisted through the World Bank Industrial Efficiency and Pollution Control Project. Table 6.5 summarises the priorities and issues, priority investment projects which were identified and prepared, and the community-based demonstration projects for each city during the initial phase of the MEIP. (MEIP, 1994)

According to the 1993 Progress Report, (MEIP, 1993), there are a number of lessons derived from Phase 1:

- The organizational framework is critical
  A broad-based and active Steering Committee, working with the National Program Coordinator, plays a key role for inter-agency co-operation, aids co-ordination and prevents wasteful duplication of activities by different donors;
- Long-term strategies and investment are both necessary
  The City Environmental Management Strategies provide the framework for negotiation and agreements for action between various civic groups and government agencies. Early, rapid identification and development of investment projects, consistent with the EMS, help satisfy demands for immediate action, and are necessary to maintain interest and momentum
- Consensus building fosters a sense of ownership
  Extensive consultation and workshops, although time-consuming, have brought a high degree of support and sense of ownership in the participating cities;
- Local-level initiatives are vital
  Environmental networks provide links across different sectors of society, and quick action on local projects helps generate confidence that solutions will be found to bad living environments. Topics selected include solid waste recovery and re-use, community-managed community facilities, river clean-up, environmental education and awareness, and youth ecology camps.
- Inter-country activities expand co-operation
  Exchanges of experiences between cities has helped find affordable solutions for environmental problems. Colombo's Clean Air 2000 Action Plan has led to four cityspecific air quality management action plans as part of MEIP's URBAIR work. Japanese experience in urban environmental management has been shared, and a regional study of the economic valuation of environmental degradation was initiated in four Asian cities.

Table 6.5: MEIP Activities in Six Asian Metropolitan Areas

MEIP City	Issues;ond Priorities	Priority Investiuent	Cominunity based Demonstration Projects
Beijing	• Inadequate & deteriorating water resources for domestic & commercial use; • Water pollution from inadequate sewage collection & treatment; • Deteriorating ambient air quality due to traffic & uncoordinated industrial expansion as well as predominant use of coal in cooking & heating; • Pollution from inadequate solid waste disposal; Tragic congestion	• Beijing Environment Project Beiiing heating subproject (economic analysis) Beijing Environmental Master Plan (preparing terms of reference & supervising project)	•
Bombay (Mumbal)	. Loss of natural resources - green areas, coastal areas, wetlands, water sources; • Deteriorating quality of surface waters & groundwater, • Flooding & stagnation of water courses; • Pollution from solid waste; • Deteriorating ambient air quality; • Environmental problems in low-income areas; • Traffic congestion	• Bombay Urban Transport II - air quality component • Solid waste management in Thane, Kalyan & Navi-Mumbai • Water Supply Improvements • Hazardous waste treatment facilities • Munic. urban development • Industrial waste abatement, recovery & infrastructure	• Solid waste management
Colombo	• Loss of natural resources - degradation of rivers, lakes, coastal lagoons, drainage canals, wetlands and in-shore marine waters; • Deteriorating quality of surface waters & groundwater-, • Flooding & stagnation of water courses; • Pollution from solid waste; • Deteriorating ambient air quality; • Environmental problems in low-income areas; • Traffic congestion	• Pollution Control & Abatement Fund • Air Quality Monitoring Network . Beira Lake restoration Central effluent treatment plants (2) • Municipal solid waste collection & disposal • Community environmental management & infrastructure improvement	• Community-based environmental improvement project (Sevanatha NGO as partner) • Composting of municipal garbage at local government & community levels
Jakarta	. Loss of natural resources - green areas, coastal areas, wetlands, water sources; • Deteriorating quality of surface waters & groundwater; • Flooding & stagnation of water courses; • Pollution from solid waste; • Deteriorating ambient air quality • Environmental problems in low-income areas-, • Traffic congestion, air pollution	• Joint wastewater treatment for industrial estates	• Greening in low-income neighbourhoods (3) • Greening river/canal banks • Recreational open space in low-income communities • Community solid waste management techniques • Small scale solid waste composting . Small credits for small business & environmental im rovement

Table 6.5: **MEN** Activities in Six Asian **Metropolitan Areas (Continued)**

MEIP City	Issues;ond Priorities	Priority Investiuent	Cominunity based Demonstration Projects
Kathmandu Vallev	• Haphazard urban development consumes valuable land, making for difficult & costly services; • Inadequate & deteriorating water resources for domestic & commercial use; • Water pollution from inadequate sewage collection & treatment; • Deteriorating ambient air quality due to traffic & uncoordinated industrial expansion; • Pollution from inadequate solid waste disposal; • Traffic congestion	• Brick kiln energy improvement analysis	• Community-based environmental sanitation action planning & implementation in 3 wards
Metro-Manila	• Loss of natural resources - degradation of rivers, lakes, coastal lagoons, drainage canals, wetlands and in-shore marine waters; • Deteriorating quality of surface waters & groundwater; • Flooding & stagnation of water courses; • Pollution from solid waste: • Deteriorating ambient air quality; • Environmental problems in low-income areas; • Traffic congestion	• World Bank Industrial Efficiency & Pollution Control Project (toxic & hazardous waste disposal facility; waste minimization & clean technology; central effluent treatment plants in industrial area) • Manila Sewerage Project	• Waste resource recovery feasibility study • Youth ecology network (teacher seminar & youth ecology camps) . Community-based solid waste management • Information, education & communication campaign - solid waste • Public Sanitation Facilities-studies & demonstration projects . mainstreamed into investment

Source:

Based on MEIP, 1994

6.6.2 Lessons for the Peri-Urban Interface:

The activities of the MEIP do not appear to have been written up, however, other than in MEIP reports or working papers. Little information is thus available on the methodology adopted to produce the metropolitan environmental management strategies, although all cities have developed environmental networks and have involved the community in working groups meetings, workshops, and local community-based demonstration projects. Consequently, it is not clear how far each of the cities had drawn upon or modified the UNCHS/UNEP Environmental Guidelines, or utilized the World Bank/UNDP/UNCHS Urban Management Programme's rapid urban environmental assessment approach. Examples are drawn from both Colombo and Manila in the UNCHS Environmental Planning and Management Guidebook, however, suggesting that this methodology has, indeed, been adopted. In Colombo, for example, the preparation of the Environmental Management Strategy for Greater Colombo between 1991 and 1994 had been preceded in 1990/1991 by the preparation of a City Environmental Profile. Its EMS stemmed from the Sri Lanka Government's National Environmental Action Plan (MEIP, 1994). All six metropolitan areas have produced clear statements of the issues and priorities, even though they are identical for Bombay, Colombo and Manila. Five of the cities had prepared environmental management strategies and action plans, although in Beijing the EMS was seen as a component of the Beijing Environmental Master Plan, with more limited applications of community-based projects.

The fact that the Programme is aimed at city-regions or metropolitan areas might have led to the expectation that peri-urban issues would be taken into account. As can be noted in Table 6.5, the loss of natural resources is identified as a priority issue in Colombo, Jakarta, Manila and Mumbai. Jakarta elaborates this to refer to *"green areas, coastal areas, wetlands, water sources"* (MEIP, 1994, p.14), and the other three metropolitan areas each refer to *"degradation of rivers, lakes, coastal lagoons, drainage canals, wetlands and in-shore marine waters"*. Kathmandu specifically mentions as a priority issue *"haphazard urban development* (which) *consumes valuable land, making for difficult and costly services"* (MEIP, 1994, p. 10). The list of activities summarised in Table 6.5, however, does not contain any specifically aimed at tackling issues affecting renewal natural resources, such as agricultural productivity, agricultural re-use of urban waste or energy efficiency in the rural-urban fringes. Inspections of maps showing the areas covered in each of the metropolitan areas, however, indicates that many smaller secondary cities or separate urban agglomerations are included, each with their own rural-urban fringes. This suggests that the spatial scale of the problems being addressed is too great and may mean that the concern is with bigger issues than those affecting the periurban interface

Traffic congestion is identified by all six cities as a priority issue, and Kathmandu also mentions "deteriorating ambient air quality due to traffic and uncoordinated industrial expansion. Air quality is seen as a particular problem in four cities, and MEIP is coordinating the URBAIR initiative in Jakarta, Kathmandu, Manila, and Mumbai (Shah, Nagpal. and Brandon, 1997). Colombo, Jakarta, Metro Manila and Mumbai all identify 'environmental problems in low-income areas' as a priority issue, which are being tackled through community-based demonstration projects. Depending on the priorities and initiatives of periurban communities, there appears to be no reason why peri-urban problems could not be addressed under this priority. Many of the priority investment projects are dealing with pollution from solid waste and water pollution from inadequate sewage collection and treatment, and improved waste treatment and management would be expected to reduce the spillover effects on downstream communities in peri-urban areas. Some community-based projects in Colombo Jakarta, Kathmandu, and Metro Manila promote small-scale waste composting, although there is no indication of whether the users are within the urban areas or are peri-urban farmers.

The programme management in each city is conducted at a very senior level, giving the appearance of a top-down activity. Priority appears to be given to seeking external fundingfor big capital investment projects, such as the restoration of the polluted Beira Lake in Colombo (Dissanayake, L. and Pereira, R. 1995). Although the intention is to foster inter-agency linkages since *"environmental agencies are often the newest and the weakest"* (MEIP, 1994, p.5), and to *"establish a framework for coordination with land use planners and sectoral development agencies which is vitally important for successful environmental management"* (MEIP, 1994, p.5). Given the magnitude of the problems being tackled, there is perhaps inevitably a sectoral emphasis on the concerns of the environmental agencies. Although Jakarta, for example, has encouraged community-based recreational open space and greening projects in low-income neighbourhoods, or greening along the banks of rivers and canals, on the whole the activities engaged in appear to be the 'brown agenda' issues seen as priorities by environmental agencies. A balance appears to be attempted, however, since local environmental action is seen as important, for example in Metro Manila, (MEIP, 1996b).

The MEIP metropolitan areas are much larger and more complex than the medium-sized cities being tackled under the DFID Peri-Urban Interface Production System Research Programme. The methodology adopted under the MEIP approach, however, appears to offer useful lessons for DFID, particularly the importance of a coordinated approach, with an overall framework, within which specific community-based initiatives can be fostered.

6.7 GTZ Manual for Urban Environmental Management.

Environmental management is defined by the German aid agency, GTZ, as being concerned with *"creating a healthy and pleasant physical environment within which we can all enjoy our lives... (and) ensuring that we look after our physical resources in a sustainable way and, as far as possible, eliminate, or at least minimize, pollution" (GTZ,* 1993, p.2) Urban environmental management is thus seen as providing and maintaining infrastructure, looking after public health, maintaining a pleasant ambience, and creating and implementing plans to ensure an efficient and pleasant city into the future.

This Manual (GTZ, 1993) was prepared as a response to the lack of good basic material available . in local languages which was adapted to local conditions and institutional arrangements. In addition, local level political commitment was often felt to be lacking to examine the problems experienced by urban communities and solve environmental problems in a systematic way. Municipal governments also felt helpless since central government agencies had previously taken all the major decisions about what measures should be implemented to combat urban problems. The Urban Environmental Training Materials Project was initiated as a mechanism primarily to raise the awareness and knowledge of urban environmental problems, and their potential solutions amongst municipal decision makers and urban communities. The content was seen as needing to be demand-led to help cities solve their environmental problems in their own way. The project was started in two contrasting Asian countries, Nepal and Thailand, since their municipalities faced different kinds of environmental problems which required different management approaches.

The Manual is less concerned with 'sustainable management' - the ability of a project to continue after the initial funding has ceased - or with 'sustainable growth' - sustaining existing social arrangements. It adopts the 'ecological sustainability' approach used in the Bnmdand Report, *"to ensure that our lifestyles and production processes do not degrade the environment and run down our resources such that they will not be available for our old age or for future generations".* (GTZ, 1993, p.9)

It was influenced by the Curitiba Commitment to Sustainable Development, which arose from the gathering of local authorities, the World Urban Forum, which preceded the UNCED meeting in Rio de Janiero. These nine commitments aimed to combat inequalities, integrate environmental planning into local economic planning, and increase and mobilise involvement in environmental management. Each local authority was expected to produce an Environmental Action Plan, a Local Agenda 21 document, in order to:

- incorporate a community consultation process to forge a 'Partnership for Sustainable Development;
- set up an interdepartmental committee to coordinate planning policy and development to lead to sound land-use, transport, energy, construction, waste and water management practices;
- undertake training and education in schools, in the community, and for municipal leaders, to promote local environmental management and sustainable development**;** and
- participate in national, regional and international networks of local authorities to exchange experience.

The Urban Environmental Training Materials Project formulated a set of ten principles of sustainable urban management (GTZ, 1993, pp. 14-15):

- Self-reliance: local needs should be addressed by municipalities without relying on central government to take the initiative or provide resources;

- **Interdependence:** central governments should provide expertise and some finance but not be an actual provider of services;
- **Training:** municipalities must have adequately trained personnel and so should make maximum use of training opportunities;
- **Data collection:** collecting and using information on local conditions and needs is important as it is not possible to organize services without good information on what already exists and what is needed;
- **Involvement of the community:** community and other local organisations need to be involved in determining what is to be done and in actually doing it; municipal responsibilities should include mobilising local resources as well as carrying out the work;
- **Information dissemination:** educating the community about the environment is a vital part of effective environmental management; all media should be used and local organisations mobilised to raise awareness and disseminate key messages;
- **Empowerment of local communities:** many environmental initiatives are successful where local communities solve their own problems, with the municipality as a facilitator, providing information and basic resources;
- **Coordination and integration:** as most environmental services and infrastructure are interdependent, a key role of the municipality is to coordinate and integrate financial, physical, social and organisational resources.
- **Effective implementation:** municipalities need to define clear environmental policies and goals, and then work conscientiously and consistently to achieve them. Annual evaluations of achievements are needed to see how to overcome any difficulties;
- **Legal framework:** to support their environmental policies municipalities need to pass local rules and regulations to enable the collection of service charges and the fining or restraining of violators of environmental regulations.

The Manual is divided into four sections since launching and institutionalizing a systematic national Urban Environmental Action Planning Programme is seen as a process involving four-stages;

- Country consultation with a national initial workshop;
- Institutional base and materials;
- Testing and evaluation;
- Dissemination and training.

6.7.1 Initial Consultations

The Manual gives guidance on setting up an initial conference or workshop at the national level. It suggests a consultation involving no more than 25-30 people, split into 4 or 5 Working Groups on specific subjects, each of 8 to 12 persons (although these numbers conflict with each other). These would put forward their ideas on particular environmental problems faced by municipalities, promising approaches to solving these problems at the local level, good examples of existing municipal initiatives, and where municipalities can look for help. It suggests using the GTZ project planning methodology, ZOPP ('Ziel Orientierte Projekt Planung' or Objective-Oriented Project Planning) to identify all interest groups affected, help involve them in the planning and execution at appropriate stages, identify the causes and effects of the problems, and clarify the role of development assistance. The 'soft' output would result from the participants' contacts with each other and the knowledge gained of the problems, the roles which different institutions and individuals can play, and the levels of commitment of time, expertise and resources that can be expected from each institution. In addition, expected 'hard outputs would be a Short List of 10 to 12 priority environmental

issues derived from a Long List of environmental issues put forward at an early stage in the workshop. The suggested Long List of 27 environmental problems under four headings includes:

- **Domestic Sanitation -** Water supply; Domestic wastewater; Drainage; Solid waste management; Reuse, recycling and resource management; Indoor air pollution, and Public Health;
- **Industrial Pollution and Traffic Management -** Industrial wastewater; Special waste; Industrial air pollution; Noise pollution; Health and safety; Traffic management; and Energy management;
- **Planning and Regulation -** Historic buildings; City greening; Urban design; Community development; Urban planning; and Environmental impact assessment;
- **Regional Resource Management -** Water resources; Ecological resources; Food and agricultural land; Building materials and mining; Energy planning; Regional environment and development plans; and Disaster relief.

(GTZ, 1993, pp.26-29)

Although never specified in these terms, many of these environmental problems actually affect peri-urban areas not just the existing built-up areas of the city. The regional resource management issues, in particular, are clearly those of concern in the peri-urban interface.)

6.7.2 Appropriate Institutional Base:

The Manual then provides guidance on the considerations to be taken into account in finding an appropriate institutional base for the Programme since its success will be heavily dependent on having good communications with a wide range of institutions. Since the Programme sees itself initially as an educational programme before any technical work can be undertaken, however, it appears to preclude the use of a demonstration pilot project in a single city. It notes that a decentralist approach involving locating in a municipality would be unlikely to achieve a high enough political profile requiring wide commitment and involvement.

Guidelines for municipal decision makers and the community are seen as the foundation of local environmental action planning. It stresses the importance of finding a balance between providing accurate and useful technical information and keeping the interest of lay readers. This requires broad research into many different issues and topics, drawing on practical knowledge from the experts' own experience, supplemented by existing relevant reports and background information, rather than deep scientific research into any particular subject, or costly and time-consuming work by consultancies. The guidelines need to be

- brief,
- written in simple, lively local language,
- illustrated where appropriate with diagrams, cartoons and photographs, and
- must highlight essential messages clearly without them being lost in the general text. In addition to the set of Municipal Guidelines, it recommends the production of 'shadow' NGO Guidelines to describe the activities involving the participation of NGOs or CBOs. This would cover how they should take part in planning their activities, organise their ongoing activities, become involved in networking to develop their capacities, or find potential funding sources for their activities. In addition, the Programme Office should provide each of the actors with a Handbook which describes each of the activities to be undertaken and designates the people to undertake them_ A draft would be discussed in a workshop, and then refined in the testing process. During the six to twelve months required to produce these Guidelines, newsletters should be circulated at regular intervals - every two or three months is recommended, posters prepared, and a high profile maintained with the visual and mass

media (cinema, television, journals and radio), and other national forums for the discussion of municipal affairs used to publicize the Programme.

6.7.3 Testing and Evaluation:

The third stage involves testing and evaluation. The Manual includes suggestions on how to select the test municipalities, organise local launch workshops, and establish an Environmental Action Planning Committee. A local Liaison Officer should be appointed to coordinate activities, facilitate communications, and provide comments on the usefulness or any problems in using the Handbook or gaps in knowledge and skills that would benefit from training initiatives and materials. The municipality's Urban Environmental Action Planning process consists of four steps:

- **Determining the immediate priorities**: Priority should not only be given to the two or three issues considered to be most urgent, given the limited resources likely to be available, but should also tackle those aspects in which success can be achieved relatively **quickly.**
- **Organising activities around priority issues:** Responsibilities need to be allocated to ensure that the issues are addressed systematically and effectively, involving a sub-committee for each priority issue with a designated chairperson and an allocation of basic resources;
- **Generating action plans:** The sub-committees should conduct further research into what the community sees as the nature of the problem, and consult with experts on technical aspects and possible solutions. Responsibility for implementing these solutions can then be allocated, the costs can be estimated and a timetable for implementation outlined. Use has to be made of regular municipal funds to finance these activities so it is essential to incorporate the action plans into the regular municipal planning and budgeting process. Raising the community's awareness of environmental problems through the regular organisation of festivals, media events, exhibitions, competitions, etc., is also seen as an essential activity;
- **Implementing management activities**: Some activities may require formal changes- in local institutional structures requiring new legislation, others may need considerable financial resources from the public or private sectors, but many activities will only call for changes in municipal, community or individual practices, requiring few resources but much commitment and cooperation.

The Manual suggests holding interim evaluation workshops to exchange experience, sort out misunderstandings, improve facilitation and communication skills, and raise morale and enthusiasm, At the end of the testing period, workshops were organised to bring together the municipalities involved. Common problems identified in Thailand, for example, included badly managed solid waste landfill sites in which the solution was seen as the use of a tailor made manual by a few municipalities to produce 'model' management activities and facilities, providing lessons for the others. Other problems included the lack of experience of local environmental NGOs and municipalities in working together, resolved by joint training exercises involving working together.

6.7.4 Dissemination and Training:

Prior to extending the Programme throughout a country, the Manual identifies a fourth and final stage of the urban environmental action planning process, dissemination and training, involves the development and implementation of training programmes for improving urban environmental management. In order to fill the deficiencies in skills and knowledge identified in the action planning process, the Manual lists the kinds of training that are likely

to be needed and the kinds of institutions that can meet these requirements. In the past, training courses had only limited success, due to:

- Procedures and technologies were often inappropriate to local physical and management conditions.
- A course was taken in isolation and not connected to practice, so it failed to provide municipal staff with enough confidence to make effective use of the knowledge and skills acquired.
- Senior staff or local politicians often failed to appreciate what was learned by municipal officers and so were not accepted locally.
- Recommended approaches for solving environmental problems lacked immediate political appeal since the general public were not aware of their benefits, and politicians had no incentive to implement them.
- The assumption was made that there was no need to involve the public in urban management since this was solely the responsibility of the municipality and professionals.

The Manual then discusses the relative merits of

- **government training courses:** These should focus on overcoming deficiencies in knowledge and skills identified in the environmental action planning exercise; course materials should provide the basic technical information required to solve problems; courses should include practical experience in one or more municipalities and in-office municipal staff as trainers; politicians and senior municipal officers should be aware of the training being given, perhaps through separate workshops for them; courses should include NGO and CBO participants.
- **government research institutions:** These should carry out research to solve specific problems identified; engagement in 'action-research' should be encouraged; research should focus on actual in-country capacities for production and maintenance of technologies; technological solutions would have to consider management structure;
- **universities and colleges of higher education:** Training and research programmes should be specifically geared towards urban issues; courses should include practical training in municipalities; more direct collaboration with municipal training and research institutions;
- **teachers' training colleges and schools:** Urban environmental issues should be introduced explicitly into school curricula, and materials developed for teachers' training; focus should be on the production of teaching materials for schools; schools should be involved, as participants and resources, in any urban environmental action planning events;

The popular media are also seen as being important in raising consciousness on environmental issues and influencing people's habits in their use of the environment. Media specific to particular cultures could be used for spreading environmental messages and include puppet shows, popular and religious festivals with speeches or sermons on environmental issues, theatrical troupes and popular singers. Regular publicity should be gained through contacts with national media like journalists' associations, television networks, and film production companies, although the Programme should publicise itself through newsletters, posters, other printed material, and visual presentations (videos, slides, etc). The importance is also recognised of community self-management for improving municipal services and the local environment through NGOs and CBOs, but these often lack the knowledge, skills and organisation at the local level so their capacities also need to be developed through training initiatives, the use of the NGO Guidelines. All training programmes should include a dimension of community awareness raising and ways and means of helping community organisations to participate in urban environmental planning and management, particularly for the poor and the aged, women and children, and disadvantaged minorities.

The Manual recommends adopting environmental auditin[g], (alternatively termed a natural resources and environmental profile, or a state of the environment report, or a national environmental action plan, or a national sustainable development report). It suggests a standard annual monitoring exercise for municipalities to consider such questions as:

- *"what is the state of the environment with regard to each issue identified, and whether it is better than last year or deteriorating?*
- *What activities were planned last year to tackle the issues, and were they successfidly implemented, and did they have the desired effect?*
- *What further actions are necessary; and what is planned for the coming year?"*

(GTZ, 1993, p.65)

The Manual concludes with definitions of 'brown agenda' and 'green agenda' issues, and- discusses sustainability. This discussion is particularly germane to the peri-urban interface, without using this term, however, since it points out that

> *"cities grow by using resources from their immediate region, including water, food, fuel, building materials, and waste disposal sites.... little regard is paid to the careful use of resources in the immediate region around cities and we find that water resources are being overused and badly polluted; agricultural land is being built over in very inefficient ways, greatly increasing unnecessary transport requirements; or is being overexploited so that its productivity will be greatly reduced in the future; timber and other fuels are being overexploited with no thought for sustainable management; mining for building materials is degrading large areas of land on the urban periphery; and wastes are being indiscriminately disposed of, leading to serious long-term land and water contamination "*
> (GTZ, 1993, pp.69-70)

It introduces the notion of 'regional self-reliance' in which most of the resources needed by a city will be generated within its immediate region. If its many needs are satisfied locally, this - will greatly reduce the necessity for energy-consuming and polluting transport. It also points out that many waste materials can be refurbished, reused or recycled, reducing the waste to be disposed of as well as the demand for imported resources. Also, many dangerous and polluting manufacturing processes can be replaced by 'clean technologies' and more efficient production techniques. It also stresses that

> *"municipalities need to cooperate closely with surrounding local authorities, regional authorities and any national agencies concerned with regional resource management, to establish a political and institutional basis for regional resource planning, on the same basis as the local environmental action planning implemented in the municipality"..(GTZ,* 1993, p.71)

This work was based on experiences in Nepal and Thailand, (GTZ, 1992), and the Manual includes Annexes giving examples from Nepal on Domestic Sanitation (GTZ, 1993, pp.76-89) and from Thailand on Resource Management (GTZ, 1993, pp.92-106). These cover sections on an outline of the problems, taking action, useful examples (with contact points), and where to find help (containing addresses and contact points of government institutions, NGOs, and academic and research organisations). In fact, the resource management discussion, summarised in twenty-nine bullet points covering land speculation and haphazard development, the loss of agriculture, the destruction of ecology and landscape, degradation of land, despoliation of water resources, plus more general points on increasing demand for energy, provides a powerful, succinct general overview of the causes and consequences of peri-urban or urban fringe problems.

6.7.5 Urban Environmental Guidelines for Nepal:

Separate urban environmental guidelines were produced for Nepal (GTZ, 1992), which contain eleven topics, each with sections on

- an outline of the problems (with a series of bullet points for each problem),
- taking action (with tables suggesting a series of questions on each problem with answers on what to do),
- useful practical examples (generally three or four examples, with photographs and contact points for further information), and
- where to find help (containing addresses and contact points for appropriate government institutions, NGOs, academic institutions, consultancies, international organisations, and sources of finance

The urban environmental topics which are covered are

- Water pollution control -desecration of the rivers, Water pollution, disability and disease; Rural sources of water pollution, Industrial sources of water pollution; Domestic sources of water pollution; Eutrophication; River bank pollution; and Groundwater pollution;
- Domestic sanitation - Direct water hazard; Lack of private and public toilets; Inappropriate sewage disposal and treatment facilities; Lack of regular maintenance; Lack of community participation; Lack of personal hygiene; and Unpleasant environment;
- Drinking water contamination - Pollution of surface water; Pollution of groundwater; Pollution at source; Pollution of piped water and distribution losses; and Water pollution in the home;
- Drainage Lack of stormwater drainage; Stagnant pools; Contamination of water sources; Lack of planning and strategies; and Lack of cooperation;
- Solid waste management - Domestic and commercial waste generation; Water storage and collection problems; Waste disposal problems; Waste as resource; and Solid waste management planning;
- Special waste management - Health hazards; Carcass disposal; Hospital waste; Industrial waste; Handling and storage of hazardous materials; and Lack of knowledge and guidance;
- Traffic and air pollution Traffic congestion; Air pollution from traffic; Damage caused by pollution from traffic; Health effects of traffic pollution; Traffic accidents; Destruction of urban community life; and Lack of transport planning and management;
- City greening - Recreation space; Trees and other greenery, Fresh and clean water areas; Regulating water movement; Maintenance of green areas, Lack of greening policy, plans and strategies; and What kinds of greening should municipalities develop and encourage;
- Built environment - Destruction of cultural heritage and townscape; Dilapidated buildings and their surroundings; Inconsistent structures; Cluttering of streetscape; and Lack of planning;
- Slum improvement - Inappropriate location; Lack of tenure; Fire risk and other hazards; Inadequate access; Lack of adequate drainage; Inadequate sanitary facilities; Inadequate solid waste management; Inadequate social services; Inadequate income; Poor quality of life; and Inadequate support from government; and
- Land use planning - Lack of protection against pollution; Lack of protection against natural hazards; Lack of space for infrastructure; Over-concentration of single uses; Dispersed development; Inconsistent structures; Inadequate knowledge of planning and regulation; Land speculation; and Inadequate institutional mechanisms. .

While this provides a particularly useful list of environmental problems for consideration at an initial municipal workshop, most of the environmental issues appear to be related to the centres of towns, with relatively few examples of problems affecting the urban fringes.

6.7.6 Lessons for Peri-Urban Research:

This GTZ project was intended to concentrate on providing materials to meet training needs and initiate activities at the national level. While very aware of the importance of involving community groups, it appears to be focussing more on meeting the needs of local authorities. However, when the GTZ Manual focuses down on municipal examples, its guidelines represent useful lists of activities which could be adopted by the municipalities and administrative areas in the Kumasi and Hubli-Dharwad city regions. In particular, the bullet points listing each of the environmental problems could be given to the community groups in the DFID case-study city-regions to assist their discussions about modifying or setting their own priority issues. The ten principles of sustainable urban management also appear likely to have practical value for the peri-urban municipalities and stakeholders. Many of the ideas on preparing separate handbooks for each actor, and on publicizing the activities of stakeholders for a wider local audience, might be adopted. Training courses for stakeholders might usefully be developed as part of the peri-urban research activities in Kumasi and Hubli-Dharwad: ' Material showing practical examples of the ways in which other areas in Ghana or India had tackled problems, and which contained information on contact points for finding help could also be circulated to local authorities and other stakeholders in the DFID case-study city-regions.

Although not specifically set out in these terms, the GTZ Manual perhaps exhibits a wider awareness of regional renewable natural resource issues around cities than the multilateral aid agencies. Despite its title, this bilateral aid programme appears more likely to cover city-regions rather than confine its apparent attention to urban environmental issues alone. Even though its context is on Local Agenda 21 issues and sustainable development, the GTZ Manual is essentially advocating a similar environmental planning and management process to the UN agencies and the World Bank. Perhaps the overall lesson is that more specific management attention needs to be paid to determining a community's own priorities for environmental action and focus the research on meeting the community's needs, - even if these are brown agenda issues rather than renewable natural resource issues.

6.8 The Local Agenda 21 Planning Guide

The global action plan for sustainable development, Agenda 21, produced at the UN Earth Summit (the United Nations Conference on Environment and Development - UNCED) at Rio' de Janeiro in 1992 recognized that since *"so many of the problems and solutions being addressed by Agenda 21 have their roots in local activities, the participation and cooperation of local authorities will be a determining factor in fulfilling its objectives. "* Chapter 28 called upon local authorities, working with their communities, to create their own local action plans or Local Agenda 21 programmes and *"to undertake a consultative process with their populations and achieve a consensus on 'Local Agenda 21' for their communities. "* The task of mobilizing and technically supporting Local Agenda 21 planning in these communities has been led . by the International Council for Local Environmental Initiatives (ICLEI) and national associations of local government.

Over five years of experience with Local Agenda 21 planning efforts have been drawn upon to produce a Local Agenda 21 Planning Guide containing planning approaches, methods and tools. (ICLEI, 1996) This introduces a planning framework for sustainable development at the local level. The Local Agenda 21 planning process aims to create strong and self-reliant communities through the application of the following underlying planning principles:

- *"systematically involve all major community groups such as different ethnic, gender, income and age groups, in all stages of planning, implementation, monitoring and evaluation of the local Action Plan;*
- *creating awareness and commitment in households, neighbourhoods and communities needs to be created so that decisions and choices made at these levels do not contradict sustainability;*
- *involving all relevant municipal departments and agencies in the process, and is creating linkages between the ongoing statutory planning activities and the local Action Plan,*
- *creating a network of informed and committed partners to examine the systemic causes of problem issues from social, economic and environmental perspectives;*
- *meeting immediate priority needs in the short-term and is making steady progress to address the long-term threats to local sustainability; and*
- *developing concrete targets and commitments to achieve measurable performance for sustainable development".*

(ICLEI, 1996, pp.189-190)

The Guide documents a process for developing action plans to address complex problems inherent in modern urbanized societies. It presents a framework for engaging local authorities with residents and local organizations in the design and provision of services to the community, while simultaneously protecting local, regional and global ecosystems. This is intended to provide residents with basic human needs, rights, and economic opportunities, and at the same time ensure a vital, healthy, natural environments -i.e. a planning approach for managing cities, towns & rural settlements in a sustainable way. The Local Agenda 21 planning process can be started at any scale - neighbourhood**,** village, city, metropolitan or regional scale. The emphasis is on involvement and empowerment. The key guiding principles of sustainable development planning include *"multi-stakeholder partnerships, community based dialogue, systemic and holistic analysis, integration of social, environmental and economic considerations, and preparation of long-term strategies".* (ICLEI, 1996, p.189)

The ICLEI Guide incorporate brief summaries of selected methods and tools for sustainable development planning (ICLEI, 1996, pp. 191-197), including:

- **Group Planning Methods and Tools;** brainstorming; community meetings; field trips; media coverages; open house; popular education; public hearings; public meetings, role playing; search conferences; vision building; workshops;
- **Assessment Methods and Tools:** community case studies; community interviews; comparative risk assessment; eco-balancing; ecological footprint; environmental auditing; environmental impact assessment/ social impact assessment; focus groups; force field analysis; geographical information systems; mapping; networked assessment; oral history; periodic monitoring reports; ranking; rapid urban environmental assessment; service issues mapping; state of the environment reporting, surveys; strengths, weaknesses, opportunities and threats (SWOT) analysis, and systems analysis.

Sustainable development is defined as

> *"development that delivers basic environmental, social, and economic services to all, without threatening the viability of the ecological and community systems upon which these services depend. "* (ICLEI, 1996, p.4)

The objective of sustainable development is to ensure that municipal services can be sustained and equitably distributed for future generations. Its achievement requires a strategic planning approach that equally incorporates long-term community and ecological and economic concerns into the development and provision of current municipal services. It recognizes that at the local level there are three distinct development processes, - economic development, community development and ecological development, each with priorities which may conflict with other priorities. The priorities of economic development are to sustain economic growth, maximize private profit, expand markets and externalize costs. Community development priorities are to increase local self-reliance, satisfy basic human needs, increase equity, guarantee participation and accountability, and to use appropriate technology. Ecological development seeks to respect carrying capacity, conserve and recycle resources, and to reduce waste. Sustainable development aims to achieve a balance between these three development processes and reduce conflicts and contradictions among these different development priorities. The strategic planning approach aims to develop municipal service systems and their various components, such as infrastructure, programmes, procedures, management routines and management interventions. Making effective use of natural and human resources depends on the support of the ecosystems and social systems that provide these resources

The sustainable development planning approach is a participatory planning process which can be used to improve municipal sector performance, mobilize and focus resources available in a community, and address the sustainable development challenge at the local level. It combines the principles and methods of corporate planning (private sector strategic planning), community-based planning, and environmental planning to create a public sector, strategic planning approach:

- Strategic planning involves developing long-term visions and goals and short-term action plans to achieve these goals.
- Community-based planning involves local residents and service users in participatory processes to develop and implement local service projects and programmes.
- Environmental planning takes environmental conditions and trends into consideration and identifies environmental impacts of development projects and takes measures to mitigate them.

Sustainable development planning is a proactive process making use of the different planning methods and tools of each of these three planning traditions to:

> *"Equally factor economic, community, and environmental conditions into the design of development projects and service strategies;*
>
> *• Fully engage relevant interest groups and, in particular, service users in the development of service strategies that meet their needs; and*

• *Create service strategies that can be sustained because they focus on underlying systemic problems rather than problem symptoms, and because they consider long-term trends and constraints".*
(ICLEI, 1996, p.7)

The key elements in sustainable development planning are seen as •
Partnerships;
• Community-based issues analysis,
• Action planning;
• Implementation and monitoring; and
• Evaluation and feedback.
Each is elaborated in a chapter of the Planning Guide**.**

6.8.1 Partnerships:

The aim is to establish an organizational structure for planning by service providers and users, and formulate a shared community vision about the future by a stakeholder group.
Six key objectives are identified for involving stakeholders in sustainable development planning:

- *"to create a shared community vision of the future;*
- *to identify and prioritize key issues, thereby facilitating immediate measures to alleviate urgent problems;*
- *to support community-based analysis of local issues, including the comprehensive review of long-term, systemic problems that confront particular service systems and the need to integrate different service strategies so that they are mutually supportive;*
- *to develop action plans for addressing key issues, drawing from the experiences and innovations of diverse local groups;*
- *to mobilize community-wide resources to meet service needs, including the joint implementation of sustainable development projects; and*
  to increase public support for municipal activities and local understanding of municipal development needs and constraints. "
  (ICLEI, 1996, p. 14)

Six basic steps are presented in the establishment of partnerships for sustainable development planning purposes:

- *"**Step1**: Determine the scope of the planning exercise and define goals and objectives. This should be done by the initiating organization (e.g. the municipality) in consultation with stakeholders. It should include a preliminary educational campaign to generate public interest and support.*
- ***Step 2**: Create or designate a Stakeholder Group to coordinate and guide overall planning effort, and to integrate the results of discussions, research, and planning into an Action Plan(s).*
- ***Step 3:** Establish distinct Working Group structures under the supervision of the Stakeholder Group. Working Groups are given responsibility for each of the unique planning tasks, e.g. priority setting, issue analysis, visioning, action planning, implementation, etc.. They may be established to focus on distinct issues, such as a Working Group on solid waste, housing, etc..*
- ***Step 4**: Identify appropriate partners to participate in the Stakeholder Group and its Working Groups.*
- ***Step 5**: Establish the terms of reference for the activities of each group, which includes defining the relationship between stakeholder planning and statutory processes, such as official development plans.*

• ***Step 6:*** *Develop a common Community Vision to guide the entire planning process. "*
(ICLEI, 1996, p.15)

6.8:2 Community-based issues analysis:

This is concerned with the identification of issues that must be addressed to achieve the community vision, Once a process has been established to gather and discuss the knowledge and wisdom of local residents about local conditions, technical assessments are undertaken to provide stakeholders with additional information. Popular knowledge and technical research are reviewed together by the stakeholders in order to try to achieve a consensus about local problems: The analysis helps the local community to establish priorities for action, and permits the community to establish 'baseline' data and indicators against which progress and future changes in conditions can be measured.

In contrast to traditional 'consultation' and 'auditing' which are seen as *"top-down, expert-driven, information-gathering activities,"* (ICLEI, 1996, p.43), the aims of community-based issue analysis are summarised as:

- *"Initiates detailed dialogue among community groups and between the community and technical experts;*
- *Focuses planning on peoples' recognized interests, needs, and preferences;*
- *Informs stakeholders about the technical aspects of the problems they wish to resolve by engaging them in the collection and analysis of data;*
- *Prevents uncritical and sole reliance upon the assessments of (often external) experts; and*
- *Creates a well-informed constituency of residents to work for sustainability.*
(ICLEI, 1996, p.43)

The process generally has four steps:

- **Step 1:** Determine the scope of the issue analysis process
The level of public participation is determined by the scope and complexity of the issues involved; the time and resources made available for planning; the size, composition and diversity of the local population and its institutional community; and the need to evaluate and understand differences between public knowledge and perceptions. A distinction is made between target communities and target groups; target communities consist of geographical areas with diverse populations but share concerns such as traffic congestion, crime, flooding; target groups may not share common geographical areas but have common sectoral or social interests, including women, youth, racial or ethnic groups, private business, etc..
- **Step 2**: Identify the issues to be analyzed
- **Step 3**: Implement complementary participant and technical assessments of key issues

Four basic requirements determine the choice of method adopted:

I . The methods and tools should be appropriate to the community, its resources, and the issues to be analyzed;
2. Participant assessment methods include. mapping, focus groups, etc. Technical assessment methods include Rapid Urban Environmental Assessment, State of the Environment Reporting, Environmental Impact Assessment, Comparative Risk Assessment, and Systems Analysis, etc. Both types of methods should be used in any analysis;
3. The participant and technical assessment processes should be integrated with each other to verify results; and
4. Procedures should be established to generate key baseline data about local conditions so comparable data can be used to monitor changes and progress

towards targets. In addition, insights need to be provided into the systemic nature of the issues being analyzed.

Traditional municipal management and environmental planning has focused simply on the assessment and alleviation of problem symptoms, but the underlying causes of these problems are inter-related economic, community and environmental issues which need to be incorporated into the long-term sustainability of different action strategies. Service Issues Mapping, including steps for using a worksheet, is introduced to combine systems analysis with simple community-based mapping techniques (ICLEI, 1996, pp.58-61). Network assessment, with a Connectivity Matrix, has also been developed by ICLEI to help working groups or stakeholder meetings identify the connections between a community's major service issues or problems and the key systems upon which the community depends. (ICLEI, 1996, pp.61-68).

• **Step 4:** Complete the issue analysis

The Stakeholder Group needs to decide at the start of the process how the information to be collected and reviewed will be used to produce a consensus report about the relevant issues. This report should:

1. *"Thoroughly describe the findings of the participant and technical assessments;*
2. *Present baseline data about relevant conditions that should be monitored in the fieture;*
3. *Identify areas of disagreement or issues that require further assessment; and*
4. *Present any proposals or options for action that should be considered in the action planning process. "*

(ICLEI, 1996, p.53)

6:8.3 Action planning:

Once the priority service issues have been identified and analyzed, action plans are initiated according to the three basic components recognized by the action planning process:

- Action Goals: translate the community vision into focused directives and resource allocation priorities;
- Targets and Triggers: targets are defined as *"a measurable commitment to be achieved in a specific time horizon"* (ICLEI, 1996, p.8), and triggers as *"a commitment to take a specified action at a fiiture date andlor in response to future conditions"* (ICLEI, 1996, p.8);
- Action Strategies and Commitments: specifies the activities of stakeholders for working as partners to achieve the different objectives of an Action Plan. They *"should be very precise and contain specific projects, time schedules for implementation, and commitments to allocate money, time and human resources."* (ICLEI, 1996, p.10) They should be designed to commence immediately since the sustainable development planning process will have raised community expectations for action and change.

A strategic action plan is expected to contain:

- *"a community vision, developed by the stakeholders, including a consensus position on current problems and opportunities;*
- *strategic goals for each problem or opportunity area related to this vision; •*

specific targets to be achieved in meeting each goal;

- *identified implementation strategies and programs for achieving these targets and goals;*
- *a description of key partnerships to be established for implementation, incheding linkages with existing planning processes; and*

- *a , framework for periodic evaluation of progress, including 'triggers' for future planning and action"*

(ICLEI, 1996, p.98)

The Planning Guide suggests that seven steps are involved in the action planning process:

Step 1: Define the action planning process, including linkages with existing formal or statutory plans, and a ranking and priority-setting exercise;
Step 2: Review the Community Vision and the findings from community-based issue analysis;
***Step* 3**: Establish strategic action goals, making use of force field analysis (described in ICLEI, 1996, pp. 108-111) to help stakeholders identify which goals should be given immediate priority,
Step 4: Set targets and triggers;
Step 5 Select specific implementation strategies and programmes;
***Step* 6**: Develop the framework Action Plan.
***Step* 7.** Promote partnerships for implementation.

The framework Action Plan is seen as a 'living' document, requiring an ongoing process of reviewing and developing partnerships and implementation agreements by the Stakeholder Group, supported by the municipality, approaching all residents, organizations and sectors.

6.8:4 Implementation and Monitoring.!

Partnership structures are created for implementation, with formal agreements outlining the responsibilities and investments of each partner, including specific work schedules and methods for ongoing monitoring of work, often involving a new organization or institution to coordinate implementation. Internal management systems for municipal compliance are also established, with institutional reorganization and adjustments in standard operating procedures if necessary. Activities and changes in services should be monitored, enabling the causes of any problems to be identified.

Five key components to an *effective* joint implementation strategy between a local government and its external stakeholders: are identified as:

- *"the creation of new structures or the reform of existing structures to support implementation partnerships;*
- *the establishment of a working linkage between the stakeholders' Action Plan and local statutory planning requirements;*
- *the review of existing municipal policies, budgetary priorities, and internal practices and procedures to test their compatibility with the Action Plan;*
- *the monitoring of new or fisture municipal policies, decisions, or actions to assure their consistency with the Action Plan; and*
- *the documentation of actions taken, both by stakeholders and by the municipality, to implement the Plan. "*

(1CLE1, 1996, pp. 125-126)

The creation of effective structures appears to be a particularly relevant issue for the periurban interface. The Guide notes that urban areas sprawl beyond existing municipal boundaries, ecosystems extend across several administrative boundaries, and various public and private agencies serve different areas. It suggests that jurisdictional reforms, such as municipal boundary extensions, amalgamations or transfers of powers, responsibilities or resources to other jurisdictions, might be needed. Alternatively, formal or informal cooperation through joint commissions, etc, might be necessary to achieve the necessary inter jurisdictional coordination. A Worksheet is provided to help stakeholders identify which geographic, policy and management jurisdictions must be involved in working towards each Action Plan Goal. The decentralization of highly centralized municipal departments

may also be necessary for them to work closely with neighbourhood organizations and residents. Specific services may be decentralized to sub-areas or to quasi-public or private enterprises, or municipalities may promote empowerment by giving political and administrative responsibilities to sub-areas with elected representatives. Inter-departmental coordination is also seen as being essential if unnecessary duplication or gaps are to be avoided. A coordination mechanism to facilitate inter-departmental cooperation is regarded as crucial for tackling systemic problems. A Worksheet is also provided to assist in the identification of the roles of different departments in achieving the Action Plan's foals and targets. By their very nature, peri-urban areas appear particularly prone to problems created by administrative fragmentation or ineffective coordination and integration among different departments or jurisdictions.

Effective planning linkages are needed to existing planning and statutory processes within municipalities**,** such as annual budgeting processes, development plan preparations**,** land use controls and approvals, general land-use plan reviews, and capital/infrastructure planning processes. The Guide states that *"the best time to undertake a sustainable development planning process is concurrent with, or preceding, the deadlines for statutory planning"* (ICLEI, 1996, p.139). The Guide provides a Worksheet to assist in setting out the schedules of different statutory planning processes and identify how these can be linked with the strategic planning and Action Plan implementation process. Other recommendations include

- conducting an internal audit of the compatibility of existing internal procedures and practices with the goals and targets of the Action Plan,
- the establishment of procedures, rules and standards to put the Action Plan into effect, and
  the establishment of a management system to monitor compliance with the new procedures and standards.

6.8.5 Evaluation and Feedback:

Accountability among the stakeholder participants is maintained, and the general public are kept informed about the progress in meeting specified targets through periodic performance evaluations using target-based indicators. Regular information and results about changes in local conditions and progress towards targets are supplied to service providers and users in order to guide planning and resource allocation processes. Issues analysis and action planning processes are repeated at specified trigger thresholds.
An effective evaluation process is seen as having four key components:

> *• "the establishment of a system whereby all the key stakeholders report to each other on the actions they have taken to implement the Action Plan;*
> *• the development of methods and tools, such as indicators, to measure the performance of the community as a whole in achieving its goals and targets, and to determine whether any 'trigger' conditions have been reached, requiring further planning or action;*
> *• the implementation of a comprehensive analysis and review, on a periodic basis, of local, regional, and global conditions and an analysis as to whether these conditions indicate progress towards actually achieving sustainability and the Community Vision; and*
> *• the establishment of mechanisms for reporting on progress and performance to local inhabitants and their community organizations, so that they continue to be informed and guide their behaviors in a way that is consistent with the goal of sustainable development.* "
> (ICLEI, 1996, p.167)

Progress reporting is needed to measure a community's progress towards actually becoming more sustainable. Indicators need to be developed to take account of both internal or external conditions as well as previously unknown or overlooked factors which may inhibit progress towards sustainability. Detailed audits or a State of the Environment Report may need to be conducted of actual conditions in the community. An effective community-based reporting system must also include performance reporting in which the stakeholders and local institutions report to each other on their performances in achieving the goals, commitments and targets established in the Action Plan. The establishment of a system of accountability among all the major actors and sectors also provides an opportunity to revise the Action Plan in the light of changing circumstances. A set of indicators are also needed to measure performances in achieving the proposed targets and commitments. ICLEI suggests that key factors to.betaken into account in developing a performance indicator should include:

- *Feasibility:* the collection of data to measure the present value of an indicator must be feasible given the time and cost constraints on the municipality or its stakeholders, so wherever possible existing data monitoring, auditing and reporting capacities should be used;
- *Frequency:* consistent, comparable time-series data are essential for monitoring trends; some indicators, such as those on air quality, may have to be reported on a daily or even hourly basis to alert pollutors or users of problems, while other indicators can be linked to annual processes such as budget reviews;
- *Validity:* accepted measurement standards and methods are required if the indicator is to be accepted as valid by diverse interest groups and institutions;
- *Relevance:* to be acceptable to local residents the indicators need to be understood and valued by the users in guiding their decisions and actions.

(ICLEI, 1996, p. 175.)

It is also suggested that the successful use of indicators should include the establishment of clear institutional responsibility for collecting and processing the data. A clear and consistent reporting format should be used for presenting indicator values to the public, and the indicators should be incorporated into official review and assessment processes..

A good community feedback system is seen as a particularly valuable tool for the implementation of a strategic Action Plan, but this is often overlooked. Appropriate information needs to circulated to different audiences within the community both to inform them about the status if conditions as well as inform them about preferable behaviour and actions. Associated with this, however, is the establishment of clear incentives and rewards for desirable behaviour, such as public recognition, financial rewards or rebates, or clear disincentives for undesirable behaviour, such as the imposition of fines or regulations. A third key element of feedback is regularity and consistency.

In addition to the case studies included in the Planning Guide, ICLEI has also compiled fourteen case studies on the responses of local authorities to the suggestion that by 1996 most local authorities should produce a Local Agenda 21 through consultation and consensus with local people and institutions (ICLEI, 1995). Eight of these case studies are for cities in developing countries - Cajamarca (Peru), Dar es Salaam (Tanzania), Durban (South Africa), Kayes (Mali), Nongkhai (Thailand), San Jose (Costa Rica), Santos (Brazil), and Tripoli (Lebanon). According to a Local Agenda 21 Survey, prepared by ICLEI in cooperation with the United Nations Department for Policy Coordination and Sustainable Development (ICLEI, 1997), five key elements have been defined for Local Agenda 21 planning in the 1992-1996 period:

- *"Multi-sectoral engagement in the planning process through a local stakeholders group which serves as the coordination and policy body for preparing a long-term sustainable development action plan.*

- ***Consultation*** *with community groups, NGOs, business, churches, government agencies, professional groups and unions in order to create a shared vision and to identify proposals and priorities for action.*
- *Participatory assessment of local social, economic and environmental conditions and needs.*
- *Participatory target-setting through negotiations among key stakeholders in order to achieve the vision and goals set forth in the* ***action plan.***
- ***Monitoring and reporting procedures, including*** *local indicators, to track progress and to allow participants to hold each other accountable to the action plan.* (ICLEI, 1997, pp. 1-2)

Although aimed at the community level, the approach adopted in the ICLEI Local Agenda 21 Planning Guide is similar in principle to that derived for national strategies for sustainability, whether these are termed national conservation strategies, national environmental action plans, etc. The World Conservation Union (IUCN) and the International Institute for Environment and Development (IIED) produced a handbook for planning and implementation of strategies for national sustainable development (Carew-Reid et al, 1994). National sustainable development strategies are *"a generic name for a participatory and cyclical process of planning and action to achieve economic, ecological and social objectives in a balanced and integrated manner".* (Carew-Reid et al, 1994, p.37) This national handbook presents principles and ideas on the process and methods and suggests how they can be used, but it is not intended to be an instruction manual for a'model' strategy. The main elements of its strategy process are participation; information assembly and analysis; policy formulation; action planning; implementation and capacity building; communication; and monitoring and evaluation. Ten lessons and features of national strategies for sustainability, derived from fourteen years of experience, are summarised:

- *They seek to improve the well-being of people and ecosystems.*
- *Their overall goal is sustainable development.*
- *Their objectives are strategic and tactical.*
- *The process is adaptive and cyclical.*
- *They are participatory.*
- *They rely on communication.*
- *They are processes of planning and action.*
- *They are integrative and inter-sectoral.*
- *They build capacity.*
- *External agencies should be 'on tap' not on top.*

(Carew-Reid et al, 1994, p.12)

After discussing participation in planning, various chapters elaborate on the strategy cycle - getting started, planning the strategy, implementing it, and keeping strategies on track.

6.8.6 Lessons for Peri-urban Research:

Since the Local Agenda 21 Planning Guide is aimed at promoting sustainable development in communities at any geographical scale, the processes put forward can be equally applicable to peri-urban communities. Indeed the scope of the planning effort can cover neighbourhoods, cities or watersheds, and could also be extended to bring together communities in several jurisdictions. The approach being adopted is essentially the same process as the strategic environmental planning and management approach adopted by the UN agencies and the World Bank. The ICLEI approach, though, appears to place more emphasis on developing partnerships. Its community-based issues analysis is not initiated with a data collection exercise leading to an environmental profile, as in the Urban Management Programme, or use a city environmental profile to initiate stakeholder discussions, as in the Sustainable Cities Programme. Instead it aims to bring together the local knowledge and wisdom of local

residents before undertaking technical assessments to provide stakeholders with additional information. Action planning within a strategic framework, leading on to the cyclical process of implementation, monitoring and evaluation, appears to be common to all management approaches. Although not adopting a cookbook approach, the ICLEI Guide suggests a series of steps to be taken, and produces sample worksheets, and suggests analytical techniques, to facilitate their practical application by the communities. As such, the ICLEI Guide has a great potential practical value for peri-urban communities wishing to undertake improved environmental planning and management.

The ICLEI Guide is perhaps aimed more at service providers and users than at renewable natural resource issues. However, it is inadequate infrastructure services and associated environmental health problems which appear to emerge as priorities in most communities on the margins of cities. In peri-urban areas there appears to be a combination of increasing populations, plus higher expectations due to rising agricultural or non-farm incomes and proximity to higher-order services in the cities. In addition, environmental degradation, like air pollution, water pollution or solid waste dumping, and environmental health hazards, spread beyond the built-up areas of cities. These needs and expectations outstrip the abilities of the local authority and other agencies to meet the basic needs of peri-urban residents and protect their environmental health. Agricultural intensification within the peri-urban areas in response to market opportunities arising from the growth of the nearby city, however, can create environmental health hazards due to the increased use of chemical or inorganic fertilizers or pesticides, or the increased use of untreated sewage water. If peri-urban communities have similar priorities to those in urban communities, then they appear likely to have a similar focus on brown agenda issues. Like all environmental planning and management approaches, however, the significance of jobs or incomes in peri-urban areas is perhaps under-estimated through the concentration on environmental issues and the provision of environmental services. The provision of education facilities and training opportunities also appear to be neglected.

There is a danger that the future occupants of a peri-urban area or the firture users of environmental and other services will not be represented as they have not yet moved into the area. These areas may also still be dominated by the traditional leadership and social or political structures; lower priority may consequently be given to the interests of recent in-migrants or of indigenous families shifting to non-farm activities and no longer so concerned with the use of natural resources, as in agriculture or forestry. Attention may be diverted onto interim problems such as competition for land or water resources rather than to long-term sustainable development.

6.9 A Participatory Local Governance Approach to Urban Environmental Problems:

The UNDP Local Initiative Facility for Urban Environment (LIFE Programme) was launched as a pilot programme by the United Nations Development Programme (UNDP) at the Rio Earth Summit in 1992. Its primary objective is to demonstrate local solutions to urban environmental problems through small projects designed, implemented and operated by local community-based organisations, non-governmental organisations and local authorities. It is a community-based initiative operating in over 60 cities in 12 pilot countries - Bangladesh, Brazil, Colombia, Egypt, Jamaica, Kyrgyzstan, Lebanon, Pakistan, Senegal, South Africa, Tanzania and Thailand. Its aim has been to address environmental problems and improve living conditions in low-income urban settlements by facilitating participatory local governance through a participatory method known as 'local-local' dialogue. Bilateral donor development agencies in Denmark, Germany, the Netherlands and Sweden joined UNDP in funding the project through cost-sharing and parallel co-financing.

6.9.1 The LIFE Programme Aims and Activities:

The LIFE Programme aims and objectives are very similar to those endorsed at the Rio Earth Summit, Local Agenda 21, *"an action plan to put control of local issues and local resources into local hands for sustainable human development through decentralized, participatory local governance"* (UNDP, 1997a, p.8)

The underlying premise of LIFE is that local people and organizations are best able to determine which environmental problems need urgent attention, and that local solutions to local problems have a better chance of creating lasting change in a community. The Programme's method and experience during its first five years of operation, 1992-1997 have been reviewed by the LIFE Programme, part of the UNDP's Management Development and Governance Division (UNDP, 1997a).

The LIFE Programme was developed in response to three factors:

a) Sustainable Human Development:
To counteract the negative social impacts on developing country populations of the free market reforms and structural adjustment strategies of economic policy of the 1980s and 1990s, UNDP advocated the concept of sustainable human development to place people at the centre of the development process. Instead of relying on macroeconomic growth and welfare policies, sustainable human development is intended to be a process which not only generates growth but also distributes it equitably. Peoples' capabilities are enhanced and opportunities are created for using these capabilities so that the poor are empowered rather than being marginalised. The environment is regenerated rather than being destroyed, and choices for present and future generations are ensured. The critical issues include poverty elimination, gender equity, employment creation, environmental improvement and sound governance.

b) Governance:
The implementation of sustainable human development strategies are seen as requiring a decentralized, local participatory process to identify and address these priority objectives. Participatory local governance is adopted to help resolve issues more effectively through local coordination, planning and action. Governance is defined as *"the exercise of political, economic and administrative authority to manage a society's affairs"* (UNDP, I997a, p.4), and the concept stresses the nature and quality of interactions within and between actors in society and the state. It adopts a broader interpretation of how society manages its economic, social and political resources and institutions, and is no longer confined to the traditional view of government by elected politicians and civil servants, dominated by the central government level. Governance covers both the technical and the representational aspects. *"The technical*

aspect refers to the how and what of development - the processes and procedures of resource mobilisation, plan formulation, technical application and resources allocation. The representational aspect refers to the way decisions are taken and who takes them - and thus includes issues of representation and participation, accountability and empowerment". (UNDP, 1997a, p.5).

c) **Urbanisation:**
The LIFE Programme was looking for ways to counter the negative effects of urbanisation. Cities are seen as promoting

> *"the modernization of agriculture by providing domestic markets for farm goods, providing the infrastructure necessary for wider export markets and relieving land pressures by absorbing rural migrants. Cities also offer residents the opportunity to obtain the knowledge and skills to become more productive. Employment and wage opportunities - particularly for women - are generally greater than in rural areas... But without adequate city planning and management, the efficiencies of cities can be overshadowed by increased poverty and environmental degradation".* (UNDP, 1997a, p.5)

Land use planning measures to separate economic and residential areas contributed to the creation of low-value land, occupied by low-income groups, often in 'unplanned' communities without adequate sanitation, access to safe water or basic health services.

> *"The hazards affecting the urban poor include undisposed wastes, contaminated water, flooding, landslides, erosion and poisoning from industrial pollution. When insecurity of tenure and inadequate employment are added, the result is not just severe health and malnutrition problems but also a fragmentation of social values that leaves the poor open to exploitation and abuse"* (UNDP**,** 1997a, p.6)

The practical value of community-based participatory projects could be demonstrated by tackling small urban environmental problems by urban populations whose characteristics did not readily lend themselves to cooperation and collective action - *'young, often mobile populations, (with) great diversity and heterogeneity, weak social cohesion and a high degree of anonymity".* (UNDP, 1997x, p.6)

The LIFE Programme has shown an awareness that central government cannot be the sole source and support for development, and that decentralisation is essential. It concentrates on fostering collaboration between community-based organisations, non-governmental organisations and local authorities and forging new partnerships among government, civil society and the private sector. LIFE's focus has been on empowering individuals and institutions in local communities to understand and improve their local environment.

The LIFE Programme has three objectives:

- To demonstrate local solutions to urban environmental problems and strengthen institutional capacities and collaboration through small projects involving NGOs, CBOs and local authorities at the neighbourhood, city and country levels.
- To facilitate policy dialogue and scaling up based on local initiatives through national and local consultations involving NGOs, CBOs and local authorities at the neighbourhood, city and country levels.
- To promote the exchange of successful approaches and innovations to local urban environmental improvement at the sub-regional, regional and inter-regional levels by NGO networks, cities' associations and international agencies.

Urban environmental problems are used to get local actors to work together, develop cooperative and collective action, reach consensus and understand each actor's strengths, weaknesses and contribution to solving a community's problems. By working together local actors can accomplish more and be more productive and efficient than acting alone.

Small urban environmental projects to be supported by the LIFE Programme in each country were selected according to the following criteria:

- Extent to which urban environmental problems are addressed (the most important criterion);
- Gender equity;
- Income generation;
- Participatory governance; and
- The professional capacity of the implementing organisation.

Although LIFE incorporates action at country, regional and global levels, its core focus is at the country level. It has adopted a three-stage process it calls ' upstream-downstreamupstream'-phases.

1. **The initial upstream phase (Setting-up):** interactive workshops and broad-based consultations help formulate national strategies to gather support, activate communities and mobilise resources for local projects. A preparatory committee is set up, key local actors are identified, a national coordinator is appointed, workshops are held and a national selection committee involving local and national figures is set up.
2. **The downstream phase (Policy Experiments):** ensuring effective and collaborative small projects are selected. Collaborative projects are identified, supported and implemented through ongoing local consultations, and systems for monitoring and evaluation are established.
3. **The final upstream phase (Evaluation, dissemination and policy): disseminating** and exchanging information nationally and internationally. Policy dialogue occurs as collaborative projects lead to a collective impact on the means and methods of municipal or national policy-making.

Useful outlines are provided on the activities undertaken as part of these three stages (UNDP, 1997x, pp. 15-17). The national and international implications of the approach have been disseminated through LIFE's participation in regional and inter-regional networks having similar approaches. As discussed in UNDP, 1997, pp.35-43, these include the International Council for Local Environmental Initiatives (ICLEI), the Habitat International Coalition, Environmental Development Action (enda), the International Union of Local Authorities (IULA), the MegaCities Project, CITYNet, the Asia Coalition for Housing Rights (ACHR), the Arab Network for Environment and Development (RAED), and the Centre for African Settlement Studies and Development (CASSED).

The LIFE programme is intended to be completed in the year 2000 but has been split into three phases:

Phase I (1993-1994):

Seven countries were selected on the basis of

- A well-developed NGO and CBO movement;
- Serious urban environmental issues-,
- Social and economic contexts; and
- Geographic distribution.

Two countries were selected from most of the regions - Thailand and Pakistan (Asia-Pacific region), Senegal and Tanzania (Africa region), Brazil and Jamaica (Latin America and the Caribbean region), and Egypt (Arab States). These countries varied in their urban percentage of the national population, in their urban growth rates, GNP *per* capita, and in life expectancy. Missions were undertaken to initiate the local-national process rather than select particular projects since the aim was to introduce a process, not to administer another small grants programme. National committees selected 45 projects to receive support, and four regional and two inter-regional projects also received support.

Phase U (1995-1996):
The programme was extended to another five countries - Bangladesh, Columbia, Kyrgyzstan, Lebanon and South Africa (one in each region, plus the only one in Europe/Asia), 129 projects were being implemented in the 12 countries, plus support for six regional and four inter-regional projects. LIFE's third Global Advisory Committee workshop was held in June 1996 to coincide with the Habitat H City Summit to review and share its performance and lessons and make proposals for future directions and action.

Phase III (1997-2000):
In addition to initiating new projects, this phase is intended to complete the implementation of projects initiated between 1992 and 1996, and will facilitate the mainstreaming and institutionalisation of the local-local method at the national and international levels.

The LIFE Programme focuses on eight urban environmental problems:

- Inadequate provision of water supply and sanitation services;
- Deficiencies in solid and liquid waste management;
- Air and water pollution;
- Occupancy of hazard-prone areas;
- Poor health from environmental degradation;
- Poverty from limited income-generation opportunities;
- Absence of environmental education; and
- Exclusion of environmental considerations in urban planning.

Overwhelmingly, communities have chosen to tackle 'brown agenda' issues. Most of the projects address multiple objectives, but out of the 129 approved small projects, the most common problem tackled is inadequate solid and liquid waste management, a component of 46 projects, or 23.2% of all projects. (UNDP, 1997a, p. 30, and Annex `2, pp. 102-119). Environmental education is a component of 37 projects, 18.7% of the total, followed by water supply 'and sanitation (26 projects, or 13.1%), and environmental health (25 projects, or 12.6% of all projects). Only 17 (8.6% of the total) are income generation environmental projects, including various recycling and composting projects. Tree planting schemes, physical improvements or construction schemes, or the preparation of environmental action plans by communities are included under the category, environmentally conscious urban planning, but there are only 15 projects, 7.6% of all projects.

While full evaluations have yet to be carried out, LIFE's assessment of the strengths of its participatory process can be summarised as follows:

- Participation - its main distinguishing feature, which in contrast to other approaches sharing community-based action and participatory processes, incorporates vertical as well as horizontal participatory approaches. Participation is seen as more than simply a mechanism for involving beneficiaries.
- Partnership - identifying and working with each local actor's strengths and weaknesses has enabled more effective partnerships to develop.
- Local-local dialogue - used to bring together the various stakeholders for project identification, problem-solving, monitoring and implementation, and provides an opportunity for understanding the needs and limitations of actors, especially the users and providers of urban services.
- The upstream-downstream-upstream approach - contributes to a greater influence and impact of a project beyond the communities they serve.
- Replicating and sustaining LIFE at the local level - the small size of the grant encourages smaller, local NGOs rather than larger, international NGOs, and allows community-based organisations to take on management and administrative roles; successful demonstrations assist replication by local agencies and governments.

- Donor participation and experimental leaming - projects are seen as policy experiments seeking local responses to local problems so donors also learn from the feedback from learning-by-doing'.
- Combining process with solutions - communities design responses to solve their own local environmental problems, and the process can be extended to other activities.
- Holistic, multi-sectoral approach - collective rather than individual action simultaneously tackles poverty, one of the underlying causes of environmental degradation, either directly through creating employment and income-earning opportunities or indirectly through reducing the costs of infrastructure or health care
- Visible results through local projects - improved environmental conditions have an immediate impact on a locality and build the community's confidence in undertaking further change.
- Decentralised structure - decisions are made at the community level under the guidance of the national coordinator; the LIFE Programme is decentralised to the country and local levels.
- Reliance on local expertise - local and national expertise rather than international consultants are used, building local capacity and capabilities and increasing the confidence and self-reliance of the community, assisting in replication and sustaining the process over time.

Various constraints of limitations can be detected in the LIFE approach:

- Institutional resistance: local authorities, NGOs, etc are more familiarity with more conventional projects and approaches.
- Effective participation of community-based organisations and the private sector has been rather limited in the national selection committees and in project implementation. Where NGOs and CBOs are independent of the local power structure they may have difficulties in continuing with their direct involvement after the LIFE programme ends.
- Partnerships: there is a danger that it becomes a NGO/CBO programme rather than a partnership involving all sectors. In some countries the local government structure is weak, and officials were found to be unsympathetic towards the LIFE methodology and approach. Government departments may be understaffed and lack the capacity to take on additional duties and responsibilities. Officials' training and experience often does not encourage them to engage in dialogue with communities, especially in poor and illegal settlements.
- Spreading too thinly over too many localities in a country creates difficulties for the national coordinator in controlling quality or providing support. If concentration on too few cities or countries, limited opportunities result for testing the approach in different environments within large countries, and the scope for 'doing-by seeing' is reduced.
- Ambitious approach: The LIFE Programme is attempting to *"change <u>what</u> is done for local urban environmental improvements the <u>way</u> it is done, and <u>who</u> is involved in doing it"* (UNDP, 1997a, p. 57). Although starting with local urban environmental improvements through participatory local governance, it hopes to be adapted to address other issues, or become part of mainstream activities. This has implications for
- Control: governments can lose power and prestige through a reduction in their control, especially in more centralized governments;
- Agenda: problem-solving is shifted towards a community-based definition away from an agency-based one. Agencies become reluctant to initiate action in areas beyond their prescribed mandates, specified areas of operation or imposed budgets;
- Returns: the emphasis shifts to longer term programmes, away from quick-fix projects;

Empowerment: community self-sufficiency is increased, with a reduction in reliance on government; this loss of power can be opposed by vested interests.

So far, the main lessons of the LIFE Programme appear to be that

- the institutional capacities of NGOs, CBOs and local authorities need to be strengthened through providing technical assistance in proposal writing, financial reporting, project development and management, fund-raising and negotiation. These skills and methods are beginning to be extended beyond local environmental problems into other issues such as gender equality and income generation.
- The media is a key element in sustaining LIFE's projects and practices through publicising successful projects, educating and informing the public about the programme method, and disseminating best practices to as wide an audience as possible.
- the private sector must also be involved to help sustain the projects over time by leveraging private source support, encouraging the income-generation aspects of projects and ensuring that small development enterprises are investment opportunities.

6.9.2 Lessons for Peri-Urban Research:

Although the LIFE Programme seeks to address urban environmental problems, the methodology and process would be equally applicable to peri-urban communities since the emphasis is on localities rather than on municipal governments. In fact, local governments surrounding a major city can often tend to be relatively weak, starved of experienced manpower, financial or other resources, yet still face many of the pressures of current or fixture environmental problems. They may be more receptive to adopting the local participatory approach and see partnerships as a means of overcoming their lack of resources. Although NGOs and CBOs may not be strong in peri-urban areas, traditional social and political structures may still be in place to form the nucleus of community-based activities.

Ghana and India are not pilot countries selected for the LIFE Programme, so LIFE assistance will not be available. The lessons from its approach suggests that there might be merits in replicating the LIFE Programme approach by devoting DFID technical advice and small grants to suitable environmental projects in the DFID case study city regions in Kumasi and Hubli-Dharwad. Participatory local governance through the participation and empowerment of the local NGOs, CBOs and other stakeholders, with workshops and broad-based consultations leading to the development of partnerships, might be encouraged to convert research recommendations into worthwhile development projects. Parts of the peri-urban interface research programme might be re-focused to facilitate participatory local governance methods for urban or pen-urban environmental action projects. The research might be used to provide the means of bringing together appropriate stakeholders, or to provide additional technical information and management advice for local environmental projects in the two city-regions. Research might estimate the impact and implications, costs and benefits, or technical feasibility of projects proposed by local partnerships.

6.10 Indicators:

6.10.1 Urban Indicators:

As part of its Urban Indicators Programme, UNCHS (Habitat) has established a Global Urban Observatory, with a Guide to Monitoring Human Settlements with Urban Indicators, on its web-site (UNCHS, 1997). This is a revised version of the Guidebook prepared for the Habitat II Conference, held in Istanbul in 1996. The Habitat Agenda agreed at Habitat II included a set of commitments and recommendations relating to the development and use of indicators. Governments of all levels, including local authorities, were expected to develop and apply shelter and human settlements indicators. The Global Urban Observatory Programme was established to permit international evaluation of progress in meeting the aims of the Habitat Agenda and to provide information on human settlements trends and conditions worldwide. The Global Urban Observatory actually brings together two programmes, Indicators and Best Practices. The Urban Indicators Programme, initiated in 1994, is an extension of the Housing Urban Indicators Programme started in 1988. The purpose of the Urban Indicators Programme is to build national and local capacity to collect and use policy-oriented indicators as part of a strategy for the development of sustainable human settlements. Its purpose is to develop a process for analysing and monitoring major trends in urbanization and the impact of urban policies, strategies and actions on the provision of adequate shelter and the achievement of sustainable human settlements development. The Programme is not seen as primarily a data collection programme, but is part of an enabling process, measuring sector-wide progress of all actors towards achieving social goals, covering sustainability and efficiency rather than the simple production goals used as government performance indicators in the past. The indicators are not seen simply as data, but rather as 'models' simplifying a complex subject to a few numbers which can be easily grasped by policy-makers and the general public. They should be measurable, using immediately available city data, and linked where possible to three themes of economic, social and environmental sustainability. They should be readily available, easily collected or estimated, and should not normally require special surveys or studies.

Local governments are asked to supply a map showing:

- the city proper,
- the metropolitan area (or set of formal local government areas which are normally taken to comprise the city as a whole and its primary commuter areas),
- the urban area (or built-up or densely populated area containing the city proper, suburbs and continuously settled commuter areas), and
- any informal settlements.

City districts, communities or neighbourhoods should also be shown since indicators would need to be disaggregated by sex, age and geographic area where special needs and equity are policy issues.

The highest priority or key indicators require only immediately available data and all countries are encouraged to provide these data. Table 6.6 list these forty-nine key indicators, divided into Background data, and six other categories. The nine Background data indicators include measures showing the rates of growth, while the nine Socioeconomic Development indicators help pinpoint poverty or other social problems. There are four indicators of Infrastructure which emphasise domestic water supplies, while the five Environmental Management indicators are mainly concerned with wastewater treatment and solid waste collection and treatment. The other categories cover four Transport indicators, eight Local Government indicators, and ten Housing indicators. A second priority or 'extensive' indicators, summarised here as Table 6.7, contains 129 indicators of a lower policy relevance or which are more difficult to collect or define. Here there are five more background data indicators. Eighteen socioeconomic development indicators are divided into indicators

Table 6.6: List of Key Indicators, UNCHS Urban Indicators Programme

Background data	
D 1: Land use	D6: Household formation rate
D2: City population	D7 Income distribution
D3: Population growth rate	D8: City product per person
D4: Woman headed households	D9: Tenure type
D5: Average household size	
1. Socioeconomic Development	**4. Environmental Management**
1: Households below poverty line	18: Wastewater treated
2: Informal employment	19: Solid waste generated
3: Hospital beds	20: Disposal methods for solid waste
4: Child mortality	21: Regular solid-waste collection
5: Life expectancy at birth	22: Housing destroyed
6: Adult literacy rate	
7: School enrollment rates	
8: School classrooms	
9: Crime rates	
2. Infrastructure	**5. Local Government**
10: Household connection levels	23: Major sources of income
11: Access to potable water	24: Per-capita capital expenditure
12: Consumption of water	25: Debt service charge
13: Median price of water	26: Local government employees
	27: Wages in the budget
	28: Contracted recurrent expenditure ratio
	29: Government level providing services
	30: Control higher levels of government
3. Transport	**6. Housing**
14: Modal split	31: House price to income ratio
15: Travel time	32: House rent to income ratio
16: Expenditure on road infrastructure	33: Floor area per person
17: Automobile ownership	34: Permanent structures
	35: Housing in compliance
	36: Land development multiplier
	37: Infrastructure expenditure
	38: Mortgage to credit ratio
	39: Housing production
	40: Housing investment

Source:

UNCHS, 1997 (http://www.unhabitata.org/guo/intro.htm).

Table 6.6: List of Key Indicators, UNCHS Urban Indicators Programme

Background data	
D1: Land use D2: City population D3: Population growth rate D4: Woman headed households D5: Average household size	D6: Household formation rate DT Income distribution D8: City product per person D9: Tenure type
1. Socioeconomic Development 1: Households below poverty line 2: Informal employment 3: Hospital beds 4: Child mortality 5: Life expectancy at birth 6: Adult literacy rate 7: School enrollment rates 8: School classrooms 9: Crime rates	**4. Environmental Management** 18: Wastewater treated 19: Solid waste generated 20: Disposal methods for solid waste 21: Regular solid-waste collection 22: Housing destroyed
2. Infrastructure 10: Household connection levels 11: Access to potable water 12: Consumption of water 13: Median price of water	**5. Local Government** 23: Major sources of income 24: Per-capita capital expenditure 25: Debt service charge 26: Local government employees 27: Wages in the budget 28: Contracted recurrent expenditure ratio 29: Government level providing services 30: Control b higher levels of over ancnt
3. Transport 14: Modal split 15: Travel time 16: Expenditure on road infrastructure 17: Automobile ownership	**6. Housing** 31: House price to income ratio 32: House rent to income ratio 33: Floor area per person 34: Permanent structures 35: Housing in compliance 36: Land development multiplier 37: Infrastructure expenditure 38: Mortgage to credit ratio 39: Housing production 40: Housing investment

Source:

UNCHS, 1997 (http://www.unhabitata.org/guo/intro.htm)..

Table 6.7: Extensive List of Urban Indicators, UNCHS Urban Indicators Programme:

Background Data
Indicator DA1 Birth and death rates
Indicator DA2: Migration rates
Indicator DA3: Household type
Indicator DA4: Household expenditures
Indicator DA5: Dwelling type

Module 1 - Socioeconomic Development

POVERTY
Indicator Al. Illiteracy of poor
Indicator A2: Daily kilojoule supply of poor
Indicator A3: Malnourished children under five
Indicator A4: Social safety net

EMPLOYMENT
hidicator A5: Unemployment rates by sex
Indicator A6: Employment growth
Indicator A7 Child labour
Indicator A8: Minimum wage coverage

PRODUCTIVITY
Indicator A9: City investment
Indicator A10: Airport activity

HEALTH AND EDUCATION
Indicator A11 : Expenditure on social services
Indicator A12: Life expectancy at birth
Indicator A13: Infectious diseases mortality
Indicator A14: School enrollment rate
Indicator A15: Adult literacy rate
Indicator A16: Tertiary graduates

SOCIAL INTEGRATION
Indicator A17: Refugees
Indicator A18: Deaths due to violence

Module 2 - Infrastructure

ACCESS AND AFFORDABILITY
Indicator A19: Cost to household income ratios

WATER
Indicator A20: Sources of water
Indicator A21: Piped water supply reliability
Indicator A22: Water leakage

SEWAGE
Indicator A23: Sewage disposal
Indicator A24: Public latrines

ELECTRICITY
Indicator A25: Electricity price
Indicator A26: Line losses
Indicator A27: Capacity to load ratio

TELEPHONE
Indicator A28: Call completion rate

INFRASTRUCTURE OPERATIONS
Indicator A29: Operating to staff ratios
Indicator A30: New connections to staff ratios
Indicator A31: Revenue to operating cost ratios

Module 3 Transport

GENERAL
Indicator A32: Transport fatalities
Indicator A33: Fuel price
Indicator A34: Transport household budget share
Indicator A35: Transport fuel consumption

ROAD INFRASTRUCTURE
hndic:ator A36: Length of road per vehicle
Indicator A37: Road congestion

ROAD VEHICLES
hndicator A38: Vehicles failing emission standards
Indicator A39: Automobile fuel consumption
Indicator A40: Pedestrians killed

PUBLIC TRANSPORT
Indicator A41: Public and mass transport seats
Indicator A42: Cost recovery from fares

Module 4. Environmental Management

AIR QUALITY
Indicator A43: Air pollution concentrations
Indicator A44: Emissions per capita
Indicator A45: Acute respiratory deaths

WATER
Indicator A46: Percent of BOD removed
Indicator A47: Cost of wastewater treatment
Indicator A48: Lowering of groundwater table
Indicator A49: Waste water recycled
Indicator A50: Level of treatment

SOLID WASTES
Indicator A51: Biodegradable waste
Indicator A52: Recycling rate
Indicator A53: Average cost of waste disposal
Indicator A54: Cost recovery
indicator A55: Industrial waste generation

RESOURCES DEPLETION
Indicator A56: Energy usage per person
Indicator A57: Fuelwood usage
Indicator A58: Renewable energy usage
indicator A59: Food consumption

DISASTER MITIGATION
Indicator A60: Disaster mortality
Indicator A61: Housing on fragile land
Indicator A62: Fatal industrial accidents

URBAN ENHANCEMENT
Indicator A63: Green space
Indicator A64: Monument list

Module 5 - **Local Government**

LOCAL FINANCE

Indicator A65: Change in real per capita total income

Indicator A66: Change in real per capita own-source

LOCAL PARTICIPATION

Indicator A67: Elected and nominated councillors

Indicator A68: Voter participation rates, by sex

Indicator A69: Number of associations per 10

Indicator A70: Citizen involvement in major planning

Indicator A71: Decentralised district units

Module 6. Housing

ACCESS TO AFFORDABLE HOUSING

Indicator A72: Mortgage affordability

Indicator A73: Excessive housing expenditure

Indicator A74: Economic share of housing

Indicator A75: Transaction costs

Indicator A76: House price appreciation.

ADEQUATE HOUSING FOR ALL

Indicator A77: Overcrowding

Indicator A78: Households per dwelling

Indicator A79: Inadequate housing IndicatorA80: Indoor plumbing

Indicator A81: Squatter housing Indicator A82: Homelessness

Indicator A83: Owner occupancy (by sex) Indicator A94: Vacant dwellings

RURAL HOUSING

Indicator A85: Rural water/electricity connection

Indicator A86: Permanent rural housing Indicator A87: Rural home ownership Indicator A88: Rural house price to income

LAND

Indicator A89: Land availability

Indicator A90: Planning permission multiplier

IndicatorA91: Formal land transactions

Indicator A92: Development time

Indicator A93: Cost recovery

Indicator A94: Minimum lot size

Indicator A95. Land development controls

FINANCE

Indicator A96: Credit to value ratio

Indicator A97: Housing loans

Indicator A98: Mortgage-to-prime difference Indicator A99: Mortgage-to-deposit difference

Indicator Al 00: Arrears rate

Indicator Al01: Mortgage loans for women

CONSTRUCTION

Indicator Al 02: Construction cost

Indicator A103: Construction time

Indicator A104: On-site productivity

Indicator Al 05: Industry concentration

Indicator A106: Employment

Indicator A107: Wage labour

TAXES AND SUBSIDIES

Indicator A108: Effective taxation rate by tenure

Indicator Al 09: Nett housing outlays by government

Indicator A 110: Property tax rate

PUBLIC HOUSING

Indicator Al 11: Public housing stock

Indicator Al 12: Privatised public stock

Indicator Al 13: Public housing production

Indicator Al 14: Social rent to income

Indicator Al 15: Waiting time

Indicator Al16: Operating subsidies.

Indicator Al17: Administrative costs

Indicator A118: Tenant management

REGULATION

Indicator Al 19: Rent control

Indicator A120: Rental eviction delay

Indicator Al21: Lease security

Indicator A 122: Evictions

Indicator A 123: Mortgage foreclosures

Indicator A124: Female property rights

showing poverty, employment, productivity, health and education, and social integration. Infrastructure contains thirteen indicators covering access and affordability, water, sewage, electricity, telephone and infrastructure operations. Environmental management is also more detailed with twenty-two indicators covering air quality, water, solid wastes, resources depletion, disaster mitigation and urban enhancement. The transport category covers road infrastructure, road vehicles and public transport using eleven indicators. Although local government itself only contains seven indicators, these cover local participation as well as local finance. The bulk of the indicators cover housing; among these fifty-three indicators, however, several are related to rural housing, to adequate housing for all, and to land, which all appear to have particular relevance for peri-urban areas.

6.10.2 Sustainable Development Indicators:

The Rio UNCED Earth Summit of 1992 recognized the importance of indicators of sustainable development. Chapter 40 of Agenda 21 calls for the development of indicators of sustainable development. The Commission on Sustainable Development, which grew out of the Earth Summit, followed up this interest and approved a work programme on the indicators of sustainable development, with the objective of making them available to decision-makers at the national level by the year 2000. While there is still no precise definition of sustainable development, indicators are thought to help show whether movements are in the right direction, and can point to trends and relationships in a concise way. They can measure progress towards pre-established targets and goals, or simply provide a picture of where things stand at a particular point in time. They can help to guide national policies for sustainable development and facilitate national reporting on measures to implement sustainable development.

By September 1996 a working list of 134 Indicators of Sustainable Development had been prepared, and a core set of indicators and related methodology sheets made available on the UN Department of Economic and Social Affairs web-site. (UNDPSD, 1997) Methodology sheets have been prepared for each indicator that include:

- *"An introduction that provides a statement of purpose, the policy relevance of the indicator and its relationship to sustainable development*
- *A methodological description of the indicators and the underlying definitions, including a short description of the indicator in relation to the framework and information on interpretation and design of the indicator*
- *An assessment of the availability of data from national and international sources; and*
- *Further readings and other references for additional information and points of contact".*

(UNPCSD, 1997)

The indicators include social, economic, environmental and institutional aspects of sustainable development, and are placed within what it termed a Driving Force-State-Response Framework.

- 'Driving Force' (or pressure) Indicators encompass human activities, processes and patterns that impact on sustainable development;
- 'State' Indicators refer to the state of sustainable development;
- **'**Response**'** Indicators highlight policy options and other responses to changes in the state of sustainable development.

The framework is a matrix that incorporates these three types of indicators horizontally, and the different dimensions of sustainable development vertically. Table 6.8 displays the chapters of the Agenda 21 report and summarises each of the three types of indicators.

Until the end of 1999, the working list of indicators is undergoing trial and error process of testing and retesting in relation to their own national priorities and interests by 21 volunteer

Table 6-8: United Nations List of Indicators of Sustainable Develonment

Chapter	Driving force indicators :	State Indicators	Response Indicators
SOCIAL			
Chapter 3: Combating poverty	• Unemployment rate	• Head count index of poverty • Poverty gap index • Squared poverty gap index • Gini index of income inequality • Ratio of average female wage to mate wage	
Chapter 5: Demographic dynamics and sustainabi6ty	• Population growth rate • Net migration rate • Total fertility rate	• Population density	
Chapter 36: Promoting education, public awareness and training	• Rate of change of school-age population • Primary school enrolment ratio (gross and net) • Secondary school enrollment ratio (gross and net) • Adult literacy rate	• Children reaching grade 5 of primary education • School life expectancy • Difference between male & female school enrolment ratios • Women per hundred men in the labour force	• GDP spent on education
Chapter 6: Protecting and promoting human health		• Basic sanitation: Percent of population with adequate excreta disposal facilities • Access to safe drinking water • Life expectancy at birth • Adequate birth weight • Infant mortality rate • Maternal mortality rate • Nutritional status of children	• Immunization against infectious childhood diseases • Contraceptive prevalence • Promotion of potentially hazardous chemicals monitored in food • National health expenditure devoted to local health care • Total national health expenditure related to GNP
Chapter 7: Promoting sustainable human settlement development	• Rate of growth of urban population • Per capita consumption of fossil fuel by motor vehicle transport • Human and economic loss due to natural disasters	• Percent of population in urban areas • Area and population of urban formal and informal settlements • Floor area per person • House price to income ratio	• Infrastructure expenditure per capita
ECONOMIC			
Chapter 2: International cooperation to accelerate sustainable development in countries and related domestic policies	• GDP per capita • Net investment share in GDP Sum of exports and imports as a percent of GDP	• Environmentally adiusted Net Domestic Product Share of manufactured goods in total merchandise exports	
Chapter 4: Changing consumption patterns	• Annual energy consumption • Share of natural-resource intensive industries in manufacturing value-added	• Proven mineral reserves • Proven fossil fuel energy reserves • Lifetime of proven energy reserves • Intensity of material use • Share of manufacturing value-added in GDP • Share of consumption of renewable energy resources	
Chapter 33: Financial resources and mechanisms	• Net resources transfer/GNP • Total ODA given or received as a percentage of GNP	• Debt/GNP • Debt service/export	• Environmental protection expenditures as % of GDP • Amount of new or additional funding for sustainable development
Chapter 34: Transfer of environmentally sound technology, cooperation and capacity-building	• Capital goods imports • Foreign direct investments	• Share of environmentally sound capital goods imports	• Technical cooperation grants

Table 6.8: (Continued): U. N. List of Indicators of Sustainable Development

Chapter	Driving force indicators :	State Indicators	Response Indicators
ENVIRONMENTAL			
Chapter 18: Protection of the quality and supply of freshwater resources	• Annual withdrawals of ground and surface water • Domestic consumption of water per capita	• Groundwater reserves • Concentration of faecal coliform in freshwater • Biochemical oxygen demand in water bodies	• Waste-water treatment coverage • Density of hydrological networks
Chapter 17: Protection of the oceans, all kinds of seas and coastal areas	• Population growth in coastal areas • Discharges of oil into coastal waters • Releases of nitrogen and phosphorus to coastal waters	• Maximum sustained yield for fisheries • Algae index	
Chapter 10: Integrated approach to the planning and management of land resources	• Land use change	• Changes in land condition	• Decentralized local-level natural resource management
Chapter 12: Managing fragile ecosystems: combating desertification and drought	• Population living below poverty line in dryland areas	• National monthly rainfall index • Satellite derived vegetation index • Land affected by desertification	
Chapter 13: Managing fragile ecosystems: sustainable mountain development	• Population change in mountain areas	• Sustainable use of natural resources in mountain areas • Welfare of mountain populations	
Chapter 14- Promoting sustainable agriculture and rural development	• Use of agricultural pesticides • Use of fertilizers • Irrigation percent of arable land • Energy use in agriculture	• Arable land per capita • Area affected by salinization and waterlogging	• Agricultural education
Chapter 11: Combating deforestation	• Wood harvesting intensity	• Forest area change	• Managed forest area ratio • Protected forest area as a percent of total forest area
Chapter 15: Conservation of biologleal diversity		Threatened species as % of total native species	• Protected area as a percent of total area
Chapter 16: Environmentally sound management of biotechnology			• R & D exp=&ture for biotechnology • Existence of national biosalety regulations or guidelines
Chapter 9: Protection of the atmosphere	• Emissions of greenhouse gases • Emissions of sulphur oxides • Emissions of nitrogen oxides • Consumption of ozone depicting substances	• Ambient concentrations of pollutants in urban areas	• Expenditure on air pollution abatement
Chapter 21: Environmentally sound management of solid waste and sewage-related issues	• Generation of industrial and municipal solid waste • Household waste disposed per capita		• Expenditure on waste management • Waste recycling and reuse • Municipal waste disposal
Chapter 19: Environmentally sound management of toxic chemicals		• Chemically induced acute poisonings	• Number of chemicals banned or severely restricted
Chapter 20: Environmentally sound management of hazardous wastes	• Generation of hazardous wastes • Imports and exports of hazardous wastes	• Area of land contaminated by hazardous wastes	• Expenditure on hazardous waste treatment
Chapter 22: Safe and environmentally sound management of radioactive wastes	• Generation of radioactive wastes		

Table 6.8: (Continued): U. N. List of Indicators of Sustainable Development

Chapter	Driving force indicators :	State Indicators	Response Indicators
INSTITUTIONAL			
Chapter 8: Integrating environment and development in decision-making			• Sustainable development strategies • Programme of integrated environmental and economic accounting • Mandated environmental impact assessment • National councils for sustainable development
Chapter 35: Science for sustainable development		• Potential scientists and engineers per million population	• Scientists and engineers engaged in R & D per million population • Expenditure on R & D as a percent of GDP
Chapter 37: National mechanisms and international cooperation for capacity-building in developing countries			
Chapter 38: International institutional arrangements			
Chapter 39: International legal instruments and mechanisms			• Ratification of global agreements • Implementation of ratified global agreements
Chapter 40: Information for decision-making		• Main telephone lines per 100 **inhabitants** • Access to information	• Programmes for national environmental statistics
Chapter 23-32: Strengthening the role of major groups			• Representation of major groups in national councils for sustainable development • Representatives of ethnic minorities and indigenous people in national councils for sustainable development • Contribution ofNGOs to sustainable development

Source:

Based on UN Commission on Sustainable Development
(http://www.un.org/esa/susdev/introduc. ind

countries to produce a set of indicators that can more accurately measure progress. These countries include the Maldives, Pakistan, The Philippines, China (Asian and Pacific Region), Ghana, South Africa, Kenya, Morocco (African Region), Austria, Belgium, UK, Germany, Finland, France, Czech Republic (Europe Region), Barbados, Brazil, Bolivia, Costa Rica, Mexico, Venezuela (Latin America and Caribbean Region). These will determine the current status of indicator use in the country, including

- which indicators are already being used within the country, by whom they are used and for what purpose; and
- a review of data already collected for indicators or other uses, by whom, where and its availability.

The working list is seen as a flexible list from which countries can choose indicators according to their national priorities, problems and targets. Consequently, countries are expected to select indicators from the working list which correspond to selected priority issues identified in the national strategy, and match the priority indicators selected with the list of indicators already in use in the country.

As might be expected, environmental indicators form the largest group with 55 indicators, 42% of the total, followed by social indicators with 39 indicators ($30^1/6$), economic with 23 or 17% of the total, and institutional with only 15 or 11%. While it can be observed from the table that many of these indicators can only relate to the national level, information on a number of the indicators could be meaningful if they could be disaggregated to a regional or local authority level. Although this is not yet the intention, changes in indicators for small areas could be used for monitoring purposes over time, or the magnitude of an indicator in a local authority or smaller area could be compared with other administrative units in similar situations.

6.10.3 Lessons for Peri-Urban Interface Research:

As its title shows, the urban indicators are being collected for cities or metropolitan regions rather than for individual local authorities. Inspections of the key indicators and the more extensive list of indicators put forward by UNCHS suggest that many of them simply do not exist for local authorities whose collection and use of data has hitherto been limited. Like other local governments, the peri-urban local authorities lack the expertise, skills and resources to assemble and analyse information, even when it is hidden in the manual files of different departments in the same administrative authority. The spread of computer technology and appropriate database or spreadsheet packages, however, mean that it is no longer unrealistic for peri-urban local authorities to hope to identify and use for their own purposes the indicators drawn from the UNCHS list of urban indicators. The local authorities in both DFID case-study city-regions might be supplied with lists of UNCHS urban indicators to encourage them to consider which indicators exist or could be estimated for their area. More importantly, the district assemblies in the Kumasi city region, and the taluks or sub-districts in the Hubli-Dharwad city-region, could be invited to consider which ones would assist them in more effective monitoring and evaluation of their planning and implementation activities. The aim should not be to participate in an international comparison, which appears to be the underlying purpose of the UNCHS indicators, however, but data should only be assembled if it does not require substantial resources. The potential benefits of providing indicators should far outweigh the costs, and could only be justified if real practical value would result. If the local authority statistical officers have sufficient resources, then the UNCHS urban indicators could provide an appropriate framework for their work.

Ambiguities exist in the definition of metropolitan areas, however. If the geographical area covered consists of blocks of local authorities, or if rural communities have been annexed into municipal boundaries solely on the basis of their contiguity, then peri-urban areas should

already be included in parts of the urban area. If Kumasi or Hubli-Dharwad have supplied information on urban indicators to UNCHS then aggregate estimates may already have covered some of the peri-urban interface there. In this case, further disaggregation to show individual villages or communities, whether they are urban or peri-urban, may provide some meaningful information on environmental or other problems existing within the urban area or city-region. Ghana, however, is particularly handicapped by the fact that the population census conducted in 1984 is now particularly out-of-date in an area with high levels of in-migration, movements within the area, and boundary changes. The Population Census of Indian was conducted in 1991, but village accountants are believed to be active in keeping other records up to date.

A number of the national sustainable indicators appear to be worthy of disaggregating down to a local authority Ievel or even for smaller communities. Information might be supplied to the local authorities to assist them in assessing whether any of the indicators would be of practical value for policy-making and monitoring purposes. The provision of a list of sustainable indicators and the methodology sheets which clarify how and why it could be used for policy purposes might provide a useful framework for performance monitoring or measuring progress towards achieving sustainability within a local authority.

6.11 Other Selected Management Issues:

6.11.1 Environmental Impact Assessment

Environmental impact assessment, potentially one of the most effective and efficient tools for environmental management, has been examined in a comparative review (Wood, 1995).

> *"Environmental impact assessment (EIA) refers to the evaluation of the effects likely to arise from a major project (or other action) significantly affecting the natural and man-made environment.*
> (Wood, 1995, p.1)

In the UK, the Department of the Environment (1988) noted that formal EIA

> *"is essentially a technique for drawing together, in a systematic way, expert qualitative assessment of a project's environmental effects, and presenting the results in a way which enables the importance of the predicted effects, and the scope for modifying or mitigating them, to be properly evaluated by the relevant decision-making body before a decision is given"*
> (DoE Circular 15/88, paragraph 7, quoted in Wood, 1995, p.1)

Wood conducted a comparative review of seven different EIA systems used in the United States, California, the United Kingdom, The Netherlands, Canada, Australia, and New - Zealand (Wood, 1995). The chapters cover each stage or aspect of the EIA process: the legal basis of EIA systems, coverage of EIA systems, consideration of alternatives in EIA systems, screening of actions, scoring of impacts, EIA report preparation, EIA report review, decision making; monitoring and auditing of actions, mitigation of impacts, consultation and participation, monitoring of EIA systems, costs and benefits of EIA systems and strategic environmental assessment. An appendix on EIA in developing countries was not based on detailed investigations of particular developing country EIA systems, but on a synopsis of relevant generalised literature (including Ahmad and Sammy 1985, Bisset 1992, Biswas and Agarwala 1992, Biswas and Geping 1987, EIA Centre 1993, Hildebrand and Cannon 1993, Kennedy 1988, McCormick 1993, OECD 1992, O'Riordan and Sewell 1981, Ortolano 1993, ODA 1992, Rayner 1993, UNEP 1988, Wilbanks et al 1993, and World Bank 1991). His brief discussion adopts a similar format to that adopted in the comparisons of the seven EIA systems in developed countries (Wood, 1995, pp.301- 308)

Very great differences between EIA systems in developing countries are noted. Many countries in Latin America and in South East Asia have developed EIA systems, while some, but not all, African countries have not done so. Some developing countries actually required EIAs to be carried out before this was a requirement in developed countries - for example, Columbia (1974) and the Philippines (1977) These are examples of EIA being undertaken successfully in many developing countries, including Brazil, China, Egypt, India, Indonesia, Malaysia, Pakistan, the Philippines, South Africa and Thailand (Biswas and Geping, 1987; Biswas and Agarwvala, 1992; Turnbull, 1992; and Hildebrand and Cannon, 1993) Wood concludes that, with some exceptions, the EIA systems in many developing countries fail to meet virtually every one of the criteria listed under eight basic principles for evaluating EIA processes:

- *"1. An effective environmental assessment process must encourage an integrated approach to the broad range of environmental considerations and be dedicated to achieving and maintaining local, national and global sustainability.*
- *2. Assessment requirements must apply clearly and automatically to planning and decision making on all undertakings that may have environmentally significant effects and implications for sustainability within or outside the legislating jurisdiction.*
- *3. Environmental assessment decision making must be aimed at identifying best options, rather than merely acceptable proposals. It must therefore require critical examination ofpurposes and comparative evaluation ofalternatives.*

- *4. Assessment requirements must be established in law and must be specific, mandatory and enforceable.*
- *5. Assessment work and decision making must be open, participative and Air.*
- *6 Terms and conditions of approvals must be enforceable, and approvals must be followed by monitoring of effects and enforcement of compliance in implementation.*
- *7 The environmental assessment process must be designed to facilitate effective implementation.*
- *& The process must include provisions for linking assessment work into a larger regime including the setting of overall biophysical and socio-economic objectives and the management and regulation of existing as well as proposed new activities. "*

(Gibson, 1993, quoted in Wood, 1995, p.10)

Although several developing countries have developed their own formal legislative bases for EIA over the past decade, the necessary organisation to enforce it is often absent. Wood attributes this to the fact that EIA has been a top-down' requirement imposed by external development assistance agencies since the 'bottom-up' pressures for environmental controls and the organisational capacity to implement them are often absent in developing countries. Grassroots pressures for environmental concerns are often missing. Politicians have little enthusiasm for environmental issues and give low political priority to the environment in general and to EIA in particular. As a result, fewer EIAs are undertaken than legal and other requirements would seem to indicate. Also most EIAs appear to have been a function of justifying a decision which has been made and are concerned only with remedial measures. Alternative courses of action are rarely considered at an early stage of the project cycle in order to select the most environmentally favourable action. Rayner has been quoted as concluding that

> *"For the Third World, EIA remains, at best, a Band-Aid to mitigate the worst consequences of rapid industrial development because it is wealth, not legislation, that leads to indigenous demands jor clean energy, stable populations, and stewardship of the land and water. "*

(Rayner, 1993, p.678, quoted in Wood, 1995, p.302)

1) Legal Basis:

In many developing countries, *"the legal basis of EIA systems may be weak, non-mandatory or non-existent"* (Wood, 1995, p.302), and the appropriate institutional framework is lacking since organisations responsible for EIA are often new, lack status and influence due to the unwillingness of others to share information. Other, more powerful ministries bypass the Environment ministries, which are consequently not given adequate powers or resources to acquire new or existing environmental information.

2) Coverage:

The impacts assessed, as well as the projects covered, are patchy, according to Woods. Often only externally-assisted projects are covered due to the top-down nature of EIA requirements in many developing countries, and not all types of action with the potential to cause local environmental damage are being considered. Positive impacts, not just the negative ones, and social impacts as well as environmental impacts need to be included in the EIAs.

3) Consideration of Alternatives:

This is seen as being weak in many developing country EIAs which fail to lead to more sustainable developments. The no-action alternative is rarely considered, and environmentally preferable alternatives, which minimises damage to the environment or involve mitigation measures, may also not be considered**.**

4) Screening: Simple and effective screening systems are often not in place in developing countries. Simplified EIA procedures might be more appropriate for certain types of projects.

5) Scoping:
Although the World Bank now demands scoping for its projects, this important step, which involves initially determining the coverage of an EIA, perhaps as part of a public consultation exercise, is generally missing in developing countries.

6) Report Preparation:
The preparation of inadequate and irrelevent EIA reports often stem from the lack of trained and experienced manpower and insufficient financial resources. Capacity building and training are needed to create local centres of EIA expertise. Multidisciplinary, practically-oriented, in-country training courses, open to personnel in environmental consultancies and research institutes as well as government officials, are needed which focus on practical and operational aspects of EIA not on its theory.

Environmental assumptions, models and standards from temperate areas are often inappropriately imported for application to tropical or semi-tropical areas. Wood quotes Biswas as blaming inappropriate methodologies for EIA reports which are "too academic, bureaucratic, mechanistic and voluminous" (Biswas, 1992, p.240). The problem is not that guides do not exist. The United Nations Environmental Programme has issued guidance on EIA is developing countries (UNEP, 1988). The World Bank also expects that EIA should normally be undertaken by a borrower country under the Bank's supervision, and has prepared a sourcebook on EIA. (World Bank, 1991) The Overseas Development Administration (1992), OECD (1992), and the Commission of the European Communities (1993) have also produced valuable guides aimed at developing countries. Users often fail to apply methodologies, techniques and standards selected to fit into UNEP's five simple and most important principles:

- *"Focus on the main issues;*
- *Involve the appropriate persons and groups;*
- *Link information to decisions about the project;*
- *Present clear options for the mitigation of impacts and for sound environmental management;*
- *Provide information in a form useful to the decision makers. "*

(UNEP, 1988, quoted in Wood, 1995, p.304)

Baseline socio-economic and environmental data may be inaccurate, difficult to obtain or non-existent for many developing countries. Often the real problem is poor or non-existent data retrieval and management systems, inter-ministerial and/or inter-institutional rivalry, or unnecessary classification of data as secret or confidential. Again the solution is seen as providing training, but also personal motivation and public pressure to release data sources.

The significance attached to particular environmental impacts are frequently not adjusted to take into account the different cultural effects in developing countries. It is suggested that the use of indigenous experts to undertake EIAs and the participation of local people in the EIA process will not overcome this problem but could also help in providing baseline environmental data.

7) Review:
This stage often appears to be missing. EIA reports are often voluminous, indigestible documents, which are not focused enough or simple and easy to use . They are frequently

kept as confidential reports, with only a limited number of copies, which are difficult to obtain for peer and public review.

8) Decision making:
Projects appraised by governments in developing countries using EIA are frequently closed to external scrutiny, and decisions may be influenced more by economic and social factors, or even by corruption. Too often, mechanistic EIA reports are found to have little or no effect on decisions. There is not only an unwillingness to integrate EIA into project planning or into decision making, but also the EIA process itself becomes secretive. Woods feels the problem of top-down EIA could be partially overcome by a real commitment by leaders to use EIAs in decision making, brought about if the EIA system responds to their needs and is designed and implemented by their own nationals. Development assistance agencies could take the lead in overcoming the secrecy by publicising the way in which EIA influenced their own decisions, promoting coordination or sharing of EIA information, or relating further aid to EIA performance.

9) Monitoring:
As in developed countries, monitoring is absent in developing countries. Changes in approved projects may take place during implementation, and environmental controls may not be observed or monitored. Appropriate compliance monitoring and post-auditing of the impacts of completed projects are urgently needed.

10) Mitigation:
This is rarely considered during the EIA process and is implemented in fewer cases. There is little opportunity for changes to be made to previously designed projects, and mitigation is frequently regarded as an after-thought. Remedying this deficiency is again dependent on the development assistance agencies and government departments insisting that adequate mitigation measures are included in EIA reports, and their implementation is enforced.

11) Consultation and Participation:
In many developing countries there is no overall tradition of consultation and participation, and this is often *made* worse by the *lack* of knowledge about EIA, the confidentiality of EIA reports, and low levels of literacy. Public consultation methods are needed, perhaps through the establishment of environmental pressure groups or the active involvement of local universities and research establishments in EIA, perhaps with targeted overseas funding.

12) EIA System Monitoring:
There are currently few cases in developing countries, and generally little interest in reviewing the operation of the EIA system,. This is not surprising since there is little information made available about EIAs, and the reports are not widely available. Motivation and external pressure will need to be added to changes expected with the expansion of EIA organisational capacity and regulatory requirements.

13) Costs and Benefits:
The advantages of EIA are not yet accepted, and many countries feel that EIA is not cost-effective due to the financial resources required, and other costs imposed through delays, lack of expertise, lack of data and confidentiality.

14) Strategic environmental assessment:
Although generating considerable interest in its application, particularly for regional development plans and land use plans for developing areas, very little experience is found in developing countries

Wood calls for a database on EIA regulations, organisations and experience in developing countries to be made available to help developing countries in preparing their EIA legislation

and adapting already existing examples to suit their needs. This would also aid communication between environmental agencies in developing countries. Countries receiving development aid have often been able to get away with token compliance. It is felt that aid - agencies have been slow to impose EIA requirements on aid recipients, and even slower to enforce consistently nontrivial compliance.

6.11.2 Decentralisation and Jurisdictional Complexity:

Two common elements underlie all the management approaches which have been reviewed. Firstly, all emphasise the vital importance of coordination and integration of agencies and other stakeholders m environmental management. Secondly, all stress the need for local decision-making and involving the communities themselves in planning and implementing environmental actions.

Particular difficulties are encountered within the peri-urban interface of many cities in developing countries since environmental problems cut across political and administrative boundaries, making effective environmental management more difficult. The causes and effects of environmental problems in and around cities spread across jurisdictions as well as across sectors, creating additional barriers to the task of coordinating actions. Cross-jurisdictional conflicts create additional managerial complexity in peri-urban areas.
Leitmann's comments on urban environmental problems seem particularly applicable to many peri-urban areas:

> *"there is often little relationship between the spatial scale or nature of urban environmental problems and the design of institutions or policies. More often than not, administrative and political jurisdictions do not correspond with ecosystem boundaries or ecological zones. Thus, the processes of planning and implementation can only address partial aspects of environmental problems".*
> (Leitmann, 1994a, p.35)

Although cross-sectoral and cross jurisdictional coordination is essential, attempts to deal with environmental issues in and around urban areas are frequently piecemeal and compartmentalized. These problems tend to grow m scope as cities expand. Negotiating cross jurisdictional solutions often involve tough political choices. Jurisdictional complexity in urban and peri-urban areas *"results in part from the multiplicity of actors with overlapping, uncoordinated, or poorly defined responsibilities in environmental management. These actors include national and regional sector agencies, state or provincial governments, and competing local governments".* (Leitmann, 1994a, p.22) Jurisdictional conflicts, both across levels of government and between municipalities in metropolitan areas, often impede- effective action, or give rise to crucial gaps in prevention and control efforts... As Bartone et al noted, *"because environmental problems cut across political boundaries, institutional arrangements and responsibilities need to be clearly delineated".* (Bartone et al**,** 1994, p.51)
They are also aware, however, that coordination and integration within and between local authorities or other agencies is not a substitute for good environmental planning and management within each of the sectoral agencies. *"Although a comprehensive approach to urban environmental management is required for maximum effectiveness and protection, each cross-sectoral agency will still need to carry out its own planning, management and operations".* (Barton et al, 1994, p.52) They then briefly outline issues affecting urban water supply and sanitation, storm water drainage, municipal solid waste management, urban

transport management, urban land management, and the management tools for carrying out these strategies. This list could be extended to other agencies concerned with natural resource management, such as agriculture, forestry.

Local authorities in peri-urban areas tend to have access to fewer resources and be less well-equipped to tackle environmental problems than the central city, leading to sensitivities and

tensions. Peri-urban areas seem particularly prone to the general weaknesses associated with inadequate governance, noted by the Urban Management Programme team:

> *"Inadequate governance (where 'governance refers to the exercise and sharing of power) is a principal constraint to effective urban environmental management. In most developing country cities, metropolitan and municipal governments lack the institutional capacity to carry out effective environmental planning and management and to routinely provide effective urban services. Other key impediments to effective governance include poor coordination when public responsibilities of different levels of government overlap, and the failure of most governments to provide adequate public education or include community and private sector participation in the design, planning, and/or implementation of environmental services".*
> (Bartone et al, 1994, p.33)

Efforts to improve environmental conditions are hampered by weak jurisdictional capacity, which often results in unclear planning and operational responsibilities and poorly executed environmental and other programmes by the local authority and other agencies. In many countries, separate sector agencies plan for, and provide, individual environmental services, but coordination between agencies is inadequate. These jurisdictional conflicts and weaknesses in capacities can be partially resolved, however, by concentrating environmental planning and management strategies at the city-region scale. Addressing environmental problems at this spatial scale would help overcome many of the particular difficulties facing agencies concerned with peri-urban areas, and help foster the required coordination and integration of activities.

Another common underlying theme is the need for decentralization since all the management approaches reviewed stress the vital importance of local and participatory decision-making. Decentralisation is a recurring theme, included, for example, in UNDP documents concerned with future urban development (UNDP, 1991), governance and sustainable human development (UNDP, 1995d) and concepts of governance (UNDP, 1997b). These discussions draw on what are still seen as the standard texts in the, literature (Rondinelli, Nellis and Cheema, 1983, and Cheema and Rondinelli, 1983). Manor (1997) and Parker (1995) have added to the discussions on the arguments for and against decentralisation.

In 1991, it was noted that priority had been given to central governments after independence, widening the gap in capacities between central agencies and municipal governments. *"Today, municipalities are plagued by inefficient organizational structures and operating procedures; they lack clear legal authority and are short of skilled personnel"* (UNDP, 1991, p.62). Raising municipal capacities through meeting the substantial training needs of municipal officials was seen as a priority since

> *"Local government officials can often plan investments in services and infrastructure more responsibly because they have greater knowledge. They can monitor disruptions and deterioration more readily, provide closer supervision of service delivery and create the enabling conditions necessary for private and non-governmental organizations to participate in service provision. For some basic services, such as waste collection and disposal, there are almost no economies of scale for districts with more than 50,000 people."*
> (UNDP, 1991, p.63)

By 1995, the justification for decentralisation had moved beyond simply strengthening administrative capacities, into more political arguments for decentralisation, in which high levels of involvement and participation by ordinary people, brought about by decentralisation, plus institutions of the civil society, are seen as conducive to sustainable human development.

> *"Decentralisation is an important means for allowing people to influence their own destiny. Increasing local participation in decision-making can make government more immediately transparent and accountable. Decentralisation can result in more efficient use of resources because projects that are locally conceived and implemented are more likely to meet local needs and are subject to local control.*

> *Importantly, decentralisation can provide a conducive setting for the emergence of NGOs and voluntary activities. It can improve economic participation by encouraging local entrepreneurship and can reduce disparities between regions as long as central governments are prepared to devise formulae for the redistribution of tax revenues. But effective decentralisation is dependent mostly on the reform of existing power structures. Elites must be prepared to relinquish power otherwise decentralisation will simply reinforce their position at the expense of the people.* (UNDP, 1995d, p.80)

Political commitment by the leadership and the *consensus* of the population are seen as the two most crucial prerequisites for decentralisation (UNDP, 1995d, p.84). Following *on* from the earlier, more detailed discussions (Rondinelli, Nellis and Cheema, 1983, Cheema and Rondinelli, 1983), the important conditions for the successful introduction of decentralisation: are summarised (UNDP, 19954, p.85) as:

- A strong national identity must exist, which instills confidence that the nation will endure whatever the power balance.
- Political commitment must be reflected in the diffusion of human and economic resources to the periphery in order to sustain decentralisation.
- Clarity is essential for establishing decentralisation goals and for building up a sense of direction and purpose
- Decentralisation arrangements must be clearly defined on the basis of sound, transparent criteria that set out the roles and responsibilities of different levels of government and the other parties concerned.
- Success depends on having qualified and highly capable leaders and managers to implement the decentralisation strategy chosen. These individuals must have integrity, patience, caution, and consistency and should be prepared to manage in ways that are accountable and transparent.

Out of the three broad types of decentralisation frequently identified in the literature (Cheema and Rondinelli, 1983), administrative deconcentration is the most common form. This

> *"involves the assignment of central ministry or government functions to branch offices or units in outlying areas. In effect, deconcentration extends central government tentacles to the periphery by creating sub-units of government and allocating to them central government functions. This form of decentralisation does not encourage the development of autonomous local governments and makes little allowance for horizontal integration at the local level".*
> (UNDP, 1995d, p. 80)

Authority, responsibility and financial resources for public services are redistributed among different levels of government. Rondinelli, Nellis and Cheema, (1983) defined this as: *"the transfer of responsibility for planning, management, and the raising and allocation of resources from the central government and its agencies to field units of government agencies, subordinate units or levels of government or semi-autonomous public authorities or corporation, area-wide, regional or functional authorities"* (Rondinelli, Nellis and Cheema, 1983, quoted in UNDP, 1995d, pp.33-34)

Delegation. the second approach, entails the transfer of responsibility for specified functions and associated authority to an organisation outside or indirectly controlled by government. This is frequently seen as a means to improve the quality of key services and of removing them from the reach of patronage within government (UNDP, 1995d, pp.80-81)

Devolution is the third broad approach to decentralisation, but *"there is little evidence of full devolution in many developing countries"*. (UNDP, 1995d, pp.80-81). Devolution means establishing or strengthening sub-national units of government that are largely independent of central government control and that have broad authority for operations across sectors.

(UNDP, 1997b, p.34). Handing over powers to strengthened local governments is the most obvious form of devolution, and according to a checklist of factors drawn up by Silverman, (1992), the circumstances most conducive to devolution include a need for

> • *"Localised decision-making, owing to unusual characteristics associated with the site of project implementation*
> • *Issues that have local significance only*
> • *Issues that are not susceptible to significant economies of scale*
> • *A rapid response*
> • *Issues that are labour-intensive rather than capital-intensive and are not technically complex*
> • *Issues that require integration of activities across sectors within a local area* • *Participation on the part of the community*
> • *Issues that are small-scale and labour-intensive*
> • *Issues that are amenable to contracting out to private enterprise and/or do not require much support from government*
>
> (UNDP, 1995d, p.82)

Ambiguities still exist in the interpretation of decentralisation. Some interpret true decentralization as devolution to the local government level from central or regional authorities, but increasingly it is seen that local authorities themselves need to decentralize their own activities down to a community or neighbourhood level.

6.11.3 Lessons for Peri-urban Research:

Environmental impact assessment is a technique which offers great promise, both for identifying damaging impacts of development activities which affect the peri-urban interface of cities in developing countries, as well as for proposing mitigating remedies. The reality, however, is that environmental impact assessments in developing countries have generally been disappointing. Evaluations of the EIA processes suggest that in most developing countries, the procedures adopted and the institutions involved have failed to meet the criteria required to be effective. Research might be tailored towards identifying the reasons why EIA is not a more effective technique for environmental management in peri-urban areas, and what is required to enable EIA to play its proper role in environmental protection and conservation. Even if these difficulties cannot be overcome in the short-term, however, the provision of baseline information should be built up for use in future environmental impact assessments. On-going programmes of regular monitoring of pollution in peri-urban areas by environmental protection agencies should be encouraged since this would also enable sources of pollution to be identified, and permit appropriate measures to be taken.

Industrial estates or large-scale industrial projects are increasingly proposed for the edges of built-up urban areas or for greenfield sites in peri-urban areas, where sufficient space is available. Planned urban expansions, or unplanned squatter housing areas, also encroach on peri-urban areas, or have direct and indirect impacts on the use of renewable natural resources for much wider areas of the peri-urban interface. The requirements for undertaking environmental impact assessments should certainly include these situations. However, in many cases the developer will actually be a public sector agency, such as the local authority itself, so the EIA will be submitted to another public agency responsible for planning or *for* protecting the environment. In effect, the agency may be responsible for policing itself, leading to inter-departmental or inter-agency disputes which undermine the search for improved policy coordination and integration. The solution might be for sufficient trained manpower and other resources to be provided so that the planning system can engage in long-term forward planning activities and be more proactive instead of giving priority to development control activities and being reactive. These development plans will need to

focus on the city region scale so that all areas of long-term future development can be included. As important, however, such a spatial scale will enable the environmental needs of the peri-urban interface to be taken into account more adequately. The best farming areas could be protected and form areas of constraints to urban development, inter-relationships between renewable natural resources and pollution or energy sources could be covered, and poverty *and* livelihoods could be examined in peri-urban areas as well as existing built-up areas.

The causes of environmental problems in peri-urban areas frequently stem from within the built-up areas, such as on existing industrial sites where changed industrial processes or practices occur, or where population densities have increased in residential areas. As new project proposals or planning applications would not take place, however, there would be no scope for environmental impact assessments to be undertaken. The major handicap to the increased use of environmental impact assessments in urban or peri-urban areas is that urban developments are the result of gradual changes through very many small-scale developments, none of which would be sufficient to initiate environmental impact assessment procedures.

Planning systems in most developing countries tends to give priority to solving the urgent needs to accommodate rapidly-growing urban populations, neglecting to properly assess the implications of urbanisation on the activities and resource-requirements of the peri-urban and rural areas. Assistance is needed into assessing the advantages and limitations of specific planning policies designed to protect the environment, such as the creation of green belts or green wedges. Research is needed into methods which might help reduce some of the harmful effects of urban sprawl, such as the concentration of urban activities on environmentally-acceptable sites or the promotion of small towns

The lesson from the examination of jurisdictional complexity reinforces the need for planning and environmental management to be undertaken at the city region scale. The nature of the peri-urban' interface means that it- is difficult to confine attention to these areas alone. As the peri-urban interface is a dynamic zone of transition, which changes over time as cities expand, some parts of the peri-urban interface may be included within the city, or in the metropolitan area. Pen'-urban areas are almost invariably subject to great jurisdictional complexity, since they are managed by several local authorities. The city itself is often better-resourced than the neighbouring local authorities, giving rise to jurisdictional conflicts.

The inner edge of the rural-urban fringe may be adjacent to built-up areas within the urban area, so is likely to be included within the administrative boundaries of the city proper. Open spaces, earmarked for recreation or for future public sector, uses, and green wedges, left as floodplains of streams, or even roadsides, may be utilized for the cultivation of crops or for grazing of livestock by particular groups. Households in low density housing areas with access to sufficient land may also engage in kitchen gardening. Others may engage in livestock fanning, either with stall-fed animals on their properties, or by allowing animals to roam within the city. As the city spreads, however, administrative boundaries may not be adjusted quickly enough, and ribbon development along the main roads, or pockets of housing or other non-farm activities, extend beyond the urban boundaries. While the outer boundary of the peri-urban interface becomes blurred and is difficult to identify with any great certainty, it is clear that for large cities the area linked to the city, through daily journey-towork or commuting patterns, or as part of its daily 'foodshed', extends for considerable distances.

Both DFID peri-urban interface research projects in Kumasi and Hubli-Dharwad have conducted their initial investigations at the city-region scale. Care needs to be taken, however, to ensure that research relating to environmental planning and management are applicable at this city-region scale, and undue priority is not given to small-scale or village case-studies which may not necessarily be applicable to this wider scale.

The implication of decentralisation for the peri-urban interface is that environmental planning and management will be more complicated. In addition to central and regional government institutions, the city region will be divided among more competing local authorities. Since the environmental issues are not confined to these artificial boundaries, any environmental planning and management will need to bring together stakeholders in all these areas in order for the necessary coordination and integration to take place. The sectoral divisions, already present when a single metropolitan authority is involved, are also duplicated, so planning and management becomes a more ambitious undertaking. Research becomes necessary into these multi-agency inter-relationships and their formal and informal linkages to identify potential blockages. An initial prerequisite is to facilitate exchanges of information among the different agencies and stakeholders to avoid unnecessary duplications or gaps in the planning and policy-making processes. Analyses ought to be conducted at as fine a spatial breakdown as possible, so that all villages and neighbourhoods can be compared. The use of a geographical information system should permit spatial variations in problems, needs and activities to be compared, forming a potentially useful practical tool for environmental planning and management.

CONCLUSIONS:

GAPS IN INFORMATION

AND

RESEARCH RECOMMENDATIONS

7. CONCLUSIONS: GAPS IN INFORMATION AND RECOMMENDATIONS FOR FURTHER RESEARCH

7.1 The review of Conceptual Issues in Part 1 has confirmed the lack of attention given directly to peri-urban areas of developing countries. Theories are generally somewhat outdated and add limited understanding to the current dynamic processes of change in the peri-urban interface. A somewhat artificial distinction into rural topics and urban topics tends to have led to the neglect of issues affecting the peri-urban interface. Many of the general environmental and ecological processes tend to be relatively familiar from other production systems, .so the emphasis has been placed on bringing together material covering the urban dimension. Some of the issues identified are similar in kind but not degree to those facing rural development practitioners. Often, the technical solutions to problems may be known, but weaknesses in organisation and management are found in putting these ideas into practice. A series of lessons have been noted for peri-urban interface research or management at the end of each section in Part 2 on Management Approaches. These are brought together in a summary form in Table 7.1.

7.2 It is suggested that firture research might consider the merits of adopting an Action Research approach. This might aim to foster the application of the strategic, participatory local governance approach to environmental planning and management, developed by the World Bank and the UN. agencies, international associations, or other bilateral aid agencies. This work should be demand-led, with the objective of initiating practical development projects by the beneficiary communities themselves. The research component would involve observing the activities and interactions of the various actors, but investigations might also be conducted to help resolve queries or problems raised by the stakeholders themselves, with an emphasis on providing appropriate technical and managerial advice or training.

The two existing case study city-regions of Kumasi and Hubli-Dharwad might benefit from setting the research within an overall framework offered by the strategic environmental planning and management approach. Both case study teams in Ghana and India have actually emphasized the consultation process with stakeholders, and have worked very closely with local researchers. Workshops or other disseminsation activities are unlikely to initiate a community-wide environmental forum able to agree environmental priorities, or lead on to the local organization of active issue-specific working groups, or result in the implementation of coordinated stakeholder action plans. More work will be required to convert research findings into development projects to solve environmental and other problems. Workshops for stakeholders and the local research community were initially convened in both cities. In the case of Kumasi, this preceded the baseline survey phase, but appear to have raised as yet-unfulfilled interest and expectations among the stakeholders, even though efforts have been made to disseminate research activities and findings to them. In Hubli-Dharwad, baseline survey results were presented to a Workshop, but this generated only relatively limited interest among NGOs or community groups in Hubli-Dharwad. The consultation process appears to have been only partial. Both research teams have been handicapped by the absence of comprehensive lists of contact points or information about recent activities or interests of grassroots formal and informal community organisations, NGOs who might wish to be involved, or pressure groups. Based on experiences noted elsewhere, the active participation of the private and voluntary sectors in the preparation of city-region and community environmental profiles would be an important first step towards a comprehensive meeting of all stakeholders. This would be expected to lead to the convening of a city-region environmental forum able to continue the environmental planning and management process in partnership with public sector institutions and the local research community.

Table 7.1: Summary of suggestions for Research and Management

1. Revise PUI Production System Log-frame (Section 6.2.4)
2. Gather data on low income communities (6.2.4)
3. Link health effects with environmental conditions (6.2.4)
4. Prepare Environmental profiles (6.2.4)
5. Foster the local consultative process (6.2.4)
6. Examine environmental problems created by poverty (6.2.4)
7. Place stress on livelihoods studies (6.2.4)
8. Focus on city region scale, with regional impacts and spatial breakdowns into PUI and other areas (6.2.4)
9. EPM to develop more effective or efficient urban/peri-urban linkages (6.2.4)
10. Disaggregation to produce small-area environmental profiles (6.2.4)
11. Initial step of consultation process to identify peri-urban environmental, poverty-related or RNR problems (6.2.4)
12. Increase understanding of public-private partnerships, & activities of community-based organisations (64.2)
13. Analyse urban areas as well as peri-urban interface areas (6.2.4)
14. Make use of GIS to display and analyse information from different agencies (6.3. 1)
15. Involve stakeholders more fully in community participation & a partnership approach (6.3. 1)
16. Data collection and mapping to focus on urban environmental profile for use in consultation process (6.3. 1)
17. Identify specific locations of environmental problems (6.4.6)
18. Add renewable natural resource issues to the brown agenda bias of EPM (6.4.6)
19. Circulate EPM Guidebook to stakeholders (64.6)
20. Stakeholders to specify research gaps and information needs (6.4.6)
21. Promote partnerships, and provide technical support and training of local counterparts (6.4.6)
22. Promote sustainability through local self-sufficiency to reduce transport costs (6.5.2)
23. Determine impact of changing economic activities for PUI as well as urban areas (6.5.2)
24. Case study cities to participate in Sustainable Cities Programme (6.5.2)
25. Collaborate with other DFID Divisions (6.5.2)
26. Examine PUI of smaller secondary cities within metropolitan areas (6.6.2)
27. Tackle PUI environmental problems in low income areas using community-based demonstration projects (6.6.2)
28. Circulate GTZ lists of environmental problems to initiate consultation process (6.7.6)
29. Provide training courses for stakeholders (6.7.6)
30. Circulate material on practical examples from elsewhere in country, with contact points (6.7.6)
31. Demand led research, according to community's own priorities and needs (6.7.6)
32. Disaggregation of EPM process to villages and neighbourhoods (6.8.6)
33. Synthesis of local knowledge before conducting technical assessments (6.8.6)
34. Circulate sample worksheets from ICLEI Planning Guide (6.8.6)
35. Add RNR issues to ICLEI EPM approach aimed at service providers and users (6.8.6)
36. Add jobs and incomes to environmental issues and services (6.8.6)
37. Incorporate the needs of in-migrants & indigenous families shifting to non-farm activities (6.8.6)
38. Adopt LIFE approach through technical advice & small grants to locally-identified environmental projects (6.9.2)
39. Refocus to facilitate participatory local governance EPM methods (6.9.2)
40. Involve all stakeholders, & provide technical & management advice for local environmental projects (6.9.2)
41. Estimate impacts, costs & benefits, & technical feasibility of local partnership projects proposals (6.9.2)
42. Assist assembly & analysis of information from other department by local policy-makers (6.10,3)
43. Circulate lists of urban indicators for use in policy formulation & performance monitoring (6.10.3)
44. Circulate lists of sustainable indicators for policy formulation & performance monitoring (6.10.3)
45. Examine why EIA still an ineffective technique for environmental management in PUI (6.11.3)
46. , Assemble baseline information for use in future EIAs in PUI areas (6.11.3)
47. Regular monitoring of pollution to identify sources of pollution & suggest remedies (6.11.3)
48. Facilitate more proactive long-tern, forward planning (6.11.3)
49. Analyse the impacts of gradual changes in urban areas on PUI areas (6.11.3)
50. Assess advantages & limitations of specific proposed planning policies (6.11.3)
51. Identify methods to reduce harmful effects of urban sprawl (6.11.3)
52. Undertake research at city-region scale (6.11.3)
53. Focus on EPM without undue priority to small-scale or village case studies (6.11.3)
54. Investigate multi-agency inter-relationships & linkages (6.11.3)
55. Facilitate exchanges of information among agencies & stakeholders (6.11.3)
56. Develop GIS as a potentially useful practical tool for EPM (6.11.3

7.4 Closer linkages of peri-urban research to development projects appear to be necessary for meeting the needs of target groups, the ultimate research beneficiaries. These not only need to be planned with full participation by the communities *and* other stakeholders themselves, but also requires their active involvement in implementation. The achievement of this objective would involve closer consultation and collaboration with the DFID Country Desk advisors, as well as with DFID Divisions to identify common objectives and priorities. Attention, however, should focus on examining environmental and other problems, both within cities as well as within the peri-urban interface areas covering the rest of a city region. Many of the causes of economic stress and environmental degradation will affect neighbourhoods within the built-up urban areas as well as in more distant villages or communities in the rural-urban fringes surrounding the city. Consequently, it would be sensible to encourage a community forum to cover these specific issues and bring together representatives of stakeholders from all parts of a city region. This will not only enable common interests or inter-related aspects to be covered, but will also provide the necessary political commitment, support and organisation for on-going activities. This will ultimately involve broadening out the focus of attention beyond environmental issues into a consideration of the sustainability of the city region. As already noted earlier for other multilateral aid agency programmes, environmental concerns can be the initial entry-point before poverty-related employment or income issues, or infrastructure needs, etc. can be examined. The ultimate concern needs to be how to identify the best means that policy-makers or planners can adopt to protect the interests of particular groups, facilitate adjustments, and resolve land use and other disputes in all areas, including the peri-urban areas.

7.5 In marked contrast to the DFID Peri-Urban Interface Production System Research Programme, some internationally-funded studies have given little prominence to renewable natural resource issues in their focus on urban environmental concerns. At best, these issues are only indirectly addressed as part of a concern with existing urban areas. Geographical boundaries around cities are drawn too tightly to address long-term future considerations and greater spatial disaggregations within the urban areas are also needed. Reliance on existing sources of information rather than conducting brief research investigations also represent pitfalls to be avoided. On the other hand, the brown agenda priorities of the communities involved in the urban environmental planning *and* management process are not yet reflected in the peri-urban interface production system outputs. Although there is some awareness of the problems created by environmental degradation, and hence a link to the brown agenda issues addressed by the international studies, the DFID emphasis is on current problems faced by farmers or other renewable natural resource users. Urban waste is seen as a potential productive resource for farmers rather than as landfill or a cause of environmental degradation. Future problems arising from current inadequate investment in environmental services in peri-urban areas is perhaps seen as a future problem, a failure to plan for or meet the needs of growing populations in peri-urban areas. Access to adequate environmental services, as well as other infrastructure facilities and services like education or health, appear to be concerns of pen'-urban residents, yet these concerns are gaps not being adequately addressed in the research programme.

A related issue, not yet addressed by the research programme, is how far do peri-urban interface residents currently suffer from brown agenda issues? An examination of environmental health problems might also help identify how these difficulties can be resolved. Often the causes of environmental degradation may result from industrial or residential areas within the cities, but they may result from changed practices or activities within the peri-urban communities themselves. These could include the breakdown of traditional environmental management practices, such as maintaining village waste dumps, domestic water extraction points, or personal hygiene or nutritional practices, etc. Studies are needed into whether such agricultural intensification measures as the increased use of more

inorganic chemical fertilizers or pesticides have led to health hazards or environmental degradation in peri-urban communities.

7.6 Additional city regions, covering a range of countries and different sizes, need to be examined so that lessons and experiences can be shared, and good practices or pitfalls to be avoided can be observed and publicized. International networks already exist, based on the work of the Urban Management Programme of the World Bank/UNDPIUNCHS, the UNCHS Sustainable Cities Programme, the Metropolitan Environmental Improvement Programme, the UNDP LIFE Programme, and the International Council on Local Environmental Initiatives and other organisations. DFID funding might be provided to enable other selected cities to adopt similar environmental planning and management approaches. These studies might be designed to identify similarities in problems and contrast the differences between large megacities and small cities.

7.7 A significant gap in knowledge exists on the problem of landlessness within the periurban interface. Some commentators have argued that urbanisation actually relieves rural pressures, but more information is needed on who is involved in the changes in peri-urban areas. It is still not yet clear if the pressures for land use changes within peri-urban areas stems from in-migration from more distant rural areas. Peri-urban areas may be more familiar environments for the rural migrants than the built-up urban areas, or the cost or rental price of land or housing may simply be cheaper there than within the city. Changes may also result from some or all of the indigenous families choosing to engage in non-farm activities, perhaps by commuting to work in the nearby city. The pressures for land use changes, however, may stem from out-migration of city residents into the peri-urban areas, perhaps seeking cheaper building land, more space, or a more attractive environment. Other, more speculative pressures; however, may also be involved in these land transactions. Those selling land, or effectively being dispossessed by the intermediaries, such as the traditional chiefs, or by the operations of the public sector land assembly process, may gain compensation in the short term, but may not have particular skills enabling them to compete longer-term in the urban job-market. Research is needed into the mechanisms by which they adjust to their changed status. Some agricultural family members may become landless labourers, rent or buy land elsewhere to continue farming, adjust their farming practices, or enter the urban non-farm labour market. The barriers to this adjustment process need to be understood if interventions are to be successfully made.

7.8 Greater attention needs to be paid towards identifying which groups actually gain from or suffer from the processes of change taking place in peri-urban areas. Priority needs to be given to investigating the impact of urbanisation on creating or reducing poverty, not only for the peri-urban areas, and former peri-urban areas recently included within city administrative boundaries, but also in older, densely-settled urban core neighbourhoods, or peripheral squatter housing areas. Particular attention appears to be given to what happens to peri-urban communities annexed or absorbed within the administrative boundaries of cities, since these provide lessons for the future. Their social and political structures will clearly change, but little appears to be known about the economic activities of those living in engulfed communities. Some members of these communities, or the landless in other parts of the peri-urban interface, may suffer from poverty as a result of urbanisation pressures and related land use changes.

7.9 Attention needs to be focused on conducting research into remedial measures which will assist with the adjustment processes facing peri-urban families. More examinations of current and recent livelihood changes undertaken by peri-urban residents are needed. This might involve studying the development of non-farm activities, both within peri-urban areas or in urban areas but providing employment for peri-urban family-members. These studies of informal sector employment might focus on the location factors of non-farm activities, and consider the incentive packages needed to help consolidate its growth. The multiplier effects

of non-farm activities are likely to be significant, and the impacts of the expenditures of these informal sector workers should also be assessed. Farmers within the city region may be the principal beneficiaries of this multiplier process, but potential sources of leakage to other regions should also be investigated. A common gap in knowledge relates to the role of the informal sector in the recycling of waste, which could not only have income-generation effects but also remove glass, plastics or other substances which reduce the value of urban waste for agricultural purposes.

A livelihoods study should also examine the adjustment processes faced by peri-urban farmers and other users of renewable natural resources there. This should cover the factors involved in leading some low-income farmers to increase their real agricultural incomes or intensify. their agricultural activities, either within the same area or through relocating their activities elsewhere, when others do not appear willing or able to do so. More information is also needed on urban agriculture, particularly on the promotional policies needed, and the economic, social, cultural, political as well as natural resource use or constraints. Urban agriculture is found within built up areas of cities as well as on the margins of cities so these activities may be fragmented under differing authorities with varied and uncoordinated policies.

7.10 Information is lacking on how far the peri-urban interface areas are actually neglected in the provision of infrastructure facilities and services. These areas would be within the sphere of influence of the higher-order facilities and services provided by the central city, yet the necessary complementary lower-order facilities might not be seen as an urgent priority due to the relatively accessibility of higher-order functions. NGOs or community groups may be left to provide these services to complement the public sector activities. It may be possible that peri-urban areas are actually drained of resources and public sector investments through not receiving their 'fair share' of public sector attention. It appears likely that the provision of environmental and other services or facilities do not appear to be geared towards assisting changes in the peri-urban areas, or preventing environmental health or other problems in advance.

7.11 More information is needed on land values in the peri-urban interface, and the factors involved in changing land values. A land information system (LIS) would speed up the land registration process, which in turn would provide an ability for the land owner to mortgage land to gain credit to undertake expenditures, including investments in agricultural changes or non-farm investments, and would facilitate the mapping process. Research on the creation of land information systems would complement work already being undertaken in Kumasi on the application of geographical information systems for practical planning purposes, using Kuminfo.

7.12 Finally, some consideration might be given towards further modifications of the proposed Peri-Urban Interface Production System log-frame. Currently it appears to be setting external priorities on the identification of problems and their solutions, independently of the residents of peri-urban areas. An overall output, such as the development of environmental planning and management strategies for city regions, would permit stakeholders concerned with the peri-urban communities themselves to indicate their own specific problems and priorities. These might be expected to incorporate some of the other proposed outputs as essential steps towards achieving this super-output, but would reflect the differing problems, characteristics, and priorities of individual city regions.

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