Living between urban and rural areas

Shaping change for improved livelihoods and a better environment
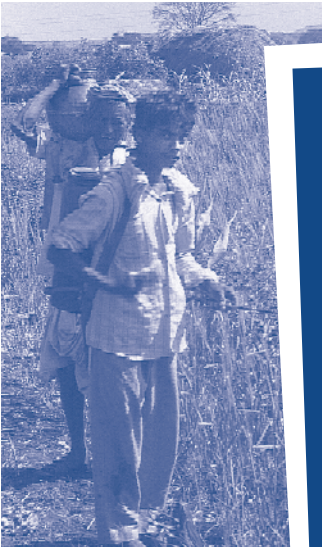
Volume 1
Understanding change in the peri-urban interface

Guidelines for strategic environmental planning and management of the peri-urban interface

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These guidelines have been formulated by critically reviewing and consolidating the existing knowledge and experience world-wide concerning environmental issues and actions at the peri-urban interface and then discussing the results with representatives of government, non governmental organisations, community based organisations, universities, and business and with citizens in and around the five cities of: Hubli-Dharwad, (India), Kumasi, (Ghana), Manizales, (Colombia), Curitiba, (Brazil), and Chennai, (India). Local collaborators gathered information and opinions, and organised workshops for these discussions. Pre-existing research in Hubli-Dharwad and Kumasi provided a wealth of information about their peri-urban interfaces and effects upon the livelihoods of the poor of a kind and a depth that is unique. In addition, representatives of more than ten international development support organisations - including ICLEI, UNCHS, USAID, DFID and IIED - provided critical commentary on the draft recommendations.

Later, local collaborators in Hubli-Dharwad, Kumasi, and Manizales conducted activities to field test various means of disseminating the guidelines. These included a project website, posters, street plays, a video and leaflets, as well as a set of three booklets of which this is volume 1.

Volume 1
Understanding change in the peri-urban Interface

This introductory volume provides a contextual analysis of the peri-urban interface, the processes of change arising from the interaction of rural and urban areas and the problems and opportunities arising from this interaction.

Volume 2
Developing an environmental planning and management process for the peri-urban interface: guiding and working principles

This volume presents the key Guiding Principles to lead the environmental planning and management process of the peri-urban interface and then elaborates on the Working Principles and Components that must be applied in order to benefit the poor and enhance the sustainability of the natural resource base.

Volume 3
Peri-urban environmental planning and management initiatives: learning from experience

This volume provides an overview of some of the initiatives that are being undertaken with respect to the environmental planning and management of the peri-urban interface by development agencies, NGOs, research institutes and government authorities.

Introduction

This document outlines a series of strategic guidelines for environmental planning and management of the peri-urban interface to benefit the poor in developing countries. [1]

The peri-urban interface (PUI) is defined as the meeting of urban and rural activities. In environmental terms, it is the intermingling of urban, rural and natural ecological systems. This meeting of different systems creates both opportunities and problems, which have significant impact on people's livelihoods. The growing recognition of the importance of urban and rural links has made environmental consequences of the peri-urban interface matters for priority action.

With funding from the British Government's Department for International Development (DFID), recommended guidelines have been formulated by drawing upon current thinking about environmental matters and upon the lessons learnt from attempts to manage the peri-urban interface. [2]

Preparation of these guidelines has been motivated by an awareness of the gains to be made from an approach to planning and management, which is not constrained by the traditional separation of urban and rural activities. Tackling the environmental consequences of town and country meeting at the peri-urban interface acknowledges, that urban and rural activities are linked.

This is a long overdue step towards environmental management on a larger scale which is still local, but which more truly matches the spatial spread of the processes involved. It is also a step towards planning and management of development at the local level which treats urban and rural as interwoven systems, potentially creating a process that treats the urban and rural economic, social, and physical systems together as a whole.

Purpose of the guidelines

These guidelines focus on the environmental planning and management of the peri-urban interface with the aims of achieving **environmental sustainability** and improving the **livelihoods** and **quality of life of the poor.**

The purpose of these guidelines is to provide a basic understanding of the processes involved in the environmental planning and management of the peri-urban interface, as well as a clear appreciation of the principles and components required within these processes. Rather than presenting a detailed recipe to be followed step-by-step that would only work for a particular set of circumstances, the necessary ingredients to improve environmental planning and management of the peri-urban interface are provided, along with the ways they can be used.

[1] Environmental Planning and Management (EPM) is the process of defining objectives, implementing environmental improvement actions and monitoring and reporting their effectiveness.

[2] For more information on the project of which this volume is an output, and to access the working papers produced by the project team see the PUI project website: **www.ucl.ac.uk/dpu/pui**

Audience for these guidelines

The chosen audience for these guidelines comprises two main groups:

- **Local institutions:** comprising local level government agencies and institutions of civil society (such as non-governmental organisations and community based organisations).

- **Supporting agencies:** comprising the community of organisations that, through technical and financial assistance, exert substantial influence upon the systems of planning and management that are in place in developing countries. The attention they give to certain matters, encourages and legitimises new priorities for government action. **3**

To deliver benefits to the poor and make progress towards environmental sustainability, both local institutions and supporting agencies have a role to play in bringing this about. Not only in using the guidelines themselves, but by passing the principles to the poor empowering them to participate and develop the approach taken to urban and rural development.

3 These are organisations such as multi and bilateral funding agencies, associations of municipalities and international NGOs that provide external support for sustainable development actions.

For a review of supporting agency activities in collaboration with local institutions, to improve aspects of EPM for the PUI see Volume 3.

4 For a more detailed review of actions by different supporting agencies to improve environmental planning management for the peri-urban interface see Minaya and Budds, 1999, downloadable from **www.ucl.ac.uk/dpu/pui/output2.htm**

Structure of these guidelines

The guidelines comprise three volumes. This introductory volume, volume 1, examines the nature of the peri-urban interface and the processes of change arising from the interaction of rural and urban activities, highlighting the problems and opportunities arising from this interaction. Special attention is given to those who are affected by these problems and opportunities.

Volume 2 presents the key guiding principles to lead the environmental planning management process of the peri-urban interface and elaborates working principles and components that must be applied in order to benefit the poor and enhance the sustainability of the natural resource base. These principles are not a blueprint for undertaking environmental planning management as this would be inappropriate, for the circumstances of each case are different, each requiring a process formulated on its own terms.

Volume 3 provides an overview of some experiences of environmental planning management of the peri-urban interface. This is not a comprehensive review, but rather it presents approaches and initiatives that illustrate the application of the principles discussed in volume 2. **4**

A cross-referencing system has been used in these three volumes. This system has been adopted to highlight the connection between the guiding principles and components of environmental planning management; as well as to explain various concepts, tools and illustrations for the benefit of the user.

| Volume 1 *Understanding change*	Volume 2 *Developing an EPM process*	Volume 3 *Learning from experience*

Understanding change in the peri-urban interface

What is the peri-urban interface?

The peri-urban interface can be recognised in the meeting of urban and rural activities. It is described as an area of mosaic or patchwork interaction between three differing systems: urban, rural and natural. **5**
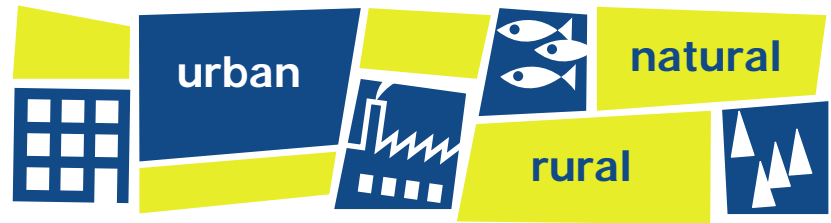
An environmental perspective provides an inclusive approach to the understanding of how peri-urban systems are created and the 'trade-offs' which occur between a sustained balance of economic productivity, social equity, political decision making and environmental protection.

Sub-systems of the peri-urban interface

The peri-urban interface and its importance can not be understood through an ecological description alone. Conventional urban planning methods traditionally view areas that are not urban, in terms of how they can serve the urban.

The peri-urban interface requires an appreciation of the interaction of the following three sub-systems: **socio-economic** – individuals and their different levels of organisation and multiple forms of interrelation; **territorial** – physical transformation of natural components at varying degrees, and **artificial** – built up components such as infrastructure, roads and housing.

Institutional awareness

Because the areas affected by the peri-urban interface are difficult to picture, it is noticeably difficult to provide them with adequate institutional support and cover. There is growing awareness that institutional arrangements that might be used, deal with pieces that sometimes overlap, but never deal with the whole area. Institutions of local government tend to be either urban or rural in focus, metropolitan governments rarely include rural jurisdictions, special purpose authorities bridging urban and rural areas are not created, and district and regional governments do not adequately link urban and rural concerns.

Improving institutional cover is critical to the management of the peri-urban interface. **6** Although there are few institutions suitable to become the basis for effective environmental planning and management, there are examples of individual strengths of institutions within the peri-urban interface. Experience indicates that building on their best features rather than creating new institutions can produce a more effective arrangement for peri-urban planning. **7**

5 For more details on the working definition of the PUI adopted in the project see Allen et al, 1999 downloadable from: **www.ucl.ac.uk/dpu/pui/output3.htm**

6 How to find an institutional base, is explained in the working principles of Volume 2, p. 20.

7 For a discussion of existing institutional structures and policies affecting the PUI see Dávila et al., 1999, downloadable from **www.ucl.ac.uk/dpu/pui/output4.htm**

What makes the peri-urban interface so important?

The peri-urban interface promotes and
maintains livelihoods in both urban and rural
areas. Activities in both areas rely upon it for
flows of labour, finance, market produce,
communication and access to the natural
resources.

Natural resources are often located within
areas of the peri-urban interface, supplying
both urban and rural areas with necessary
resources. However, when a supply is used
or degraded, the effect is felt most heavily by
those who rely upon them the most. Alternative
sources may only be found a great distance
away, using both time and money for travel
and transport.

The **sustainability of the natural
resource base** is degraded by its continued
use to meet the increasing demands of urban
activities. Rural areas offer opportunities not
only for the extraction of natural resources
but also for the dumping of wastes generated
by urban activities. Sustaining the natural
resource base means not degrading the
environment and consuming resources in ways
that prevent present and future generations
from enjoying them.

As environmental change occurs it is necessary
to be aware of its effects on places and upon
livelihoods. The poor tend to feel the impacts
of the peri-urban interface the most as they
lose access to farm and grazing land and have
to cope with various kinds of urban-induced
pollution. Yet, as a consequence of the meeting
of town and country, the rural poor can also
find new opportunities in urban job markets
benefiting from urban services, while the urban
poor can find low cost shelter.

The priority currently on development agendas
to the reduction of substantial, and growing,
urban and rural poverty, demands that every
process of action strives to **benefit the poor.**

In order to bring about positive changes,
the management of the peri-urban interface
needs to address the connection between
sustainable livelihoods 8 (the quality of
lives of the poor) and **environmental
sustainability.**

Who is affected by these problems and opportunities and how?

The relationship between low-income groups and environmental health problems is directly allied to their conditions and places of living. Uncollected garbage, inadequate water supply and sanitation, overcrowded living conditions and air pollution are common conditions confronting many of the poor of the peri-urban interface today. The poorest face greatest exposure to biological and physical threats and also more restrictions on access to protective services and infrastructure. **9**

Change affects those who are poor in different ways, according to gender, age and ethnicity, in terms of their access to livelihood assets. The poor are often defined as falling below certain standards and, therefore, are often viewed as a single group for the purposes of targeting policies. However, it is important to keep in mind that there are many types of poverty and that the location of poverty also influences policy options. For example, the rural poor are usually heavily dependent upon natural resources. Attacking rural poverty then requires improving poor people's ability to create a livelihood from these natural resources. In urban areas, the health of the poor is particularly affected by a degraded environment such as, sub-standard housing, inadequate or polluted water, poor sanitation systems, and outdoor and indoor air pollution. Ill health leads to a host of problems, including a decreased ability to work. Improving the urban environment positively impacts the health of the poor.

To realise the potential of these guidelines, it is necessary to view the poor as a mixed group rather than all the same, with certain poor people at greater risk from change than others. Poverty can be seen as a set of relations. The poor compete with each other and with the non-poor for control over assets. Poverty can also differ within households. Women and children, especially girls, often have the least access to productive assets, and are usually the most affected by pollution. Efforts to reduce poverty must also recognise this competition for resources and the different impact of environmental degradation among and within households.

On the following page, case study 1 looks at the relationship between gender, poverty and health in the city region of Hubli-Dharwad, India. It shows that changes in the roles performed by women and their increasingly vulnerable social status reinforce the risk of exposure to health hazards of pollution, contamination and injury.

9 For an analysis of the livelihoods of the poor in the PUI see Tacoli, 1999 (downloadable from **www.ucl.ac.uk/dpu/pui/paper2.htm**)

Case study 1 Gender, poverty and health in peri-urban Hubli-Dharwad, India

Poverty in the peri-urban interface has a strong gender dimension, as is shown by the situation around the city of Hubli-Dharwad. Overall employment opportunities have increased in this area due to a number of different factors over the past fifteen years. It is most important, to look at the division of the labour force. Whilst men have increasingly gained non-farm employment, the vast majority of the female labour force is concentrated in agricultural production. This is the lowest paid sector, and women in it are paid even less than men.

The selection, recycling and composting of municipal solid waste in dump sites is mainly carried out by women and children. However, there is no clear data or information on the economic contribution of these activities to individual and household livelihood strategies. Women are also the main parties involved in collecting recyclable waste from bins and dumps and selling it on to itinerant buyers.

In peri-urban and rural villages, it is typically women who are responsible for the management of dump sites at the community level. Within the household, women are involved in the composting of organic waste and its subsequent use in horticulture, as well as a wide range of duties relating to the household energy needs.

As firewood, a main source of energy, becomes scarcer around the city, women have to walk further in order to collect it. This can impact negatively on their health (injuries during transport) as well as leaving less time to perform other chores.

Poor water and sanitation infrastructure with-in the peri-urban interface means that there are high risks of water borne diseases. However, evidence shows that women are not involved in the use of wastewater as a soil improver in Hubli-Dharwad.

Another health hazard for women in the peri-urban interface is the potential for respiratory disorders associated with intense exposure to the smoke from cooking stoves.

For a discussion of health impacts in the PUI see: Birley, M. H. and K. Lock, 1998, "Health and Peri-urban Natural Resource Production", Environment and Urbanization, Vol. 10, No. 1, p. 89-106.

Source: Birmingham, Nottingham and Wales, Universities of, 1998, Baseline Study and Introductory Workshop for Hubli-Dharwad City-region, Karnataka, India. Final Technical Report, Volume 1, Peri-urban Interface Production Systems Research.

Access to land

Land access can be an easy starting point for understanding the effects of environmental change upon the poorer communities affected by the peri-urban interface. Three issues to consider here are:

- **Affordability, infrastructure and planning regulations:** first, the poor are forced to occupy areas with basic or rudimentary service infrastructure. The higher the standard of infrastructure, the higher the value of land. Second, the use and occupation of land with no formal planning often brings hidden costs, for this often means using and occupying unsafe land, such as flood zones and hazardous slopes or prohibited areas, such as forest resources.

- **Competition within informal land delivery systems:** land prices rise, the poor communities are priced out of even the less desirable areas by middle-income earners, leaving them very little alternative other than makeshift temporary settlements.

- **Marginal urban environments:** Many of the environmental problems of the peri-urban interface suffered by low-income groups are associated with land, i.e. the degradation of wetlands, occupation of other environmentally sensitive and hazard prone areas. Therefore, not only do the poor tend to live in marginal environments, but toxic and noxious activities tend to be localised around low-income settlements where the economic costs and possible compensations are lower and political resistance weaker.

Sustainable livelihoods – accessing the components of change

The Sustainable Livelihoods Framework can be used to provide a method of under-standing the problems created by environmental change upon people's livelihoods. This framework identifies five different types of assets upon which individuals draw to build their livelihoods. Changes created by a peri-urban interface can affect each type by reducing (problems) or increasing (opportunities) people's access to and control over these assets. **10**
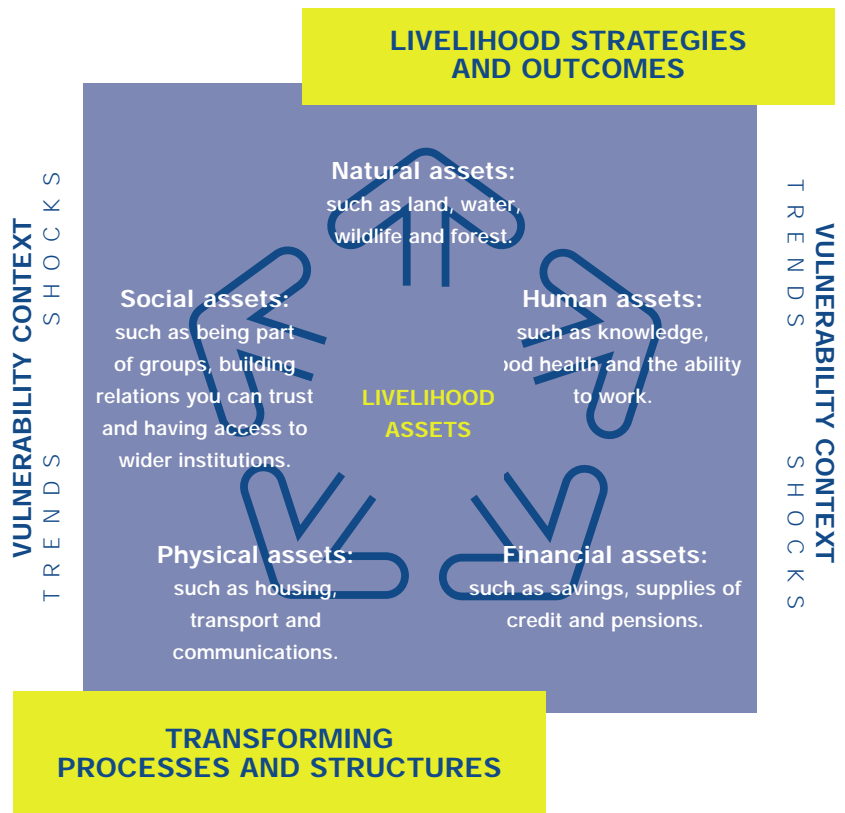
This framework is built around assets but also requires an understanding of other factors influencing people's livelihoods. First is the need to understand the vulnerability context in which assets exist, such as the trends, shocks and local cultural practices which affect livelihoods **11**. Second it is vital to understand the structures, (organisations, from layers of government through to the private sector) and processes (policies, laws, rules and incentives), which go to make up people's livelihood options.

Structures and processes impact upon livelihoods in two main ways:

1   They are critical in determining both who gains access to which type of asset and what the effective value of that asset is, such as land value.
2   They help define which livelihood strategies or activities, natural resource-based or otherwise, are open and attractive; for example, policies which outlaw private trade severely limit the likelihood of people becoming traders.

Markets and legal restrictions have strong influence on the way in which one asset can be converted into another type. Convertibility increases the options available to people who are striving to improve their livelihoods and to withstand shocks and stresses.

10 For more information on the Sustainable Livelihoods Framework (SLF) see: Carney, D., 1998, "Implementing the Sustainable Rural Livelihoods Approach", in D, Carney (ed.) Sustainable Rural Livelihoods. What Contribution Can We Make? DFID, London, Chapter 1, p. 3-23.

11 See case study 2 on the following page.

LIVELIHOOD STRATEGIES AND OUTCOMES

VULNERABILITY CONTEXT SHOCKS TRENDS

VULNERABILITY CONTEXT TRENDS SHOCKS

Natural assets: such as land, water, wildlife and forest.

Social assets: such as being part of groups, building relations you can trust and having access to wider institutions.

Human assets: such as knowledge, good health and the ability to work.

LIVELIHOOD ASSETS

Physical assets: such as housing, transport and communications.

Financial assets: such as savings, supplies of credit and pensions.

TRANSFORMING PROCESSES AND STRUCTURES

Case study 2 — The role of traditional cultural values in the process of land conversion in Kumasi, Ghana

The traditional Ashanti authority, the Golden Stool, controls most of the land around Kumasi. Its territorial domain has no relationship whatsoever with the jurisdiction of any formal administrative unit in Kumasi and the surrounding region. Traditionally the land is considered sacred as a source of life, hence it cannot be owned by an individual. At village level, chiefs act as intermediaries between this key natural resource and the community on the basis of a trust relationship, appointed as custodians of the sacred land in the interest of the community. As the chiefs have control over the land, they represent the main driving force behind the process of land conversion at the peri-urban interface. It appears that village chiefs are increasingly adopting commercial criteria in disposing of communal land rights, disregarding traditional values and the interest of the land. A major tendency has been reported in peri-urban villages of shifting land rights from stool (communal) property to individual property.

The funds received by the chiefs from land sales are not always redistributed or reinvested in the construction of communal facilities schools, paving of roads, water pipes, churches and so forth, but rather satisfy the chiefs' personal interests. Also, land transactions often take place with little or no consultation with the villagers. Only in a marginal number of villages planning committees have been constituted providing a representation of the community's interests in village management. Traditionally, the role of the chiefs has been that of preserving the relationship between the communities and the environment and over the centuries this has contributed to the conservation of local natural resources.

By increasingly exploiting for their own benefit the opportunity offered by the city's expansion and the associated demand for land, the chiefs not only undermine the traditions on which social cohesion in villages has been historically based, but also promote unauthorised new developments, the loss of endemic vegetation and fauna along river banks and in sacred groves, excessive run-off from river banks and ultimately a risk of flooding of the surrounding areas, soil erosion, the loss of land by farmers, as well as an increased number of disputes between chiefs and community members, and chiefs and land purchasers, with an associated upsurge in violence.

Because of the administrative fragmentation of these areas and the lack of resources, and because of the collusion of public officials; public institutions play a passive role in implementing laws and regulations, and initiatives are largely left to the single villages.

How do urban-rural links shape the peri-urban interface?

Changes taking place at the peri-urban interface are linked to urban and rural interactions that involve flows of people, goods, income, capital, natural resources and wastes. The analysis of flows shaping and reshaping the use of environmental resources and ecological services at the peri-urban interface show how three inter-connected yet varied levels drive them.

- At the first level, change is driven by **local conditions** including, for instance, the competition between urban development and agriculture for land, or increasing pressure of extractive activities as a response to the city demand for building materials.

- At the second level, change is driven by **regional and national conditions** such as the promotion of industrialisation.

- At the third level, change is driven by **international conditions**, such as falling prices of export crops that increase the migration of impoverished farmers to the peri-urban interface in search of alternative livelihood strategies.

The diagram on the following page presents a framework for understanding how rural and urban linkages or flows can be mutually reinforcing and beneficial, illustrating the dynamic give and take relationships between the two. [12]

The column marked rural system, highlights the areas that are strengthened through the give and take interaction with the urban. The column marked urban system functions, highlights the function that the urban plays in supporting and enhancing these structural changes. The central column indicates the flows that occur from urban to rural, as is the case with increased education and shopping opportunities; and from rural to urban, as in the case of rural produce and commuting labour. It is clear that both rural and urban sectors support each other's own development, so changing effects on one system would clearly have knock-on effects upon the other.

This is particularly relevant to the understanding of the role played by the peri-urban interface in environmental changes and the flows of natural resources and wastes. This area is where many of the bottlenecks in urban and rural flows take place, leading to problems and opportunities not only for peri-urban communities but also for the sustainable development of adjacent urban and rural systems.

Opposite diagram: Source: Based on Douglass, M, 1998, "A Regional Network Strategy for Reciprocal Rural-urban Linkages", Third World Planning Review, Vol. 20, No. 1, pp. 31.

Reciprocal urban – rural Interactions

RURAL SYSTEM/STRUCTURAL CHANGE	URBAN – RURAL FLOWS	URBAN SYSTEM FUNCTIONS/ROLE

← →

Socio-economic structure relations

Rural economy (sectors)

Rural production regimes

People
Labour commuting/migration
Other migration (e.g. education)
Shopping, visiting/selling

Production
Upstream linkages (inputs)
Downstream linkages (processing, manufacturing)

Commodities
Inputs
Consumer non-durables/durables
Rural products

Capital/income
Value-added
Savings/credit
Migrant remittances

Information
Production/sales/prices
Welfare/social/political
employment

Natural environment and resources
Building materials
Water, energy

Wastes
Solid/liquid wastes
Air pollution

Non-agricultural employment

Urban services

Production supplies

Non-durable and durable goods

Markets for selling rural products

Processing / manufacturing

Information on employment, production, prices, welfare services

← →

What creates environmental changes in the peri-urban interface?

Environmental change often occurs without people realising it is happening. A reason for this is the fragmentation and overlap of institutional organisations working in the area. Regulations, policies and planning mechanisms are usually designed to deal with either rural or urban areas, not with the interaction between the two.

When changes occur:

- The environment is damaged
- The poorer people suffer the most.

This is because:

- They rely heavily upon depleting resources such as water, firewood and local produce.
- Their health and living standards often suffer because they live close to the sources of pollution.

Most environmental change occurs in three ways:

- **Changes in land use:** for example, from agricultural to industrial or residential land uses.
- **Changes in the use of natural resources:** for example, de-forestation, water depletion and soil erosion.
- **Changes in the generation of waste:** for example, increased solid and liquid waste resulting in water and soil pollution.

These changes create both

problems	opportunities
– Soil erosion	– Diverse livelihoods
– Water pollution	– Better transport
– Ill health	– Access to education and urban markets for those living between urban and rural areas.

Changes in land use

There is intense pressure to convert land from one use to another, due to several processes at the peri-urban interface:

- **Industrialisation** follows two patterns: the spontaneous construction of small-scale industries and the creation of large-scale industrial estates following national and regional policies of industrial promotion.

- **Uncontrolled urban expansion** leads to a 'patchwork' of development activities, taking poorly planned locations. Not only is the amount of land that is converted of concern, but also the type of land being lost such as prime agricultural land. Cheap housing for the poor is often developed upon poor quality land, such as slopes, increasing safety problems.

- **Development of special physical infrastructure** within the peri-urban interface, such as airports, sewage plants and landfills often leads to large-scale environmental impacts. Huge amounts of land are used. Airports for example are notorious for causing widespread noise pollution as well as air and soil pollution from fuel leakage.

- **Loss and degradation of agricultural land and valuable ecological sites.** The pressures for land use change created by the peri-urban interface result in a severe loss of agricultural land. This again affects the poor more than others, because agricultural production tends to be an important factor in their livelihoods. The loss of forest land disproportionately affects the lives of women who are often the ones collecting fuel wood, forcing them to look further afield for new supplies.

problems	opportunities
– Loss of agricultural land, leading to a loss of livelihoods for poor farmers and shortages of food for urban supply	– New sources of employment – Land for low-cost housing – Better transport links between rural and urban areas – Better access to health and education services.

Case study 3 Land conversion, environmental degradation and poverty in Kumasi, Ghana

Increasing numbers of people are moving into the areas around the city of Kumasi due to general population growth, the lower land and rent prices to be found there, and affordable transport to the urban centre. Consequently, the demand for accommodation in peri-urban villages is steadily rising. Many villages around Kumasi are slowly being absorbed into the urban fabric of the city.

The use of land for new houses for these people in formerly rural villages has increased population densities and has reduced the quantity and quality of available farmland.

A joint study by institutions from Kumasi and the UK found that 90% of villages surveyed reported a significant reduction in available farmland and a corresponding increase in residential land.

The physical transformation of the rural areas around Kumasi has had a significant and immediate impact on the livelihood strategies of those who live there. Typically, land rights are taken from farmers and sold for the construction of new housing, often built by and for wealthier people. Agriculture plays a major role in the local economy, especially in villages. The vast majority of the peri-urban poor are farmers who have lost their rights to farmland. As land is lost to residential development, so is the potential for peri-urban subsistence farming and for the cultivation of high value produce, which could be sold in the nearby urban markets.

The reduction in the size of plots has created pressure to farm the land more intensively, with agrochemical inputs and shorter fallow periods. In the long term, this reduces soil fertility and increases health hazards associated with agrochemicals. The rising population density also increases waste production and pollution levels. The poor are the most vulnerable to health risks associated with this urban pollution.

Women, who constitute the majority of peri-urban farmers, are central actors in the survival strategies of the poor. They are, however, the most vulnerable to the land conversion process as they have limited opportunities for investment in other activities and are not consulted when land rights are sold.

Emerging problems of unemployment, homelessness and landlessness in Kumasi indicate that the changes to the peri-urban environment have increased the vulnerability of the poor.

Case study 4   Human settlements in risk-prone areas: the case of Manizales, Colombia

Manizales has an altitude ranging between 800 and 3,400m above sea level and is located in an area of seismic activity. These extreme conditions make cultivation of and / or construction on the land linking the urban and rural areas difficult.

Physical expansion of the city is greatest towards the north, where it has reached the urban perimeter on either side of the Olivares river valley. Here, new urban developments are increasingly encroaching on uncultivated areas of high ecological value (e.g. riverbanks and forest areas). This has a direct negative impact in terms of loss of natural resources (flora and fauna), loss of landscape, decreasing soil stability of the steeper slopes, and underground water levels and flows.

Furthermore, as the city continues to expand (both legally and illegally), land that is safe to develop is becoming extremely scarce. Although the municipality's physical growth plans will destroy natural habitats, they have managed to allocate land for construction that is still on a relatively flat ground. The scarcity of 'safe' land on which to develop has meant that the poor of Manizales have been forced to build on risk-prone steep slopes. Along with the seismic activity and the low quality of building materials this all adds up to a significant environmental hazard for this sector of the population. Their lack of means implies that these people have very low possibility of obtaining safer land for construction. It is important to remember this, alongside other social and economic factors, when formulating a strategy for improvement of livelihoods.

Source: Based on field observations, Manizales-Villamaria, January 1999.

Changes in the use of natural resources

Environmental problems arise when natural resources are degraded or exploited beyond their regenerative capacity. De-forestation is a typical consequence of the peri-urban interface. Reasons for this are varied; over use for fuel, farming, housing, mining, logging and hydropower activities.

The exploitation and degradation of water supplies is another problem facing people within the peri-urban interface. Urban growth leads to an increase in demand, which impacts particularly upon the poor who suffer from limited access to water sources and upon women who often collect fresh water daily. Water pollution occurs most often from agricultural activities and by-products of human settlements. Action against the problem is often made more difficult by a lack of adequate administrative coverage or co-ordination.

problems

– Loss of local forested areas for firewood, construction materials, flood control, recreation and ecological diversity.

– Water resource exploitation and degradation, leading to polluted water and water shortages.

– Loss and degradation of agricultural land and valuable ecological sites.

opportunities

– Access to piped water supply

– Access to other forms of fuel for energy supplies.

– Opportunity to produce cash crops for city demand.

– Opportunity to set up conservation projects.

Case study 5   Water management in the Greater Kumasi City Region, Ghana

The urban area of Kumasi is one of the five districts of the Greater Kumasi City Region, and is under the jurisdiction of the Kumasi Metropolitan Assembly. Kumasi's urban area lies on top of a watershed, and pollution generated in the city (such as petroleum, sawdust, and wastes from the brewery, abattoir and tanneries) flows downstream towards the outskirts of the city. This affects agricultural production and health conditions region-wide, and contaminates reservoirs and streams. Many villages, which have no access to piped water, rely on these sources exclusively for their water supply. Other activities, such as the extensive use of agrochemicals and the dumping of human and industrial waste in rivers, also increase water pollution in the peri-urban interface.

Building construction (particularly on riverbanks) associated with extractive activities (sand and stone mining) and other unauthorised activities also contribute to pollution. The erosion of riverbanks caused by construction and extractive activities also increases vulnerability to flooding.

Individual districts have so far failed to implement existing regulations on industrial pollution, waste dumping and waterbed protection. However, more stringent implementation of these regulations will not solve the problem of the institutional vacuum concerning the management of water resources. The Ghana Water and Sewage Corporation (which manages reservoirs, ground water supplies and water distribution) does not have the responsibility to manage water resources. The districts, the regional government, and the Environmental Protection Agency all have very limited mandates on this issue.

In the absence of a clear, effective institutional structure, the problem of water resource management tends to be left to village-level initiatives. On the village level, however, the conversion from urban to rural land uses is generating increased pressure on existing natural resources, particularly water sources. Moreover, local communities have no control over pollution occurring upstream and no responsibility for water conditions downstream. The resulting situation is one of fragmented efforts and institutional stalemate.

Case study 6 Institutional conflicts over water management in the Manizales-Villamaría conurbation, Colombia

The municipalities of Manizales and Villamaría merge to crate an urban area of about 440,000 inhabitants and share a very rich and diverse ecosystem. They also share a variety of natural resources, in particular water.

Over the last decade, the population of Manizales has grown slowly and the city authorities have worked hard at implementing plans to improve urban and environmental quality and has nearly achieved population stability. Villamaría, however, has not done so well, its population has increased by 169% over the last 20 years. These inhabitants are mainly poor people moving to areas where rents are lower. The outcome of the disparity is evident in the conflict that has arisen with regards to water resource use.

A large part of Los Nevados National Park falls under the jurisdiction of Villamaría. Despite the fact that the park provides water for both municipalities and has the potential for this area to generate revenue from tourism and hydroelectric power, there is no overall management. Attempts to create joint management initiatives have yet to show significant results. Also, there are no plans to protect the catchment area from urban construction.

A joint public and private company manages the water provision for Manizales, as well as liquid waste treatment. It is building a plant for the treatment of industrial effluent on the Manizales bank of the Chinchiná River, which forms the border between the two municipalities. Villamaría municipality (which manages water provisions for Villamaría) was not consulted and is opposing the construction as it fears negative environmental impacts. This reflects a wider range of conflicts between the two municipalities, arising from a lack of joint management of the river basin. The two banks have indeed been put to different uses. Manizales intends to create water parks for recreation and tourism. Villamaría uses the area for industries and petrol stations. There may be risks of mercury contamination from the Villamaría gold mines, and erosion of the riverbanks caused by construction work there. However, there are no management initiatives to tackle these problems.

It is obvious that the two municipalities need to work in unison, rather than unilaterally, in order to tackle problems (pollution, erosion) and exploit potential (water provision, tourism, hydroelectric production) successfully.

Source: Velásquez, Luz Stella and Pacheco, Margarita, 1999, "Research-Management as an Approach to Solving Environmental Conflicts in Metropolitan Areas: a Case Study of the Manizales-Villamaría Conurbation, Colombia", in A. Atkinson, J. Dávila, E. Fernandes and M. Mattingly (eds.), The Challenge of Environmental Management in Urban Areas, Ashgate, London.

Changes in waste generation and pollution

Urban wastes are typically disposed of within the peri-urban interface, legally and illegally. This is due primarily to the availability of open space accompanied by easy access from urban areas. Because of this the peri-urban interface runs the very real risk of becoming the urban 'backyard'.

Poor mechanisms for waste disposal and poor implementation of regulations reinforce illegal and unmanaged dumping, particularly in rivers and streams flowing through the city. In peri-urban villages waste management is often the responsibility of local communities. It is often women who are involved in its sorting and picking, suffering health risks as a result.

Increasingly common is the location of industry, bringing to the local population a rising degree of pollution and accompanied health hazards. There are three major factors reinforcing the problems of industrial pollution:

- The re-location of heavy polluting industry from urban to peri-urban areas. Due in part to the toughening of pollution control requirements in the urban areas. The peri-urban area becomes preferable due to its good transportation network, its well-educated workforce (compared to rural areas), better energy supplies and its less rigid pollution control requirements.

- Location of waste treatment factories within the peri-urban interface. Due to the fact that regulation may not be as rigidly adhered to as in urban areas.

- Capital resources invested in environmental quality are often lower in the peri-urban interface than in core urban areas.

problems	opportunities
– Changing composition of household wastes (ie, increasing non-organic materials)	– Auctioning of solid waste for the re-use as compost
– Availability of chemical fertiliser and transport costs decreasing the use of natural fertiliser	– Agro-industrial waste from dairy produces to be use as fertiliser
– Cost of separating rubbish results in less waste re-use.	– Waste as a resource.

Case study 7   **Soil pollution around Kumasi, Ghana**

Kumasi's inadequate waste management system is undoubtedly the primary cause of soil pollution in the peri-urban interface of the city. The system is no longer able to cope with the growing population of the Greater Kumasi City Region (GKCR). The lack of co-ordination among the five districts that make up the GKCR results in administrative fragmentation and serves only to compound the problem.

Waste produced within Kumasi affects environmental conditions around the city in three ways. First, solid waste is transported from the city's central district to disposal sites in neighbouring districts around the city. This has a negative effect on health conditions and agricultural production in these areas. Secondly, liquid and solid waste produced within the city (petroleum from Kumasi's many car repair workshops, effluent from breweries and tanneries, etc.) flows towards the outskirts through a dense network of rivers and streams, thus contaminating water and soil resources. Thirdly, waste is dumped illegally in tips around the city or along riverbanks.

The lack of adequate sanitation infrastructure causes the contamination of soil resources and rivers with human waste. Since water from these rivers is often used for irrigation, the quality of farmland, the safety of agricultural products, and ultimately human health are all negatively affected.

Waste generated within the peri-urban interface itself also affects soil quality. Increasing population density and poor location, rotation and management of pit latrines negatively affects health conditions and the availability of safe farming land. The location of peri-urban waste dumps near housing and riverbanks also increases soil pollution. In the four districts surrounding the urban area, waste management is left to the responsibility of each village, where public authorities seem to play no significant role.

Reductions in plot sizes due to the conversion of land from farms to residential areas, have put pressure on farmers to increase their yields. The resulting increase in the use of fertilisers and pesticides will compromise the long-term quality and productivity of the soil through over-intensive use and chemical contamination.

The implications of soil contamination are inevitably more serious for areas around the city, which rely on land as a primary asset in local production strategies. Direct exposure to contaminating agents, and indirect exposure through contaminated food, has negative consequences for soil productivity and human health throughout the GKCR.

Source: Natural Resources Institute and Kwame Nkrumah University of Science and Technology (UST Kumasi), 1997, Kumasi Natural Resources Management Research Project – Inception Report, NRI-University of Greenwich.

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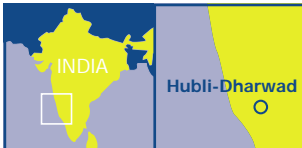
Hubli-Dharwad

Case study 8   **Waste re-use in Hubli-Dharwad, India**

In the Hubli-Dharwad conurbation, there is a long-standing tradition of the re-use and recycling of waste generated within and outside the urban area. Solid waste used to be auctioned to farmers at dump sites or sold by tractor-loads for a set price. Garbage from municipal dump sites is composted and sold as soil fertiliser. The construction of an underground sewage system, however, has caused a decrease in the availability of nightsoil, which was mixed with garbage to improve decomposition. This has resulted in a corresponding decrease in the production and sale of compost. The changing composition of urban waste (containing increased quantities of plastic, wood, glass and construction waste) has made the compost more difficult to make and use.

Rising transport costs and the availability of other sources of fertilisers, soil ameliorants and animal feed have also decreased the sale of solid wastes to farmers in the peri-urban area. Furthermore, a lack of resources to maintain dump sites and to hire labour to separate garbage has meant that garbage is no longer efficiently made into good quality compost.

Individual households compost most of the waste generated in peri-urban villages. In general, these small quantities of compost are only enough for small household vegetable patches.

Agro-industrial waste (dung, poultry manure, sawdust, rice and oil waste) is widely used in agriculture as well as for fuel (dung cakes and sawdust). Untreated wastewater is often used for irrigation. Nightsoil from pit latrines and septic tank waste is also used as soil fertiliser. This practice may contribute to health hazards and increase weed and insect infestation, which subsequently leads to heavier use of pesticides.

Despite the decline in the use by farmers of municipal waste, the increase in waste production in the coming years will create new problems and new opportunities. There will be problems of disposal, pollution and health hazards within and outside the urban area. However, there will be more potential for re-use of wastes in agricultural production and recycling energy production (biogas).

Source: Birmingham, Nottingham and Wales, Universities of, 1998, Baseline Study and Introductory Workshop for Hubli-Dharwad City-region, Karnataka, India. Final Technical Report, Volume 1, Peri-urban Interface Production Systems Research.

Glossary

Environmental Planning and Management (EPM): is a set of activities aiming at identifying environmental problems (before they turn into costly emergencies) and opportunities (in time to take good advantage of them), at agreeing on strategies and actions in response to these problems and opportunities, and at implementing strategies through co-ordinated public and private actions. EPM can take a strategic approach which seeks to make a balance between the formulation of long-term cross sectoral, dynamic strategies and the development of short-term action programmes or projects. A strategic approach to EPM focuses on essential interventions that can be implemented quickly, have a high chance of success, lay the grounds for dealing effectively with future environmental matters, and give priority to strengthening emerging institutions. EPM stresses a "holistic systems approach" in which planning is seen as a complex iterative cyclical process rather than a linear sequence of stages.

Institutionalisation: is defined as the process whereby social practices become sufficiently regular and continuous to be described as institutions that is 'social practices that are regularly and continuously repeated because they are accepted as part of an organisational culture or social culture. Institutions should not be confused with organisations. Institutions are the established underlying practices of organisations. The institutionalisation of EPM is defined as incorporating its practices and methods into the institutional structure and behaviour.

Peri-urban interface (PUI): defined, from an environmental perspective, by the meeting of an urban and one or both of a rural and a natural ecological system. The meeting of ecosystems, when one of these is urban, gives rise to a dynamic situation because the urban ecosystem is usually changing. Consequently, problems and opportunities are created by the meeting of these eco-systems. They show their effects at particular locations, and these locations mark out the peri-urban interface. For the purpose of environmental planning and management, this is more appropriate than identifying an area defined by factors such as land uses or population density or at a predetermined location, such as the city periphery or the urban hinterland.

PUI processes and flows: are defined as any continued set of actions connected with (the continuation, development, and change of urban-rural interactions. The focus on processes of interaction and flows rather than states of being is particularly important for the planning and management of the PUI because urban-rural interactions generate a dynamic situation of change which can generate opportunities and problems for different groups. Four main processes of environmental change usually take place in the peri-urban interface: Land use changes, Use of renewable resources, Use of non-renewable resources, Generation of wastes and pollution.

Rural-urban interactions: the processes of social and environmental change taking place in the PUI need to be considered in the light of complex rural-urban interactions. For analytical purposes, rural-urban interactions are divided in two broader categories:

Spatial interactions: these take place across space between 'urban' and 'rural areas'. They include flows of people, goods, money, information and wastes.

Sectoral interactions: these include 'rural' activities taking place in urban areas (such as urban agriculture) and activities often classified as 'urban' (such as manufacturing and services) taking place in rural areas.

Until recently, these interactions between urban and rural activities have largely been neglected, and the competition between city and countryside has been emphasised. Rural - urban interactions occur at diverse locations and at these locations (which define the PUI) these interactions create opportunities (e.g. for livelihood diversification strategies for poor rural communities as they have access to urban markets); but they can also impose heavy burdens for both livelihoods sustainability and the sustainability of the natural resource base (e.g. expansion of cities which results in deforestation and depletion of the productive base for peri-urban dwellers).

Stakeholders: a stakeholder is any person, group or institution who has an interest or 'stake' in an activity, project or programme. This definition includes intended beneficiaries and intermediaries, winner and losers, and those involved or excluded from the decision-making process. Different types of stakeholders exist:

Primary stakeholders are those directly affected by a project, either positively (e.g. project beneficiaries) or negatively (e.g. those involuntarily resettled). In many contexts, primary stakeholders are often divided by gender, social or income classes, and occupation or service user groups. Care is needed in classified stakeholders as 'similar' groups (e.g., farmers, villagers) may have little in common and have very different interest.

Secondary stakeholders are the intermediaries in the delivery process, or those groups affected indirectly by the project. They can be divided into funding, implementing, monitoring and advocacy organisations.

Key stakeholders are those who significantly influence, or who are important to the success of the project. They may be either primary or secondary stakeholders.

Usually no distinction is made between stakeholders and actors. However, a useful differentiation recognises that not all those whose actions are part of an environmental matter recognise (or accept) they have a stake in an EPM process for the PUI. For example, an industry located in a city may be discharging harmful wastes into a river leading into the PUI, and its operators may not recognise or be interested in the problem which is the outcome of their activity. They do not see that they have anything to win or lose.

Stakeholder participation is a process whereby stakeholders play an active role in a process which affects them.

Sustainability (of a natural resource base): with regard to environmental matters, often this is defined as the quality of not degrading the environment and running down resources such that present and future generations will not be able to enjoy them.

The environmental sustainability of the natural resource base of the PUI is linked to the sustainability of the regional extraction patterns of renewable and non-renewable resources and the minimisation of environmental costs (waste, pollution) from rural and urban systems to the PUI. Similarly, the sustainability of both rural and urban areas can be affected by the dynamic and changing flows of commodities, capital, natural resources, people and pollution taking place in the peri-urban interface.

Sustainable Livelihoods: a livelihood is made up of the capabilities, assets (including both material and social resources) and activities required for living. A livelihood is sustainable when it can cope with and recover from stresses and shocks and maintain or enhance its capabilities and assets, both now and in the future.

Sustainable Livelihoods Framework (SLF): is a tool to analyse livelihoods. It has three main components: assets, transforming structures and processes, and livelihood strategies and outcomes.

Livelihoods assets. At the heart of this SLF lies an analysis of the five different assets upon which individuals draw to build their livelihoods. These are:

Natural assets. The natural resource stocks from which resources flows useful for livelihoods are derived (e.g. land, water, wildlife, biodiversity).

Social assets. The social resources (networks, membership of groups, relationships of trust, access to wider institutions of society) upon which people draw in pursuit of livelihoods.

Human assets. The skills, knowledge, ability to labour and good health important to the ability to pursue different livelihood strategies.

Physical assets. The basic infrastructure (transport, shelter, water, energy and communications) and the production equipment and means which enable people to pursue their livelihoods.

Financial assets. The financial resources which are available to people (whether savings, supplies of credit or regular remittances or pensions) and which provide them with different livelihoods options.

Transforming structures and processes: transforming structures (public sector, private sector, civil society) and processes (legislation, policies, culture and institutions) are crucial because interventions at this level are likely to affect strategies and outcomes. They operate at all levels, from households to global, and determine access to assets, terms of exchange between different assets, and the returns (economic and non-economic) to livelihood strategies. Understanding transforming structures is especially important in the PUI, where institutional fragmentation and rapid change in the roles, responsibilities, rights and relations between different groups and organisations can result in growing social polarisation.

Livelihood strategies and outcomes: this is where rural-urban linkages can be more visible, for example in the form of different forms and types of migration, multi-spatial household organisation, etc. It is also where the opportunities and constraints characteristic of the PUI can be more easily identified, for example in the types of income diversification strategies available to different groups.

The sustainable livelihood framework is essentially a participative tool whereby people identify not only what livelihood assets are and also the major constraining forces or factors are (including structures and processes) that affect their livelihood options.