

LOCAL ENVIRONMENTAL HEALTH ACTION PLANS
(LEHAP)

RESOURCE MANUAL TO SUPPORT
TRAINING IN CHINA



Ministry of Health, P.R. China



Institute for Environmental Health
and Related Product Safety, China CDC

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Preface

This document has been prepared as part of the Spanish MDG Joint Program in order to provide resource materials for the implementation of:

- a. LEHAP development within four Provinces in China to serve as a model for other communities,
- b. a framework for the ongoing implementation of a strategic approach to manage the health impacts of climate change.

Acronyms

CEHAP:	Community Environmental Health Action Plans
ESD:	Ecologically Sustainable Development
EH:	Environmental Health
EHIS:	Environmental Health Information Systems
GIS:	Geographic Information Systems
HCN:	Healthy Cities Network
KRA:	Key Result Area
LA21:	Local Agenda 21
LEAP:	Local Environmental Action Plans
LEHAP:	Local Environmental Health Action Plans
MEAP:	Municipal Environmental Action Plans
NEAP:	National Environmental Action Plans
NEHAP:	National Environmental Health Action Plans
NIS:	Newly Independent State
NGO:	Non-government Organization
OECD:	Organization for Economic Cooperation and Development
OHN:	Our Healthier Nation

PAP:	Priority Actions Program
SoE:	State of the Environment
SD:	Sustainable Development
WHO:	World Health Organization
WHO/WPRO:	World Health Organization Western Pacific Regional Office

1.0 Purpose of Resource Manual

The manual is developed to support the conduct of training workshops to be conducted in four pilot Provinces in China as part of the MDG Joint Program on Climate Change.

As such the Resource Manual provides:

- 1. Strategic planning techniques suitable for local EH planning**
- 2. Resource material related to Local Key Performance Areas**
- 3. Resource material related to development of local climate change adaptation and mitigation planning**
- 4. International examples of LEHAP to serve as a guide to local implementers**

1.1 Background

Overview of NEHAP and LEHAP Development

As will be described in this manual many countries, throughout Asia and Europe have found that current and future development pose significant threats to the health of the globally community. Of particular concern is the current and predicted threat to health arising from climate change. The UN community is actively supporting developing nations to build adaptive capacities and mitigation policies to address this threat.

In China and elsewhere there is a recognised need to build a strong environmental health management system as part of it's response to climate change. The vehicle for this has been through the development of National Environmental Health Action Plans (NEHAP). To date over 100 countries have developed NEHAPs. An important component now is the development is the parallel development of Local Environmental Health Plans (LEHAPs) which has been recognised as key to the implementation of real change 'on the ground'.

The Emergence the NEHAP and LEHAP

The international community has continued to call for changes in the way nations manage the interface between environment and health. Following the adoption of Agenda 21, which embraced the concept of sustainable development, numerous countries began to review and change the way they manage development. In Europe for example the WHO facilitated in 1994 a meeting of European Ministers of Health to discuss the way forward. The meeting endorsed the "Helsinki Declaration" which called for the development of a new policy development approach termed "National Environmental Health Action Plans". The Ministers recognized that the rapidly deteriorating environments throughout Europe required them to commit to the development of environmental health policy and practice which was both integrated and innovative. The NEHAP was considered to provide a framework for both short term and long term action, and environmental health was considered to be the intellectual concept upon which change could be built. A particular focus of the NEHAP was intended to be on the integration and further improvement of each country's environmental health tools.

As described by WHO, many countries urgently need to create or improve the main tools available to decision-makers for environmental health management. To be effective, this requires a shift from the traditional approaches to actions more in keeping with the principles endorsed under Agenda 21. Such tools require a planning framework that reflects the need for new partnerships between authorities in environment and health and other relevant sectors at all levels of management. The development of the NEHAP was intended to provide this framework by linking national, regional and local goals to specific actions and in the process identify necessary resources to support change.

The main environmental health management tools to be considered in a NEHAP are identified as:

- Environmental health information systems
- The identification and assessment of environmental health hazards and risks
- Framework of enforceable legislation

- Additional control measures, including economic and fiscal instruments
- Environmental health services
- Professional education and training
- Public information and health education
- Public participation
- Research and technological development.

The NEHAP also links the development of these tools with a wide range of environmental health issues by providing a strategic approach to the management of issues such as:

- Waste management
- Environmental pollution
- Food and drinking water safety
- Disaster management
- Vectors
- Climate Change
- Occupational health and safety
- Housing
- Indoor environments

Local EH Plans

The review of the pilot NEHAPs in other countries identified that a Local Environmental Health Action Plan (LEHAP) is a particular case of applying the principle of subsidiarity. Most pilot countries have been encouraging local action because;

- The priority to be assigned to environmental health problems will vary greatly from area to area.
- Local solutions have the advantage of fostering support through a feeling of local ownership.
- Interest in linking environmental health measures to Local Agenda 21 and the Healthy Cities campaigns.

The China NEHAP

The National Environmental Health Action Plan (NEHAP), provides a strategic direction for China to proactively address the Environmental Health issues facing China. Its primary focus is to improve the practical approaches to controlling and managing environmental hazards in the protection of public health and the environment. While the NEHAP approach is relatively new in Asian countries – it is well established in Europe where important lessons have been learnt including the need to implement strategies to transfer the broad frameworks contained in the NEHAP to the local level. The vehicle for this has been termed ‘Local Environmental Health Action Plans’ (LEHAP). Without such planning strategies change at the local level has been found to be highly problematic.

In China, ‘Action Research’ is proposed as a primary intervention strategy with its aim to facilitate the development of a LEHAP at the Provincial or city level. This will involve the development of LEHAP working groups comprising representatives from government and civil society. Workshops will be conducted to support knowledge and skill development with these teams prior to facilitating the development of a local strategic planning process, which both contextualizes the NEHAP in term of issues such as climate change and work with local priorities. The process will require time to unfold and produce learning that can be adapted and used by the local teams. A National workshop is proposed to share the lessons learnt and explore opportunities for transferring the knowledge gained. As the overall project unfolds integration of tools such as risk assessment and information management described below will be facilitated.

Development of LEHAP Models

China is a diverse and complex nation and as such it is expected that LEHAP development will reflect that diversity and a ‘one shoe fits all’ approach is unrealistic. The process of LEHAP development will therefore need to reflect the social, environmental and cultural character of each Province but at the same time they will need to reflect the general policy framework provided in the China NEHAP.

As part of the MDG Joint program it is expected that two interrelated areas will need to be addressed in all LEHAPs:

1. Focus on improvement of Key Performance Areas within the delivery of Environmental Health Services

The key performance areas currently being reviewed include:

- Monitor Environmental Health Status to Identify Community Health Problems
- Diagnose and Investigate Environmental Health Problems and Environmental Health Hazards in the Community
- Educate, Empower and Engage with Community
- Enforce Laws and Regulations that Protect Environmental Health and Ensure Safety
- Effective policy development to enable response to priority environmental health issues
- Assure a Competent Environmental Health Workforce
- Plan and Evaluate Effectiveness, Accessibility, and Population-Based Environmental Health Services
- Research for New Insights and Innovative Solutions to Environmental Health Problems

2. Focus on development of specific strategies to adapt and mitigate climate change impacts on environment and health

- Conduct of vulnerability assessment for the Province
- Identify key environments and communities at risk
- Develop specific strategies to support mitigation of GHGE which have public health benefit
- Develop and implement specific strategies to support adaption to climate Change.

SECTION A:

2.0 LEHAPs: Processes and Frameworks

Frameworks for local action planning in relation to environment and/or health exist in a variety of forms. There are Local Agenda 21 Plans (LA21), Healthy Cities Projects, State of Environment Reports (SoE Reports), Community Environmental Health Action Plans (CEHAP), Local Environmental Action Plans (LEAP), Municipal Environmental Action Plans (MEAP), and of course Local Environmental Health Action Plans (LEHAP).

NEHAPs, and their local equivalents LEHAPs, were given rise at the Second European Ministerial Conference on Environment and Health held in Helsinki in 1994. They were seen as an appropriate way to address the framework of the Rio Declaration of 1992, the concept of sustainable development and Global Action Plan, Agenda 21 (MacArthur, 2000).

LEHAPs were developed out of the process of formulating and drafting NEHAPs in Europe and were identified as a priority area for ensuring the success of NEHAP implementation at the 4th Meeting of Vishegrad Group Countries (representatives from Austria, Croatia, the Czech Republic, Hungary, Poland, Romania, Slovenia as well as the European Regional Office of the World Health Organization) in 1998 (Vishegrad Group Countries, Online).

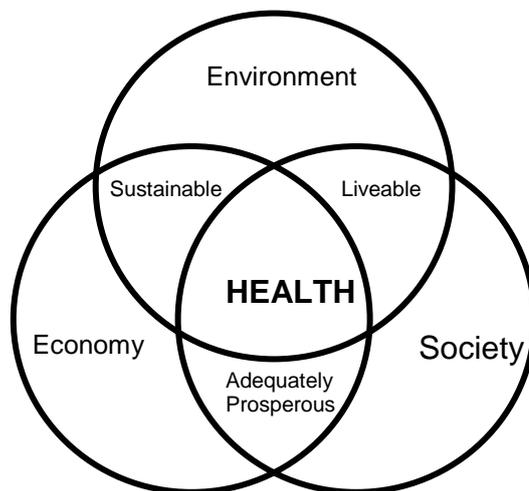
The idea of linking local action to national plans is nothing new, but it is questionable as to how effective the process is in practice. Effective local action in the area of environment and health is difficult to find. There are many examples of good small-scale projects, however examples that link into existing strategies and policies, and receive adequate resources, are rare (Church and UNED Stakeholder Forum, Online).

The purpose of this document is to guide local environment and health planners in making these linkages in the adoption, development and implementation of LEHAPs. It aims to inform local authorities of the possibilities for using the LEHAP

framework in ways that are flexible and accommodate the particular needs of individual nations, localities and settings.

“It is now well established and widely accepted that addressing environmental health issues effectively can only be achieved through working in partnership with others. ‘Health’ in many respects is not a natural product, rather it is the result of an interaction and balance between society, economy and environmental pressures and drivers.” (MacArthur, 2000) See Figure 1 below.

Figure 1 A Health and Sustainable Community



Source: (Department of the Environment Transport and the Regions, 1998) in (MacArthur, 2000).

3.0 What is a LEHAP? Who is using them? Who isn't & why not?

NEHAPs and their local equivalent, the LEHAP, arose out of the Second European Ministerial Conference on Environment and Health, held in Helsinki in 1994. They were seen to fit within the framework provided by the Rio Declaration of 1992, the resultant Agenda 21 initiative, and the notion of sustainable development generally (MacArthur, 2000). LEHAPs are principally a local planning initiative providing a framework for cooperative action on environment and health in the recognition that they are inextricably linked.

Until 1999, in most countries in Europe, NEHAPs themselves had only recently been adopted or were in the process of being adopted (Regional Environmental Centre for Central and Eastern Europe, Online), and since then many have been slow to develop and implement LEHAPs (with the notable exception of the Newly Independent States of Eastern and Central Europe).

The UK in particular has stagnated in producing LEHAPs after the initial development of NEHAP.

“Despite the call from the WHO, and others, for localities to produce LEHAPs, the UK (unlike some other nations) has only a handful. Hard-pressed local councils and health trusts and boards have resisted the call to set up yet another process, rather as most of them did when the idea of local Biodiversity Action Plans was launched in 1996.”
(Church and UNED Stakeholder Forum, Online).

The problem is one of parallel processes occurring in environmental, and related fields, leading to duplication of work (European Environment and Health Committee, 1995). Ian MacArthur, in conjunction with the Chartered Institute of Environmental Health, the Department for International Development and the WHO Regional Office for Europe, has authored a substantial guidance document on LEHAPs. He states:

“At the local level, the idea of developing LEHAPs to implement NEHAPs comes late to an already crowded market of local initiatives. Local Agenda 21 (LA21), the Healthy Cities concept and movement, the Sustainable Cities project and others, are all well established in their own networks and methodologies.” (MacArthur, 2000).

Some means of overcoming this problem are explored in **Section 4.1.1** and the decisions that this presents to EH planners is discussed in **Section 8.2**. Also, MacArthur goes on to state:

"It is recognized that a LEHAP is unlikely to be the first or only plan developed by a municipality, and that compromises will be required if it is to fit with the suite of existing strategies and plans. The municipality may already have a physical development plan, an economic development plan, a local health plan, a housing strategy, an environmental policy, an energy plan, a transport strategy, biodiversity, social programmes and many more besides. The LEHAP framework provides a means to begin to integrate some of these issues, and to investigate the linkages between different sectoral plans. In this way the process of developing the plan can have as a significant impact as the final document itself. It may even demonstrate hitherto unseen linkages, highlight duplicated work and activities and can point towards cost savings. It may also demonstrate where gaps exist and where new resources need to be directed." (MacArthur, 2000).

In the Newly Independent States (NIS) of Central and Eastern Europe NEHAPs/LEHAPs have been widely accepted as being the most appropriate framework to apply to their particular situation.

“Local Agenda 21 is not at all popular, because the countries of NIS are not able to promote consistent strategies of sustainable development due to the transitional state of their economies. Also,

the environmental health agenda does not have a clear enough focus in the Local Agenda 21 strategy. The NEHAP on the other hand focuses on the exact issues which are the current problems of the NIS, where environmental and health disasters are having a major impact on the wellbeing of the population.” (Golubovska-Onisimova, 2000).

The NIS countries view the LEHAP framework as being crucial for the development of democracy and sustainability. They are to be a means for providing an opportunity for local activists to help create a framework for action that is in line with priorities of NEHAPs applied to the local level (Golubovska-Onisimova, 2000).

“LEHAPs will provide a forum for multi-sectoral debates, which can be more open and productive in Ukraine than in Western countries, as both the third (NGO) sector and the second (private) sector are quite new, and are not burdened by historical differences in culture and the distrust which can be prevalent in the West.” (Golubovska-Onisimova, 2000)

LEHAPs have been implemented in Fiji and, in Australia; Community Environmental Health Action Plans (CEHAPs) are being developed. These will be explored in subsequent sections of this paper.

4.0 LEHAPs in Europe

Much of the European approach to the LEHAP/NEHAP process has already been outlined in previous sections of this paper. As mentioned previously, the adoption of preparation and implementation of LEHAPs has been slow in following on from NEHAPs. However, the adoption of LEHAPs in the NIS countries of Eastern and Central Europe has been relatively successful and widespread.

“In these countries... there are currently no other strategies related to health and environment, and no equivalents to the Healthy Cities Program, or Local Agenda 21. Thus, the NEHAP and LEHAP are potentially a very powerful tool for organizing different sectors of the community at local and national level to form and implement a policy which meets local needs.” (Golubovska-Onisimova, 2000).

Another reason for the success of the LEHAP process in Eastern and Central Europe is in the incorporation of public participation into all phases of the project. This will be discussed in further detail in **Section 8.0**. Related to this aspect is the fact that, in Eastern and Central European countries, the LEHAP preparation campaign is generally widely advertised through mass media, publishing of special posters, leaflets, brochures and other publications.

“... both the authorities and all those involved in the work on elaboration of the draft cooperate closely with the media, and the latter usually covers the whole process, providing regular reports on development and, therefore contributing to the overall transparency of the process.” (Regional Environmental Centre for Central and Eastern Europe, Online).

Generally, in Europe, the LEHAP is principally a tool for the implementation of the NEHAP. The plans are part of the same initiative yet on a differing scale. LEHAPs in this context are narrower in focus on the range of environmental and health issues to be addressed than a NEHAP. The issues addressed in LEHAPs are more specific and require more detailed proposals for action (WHO Regional Office for Europe, 1998).

Some European countries have decided not to require separate LEHAPs and instead intend that local actions to implement NEHAPs should take place through pre-existing frameworks and systems (WHO Regional Office for Europe, 1998).

In response to the establishment of the NEHAP in many member states, the WHO European Regional Office extended and strengthened its existing programs aimed at assisting local authorities in providing technical information and guidance on environmental health (WHO Regional Office for Europe, 1998).

"Contrary to the overly economic and overly health approach of Local Agenda 21 and respectively Healthy Cities, the Regional Office for Europe of WHO has launched a new local environmental health policy initiative - the development and implementation of Local Environmental Health Action Plans. This initiative stems, in large, from the successful experience with developing and implementing NEHAPs throughout the European region and from the view that the successful implementation of NEHAPs at the local level shall follow the similar principles and approaches for planning and implementation. The purpose of the LEHAP process is to span environmental and health aspects and provide impetus to put "health" into the environmental projects and "environment" into the health projects. WHO/EURO has prepared a document "Local Environmental Health Planning: Guidance for Local and National Authorities" that reviews the different approaches and the good practice in setting up the planning process, identifying and involving the different stakeholders in LEHAP development. In addition WHO is preparing a pamphlet for local authorities with practical advice on local environmental health planning." (Haralanova, 2001).

The European approach, whilst being tied to the NEHAP, still requires local authorities to play the key role with assistance to be given by the central government of the state (Haralanova, 2001). A major hurdle that has been identified is the poor relationship and communication between central governments and local authorities (WHO Regional Office for Europe, 1998).

"Central Government and its agencies need to support actions being undertaken at the local level, particularly in setting up the planning process, preparing environmental health status, selection of priorities, and application for projects to national funds and international donors." (WHO Regional Office for Europe, 1998).

Indeed, the impetus for LEHAPs will rely heavily on the national level as the NEHAP movement is not as well known or publicised as other frameworks, such as the Agenda 21 program (MacArthur, 2000).

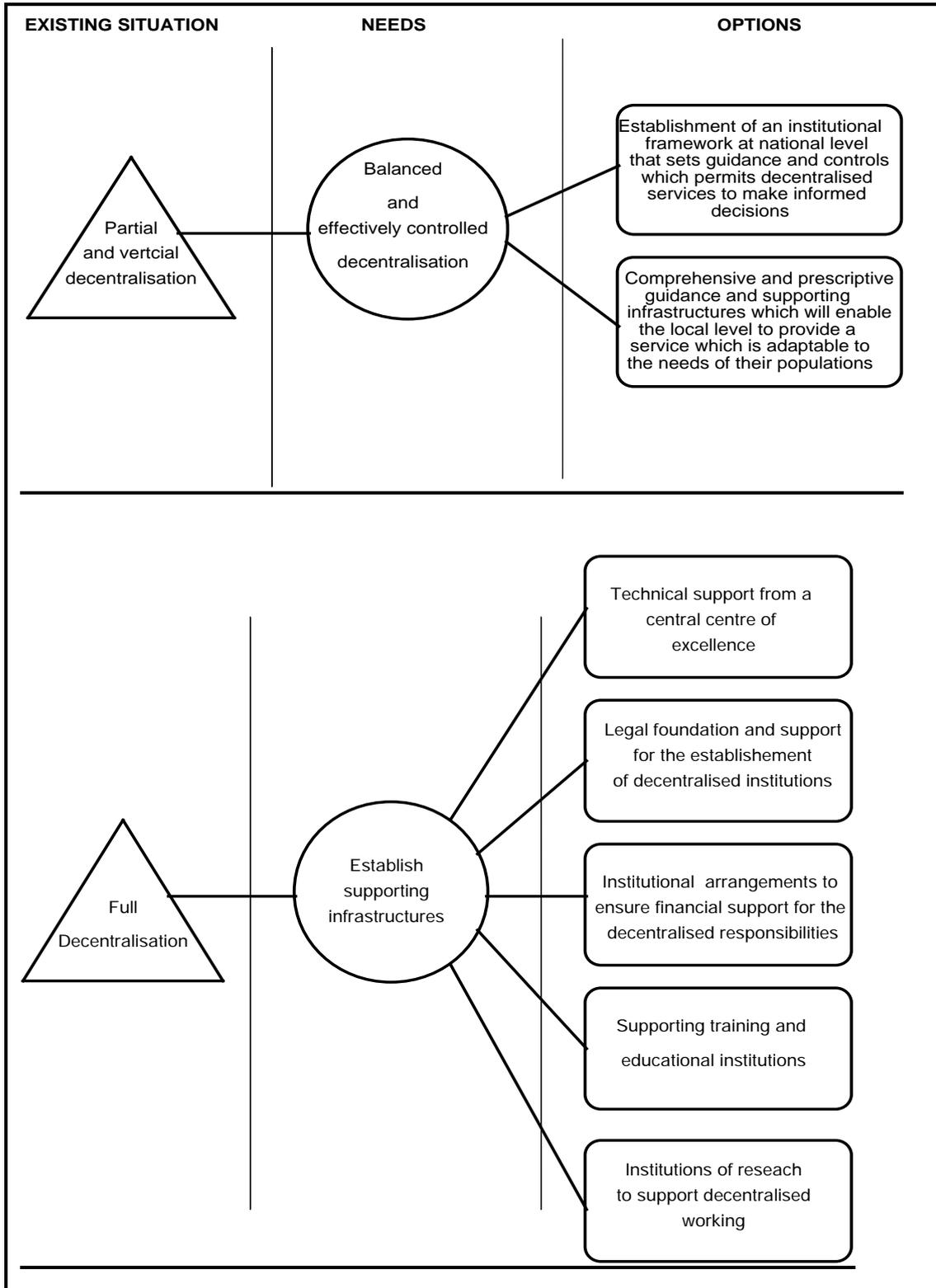
In association with this need it is recommended that political commitment, organizational infrastructure and a thorough analysis of the priorities in each local situation are ensured and complete before the first draft of a LEHAP is commenced. In Europe this approach has identified environmental health professionals as being responsible for promoting the plan with local politicians in order to achieve political commitment. This approach also places particular emphasis on developing and maintaining an inclusive, open and transparent method for proceeding (Haralanova, 2001).

An issue relevant to the European experience is that of decentralisation of administrative and political responsibility (MacArthur, 2000).

"Decentralisation is taking two principle forms. First, there is vertical decentralisation where central authorities strengthen their regional or local implementation offices. In this situation primary responsibility does not change significantly, but the degree of activity at local and regional levels will increase. The second process of decentralisation is where both activity and responsibility is transferred to the regional or the local level. Unfortunately this transference of full or major responsibility is not always supported by the necessary supporting mechanisms and infrastructures to ensure the effective operation at the local level. When such a policy is adopted, it is necessary for the institutional support to be available at the national level." (MacArthur, 2000).

This situation is outlined in **Figure 2** below:

Figure 2 Options for decentralisation Reforms (the European context)

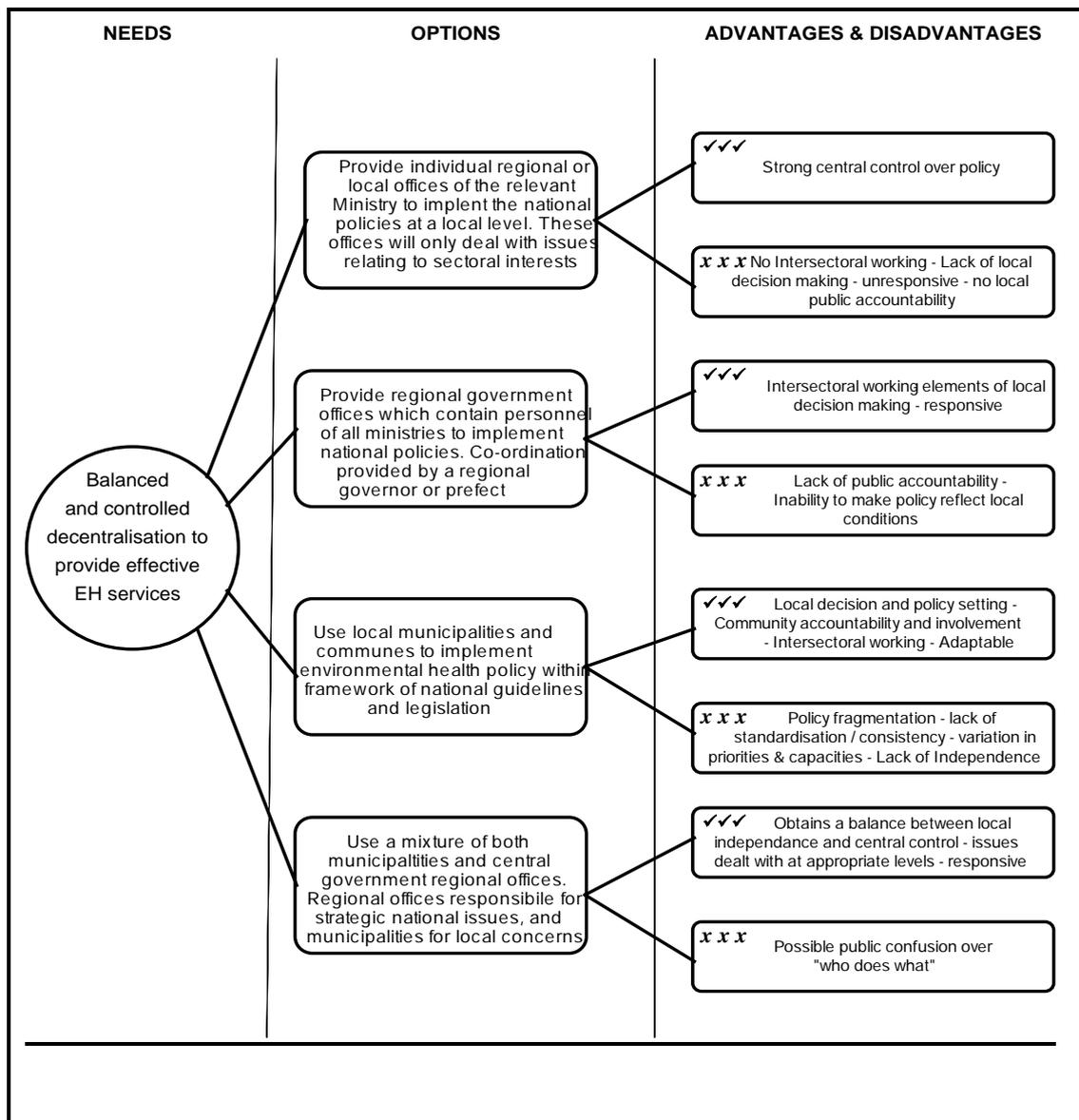


Source: (MacArthur, 2000)

The process of decentralisation offers a variety of options for the delivery of environmental health services. The advantage of localising services is that there can be more effective and adaptive attempts to meet the needs and desires of populations which vary greatly from country to country, city to city and culture to culture (MacArthur, 2000).

Figure 3 shows a more balanced and effective (in terms of EH) approach to decentralisation. See below:

Figure 3 Balanced Options for Decentralisation Processes (the European context)



Source: (MacArthur, 2000)

Even with a balanced approach to decentralisation of government responsibilities, there is still a need for central governments to be the key actors in the LEHAP process.

"In many countries local government can only act on certain issues where they have distinct and specific legal powers to do so. In such constitutional circumstances, it will be implicit upon the national government to provide the necessary legal basis to develop a LEHAP. This may require subsequent and related powers, to raise funding, through taxation or other external mechanisms, to engage in partnership and joint funding arrangements, and to physically take action or require action to be taken on certain issues."
(MacArthur, 2000).

Finally, the greatest support and encouragement to the LEHAP process (as experienced in the European context) is for national authorities to be working in the same direction and for similar objectives as local communities (MacArthur, 2000).

5.0 LEHAPs in Fiji

In Fiji LEHAPs have also been developed as a part of the NEHAP process, however there are some fundamental differences to the European process.

“The Fijian NEHAP, unlike the European pilot countries, was a grass roots document. In fact, two Fijian NEHAPs were developed within three years, demonstrating the ‘emerging’ nature of the document. Unlike countries such as Latvia, Fiji approached the broad issue of EH selectively, drawing heavily upon the LEHAP as a planning *instrument*, used to define priorities, formulate objectives and develop national plans of action.” (Powis, et al, 2002).

The term ‘grass roots’ in this case refers to the way in which LEHAPs were deferred to EHOs in each district for comment and input on specific action that could be taken locally in line with the national objectives. The district EHOs are then responsible for driving and implementing these actions, and also for developing and monitoring indicators for success of these actions.

“Fiji has devised a mechanism to derive LEHAPs in line with national policy. The strategies... (from the NEHAP*) were copied across to empty LEHAP formats and loaded onto diskettes. These were distributed to district EHOs along with a copy of the NEHAP...

Local EHOs were given discretion to propose how they might respond to each strategy...” (Fiji Ministry of Health and WHO Western Pacific Regional Office, 2002) (**Parentheses added*)

This approach is applied individually to each of the nine key result areas (KRAs) identified in the NEHAP for Fiji. The layout or ‘empty LEHAP format’, as distributed to district EHOs, is illustrated in **Figure 4** below:

Figure 4 The landscape layout of a LEHAP format for each of the KRAs

Strategies	Improvement Activities	Officer	By Date	Indicators of Success
Numbers and words identical to National Strategies already laid out in the 'Improvement Strategies' section of the NEHAP.	This space is for EHOs to propose activities for each strategy that may apply. Some strategies may belong higher in the organization.	Space to identify active EHOs by name.	Target dates for each activity.	This allows space to describe what might be happening nationally and/or locally if the strategy is working.

Adapted from (Fiji Ministry of Health and WHO Western Pacific Regional Office, 2002).

This is in contrast to the use of the term 'grass roots' in the Australian context of CEHAPs in which there is a strong emphasis on community groups setting goals and initiating action in partnership with EH professionals.

6.0 CEHAPs: an overview of the Australian Approach

The Community Environmental Health Action Plan (CEHAP) is an Australian initiative that seeks to implement local environmental health strategies that link the community commitment of voluntary programs to the legislative power of government. There is an agenda to bridge the divide between health and environment currently found in professional and government services and community expectations, as well as the recognition of the need to bring together a wide range of activities and resources for environmental health from the community, experts and government (Nicholson, Stephenson, Brown and Mitchell, 2001).

The focus is very much on community action with examples of projects such as:

- Illawarra's Dioxin Action Campaign – a community campaign in response to identified leukaemia clusters.
- Creating supportive networks for parents fighting to relocate a mobile phone tower.
- Community action in raising awareness of the health risks of the use of organophosphate pesticides.

(Nicholson, Stephenson et al., 2001)

There is an emphasis on 'place-based planning', which incorporates the notion of 'saving what we value, changing what we don't' (Nicholson, Stephenson et al., 2001), however there is also recognition of the importance of central planning:

"The dilemma facing Community Environmental Health Action Plans is that legislative planning frameworks are focused, circumscribed, detailed and mandatory; integrative community/government frameworks value diversity, are open-ended and, in principle, voluntary; and neither can be effective without the other." (Brown, Nicholson, Stephenson, Bennett and Smith, 2001)

Fundamental to the CEHAP approach is the recognition of the various kinds of relationship that occur between actor / authority and community. **Figure 5** illustrates

various degrees in this relationship. The scale runs from degree of 'outsiderness' to degree of 'insiderness'. Each position represents a quite different relationship between actor and community:

Figure 5 Community action scale: Outsiders and insiders



A research team based at the Regional Integrated Monitoring Centre, University of Western Sydney, has been actively developing and publicising the framework for CEHAPs. The project is commissioned by the Commonwealth Government of Australia through the Environmental Health Unit of the Department of Health and Aged Care. The CEHAP process is linked to, but quite distinct from, the 1999 National Environmental Health Strategy (Commonwealth Department of Health and Aged Care, 1999).

The framework's basis came out of a study involving 36 people in leadership positions in community environmental health action (working in policy, strategy, action and evaluation) from every State and Territory in Australia. The study consisted of one to two hour interviews regarding the present state of community-based environmental health as perceived by the interviewee. All agreed that CEHAPs were a good idea IF they produced action and didn't just sit on a shelf (Brown, Nicholson et al., 2001).

Figure 6 below broadly illustrates some of the linkages necessary for community-based environmental health action:

Figure 6 Web of Community-based Action for Environmental Health



Adapted from Planning Web concept by P. Cuming. Source: (Nicholson, Stephenson et al., 2001)

The overall approach can be summed up by the title given to a guidance document on CEHAPs ('Grass Roots and Common ground'). The projects seek to find a common ground in that they aim to build alliances between stakeholders with widely varying agendas. The projects also seek to work from the grass roots in that they are largely driven by community groups that identify issues of concern and then seek to act on them in consultation and partnership with experts and government.

This approach is to provide access and guidance in resourcing community groups and individuals to take action. Some of the tools, exercises and activities provided to empower such groups are listed below:

- Brainstorming
- Committee procedures: How to hold a meeting
- Conflict resolution skills
- Consultation processes
- Focus groups
- The Internet as a lobbying tool
- Listening
- Lobbying
- Media
- Negotiation
- Priority setting & nominal group processes
- Speaking in public
- Visioning
- Writing

(Nicholson, Stephenson et al., 2001)

An initial step in involving the community in environmental health processes can be achieved by something as simple as a mail out of invitations to a meeting about a particular issue. Such was the case when Manly Council sent invitations to known community groups, radio, community newspapers and television, to attend a 'Litter Summit'. Having already facilitated the setting up of a 'Litter Strategy Working Group', the aim was to recruit key community players to form a partnership with the Council (Nicholson, Stephenson et al., 2001).

A potential key issue in ensuring the future success of CEHAPs has been identified as the need to link mandatory and voluntary frameworks (Brown, Nicholson et al., 2001). In developing a strategy to do so, four distinct sets of collaborator have been observed. They are: the policy-makers, the administrators, the specialist practitioner and local interest groups. Linking mandatory and voluntary frameworks will allow

better collaboration between these sets. Four strategic directions that facilitate this are:

- Local legislation supporting innovative voluntary frameworks;
- Extension education for Environment and Health practitioners;
- Annual whole-of-environment reporting to expert and community future goals; and
- Community alliances responsible for addressing specific issues.

Source: (Brown, Nicholson et al., 2001)

The approach that is evolving is to develop a planning process within a community model and to then utilise the drafting of local law to formally express and legislate the communities will (Brown, Nicholson et al., 2001).

7.0 Public involvement in LEHAP development

7.1 To what extent should LEHAPs be community driven?

There is much made about the importance of public participation in drafting and implementing a whole range of environmental policy decisions and actions, however the whole process is often overlooked for a variety of reasons. Despite the jargon about the benefits of public participation, there is a very important question as to whether or not public / community involvement is appropriate in preparing and implementing LEHAPs and, if so, at which stage. Speaking of the importance of community participation, Ian MacArthur states:

“Not only does it get people more involved; it also develops mutual understanding and respect which can lead to greater local commitment and participation in solutions. The development of participatory democracy... is born out of a realisation that many of the problems we face in environmental health at the beginning of the 21st Century will only be solved when whole communities can understand and act together for their solution. For example, an individual’s action to use public transport instead of a personal car, will make very little difference to air quality in a city; it will only be when a large proportion of the whole community change their travelling habits that discernible change will be measured. This type of action can only be achieved through an informed, engaged and empowered community.” (MacArthur, 2000)

This decision, as to how, who and when to involve the public / community, is ultimately in the hands of the individual nations and local authorities drafting and implementing LEHAPs. The text that follows will seek to illuminate some of the different approaches and their success or appropriateness in each situation.

A European Conference and Environment and Health, held in Frankfurt in 1989, adopted a charter (The European Charter on Environment and Health). It outlined the right to access to information, consultation and participation in decision-making for

individuals and the public in general. It also emphasises the importance of NGO's in promoting public awareness and distributing information (WHO Regional Office for Europe, 1990).

Furthermore, in the Environmental Health Action Plan for Europe, NGO's are designated as one of the main sectors that should participate in improving health and environment, whilst public participation is listed as a main tool for environmental management (WHO Regional Office for Europe, 1994).

The experience of NEHAPs, in Europe, shows that the drafting process, and much of the implementation, is almost entirely driven by government. In most countries public participation in NEHAP preparation is limited to commenting on the pre-final draft.

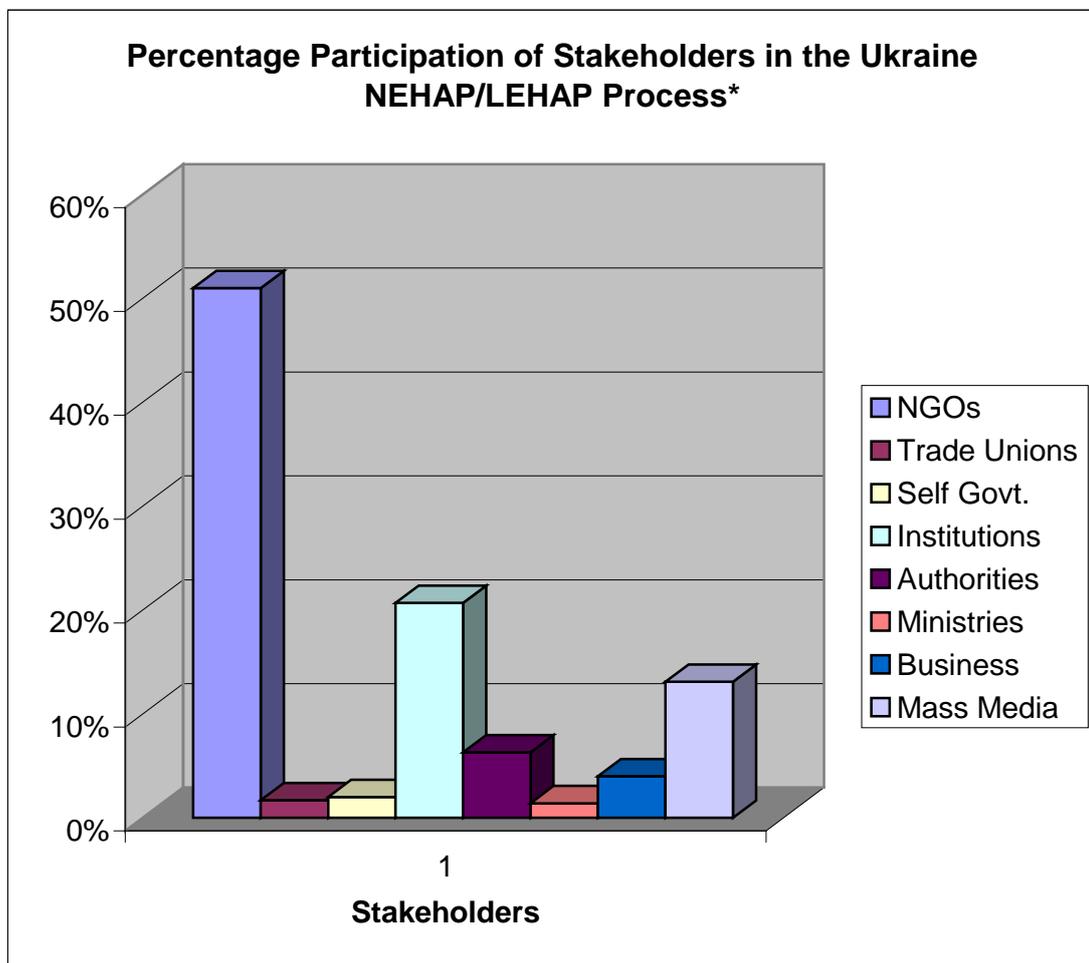
“... information on drafts... was either selected by the government or identified by NGOs upon governmental request... However, despite limited provisions of public participation in the texts of the NEHAPs themselves, it is evident that the public is more active in the process of *local implementation*. This is particularly true in the preparation and implementation of the Local Environmental Health Action Plans (LEHAPs).” (Regional Environmental Centre for Central and Eastern Europe, Online) (*Emphasis added*)

It is apparent in Europe (or at least in the countries that have continued the NEHAP process through to the LEHAP level) that the means of facilitating public and NGO participation in NEHAPs is accommodated within processes of preparing and implementing LEHAPs. That is, LEHAP is the vehicle for this process, in regards to NEHAPs, and in this instance the importance of public participation cannot be understated. It is the very driving force of implementation of national policy at the local level.

Figure 7 charts the participants involved in the implementation phase of NEHAPs in the Ukraine. It shows the involvement of NGOs at this level as being far greater than any other sector.

“One of the important outcomes of our Consultative Process is that many NGOs around Ukraine have been stimulated by the process and are now ready to organize their own Public Consultations for developing and implementing Regional and Local Plans on Environmental Health. Not only NGOs were identified as actors but also Trade Unions, Committees for Self-governance, Local Authorities, Medical, scientific, research and educational institutions, Ministries, Business and Mass-media.” (Golubovska-Onisimova, 2000)

Figure 7 Percentage Participation of Stakeholders in the Ukraine NEHAP/LEHAP Process



*Adapted from (Golubovska-Onisimova, 2000)

The Eastern and Central Europeans have found that the earlier public/community access and involvement is initiated, in the drafting of LEHAPs, the more open the

process became and, consequently, higher relative levels of success were experienced in implementing the LEHAP. Whereas the NEHAP process tended to involve only the most active NGOs, LEHAP preparation in Central/Eastern Europe involved “anyone active in the community and interested in the issue” (Regional Environmental Centre for Central and Eastern Europe, Online).

Reflection on success of LEHAP implementation in Eastern Europe has led to the following criteria for good practice of public access to information. See **Table 1** below:

Table 1 Criteria for Good Practice of Access to Information and Public Participation in the NEHAP/LEHAP Process*
1. Early information is provided to the public (all stakeholders and relevant NGOs) about the decision-making process.
2. Decision-making process is transparent: All information/documents, materials are accessible as soon as they become available, including the full minutes of consultations, hearings, reports of expert meetings. Progress reports are disseminated regularly.
3. There is public participation in designing the public participation strategy and procedure.
4. There is identification and early notification of the public.
5. There is early involvement in decision-making.
6. There are opportunities for the public to participate throughout the whole decision-making process in the different phases (developing, prior to adopting, implementing of the NEHAP/LEHAP and monitoring and reviewing the process).
7. It is an open-ended participation process. (Everyone who is interested can get on the list, participate and contribute.)
8. There is active notification. (Those who are on the list get all the information automatically, and those who should know about the process also get information)
9. There is a broad definition concerning stakeholders. All stakeholders should be invited to participate.
10. There are opportunities to submit comments which are seriously considered and documented, and substantive arguments are addressed in the decision-making process.
11. There is public involvement in the decision-making bodies in the LEHAP process, and the representatives of the public/NGOs are treated fairly.
12. The decisions are reasoned.
13. There is a possibility to review and challenge the decisions.

* Adapted from (Regional Environmental Centre for Central and Eastern Europe, Online).

Table 2 outlines, on a sliding scale, the various degrees of community participation and involvement that can be undertaken in the formulation and implementation of a LEHAP.

Table 2 Levels of Community Participation and Involvement

Control	Participants Action	Examples
High  Low	Has control	Organisation asks community to identify the problem and makes all key decisions on goals and means. Willing to help community at each step to accomplish goals.
	Has delegated authority	Organisation identifies and presents a problem to the community. Defines limits and asks community to make a series of decisions which can be embodied in a plan which it will accept.
	Plans jointly	Organisation present tentative plan subject to change and open to change from those affected. Expects to change the plan at least slightly and perhaps more subsequently.
	Advises	Organisation presents a plan and invites questions. Prepared to change plan only if absolutely necessary.
	Is consulted	Organisation tries to promote a plan. Seeks to develop support to facilitate acceptance or give sufficient sanction to plan so that administrative compliance can be expected.
	Receives information	Organisation makes plan and announces it. Community is convened for informal purposes. Compliance is expected.
	None	Community told nothing.

Adapted from Brager & Sprecht in (McCarthy and Ferguson, 1999); Source: (MacArthur, 2000).

It is clear that if public participation is to be an integral part of the LEHAP process, then it will be vital to maintain and foster the interest of those who become involved.

“Developing public consultation and participation can be a major, complex and inevitably lengthy process... however, it is of paramount importance that quick and meaningful feedback is provided to those who have participated. The process must be seen to be making a difference by those who are engaged in it or they will begin to lose their enthusiasm and commitment.” (MacArthur, 2000)

The Fijian experience shows that, although their LEHAP preparation was driven by health authorities, working with communities and building up relationships is very important. They offer a grounded and realistic approach, though it may not be the most expedient.

“Experience... has led Fiji EHOs to join with communities and build relationships around things that interest people. Sometimes communities set priorities that are not, strictly speaking, health. BUT the price of contradicting these local priorities is loss of a common cause. There are occasions in building community relationships, when the health agenda simply needs to wait.

This flexible approach directly contradicts the regulatory paradigm BUT gains from community participation outweigh the waiting time. When the timing is right, EHOs have found that the health agenda does return.” (Fiji Ministry of Health and WHO Western Pacific Regional Office, 2002)

Recognition of the value of community stakeholders is also important in ensuring commitment and effectiveness.

“Environmental and health professional, together with those working in social welfare and education, need to work with the economic sectors and other ‘major groups’ in society such as non governmental organisations, religious groups, and ethnic minorities. All of these, and other appropriate ‘stakeholders’, need to be ‘signed-up’ to the environmental health planning process and each

recognised as having an equal degree of commitment and responsibility to the process.” (MacArthur, 2000)

MacArthur also states the importance of practicing what you preach, in gaining the support and cooperation from the community.

“It should be realised from the outset of the LEHAP process, that the commitment to developing a plan has wider and deeper repercussions than merely producing a printed document. It implies a serious commitment to reviewing and changing the way in which the local municipality operates and implements its own policies. It calls upon a strong and authority wide determination to practise what it preaches in terms of health, development and environment. It may indeed identify a number of conflicts of interest which will need to be resolved and to introduce environmental management systems within the municipality. It is recognised that this is probably the hardest single element of the LEHAP process, and whilst it can be easily overlooked, such inaction would ultimately undermine the LEHAP process and the final plan.” (MacArthur, 2000)

7.2 Potential for a specific EH professional planning role

In the case of LEHAP development in Fiji, involvement in the drafting of LEHAPs was comprised exclusively of EH professionals/institutions with the support of Government Departments. The authorship for both NEHAP and LEHAP is attributable to the Fiji Institute of Environmental Health who initiated the process.

“The decision to develop a NEHAP arose from the Fiji Institute of Environmental Health, which was subsequently given the support of government ministries and has continued to enjoy a level of involvement in the formation of the initial NEHAP, developed in 1998 and its subsequent review in 2001.” (Powis, et al, 2002)

The involvement of the community is encouraged but the process of doing so takes place *after* the plans and their implementation strategies have been formulated. It is then up to the discretion of the district EHOs as to how they will engage the community in working towards the success of the improvement activities that have been drafted (Fiji Ministry of Health and WHO Western Pacific Regional Office, 2002).

This may be perceived as a weakness on one level, however the LEHAP has served the purpose of providing a framework for action planning that is specifically intended for use within the context of the environmental health profession.

“Community participation is a goal also cherished by the Environmental Health Service. BUT under the Central Board of Health, it must apply statutory standards equally across all divisions. EHOs need a management system that reconciles this dilemma:

- Linking local regulatory practice with national uniformity across all Divisions;
- BUT also opening up flexible and localised ways to invite community participation.”

(Fiji Ministry of Health and WHO Western Pacific Regional Office, 2002)

Internationally, EH professionals would employ LEHAPs, to meet their own planning needs, alongside other plans that are being used and adopted by other sectors in government and public domains (such as LA21, SoE, MEAP & LEAP). In regards to these other local planning initiatives, Ian MacArthur states:

“In recognising these powerful, secure networks and programmes, the conception and creation of LEHAPs needs to bring a different and positive perspective to existing initiatives, and it is not... to reinvent the wheel.” (MacArthur, 2000)

There may be plenty of opportunity, and indeed a need for, community involvement in the implementation of the plan, but the development and drafting stage is driven by EH professionals in consultation with various levels of government. It would then be a matter for local discretion, on the part of EH professionals, as to how and to what degree community involvement would take place.

The experience, as previously outlined, in Eastern and Central European NISs is that unless the community and NGOs are involved in the planning stage, then their interest and involvement in process won't be sustained. However, Ian MacArthur has the following to say in regards to too much emphasis being placed on community ownership:

“No matter how hard they try, people on or near the front line are in no position to launch or sustain the process of environmental health planning. They lack the breadth and the perspective needed to see the entire process through from start to finish, and they are limited in their ability to begin to bring different agencies and organisations together. Additionally, and inevitably, they can carry with them their own agendas which can sometimes act as barriers to the planning process and the development of joint working.” (MacArthur, 2000)

This is not to say that widespread consultation must not take place, it is simply a question of who is initiating the whole thing. Indeed it is essential for EH professionals/institutions to make these connections:

“Environmental health issues are by their nature multi-sectoral. They are too complex to be left just to environment and health professionals; they are however too important to be managed without them! What experience has shown us is that progress and success in addressing environmental health issues only comes when all agencies, at all levels, work together.” (MacArthur, 2000)

This may be a perfectly appropriate approach to the LEHAP in that it serves a purpose which is distinct from other initiatives that are already public/community driven, or at least involve the public in the planning stage, and are already competing for scarce resources in terms of support across a variety of sectors. The failure of the adoption of LEHAP, by communities and local authorities that have already invested heavily in such things as LA21 Plans, is evidence of this.

It is apparent that the very nature of a LEHAP is dependant upon the needs in a particular location. In Eastern Europe LEHAPs have filled a niche that required a framework within which the activities of citizens and NGOs could be co-ordinated and supported in unison with policy. In Fiji LEHAP ‘ownership’ has been adopted by professionals in the field of environment and health as a framework that can be adapted to the profession’s specific emphasis on health *in relation to* environment. In the UK LEHAP development has lagged due to the widespread acceptance of Local Agenda 21 Planning. Here it has been suggested that LEHAPs become incorporated as a part of Local Government’s LA 21 Plans in order to allow a sharper of focus on health and environment rather than environment in isolation to health (Church and UNED Stakeholder Forum, Online).

One of the key questions that should arise from this resource guide is whether or not the framework (and in which form) fits the needs of smaller or developing nations, and specifically the countries within the WHO/WPRO area. Ultimately this is a question that these nations must themselves decide.

SECTION B:

8.0 Transferring National Policy into Local Action (from NEHAP to LEHAP)

Responsibility for protection of environment and health lies ultimately at the national level, but local level issues are the ‘coal face’ at which plans must be acted upon and carried out.

“Responsibilities for action on environmental health issues cannot be placed at the local level without the national level providing the means, in terms of legislation, fiscal and collaborative powers. A complex balance of capacities and responsibilities is required.” (MacArthur, 2000)

In Europe local and municipal governments are seen as the most obvious vehicle through which these issues should be dealt with.

“... their common, locally democratic status, coupled with their ability to influence and work with and through other local and regional agencies means that local municipalities are the natural leaders for local environment and health planning.” (MacArthur, 2000)

Ian MacArthur goes on to outline some required ‘supporting actions’, which must take place at the national level:

“There are a number of actions which central government authorities can take to help support municipalities and other local agencies develop local environmental health action. These include:

- Providing the legal framework for local action
- Providing National guidelines on the development of LEHAPs
- Helping set priorities

- Helping develop national indicators for local use
- Develop information systems that are user-friendly at the local level
- Promoting integration across sectors
- Releasing funds or provide access to funds
- Providing increased local discretionary powers
- Assist with trans-boundary and cross border issues”

(MacArthur, 2000)

In regards to LEHAPs in Europe the approach has been to first develop and draft a NEHAP, for each particular country, which is largely driven and directed by government. The idea of a LEHAP follows principally as a means of implementing the national policy (Regional Environmental Centre for Central and Eastern Europe, Online).

In this sense it is more than a **local** extension of the NEHAP reduced to issues of local importance, it is rather the ‘*Action*’ in the National Environmental Health *Action* Plan.

“The LEHAP process originated as an implementation strategy for the NEHAPs. The priorities and actions set up at the national level are thought to be best implemented on the local and regional levels.”
(Regional Environmental Centre for Central and Eastern Europe, Online)

The interrelation between NEHAPs and LEHAPs is thus that, in the European context, they are two parts of the one same plan.

“NEHAPs based on the pilot NEHAP format addressed a fairly standard range of issues and the notion of LEHAP (when mentioned) was framed as a tool of implementation within the overall national plan.” (Powis, Sidoti, O’Leary, and Centre of Environmental Health Development, 2002)

In Central and Eastern European countries the linking of local to national plans is taken further to include community participation (seen as the main driving force for implementation at the local level).

“... the LEHAP process also depends on the development of a NEHAP in a particular country. Though there is usually different regional and local health programmes being developed, the process is usually started through a bottom-up approach, where the initiative comes from the local communities.” (Regional Environmental Centre for Central and Eastern Europe, Online)

The Ukrainians have outlined a list mechanisms for implementing NEHAPs at the *local* level, which they consider to be “extremely important” for ensuring that implementation is effective (Golubovska-Onisimova, 2000). It is specific to the current political and social landscape of NISs, however there are several themes and lessons, which can be drawn out of their approach and will be relevant to other nations embarking upon LEHAPs.

It begins by outlining the various types of support required for the “implementation of actions and achievement of goals” (Golubovska-Onisimova, 2000). It is important to keep in mind that most of these actions are still at the national level but are part of the local implementation process:

"Required Organizational Support

- Establish an Intersectorial Committee consisting of representatives from various ministries (health, environment, energy, industry, agriculture) and representatives that have necessary information about governmental decisions that may influence public health and the environment.
- Developing and implementing Sectorial Action Plans as part of the more complex development plan of each sector.
- Integrate LEHAP as much as possible into local social and economic reform plans."

(Golubovska-Onisimova, 2000)

"Political Support

- This will be ensured through the participation of all branches of executive power in the implementation of actions from national through to local level, and also through the wide involvement of NGOs."

(Golubovska-Onisimova, 2000)

Legal Support to be ensured by:

- "Implementation of existing legislation.
- Preparation of new legislation to control adverse environmental factors that may pose a threat to human health (in particular, laws regarding hazardous wastes and chemical safety)."

(Golubovska-Onisimova, 2000)

In the Ukrainian example specific coordination was required between:

- The National Program of Ecological Recreation of the Dnieper Basin and Drinking Water Quality Improvement.
- The Program of Industrial Wastes Utilisation and Consumption by 2005.
- The Program of Protection and Renewal of the Black Sea and the Sea of Azov and with complex economic sectorial programs (energy provision, agriculture development and rural area recreation, termination of racket and nuclear weapons, and development of underground space in Ukrainian cities) and international projects ('Healthy Cities', 'Healthy Schools', 'Health Promotion', etc.).

(Golubovska-Onisimova, 2000)

Financial provision for priority actions on the basis of:

- "Ukrainian state and local budgets.
- Environmental protection funds at all levels.
- Investments from companies, foreign investments, other extra-budgetary actions."

(Golubovska-Onisimova, 2000)

It is supposed reasonable:

- "To implement a system of loan granting for priority actions.
- To improve the system of fines for environmental pollution, payment for use of natural resources.
- To produce and implement a system of environmental risk insurance and environmental audit.
- Greening of tax and prices policy.
- Enhancing domestic and foreign investments in environmental and health protection."

(Golubovska-Onisimova, 2000)

Further to these, a set of priorities has come out of the Ukrainian experience of NEHAPs and LEHAPs. They relate to public participation in the processes, which is seen as the key to transferring national policies into locally implemented plans. The importance of this will be discussed in detail later, but here are the main points regarding public participation as they relate to the process of transferring national plans into local ones:

"Priority 1: Development of partnership between the government and public at the local level.

- To develop a concept of cooperation between government and NGOs in the domain of environment protection;
- To establish local Radas (Councils) with participation of representatives of the various social sectors and public for development and implementation of the local action plans;
- To establish schools to educate cooperation in resolving the problems arising between non-governmental environmental organisations, deputies of local self-governments and representatives of local authorities;
- Together with oblast Radas and private companies to establish the fund "Bonus to Public Initiatives in the Sphere of Environmental Health" to

encourage the best non-governmental environmental organisations and individual activists on the annual basis;

- To devote close attention to women's and women's organisations involvement into discussing and approving the National Plan as well as to working out and implementation of the Local Action Plans."

(Golubovska-Onisimova, 2000)

"Priority 2: Provision of public with information on environment and health.

- To work out a concept of development of governmental capacity in active informing the citizens of the environmental and health challenges and its immediate introduction with the NGOs' assistance;
- To place in Internet an appropriate information (in the form of data bases, reports, Ukraine's participation in the international agreements etc.) and to update it continuously, to widely disseminate an address of this WebSite;
- To introduce into the annual budgets of the Ministries a planned 1% (0.5% - of the Ministry for Environmental Safety, 0.5% of the Ministry for Health Protection) for funding on competition basis the NGOs projects on public informing of the environmental pollution and its health effects."

(Golubovska-Onisimova, 2000)

"Priority 3: Public education.

- To develop an academic curriculum on Environmental Health for pre-school, school and higher educational institutions, to make teaching this discipline essential rather than extracurricular;
- To ensure printing and as wide as possible dissemination by the government of the appropriate printed number of copies on continuous basis (to develop a scheme)."

(Golubovska-Onisimova, 2000)

"Priority 4: Mass media involvement.

- To introduce professional courses for journalists on specialisation: "Environmental Health";
- To develop a plan of journalist education on this speciality;
- To establish the Committee on Mass Media under the rule of the Coordination Council on the Plan's Implementation with the right to introduce properly paid positions into a payroll."

(Golubovska-Onisimova, 2000)

"Priority 5: Development of the Legal Framework.

- To invite experts (an NGO representative on appropriate matters inclusive) to study existing in Ukraine legislative framework on public participation in the process of decision-making in the sphere of environmental protection and to submit proposals related to its improvements and harmonisation with the international legal instruments, to devote close attention to situation at the local level;
- To conduct discussion with participation of public, government's representatives, experts, other interested groups;
- To work out the wordings for approval/adoption;
- To provide continuous operation of the process of improving legal framework on public;
- Participation in planning, decision-making and implementation of the strategy."

(Golubovska-Onisimova, 2000)

Ian MacArthur has listed some of these approaches/priorities in stages (refer **Table 4**)

Table 4 Stages in the Local Planning Process

Stage	Who	What
1. Initial Preparatory Work	A small team of committed professionals from a range of backgrounds within the municipality.	Build up a range of information and evidence on the need for a LEHAP approach, the costs and resources which will be needed and the potential benefits it will bring.
2. Seek Political Commitment	Needed from the highest democratically elected official for the area. Support may also be required from regional officials and national ministries.	Produce a political statement setting out the core values and commitment towards environmental health protection and the LEHAP process.
3. Gathering the partners	The political leader of the LEHAP process to invite a wide range of partners both individually and as representatives of organisations to be members of the LEHAP steering group.	To build a committed partnership with a wide range of agencies and interested groups. To formally constitute the group as the steering committee for the LEHAP project.
4. Practising what you preach	The entire staff and leaders of the municipality and all partners signed up and committed to the LEHAP process.	Review, thoroughly from an environmental health perspective all the Municipality's policies and practices and to develop a programme of actions to ensure that they have a limited negative impact on environmental health issues.
5. Analysing the Environmental Health Situation	Broad group of professionals and the scientific and academic community.	Bring together existing information and data on the environment and health of the region. Making connections and correlations between environment and health, identifying gaps in the data, information and knowledge.

6. Consulting the Public	Utilising the LEHAP steering committee with particular assistance of the NGO's, Mass Media, Schools and General Public.	Collection of information on the general public's perceptions of the major environmental health issues and hazards and some indication of how these could be resolved. This can be carried out in a number of ways including the direct consultation of the public through questionnaires, workshops, meetings, focus groups, etc.
7. Setting initial priorities	The LEHAP Steering Group with a heavy focus on the political representatives.	Decisions have to be made to consider the subjective and the objective views of the community. Within that framework priorities for action need to be set recognising that the resultant proposed actions will need to be legal, affordable, technically possible, practical, aim for the short and long term, measurable and visible.
8. Consultation on the draft plan	The LEHAP Steering Committee should oversee the development of the consultation process.	Widespread consultation should be undertaken with the general population and those agencies who will be affected by the plan. Some key questions may be drawn out and highlighted during the consultation period.
9. Review, Amend, Publish and Launch the Plan	The LEHAP Steering Group and leading Politicians	The major and significant responses should be considered by the LEHAP Steering Group, and should be incorporated within the plan where reasonable and practical. A public launch of the plan will provide visibility to the plan and the process and is likely to facilitate interest and pressure for its implementation.
10. Monitor, Review and Advise through implementation	The LEHAP Steering Group and all identified partners and actors.	As the plan is implemented by all the identified partners and actions, the LEHAP steering group must both continuously and periodically monitor the progress being made, review the mechanisms being used and with reference to the changing environmental health conditions or public perceptions, must revise the plan. Periodic reviews will involve greater analysis and reviews of action against targets.

Adapted from (MacArthur, 2000)

In Fiji the development of the LEHAP has also been strongly linked to the NEHAP process. The process of drafting the documents was an ‘emergent’ one (Powis, et al, 2002) whereby NEHAP and LEHAP developed alongside one another with a continual interchange and flow of information between national planners and district EHOs.

“... Fiji approached the broad issue of EH selectively, drawing heavily upon the LEHAP as a planning *instrument*, used to define priorities, formulate objectives and develop national plans of action.” (Powis, et al, 2002)

The NEHAP is first drafted by the Headquarters of the Fiji Institute for Environmental Health (the first NEHAP was drafted in 1998 and a review followed in 2001). A series of Key Result Areas (KRAs) are established in the process and improvement strategies drafted for each one (KRAs are comprised of areas such as ‘Pollution Control’; ‘Health Promotion’; ‘Water and Sanitation’). The improvement strategy section for each KRA is then forwarded to district EHOs who then identify methods for local implementation, which are in line with these strategies, and feed back the information to Headquarters (Fiji Ministry of Health and WHO Western Pacific Regional Office, 2002).

This process of feeding back ideas for action is the basis of the LEHAP for each district:

“Local EHOs were given discretion to propose how they might respond to each strategy in each of the nine KRAs. These will be returned to Headquarters before the end of 2001 to complete a national to local picture of the Environmental Health Service.” (Fiji Ministry of Health and WHO Western Pacific Regional Office, 2002)

The process is outlined further in the section ‘LEHAPs in Fiji’.

In the examples shown it is clear that the processes, by which LEHAPs are drafted and implemented, are dependant on the particular planning mechanism chosen.

MacArthur states:

"Planning processes are alive and organic. They are not one-off exercises; the successful ones are continuous, endurable and sustainable." (MacArthur, 2000)

9.0 What other frameworks & action plans exist? How do they transfer national policy into local action?

9.1 Local Agenda 21

Agenda 21 is an action program for global sustainable development which was adopted, along with the Rio Declaration on environment and development, by over 178 governments at the Rio Earth Summit in 1992 (United Nations, 1993).

It has been promoted, by governments, UN organisations, development agencies, NGOs, municipalities, commerce and industry, as a global blueprint for action for the 21st century which applies to every area in which human activity impacts on the environment (MacArthur, 2000).

At the heart of Agenda 21 is the need for Sustainable Human Development; often referred to as Sustainable Development (SD) or Ecologically Sustainable Development (ESD). 'Human' is added in recognition of the maintenance and improvement of the human condition being at the centre of all sustainable development action (MacArthur, 2000).

Agenda 21 sets out a series of principles, in conjunction with the Rio Declaration on Environment and Development, on environment and health issues into the 21st Century. There is a focus on roles that need to be played to address key areas of concern, and (of particular relevance to this document) it "provides a clear mandate for the health sector, both curative and preventative, to play its role in working towards sustainable development" (MacArthur, 2000).

These principles are then reduced down to the local level of action. Chapter 28 states:

"Because 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. Local authorities construct, operate and maintain economic, social, and environmental infrastructure, oversee planning

processes, establish local environmental policies and regulations, and assists in implementing national and sub-national policies. As the level of governance closest to the people, they play a vital role in educating, mobilising and responding to the public to promote sustainable development." (United Nations, 1993)

Due to the nature of Agenda 21 dissemination, Local Agenda 21 plans don't generally 'hang off' national ones. Most local governments have acted with a certain amount of autonomy in adopting Agenda 21 in that the plans are adopted and developed at the local level without reference to the national level. This has also occurred partly due to the high profile of Agenda 21, but mostly as the result of a general trend toward decentralisation of responsibility for environmental issues from the national to the local level.

"*Agenda 21* included a call to local governments to develop their own 'local Agenda 21' outlining local priorities." (International Council for Local Environmental Initiatives, Online)

In the past decade or so local governments in over 60 countries have been given increased responsibilities for environmental protection and social programmes as a result of national-level deregulation, decentralisation, and "down-loading" of traditional national or state level responsibilities (International Council for Local Environmental Initiatives, 1997).

A great deal of commitment, to the local implementation of Agenda 21, has been displayed by local governments. More than 1800 local governments in 64 countries have established Local Agenda 21 processes, since 1991, to engage their communities in implementing Agenda 21 at the local level (International Council for Local Environmental Initiatives, 1997).

Subsequent evaluation of Local Agenda 21 initiatives have shown that the presence of a national campaign has an important influence on the proliferation of local uptake of the initiative.

"National campaigns promoting Local Agenda 21 processes can be found in 18 countries that together account for 41% of the global total (2,640 of 6,416).

The presence of a national campaign correlates directly with both high numbers of Local Agenda 21 processes in a country and the degree of activity of such processes." (International Council for Local Environmental Initiatives, Online) See **Figure 8** below:

Figure 8 Results of Local Agenda 21 Survey in the Presence of National Campaigns

<i>Region</i>	<i>No National Campaign Present</i>		<i>National Campaign</i>	
AFRICA	Algeria	3	Mozambique	2
	Benin	1	Libya	2
	Burundi	2	Namibia	5
	Cameroon	1	Nigeria	5
	Congo, Dem. Rep.	2	Rwanda	1
	Egypt	7	Senegal	3
	Gabon	1	Sudan	1
	Ghana	3	Tanzania	13
	Kenya	11	Togo	2
	Madagascar	5	Tunisia	1
	Mali	2	Uganda	5
	Malawi	4	Zambia	4
	Mauritania	1	Zimbabwe	39
	Morocco	5		
		<i>Subtotal—131 LA21s</i>		<i>Subtotal—20 LA21s</i>
ASIA PACIFIC	Bangladesh	2	Pakistan	1
	India	14	Philippines	28
	Indonesia	8	Singapore	1
	Malaysia	9	Thailand	21
	Nepal	4	Vietnam	20
	New Zealand	37		
		<i>Subtotal—145</i>		<i>Subtotal—529</i>
EUROPE	Albania	7	Lithuania	14
	Austria	64	Luxembourg	69
	Belgium	106	Montenegro	2
	Bosnia & Herzegovina	1	Netherlands	100
	Bulgaria	22	Poland	70
	Croatia	20	Portugal	27
	Cyprus	1	Romania	12
	Czech Republic	42	Russia	29
	Estonia	29	Slovak Republic	30
	France	69	Slovenia	3
EUROPE Continued	Germany	2,042	Spain	359
	Greece	39	Switzerland	83
	Hungary	9	Ukraine	9
	Latvia	5	Yugoslavia	18
	<i>Subtotal—3,281 LA21s</i>		<i>Subtotal—2,011 LA21s</i>	
LATIN AMERICA	Argentina	1	Guyana	1
	Bolivia	1	Honduras	6
	Brazil	36	Jamaica	5
	Chile	15	Mexico	2
	Colombia	6	Nicaragua	5
	Costa Rica	4	Trinidad and Tobago	1
	Cuba	2	Venezuela	3
	Dominica	1		
	<i>Subtotal—89 LA21s</i>		<i>Subtotal—30 LA21s</i>	
MIDDLE EAST	Bahrain	1	Oman	1
	Iran	2	Qatar	1
	Israel	3	Syria	2
	Jordan	4	Saudi Arabia	4
	Kuwait	1	United Arab Emirates	2
	Lebanon	6	Yemen	2
	<i>Subtotal—29 LA21s</i>		<i>Subtotal—50 LA21s</i>	
NORTH AMERICA	Canada	14	USA	87
		<i>Subtotal—101 LA21s</i>		
SUBTOTAL	No National Campaign—3,776		National Campaign—2,640	
TOTAL	6,416 LA21s Worldwide in 113 Countries			

Source: (International Council for Local Environmental Initiatives, Online)

In terms of stakeholder involvement and participation, it has been observed that 73% of municipalities with LA21 plans have stakeholder groups involved at some level

(27% with no stakeholder involvement). In all cases local authorities generally control the process *and the budget* (International Council for Local Environmental Initiatives, Online). See **Figure 9** below:

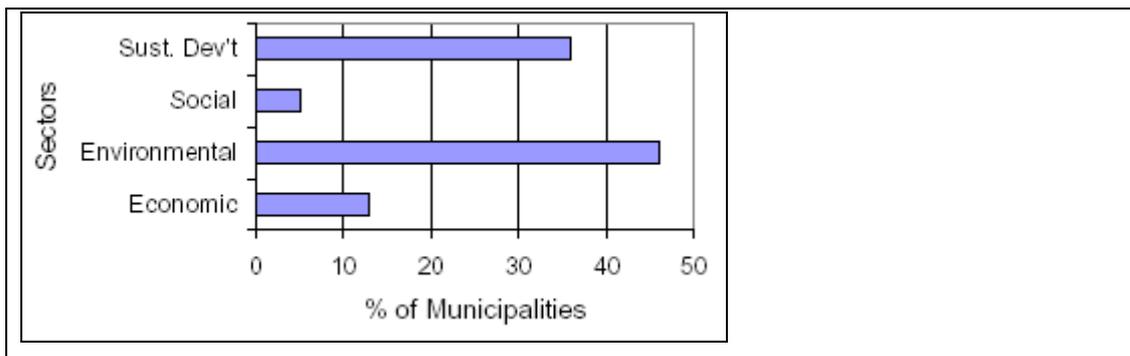
Figure 9 Role of Stakeholder Group and Local Authority in Local Agenda 21 Process.

<i>Role of Stakeholder Groups</i>		<i>Role of Local Authorities</i>	
No formal stakeholder group exists at this time	27%	Local authority is not involved	1%
Stakeholder group provides input to the process	34%	Local authority provides input	9%
Stakeholder group is involved in decision making	21%	Local authority is involved in decision making	19%
Stakeholder group is responsible for Local Agenda 21 process but does not manage the (related) budget	10%	Local authority is responsible for Local Agenda 21 process but does not manage the (related) budget	11%
Stakeholder group is responsible for Local Agenda 21 process and manages the (related) budget	9%	Local authority is responsible for Local Agenda 21 process and manages the (related) budget	60%

Source: (International Council for Local Environmental Initiatives, Online)

It is interesting to note the areas in which LA21 activity has occurred. **Figure 10** shows that the majority of LA21 initiatives focus on environment.

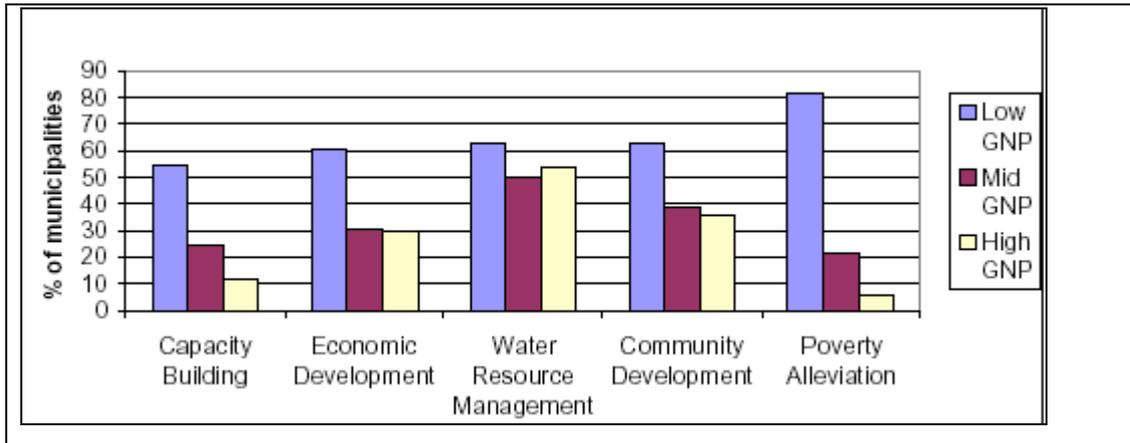
Figure 10 Focus of Local Agenda 21 Process Globally



Source: (International Council for Local Environmental Initiatives, Online)

Another trend observed in the evaluation of global LA21 activity is that the activities and priorities of developed countries are different to those of developing countries. **Figure 11** illustrates this difference in comparing the LA21 activities of high, mid and low GNP countries.

Figure 11 Comparisons of Activities in Low GNP Category and other GNP Categories



Source: (International Council for Local Environmental Initiatives, Online)

It would seem that, whilst there has been a general 'hive' of activity involving LA21 processes, significant changes in urban development trends has only occurred in a limited number of cases (MacArthur, 2000).

"During the same period, many national governments have 'downloaded' environmental protection and social development responsibilities to local governments in order to address national fiscal problems. This trend has rarely been accompanied by new revenue generating powers or by transfers of revenues that were traditionally available for their execution. The resulting increase in financial burdens upon local governments is undermining their ability to implement Local Agenda 21 strategies." (MacArthur, 2000)

The end result of this trend is that local authorities are left to deal with the inevitable environmental and health consequences of industrial and economic globalisation, yet have no real power over the forces that are shaping these outcomes.

9.2 When is LA21 a LEHAP?

In some cases in the UK Local Agenda 21 Plans have emerged with an angle on environment *and* health and it is clear that the more progressive LA21s in the UK are LEHAPs in all but name (Church and UNED Stakeholder Forum, Online).

This has led to the suggestion that the development of LEHAPs could occur as a project within LA21, as a second or third stage in the LA21 process (Church and UNED Stakeholder Forum, Online).

“... Certainly (in relation to LA21)* any council wishing to encourage participation from marginalised groups is likely to find that health issues are a higher priority than the environment, and that when poorer communities do focus on the environment, it is because of the health problems associated.” (Church and UNED Stakeholder Forum, Online)

**(parentheses added)*

Ian MacArthur takes this line of thinking a step further:

“Many of these approaches, although born out of different sectoral interests, are very similar in the principles and key methodologies that they adopt, and in truth there is very little to separate them. They are fundamentally about improving the health and quality of life of the local population by involving the community in decision making, and by integrating social, economic and environmental concerns into policy and action. The title attached to such initiatives, be it LA21, Healthy Cities, environmental protection or LEHAP is therefore of *little relevance to the final outcome.*” (MacArthur, 2000) (*emphasis added*)

9.3 Healthy Cities Projects

A WHO initiative, the Healthy Cities project is an international development project based on Local Agenda 21. It has its basis in the field of health promotion and is a long term project aiming to increase the incorporation of the health and sustainable development agenda into decision-making in European cities. The ultimate goal of this initiative is to enhance the environmental, social, physical and mental wellbeing of people living and working in cities (MacArthur, 2000).

Whilst the European Regional Office of WHO originally initiated the Healthy Cities Program, it has been adopted in many parts of the world including both rich and poor nations (MacArthur, 2000). The use of the 'settings approach', as it is known in the field of health promotion, has since been transferred from cities to other settings such as islands, villages, schools, hospitals, childcare centres and so on.

Six common characteristics of Healthy Cities projects have been identified as:

1. Commitment to health

They are based upon a commitment to health. They affirm the holistic nature of health, recognizing the interaction between its physical, mental, social and spiritual dimensions. Promotion of health and prevention of disease are their priorities. They assume that health can be created through the cooperative efforts of individuals and groups in the city.

(WHO Regional Office for Europe, 1997)

2. Political decision-making

They require political decision-making for public health. Housing, environment, education, social service and other programmes of city government have a major effect on the state of health in cities. Healthy Cities projects strengthen the contribution of such programmes to health by influencing the political decisions of city council.

(WHO Regional Office for Europe, 1997)

3. Intersectoral action

They generate intersectoral action. The term “intersectoral action” describes the process through which organizations working outside the health sector change their activities so that they contribute more to health. Urban planning which supports physical fitness by providing ample green space for recreation in the city is an example of intersectoral action. Healthy Cities projects create organizational mechanisms through which city departments and other bodies come together to negotiate their contribution to such action.

(WHO Regional Office for Europe, 1997)

4. Community participation

They emphasize community participation. People participate in health through their lifestyle choices, their use of health services, their views on health issues and their work in community groups. Healthy Cities projects promote more active roles for people in all of these areas. They provide means by which people have a direct influence on project decisions and, through the project, on the activities of city departments and other organizations.

(WHO Regional Office for Europe, 1997)

5. Innovation

They work through processes of innovation. Promoting health and preventing disease through intersectoral action requires a constant search for new ideas and methods. The success of Healthy Cities projects depends upon their ability to create opportunities for innovation within a climate that supports change. Projects do this by spreading knowledge of innovative methods, creating incentives for innovation and recognizing the achievements of those who experiment with new policies and programmes.

(WHO Regional Office for Europe, 1997)

6. Healthy public policy

Their outcome is healthy public policy. The success of Healthy Cities projects is reflected in the degree to which policies that create settings for health are in effect

throughout the city administration. Projects achieve their goals when homes, schools, workplaces and other parts of the urban environment become healthier settings in which to live. Political decisions, intersectoral action, community participation and innovation promoted through Healthy Cities projects work together to achieve healthy public policy. (WHO Regional Office for Europe, 1997)

The end result (a healthy city) should, if these characteristics have been applied, consist of the following qualities. See **Figure 12** below:

Figure 12 The qualities of a Healthy City

A city should strive to provide:

1. A clean, safe physical environment of high quality (including housing quality);
2. An ecosystem that is stable now and sustainable in the long term;
3. A strong, mutually supportive and non-exploitive community;
4. A high degree of participation and control by the public over the decisions affecting their lives, health and well-being;
5. The meeting of basic needs (for food, water, shelter, income, safety and work) for all the city's people;
6. Access to a wide variety of experiences and resources, with the chance for a wide variety of contact, interactions and communication;
7. A diverse, vital and innovative city economy;
8. The encouragement of connectedness with the past, with the cultural and biological heritage of city dwellers and with other groups and individuals;
9. A form that is compatible with and enhances the preceding characteristics;
10. An optimum level of appropriate public health and sick care services accessible to all; and
11. High health status (high levels of positive health and low levels of disease).

Source: (WHO Regional Office for Europe, 1997)

Healthy Cities projects don't generally occur as a result of a national plan; rather the strategy has been adopted by city managers independently as a means for bringing about positive changes in urban management. Successive phases of the program, however, have led to the formation and development of national and regional networks of Healthy Cities (MacArthur, 2000).

The whole process begins when people decide that their city would benefit from new approaches to public health as fostered through a Healthy Cities project. The project starts once it has been approved by the City Council and then steps toward taking action are embarked upon (WHO Regional Office for Europe, 1997). This process is outlined in **Figure 13** below:

Figure 13 Three phases of project development

1. Getting started

- Build support group
- Understand ideas
- Know the city
- Find finances
- Decide organization
- Prepare proposal
- Get approval

2. Getting organized

- Appoint committee
- Analyze environment
- Define project work
- Set-up office
- Plan strategy
- Build capacity
- Establish accountability

3. Taking action

- Increase health awareness
- Advocate strategic planning
- Mobilize intersectoral action
- Encourage community participation
- Promote innovation
- Secure healthy public policy

Source: (WHO Regional Office for Europe, 1997)

Healthy Cities projects have been a useful means of 'tying in' LEHAP with existing frameworks/processes in Europe:

“Another specific feature of the LEHAP process is that, in most countries, it is associated with the Healthy Cities Project, and coordination of the two projects helps to facilitate the whole (LEHAP) process”. (Regional Environmental Centre for Central and Eastern Europe, Online)

Another concept that has been adapted from the settings approach to health and environment is the Healthy Islands Vision, which has been applied to the Pacific Islands region. This vision is expressed in the following words that opened the Yanuca Island Declaration:

“Healthy Islands should be places where:

- Children are nurtured in body and mind;
- Environments invite learning and leisure;
- People work and age with dignity;
- Ecological balance is a source of pride;
- The ocean which sustains us is protected.”

(WHO Regional Office for the Western Pacific, 1995)

9.4 NEAPs, LEAPs and MEAPs

NEAPs (National Environmental Action Plans), LEAPs (Local Environmental Action Plans) and MEAPs (Municipal Environmental Action Plans) have an obvious initial difference to NEHAPs/LEHAPs in that they are missing the word 'Health' from the title. This may also be true of the plans themselves. It should be noted that the terms LEAP and MEAP appear to have been used interchangeably and have the same general meaning. It appears to be merely a matter of preference as to which is chosen.

NEAPs/LEAPs have emerged out of an awareness of the structural, global character of environmental crises experienced at the national and local level. In Rio de Janeiro in 1992, the international community acknowledged the fact that environmental issues and economic development were two closely related problems (Toure, Online).

The main goal of an environmental action plan at the national level (NEAPs) is to find realistic, cost effective and efficient methods for environmental improvement.

"The NEAP should not be another concept document which demonstrates the country's ability to write policy papers. Likewise, the aim is not to mobilise foreign financial support for the country. The goal of the planning process is to develop a comprehensive program for reducing environmental pollution and improving the environment at the lowest cost. Drafting the NEAP should lead the country from drafting vague 'strategic' concepts to implementing the problem-oriented programs designed to achieve particular goals in a certain time limit and with a certain budget." (MacArthur, 2000)

Similarly, both LEAPs and MEAPs build upon the urban environment aspect included in Agenda 21. They recognise that conventional urban planning tools do not sufficiently address environmental and community participation issues (Koffi, Online).

MEAPs and LEAPs are reference documents that list realistic environmental actions prioritised by the locality/municipality inhabitants. They provide a 'data bank' of projects that have the potential to aid the search for technical and financial assistance. MEAPs/LEAPs constitute a complementary planning document to conventional urban management policies (Koffi, Online). They should be a part of existing planning and urban management procedures and policies and should contain:

- An urban environmental profile;
- A long term action plan (ten years), medium term action plan (five years) and a short term action plan (three years);
- A Priority Actions Program (PAP) composed of a three-year plan including micro-project briefs designed by specialized working groups.

(Koffi, Online)

The planning stage of a LEAP/MEAP may involve a SWOT analysis (Strengths; Weaknesses; Opportunities; Threats) of the prevailing environmental situation in a given locality. This process constitutes a 'needs assessment' approach to developing an action plan (MELISSA, Online). The following prerequisites are identified:

- **Establishment of political support**

"For any project to be successful, support is needed. It is therefore necessary that the mayor and councilors support and believe in the LEAP. During the development stage the community must also be able to give their input, because they are the taxpayers, and any development will also have an impact on them.

The provinces and national government must also support the LEAP, because it must fit in with their overall planning as well.

International support is also important during the development of a LEAP, and especially for its implementation in a poor country like Madagascar. If support were gained from international countries, the

possibility of finding donors or any financial support for some of the projects would be much easier." (MELISSA, Online)

- **Responsibility and support of role players**

"After support is gained from all the relevant role-players, it is necessary to identify the tasks and responsibilities for all. It would therefore be necessary to have a meeting with them all to identify the steps to be followed for the implementation of the LEAP, as well as whom will be responsible for what. Strict monitoring would be necessary during the process to make sure that all the parties involved (the councilors, officials, customers, service renders, industry, donors, aid organizations and global companies) are still supporting the project." (MELISSA, Online)

- **Transparency and Openness**

"In a democratic society, transparency and openness is crucial. It is thus necessary to have good communication channels between the City council and the community about the project and its implementation. Public scrutiny is a very important part of any project, and the City council must give the community the opportunity to raise their views and concerns regarding the project. The council must make sure that information sharing takes place on a constant basis." (MELISSA, Online)

- **Inter-Sectoral and Inter Institutional Co-ordination**

"During the preparation of a LEAP, inter departmental and intergovernmental coordination is necessary to avoid duplication of services and to establish a good working relationship and support base between the role players. All the provincial departments as well as national departments must know exactly what the City council is planning in its LEAP. Expertise must be exchanged where possible." (MELISSA, Online)

- **Communication Strategy**

"The success of the LEAP will also be determined by the communication strategy followed by the City council. The community must as far as possible be informed about the project and its progress. Forms of communication that can be used may include verbal, visual, written, press, radio, TV, sessions and public meetings. It will be necessary to budget properly for the communication, because it usually costs a lot". (MELISSA, Online)

In looking at a specific LEAP for Olivares, a poor community in Manzales, Columbia, it is observed that the program was initiated and driven by the municipal government as a part of its municipal development plan. (Velasquez, 1999) The brief inventory of LEAP projects for Olivares (below) shows a typical cross section of the types of projects being conducted as a part of LEAPs in developing countries. Projects 1 through to 10 are outlined in the following examples of the Olivares community:

Project 1: House for citizen's environmental education centre. This is a citywide project where a range of environmental education programs are being developed.

Project 2: House of culture. Renovation of a building representing the local architectural heritage to be used for a range of community cultural activities.

Project 3: Museum of religious art.

Project 4: Improved traffic intersection.

Project 5: Urban balconies. Public space, park for recreation and the visual enjoyment of the landscape.

Project 6: Community house and youth club. Physical renovation of a school to be used as a meeting place by the young.

Project 7: Vegetation research centre. Nursery used for research and providing seedlings of native species of trees for use in construction.

Projects 8 and 9: Street park and commercial streets. The main promenade used for social encounters by the local inhabitants. Serves the dual purpose of recreation and commerce.

Project 10: Renovation of buildings. Renovation, reconstruction and change of function of existing buildings to make better use of them for housing and commerce.

Source: (Velasquez, 1999)

In terms of differences between LEAPs/MEAPs and LEHAPs, there is more than a mere difference in nomenclature, the aspect of missing or overlooking health and health issues can also be observed within the plans themselves. Observing the framework at the national level (NEAPs), MacArthur states:

"National Environmental Action Plans have largely concentrated on the 'green' or ecological issues and rarely make more than a passing reference to public health issues. Normally they have been written without broad consultation or partnership with other agencies or Ministries. As a result the Plans tend to serve the interests and work programmes of Environment Ministries rather than a broader agenda."
(MacArthur, 2000)

At the local level, however, things are a little different:

"...there is potential, particularly at the local level where intersectoral working can be achieved more easily, for a more expansive view to be taken...very often all that will be needed in the development of a LEAP will be the introduction of some health aspects, data and information. Health professionals participation in the formulation and implementation of LEAPs is essential." (MacArthur, 2000)

9.5 State of the Environment Reporting

State of the Environment reporting has been described as a scientific assessment of environmental conditions, which focuses on the impacts of human activities in terms of their significance for the environment and societal responses to the trends observed (Environment Australia, 2001).

"Although SoE reporting continues to evolve, its purpose remains mostly unchanged: to raise awareness of the issues and to provide sound reliable databases for informed decision-making." (EPA, 1997)

The principle of ecological sustainable development is at the heart of SoE Reporting. The establishment of a sustainable pattern of development is seen as one generation's responsibility to the next (Commonwealth Department of the Environment Sport and Territories, 1994).

SoE reporting is government driven with the aim of the adoption, into Government policy, of a means of gaining reliable and readily accessible information on the natural environment.

Being able to plot a path of sustainable development doesn't come about just by being well intentioned. It requires strategic planning and action tools. Principally, what is needed is a 'snapshot' of the current situation and a set of indicators that will allow us to observe any changes as they occur (Commonwealth Department of the Environment Sport and Territories, 1994).

Most States and Local Governments in Australia produce regular SoE reports. They are also produced nationally by most industrialised countries (as is a requirement for membership of the Organization for Economic Cooperation and Development – OECD), and internationally by international organizations (Powell, 1999).

Australia has international environmental reporting obligations to the OECD, the United Nations Environment Programme, the United Nations Economic and Social

Council for Asia and the Pacific, and the World Meteorological Organization (Commonwealth Department of the Environment Sport and Territories, 1994).

Nationally SoE reports are due to be completed every five years. NSW State SoE reports are undertaken every two years, whilst local governments in NSW are required by legislation (*Local Government Act 1997*) to complete annual SoE reports (NSW Department of Local Government, 2000) and (Powell, 1999).

Local, state/territory and national SoE reports are produced independently of each other, however there is a degree of 'sharing' of information across all scales of reporting and there are examples of regional reports produced by collective local governments with support from state/territory and national governments.

Underlying SoE reporting is the concept of the Pressure-State-Response (PSR) model. The PSR model was proposed in the 1970's by Tony friend and David Rapport (OECD) in order to adopt a way of analysing the interactions between environmental pressures, the state of the environment and societal responses (OECD, Online).

"The PSR model is based on the concept of causality: human activities exert pressures on the environment and change its quality and quantity of natural resources ('state'). Society responds to these changes through environmental, general economic and sectoral responses ('societal responses')." (OECD, Online)

In order to practically apply the PSR model environmental issues are broken into distinct themes. These consist of Land; Air; Water; Biodiversity; Noise; Waste; Aboriginal heritage; Non-Aboriginal Heritage (Powell, 1999).

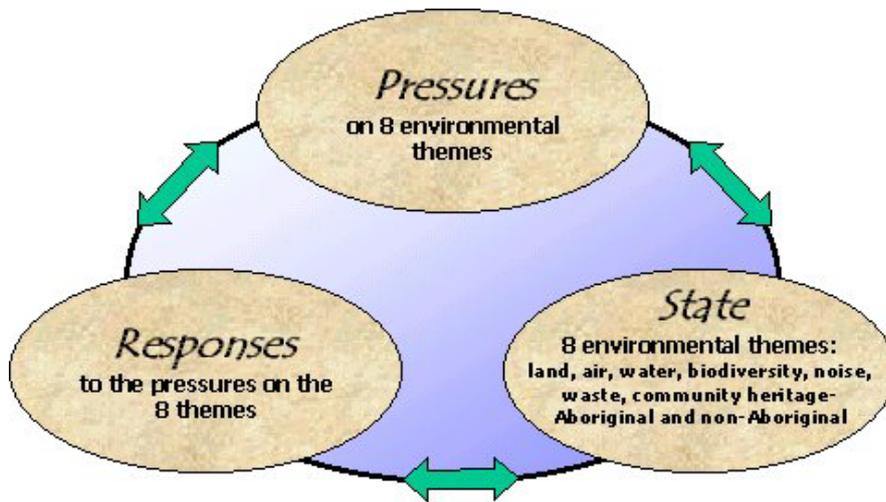
Objectives relating to each theme are comprised of:

- Protection of environmental qualities and values (Powell, 1999)
- Identification of management issues (Powell, 1999)
- Restoration of environmental values (Powell, 1999)

- Increased awareness and understanding of the environment and environmental issues (Powell, 1999)

The diagrams below outline two types of PSR model (conventional and one future-oriented). See **Figures 14** and **15**:

Figure 14 Conventional Pressure-State-Response Framework



Indicators of State:

Measures of the current condition of 8 environmental themes: land, air, water, waste, noise, biodiversity, Aboriginal and non-Aboriginal heritage, in relation to a sustainable future for Western Sydney

Indicators of Pressures:

Measures for issues for sustainable development for each of the 8 themes

Indicators of Response:

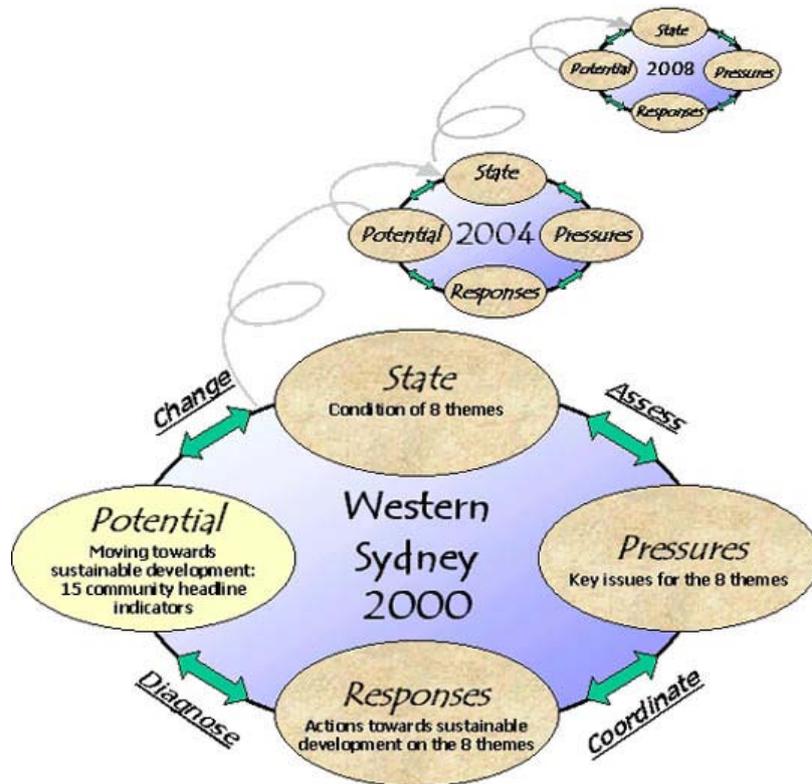
Descriptions of actions and events that reduce pressures on the eight themes

*Sourced from (Western Sydney Regional Organization of Councils, Online).

More recent practices are linking environmental monitoring to local government management plans, community priorities and sustainable development with a '*future*' emphasis. It is here that the new legislation needs a framework for an active decision-making system with options for the *future* (i.e. the capacity to learn, and scope to change the whole system) (Western Sydney Regional Organization of Councils, Online).

In **Figure 15**, the PSRP Framework translates from a closed circle to a decision-making spiral. Included are steps to link the four different sets of information and to connect the monitoring process to management decisions that need to be made (Western Sydney Regional Organization of Councils, Online).

Figure 15 Pressure-State-Response Framework with Potential for Change Option



*Sourced from: (Western Sydney Regional Organization of Councils, Online).

An indicator quantifies and simplifies an event or phenomena in order to help in the understanding of complex realities. Indicators are therefore collections of raw and processed data that 'tell a story' (International Institute for Sustainable Development, Online).

There is no universal list or set of indicators to be used in applying the PSR model. Practicality dictates that several sets of indicators exist that relate to intended audiences and specific purposes (OECD, Online).

The purpose of any indicator, used in relation to the PSR model, is to keep track of environmental progress, yet they may also be chosen for the expression of and integration into various sectoral policies and also for economic relativity (OECD, Online).

The most important aspect of any indicator is that it is measurable and readily attributable as a relevant and understandable gauge for systemic changes. Once this has been established it is then necessary to monitor and collect data for each indicator. This may be undertaken by government authorities or organizational bodies or the community (as with groups such as StreamWatch) (NSW Department of Local Government, 2000).

In selecting indicators it is also important to recognise that they need to be understood by different groups of people, as SoE reports are primarily for public release and consumption. However, there is still a need for less concentrated forms of data for researchers, and practitioners from the sciences. In fact the different levels of indicator audiences are summarised as:

- Indicators for scientists
- Indicators for policy makers
- Indicators for the public

(Commonwealth Department of the Environment Sport and Territories, 1994)

Similarly to this process, it has been suggested that the preparation of a 'state of environmental health report' is a "principle building brick for the LEHAP process and it should be widely circulated to all stakeholders and made available to the general public" (MacArthur, 2000).

Indicators have also been important to the NEHAP process and as such it would follow that they would be integral to LEHAPs also. In terms of NEHAPs, indicators are considered an essential component in the following areas:

1. Needs identification
2. Action identification

3. Action evaluation
4. NEHAP evaluation

(Centre of Environmental Health Development, 2002)

One of the criticisms of SoE reporting may be in its effectiveness, or lack of, in confronting the issues contributing to the environmental and social consequences of globalisation.

"The sustainable development concept remains plagued by unresolved questions about what it means in terms of underlying economic principles. Particularly significant is the question of whether or not unbridled pursuit of economic growth – the central policy of most governments- is sustainable. Also how should natural capital be valued and accounted for by the economic system?" (Dore and Woodhill, 1999).

Integrating social, economic and environmental priorities is recognised as an essential direction, yet at the same time there is this tendency to maintain the 'steady state systems' that have existed for so long. The paradox is that the new agenda is also conservative albeit in favour of social and environmental resources (Dore and Woodhill, 1999).

In terms of improving the application of SoE information to local sustainability, the following points identify areas of need for local government in applying the results of environmental information locally in a sustainable manner (Brown, 1997).

- Better liaison with the environmental policies of the federal and state governments
- More research on the local application of technical and expert environmental information
- Better flow of information between departments in undertaking environmental management tasks

(Brown, Orr and Ingle Smith, 1992)

"When the SoE Report presents information which meets the needs of politicians, administrators, industry and the community (that is, includes socially sensitive, scientifically accurate and newsworthy indicators) then it will be a very effective document in council for stimulating action and change." (Brown, in Powell, 1999)

9.6 Municipal Public Health Plans (MPHPs)

Local councils throughout Victoria, Australia, are attempting to lead the way to creating healthier and more supportive communities through the use of a planning strategy launched by VicHealth, in partnership with the Municipal Association of Victoria and the Department of Human Services (VicHealth, 2002).

The Municipal Public Health Plan (MPHP) approach, outlined in a document titled 'Leading the Way: Councils creating healthier communities', was developed as an aid to local government in explaining the things that influence the health and wellbeing of communities and to provide a means for municipal councils to respond to their own local circumstances with practical solutions (VicHealth, 2002).

The approach recognises the leading role played by local government in creating environments in which their communities and the people within those communities can enjoy reasonable prosperity, health and wellbeing. Thus, it recognises that local governments have a vital role in *creating* healthier communities. It emphasises the notion that good health and wellbeing should be a strong part of every council's core business (VicHealth, 2002).

The Municipal Public Health Plan approach has been developed to provide an invaluable resource to support councils in their endeavours to achieve better outcomes for their communities. It is a resource that emphasises the importance of building strong partnerships with sectors other than just health, in spite of being a largely health-focused approach (VicHealth, 2002).

The approach taken is to identify ways to create healthy environments – and conditions in which people can live, work and perhaps more importantly, can thrive. An integrated approach to planning is the goal, whereby local leaders are enabled to develop policy and strategic priorities to address the social and economic issues of health and wellbeing (VicHealth, 2002).

The Municipal Public Health Plan approach was designed to provide councillors and senior leaders with the *information and tools* they need to develop policy and directions to create healthy communities. The resources developed were tested with Councillors, CEOs and senior managers from a range of municipal councils who participated in a pilot scheme, including the Victorian Shires of Corangamite, South Gippsland, Towong and Yarra Ranges and the Cities of Banyule, Brimbank, and Greater Dandenong (VicHealth, 2002).

Integral to this approach has been the establishment of accessible information systems, such as the 'Primary Health Knowledge Base' set up by the Victorian Department of Human Services. The use of an information gathering process known as 'Municipal Scanning' identifies information needs in the built/physical, Social, Economic and Natural environmental dimensions (Victorian Department of Human Services, 2001).

The Council's role in this process is as coordinator and facilitator, however it is not the council's role to undertake all the strategies of the MPHP. Identification of stakeholders, their involvement and the acceptability of the MPHP is of key importance (Victorian Department of Human Services, 2001).

A checklist has been developed for the implementation of the Municipal Public Health Plan (MPHP) strategy. The selection of these strategies rests on comparing all alternatives. Decisions need to be made on agreed selection criteria. The checklist is as follows:

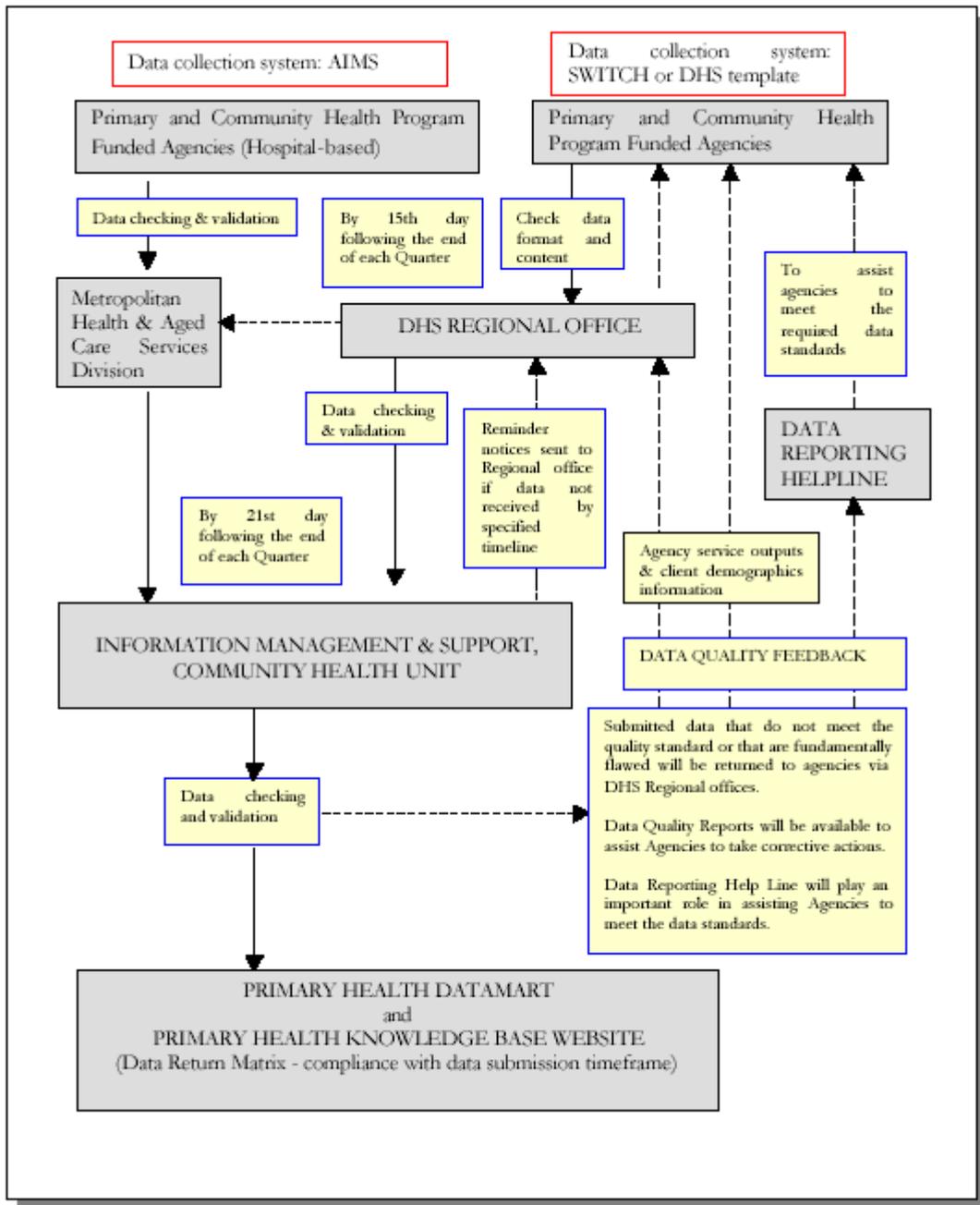
- "Acceptability to key decision-makers and stakeholders (this could also include funding bodies).
- Acceptance by the general public.
- Technical feasibility.
- Relevance of the issue.
- Cost effectiveness.
- Timing.
- Client or user impact.
- Long-term impact.
- Flexibility and adaptability.
- Coordination and integration with other strategies, programs and activities."

(Victorian Department of Human Services, 2001)

An output of this process, the Victorian Department of Human Services have developed a 'DataMart' that provides information links for public health professionals.

Figure 16 outlines the reporting process and timeframes used. It should be noted that this example is public health focused, rather than environment and health.

Figure 16 Data reporting process for primary & community health



Source: (Victorian Department of Human Services, Online)

10.0 Correlations between the various types of Local Action Planning Tools and Potential Incorporation into National Strategies

The development of the NEHAP, in many instances, has taken place prior to the development of LEHAPs. This is in contrast to more emergent processes as have occurred in Fiji and are unfolding in the Malaysian context. In such instances it is sometimes decided that pre-existing local action planning frameworks, such as *LA21* or *Healthy Cities*, will be utilised as they are and incorporated into the national planning process without the drafting of a LEHAP document.

In Malaysia the local and national planning processes are taking place along side one another, with the local process to 'feed' into NEHAP development. It is, however, still worth noting the contributions and similarities of a range of frameworks, and their role in planning processes, whether or not a formal LEHAP is subsequently drafted. The Local Agenda 21 process has, after all, played an integral role in the MPPJ LEHAP process.

As stated previously, the main difference between LA21 plans and LEHAPs is the emphasis on environment as opposed to the emphasis on health *in relation to* environment (respectively). It is now an established concept that environment and human health are inextricably linked, so is there any practical difference between the two plans? If LA21 plans focus on the environment (as well as economic development, community development & poverty alleviation) then there will be an inevitable associated impact on health.

The difference may be only in the fact that local plans developed with an emphasis on health will be more readily evaluated in terms of health outcomes. This is of clear benefit to stakeholders that are oriented within the health sector. It has implications for budgeting (in regards to funds assistance), community understanding of the benefits of action planning, and the types of stakeholders that can be recruited. There is also the possibility of an intentionally complimentary role for LEHAPs and other local planning initiatives.

“Many of the local planning initiatives that are intended to focus on health development and life quality issues share very similar principles and processes. As such Local Agenda 21, the Healthy Cities Project, Environmental Protection Programmes and LEHAPs can be complimentary, and can work in an integrated manner. In established programmes of LA21, Environmental Protection and Healthy Cities, the prospect of LEHAP can prompt existing processes to consider and re-evaluate their programmes from a different perspective. LEHAP can be used to bring a ‘health focus’ to LA21 and to assist the development of an ‘environmental awareness’ in Healthy Cities projects. Similarly LEHAP can bring a new and fresh perspective to economic development plans or physical development plans.” (MacArthur, 2000)

In many of the NISs in Eastern and Central Europe work from the Healthy Cities Network (HCN) was utilised as a framework for formulating and implementing LEHAPs. Such information as city health profiles and city health plans, along with public participation mechanisms, have been incorporated from the HCN into the NEHAP/LEHAP process (Vishegrad Group Countries, Online).

In Europe there are also strong links between the Healthy Cities Movement and sustainable development initiatives such as Local Agenda 21.

“Within the Healthy Cities movement there is a growing understanding and acceptance that human health and sustainable development are inextricably linked. The Healthy Cities project has developed strong links with the European Sustainable Cities and Towns Campaign, and it continues to work with the Committee of European Municipalities and Regions, United Towns Organisation and EUROCITIES. Furthermore, together with a range of partners, it has produced a series of publications drawing out the linkages, in theory and in practice, between the sustainable development and the Healthy Cities approach.” (MacArthur, 2000)

See **Table 5** for a comparison of Healthy Cities and LA21 planning processes.

Table 5 highlights linkages in principles and planning processes between the frameworks behind the Healthy Cities movement and local sustainable development initiatives (respectively):

Table 5 Comparison of principles and processes for planning for health and sustainable urban development from health for all and Agenda 21

Principles	Health for all	Local Agenda 21
Equity	Yes	Yes
Sustainability	Implicit	Yes
Health promotion	Yes	(health)
Intersectoral action	Yes	Yes
Community involvement	Yes	Yes
Supportive environment	Yes	Yes
International action	Yes	Yes
Processes	Health for all	Local Agenda 21
Consider existing planning frameworks	Yes	Yes
Analysis of health, environment and social conditions	Yes	Yes
Public Consultation on priorities	Yes	Yes
Structures for intersectoral involvement	Yes	implicit not explicit
Vision	Yes	Yes
Long-term action plan with targets	Yes	Yes
Monitoring and Evaluation	Yes	Yes

Adapted from (MacArthur, 2000).

Table 6 (see over) similarly compares key elements and stages of LA21, Healthy Cities and LEHAPs.

Table 6 Comparison of processes for planning for LA 21, Healthy Cities and LEHAP.

<p>Local Agenda 21 6 Key Elements (Local Government Management Board, 1994)</p>	<p>Health Cities 20 Steps [WHO Regional Office for Europe, 1995 #40]</p>	<p>Environmental Protection Plans (LEAPs & MEAPs) 5 Phases (Regional Environmental Centre, 2000)</p>	<p>LEHAP 9 Stages (MacArthur, 1999)</p>
<p>Managing and Improving the Local Authorities sustainability performance Integrating Sustainable development issues into the Local Authorities practices Raising awareness and education Consulting and involving the wider community and the general public Working with others Measuring, monitoring and reporting</p>	<p>Build support group Understand ideas Know the City Find finances Decode organisation Prepare proposal Get approval Appoint committee Analyse environment Define project work Set-up office Plan strategy Build capacity Establish accountability Increase health awareness Advocate strategic planning Mobilise intersectoral action Encourage community participation Promote innovation Secure healthy public policy</p>	<p>Getting Started Assessing Environmental Issues and Setting Priorities Developing an Environmental Action Plan Implementing Actions Monitoring Evaluation and Results</p>	<p>Gain political commitment Gather Partners Practise what you preach Analyse the environmental health status Seek public opinion Set priorities, make decisions Widespread consultation Review and amend Monitor, report and revision through implementation</p>

Adapted from (MacArthur, 2000)

In regards to these comparisons, MacArthur states:

"...the name or ideology which is attached to a certain local planning process matters little when the intended outcome is broadly the same... the principles which underpin the LA21 and the Healthy Cities approach are broadly similar. Both the LEHAP and the environmental protection approaches (NEAP/LEAP/MEAP) also seek participants to adopt such principles. All four hope to improve health and life quality for all members of society in a way which does not harm the environment and which looks beyond the needs and demands of the current generation." (MacArthur, 2000)

In Fiji the NEHAP/LEHAP process is also aligned with other action planning frameworks, namely Agenda 21 and the Healthy Islands movement.

“This document (NEHAP) began by setting out frameworks for Environmental Health and Healthy Islands. It did four things:

- Aligned Fiji’s Environmental Health programme with Agenda 21;
- Gave shape to the Healthy Islands vision of the Yanuca Island Declaration;
- Acknowledged the Jakarta Declaration on Health Promotion; and
- Reinforced the Raratonga Agreement on Healthy Islands.”

(Fiji Ministry of Health and WHO Western Pacific Regional Office, 2002)

In the end each locality will need to consider the following points in deciding upon a type of process which best suits their needs:

- Political acceptability of a particular project
- Existence of a national framework, and
- Funding mechanisms

(MacArthur, 2000)

As previously discussed, in relation to the implementation of NEHAPs in Europe, many countries have decided not to develop LEHAPs and instead intend that local actions to implement their NEHAPs should be through pre-existing frameworks such as LA21 or Healthy Cities (WHO Regional Office for Europe, 1998). Again, this is a course for each particular nation and locality to decide.

SECTION C:

Tools for Strategic Management

Overview

In line with the overall objective for this resource manual (of developing your skills and knowledge to develop a LEHAP) the purpose of this particular section is to introduce you to two powerful tools to help in analysing environmental situations and identifying strategies for change.

The first of these tools is a descriptive/analytical model developed by Valerie Brown of UWS called the 4P Model (Policy, Problem-solving, Practice and Place). You will find many links between how this model works and the approaches used to describe environmental issues and their determinants.

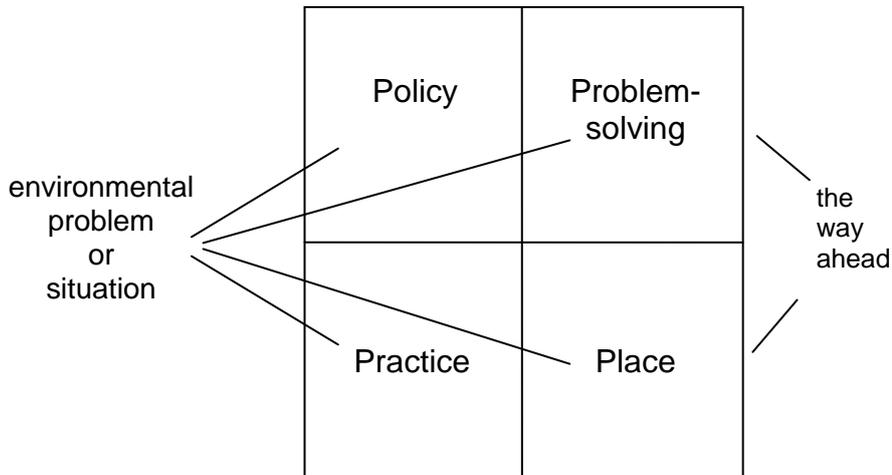
The second model, developed by Jim Ireland, is called the ABCD (Strategic Questioning Model). You will find some parallels between this model and the strategic questioning material by Fran Peavey. The ABCD model goes beyond strategic questioning, however, and offers us a framework for using strategic questions (and the answers obtained) to drive the change process in Environmental Management.

The final purpose of this last module is to attempt to draw together and consider the skills and competencies you will need to develop in order to take up your role as an agent for change in Environmental Management, Environmental Health or Occupational Health and Safety.

The 4P Model: A descriptive/analytic tool for change

The 4P Model developed by Valerie Brown of UWS Hawkesbury is one such model for describing and analysing **environmental situations**.

In simple terms, the model can be summarised in the following way:



By structuring the description and analysis of a particular problem/situation between the four (4) frames (Policy, Problem-solving, Practice, and Place) the environmental manager is able to:

gain insight into the physical, ecological and social boundaries of the problem, evaluate the existing policy framework influencing the problem, develop a critique of the current ways of solving problems in this area, and identify opportunities for future actions that can be carried out.

As Brown (1997) states in her paper, the four dimensions together make up an interconnected system to assist with locally based decision-making. The four frames can be entered at any point (i.e. there is no sequential order for dealing with each) as the process is an interactive (and iterative) one (i.e. the process of adding to one frame can trigger an entry into one of the adjoining frames). Each of the four frames is built up until a rich picture of the problem/situation is developed.

Policy

Put simply, the four frames can be summarised as follows:

This refers to the policies, standards and guidelines (existing on a local, regional and global level) that have a bearing or influence on the situation. An understanding of the prevailing policy framework provides all stakeholders (e.g. councillors, staff, the community) with a sense of common purpose and a shared vision for the future.

Problem-solving

This refers to the approaches used to respond to the impact of policy or place, i.e. how do we transfer the policy framework and achieve the desired outcomes at a particular level. The problem-solving approach can operate on a local, regional or global level. Approaches such as systems, reductionist science, etc., all have a valid role to play in our approach to problem-solving. Examples of some of these problem-solving approaches are dealt with in the following reading.

Practice

This refers to the way in which different stakeholders work together towards solving the problem or improving the situation. The actual practice of environmental management needs to take account of the different backgrounds, world views, and communicative methods of each of the participants. Communication strategies, conflict management techniques, mediation and team-building techniques are all important tools in the process of environmental management.

Place

Place refers to the natural and cultural heritage of the area including the history, the rules and the norms that give a particular locality its meaning. This concept corresponds well to that dealt with in Brown's 4P Model.

Using the 4P Model

The section 'The 4P Model: a descriptive/analytic tool for change' gave an outline of the four frames of the 4P Model (Policy, Problem-solving, Practice and Place). Whilst the four frames should now be clear to you, what may be less certain is how to use these four frames to describe or analyse a particular problem.

In its simplest terms, the model can be used on an individual or group basis as a tool to help organise information for each of the four frames. The practical exercise in the activity below should assist you in seeing how this works.



Activity

Assume you are working in a medium-sized town that is experiencing some problems in relation to waste management (e.g. too much waste, cost of disposal too high or something similar). Someone has suggested that the town do something about waste management and you have been appointed as the project officer.

As part of the analysis, you decide to use the 4P Model to help you and the project team get started. Please attempt to fill in the following matrix (use your current workplace and/or your imagination to assist with filling in the gaps).

Policy

What policies, rules, guidelines or initiatives already exist to advise on waste management? How can you set goals with management, staff and other stakeholders relating to waste minimisation?

Problem-solving

What different problem-solving methods exist to help with reducing waste, e.g. regulation, education, promotion, etc.?

Practice

How can different players work together to improve the situation? What skills and techniques will be required to implement change and to check and monitor progress?

Place

What are the characteristics of the place and the people that make this situation unique? Describe the environment, the extent of the current problem, who is involved, etc.

Brown (1997) highlights the following strategies as being particularly relevant to the process of developing locally sustainable development (ESD):

- developing personal communication skills,
- strengthening local government/community relationships,
- monitoring the whole environment,
- mainstreaming environmental issues into strategic planning, and
- managing for sustainability.

A final word on the 4P's

Remember, the 4P Model is not specifically designed to provide you with a clear direction/strategies to follow in relation to managing a particular environmental problem. Rather, the model is a way of helping you organise what is and what can be. Finally, you may wish to keep on developing the hypothetical example of the 4P's analysis you started to build in the previous activity. You may even wish to apply the methodology to a situation that has more direct relevance to you. There will also be an opportunity to work on this model during the mid-semester workshop.

The ABCD strategic planning process

Whilst the aim of the 4P Model is to help you describe or analyse a particular situation, the ABCD Model goes one step further and helps formulate distinct strategies for Environmental Management. The model has its roots in work done by Jim Ireland and Golsby Smith & Associates in the early to mid 1990s.

The model is a powerful tool for looking at:

- where you are now (the A of the model)
- where you want to be (the B of the model)
- how to get from A to B (the C of the model)
- who is responsible for the actions in C? (the D of the model).

There is also an optional extra stage (called E), which involves the process of monitoring and reviewing the outcomes of the process once the strategic plan is implemented.

You will note from the ABCD methodology (which I will not repeat in full here) that one of the first steps in the model is to formulate a mind map to capture a rich picture of the problem situation (the 'Where are we now?' question).

The power of the mind mapping technique should be apparent here. It is a useful tool for learning and for quickly capturing and representing our thoughts and feelings about a particular situation. Mind mapping helps us to develop a rich picture of the

problem situation. It also helps us to draw out the critical theme/s, which is determining the process of change.

Other parallels between the ABCD Model and material covered elsewhere in this subject include:

- the use of a strategic planning framework (i.e. a model for change) to drive the process, i.e. identify a problem → set goals → identify and select strategies → implement and monitor,
- the use of the strategic questioning techniques (similar to Peavey 1994) to drive the A, the B, the C and the D steps of the model,
- the use of the systems-related method of formulating a rich picture of the problem situation and comparing it to what is, and
- the use of an iterative process (or ongoing cycle) of planning, action, observing and reviewing which is closely linked to the Kolb Learning Cycle, the Action Research Spiral and the way we learn.

The ABCD Model has been used successfully on a number of different levels:

- on a personal level for career planning and personal counselling,
- on a local level for formulating business plans and environmental management plans in industrial settings,
- on a regional basis for development of a regional air-shed management strategy, and
- on an international level for development of inter-country water and sanitation training strategies in the South Pacific.

Forging Partnerships - Tools for strategic questioning as an aid to environmental management

By Jim Ireland

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Forging Partnerships - Tools for strategic questioning as an aid to environmental management

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Environmental management is the process of:

- *Intersectoral teams thinking long term and acting short term*
- *Communities of people thinking globally and acting locally*
- *Communities of nations thinking locally and acting globally*

Brown and Ireland

Forging partnerships in environmental management

Environmental management requires stakeholders from many sectors to think together about multi-dimensional problems and complex issues. The problems which are most difficult are those where competing forces degrade relationships and complexity clouds people's thinking. Building partnerships in such circumstances requires more than the linear and logical thinking which is exhibited in many strategic planning models.

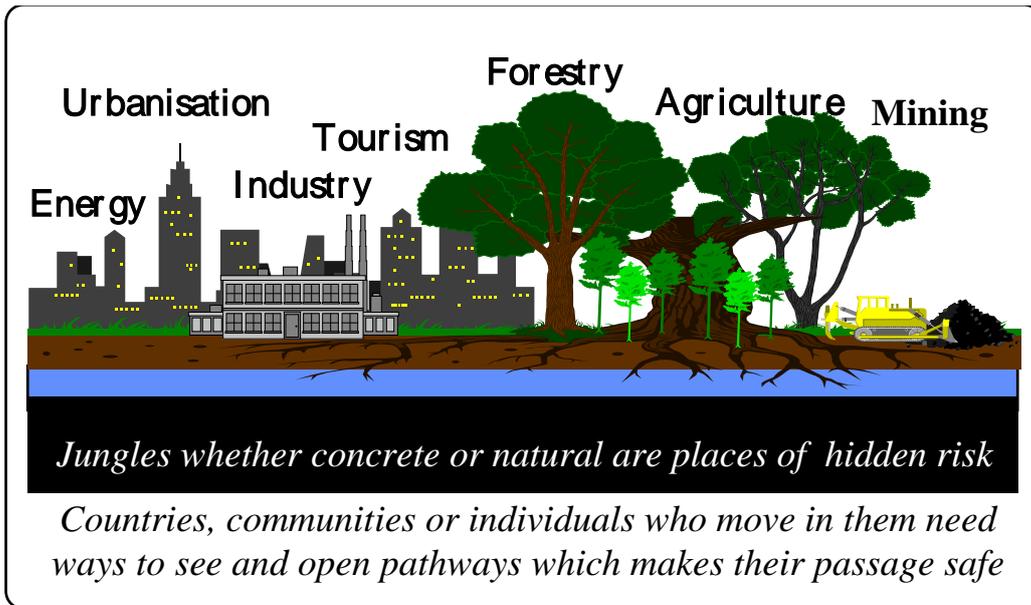
Stakeholders need to listen to each other while dealing with their uncertainty. They need ways to shape the future with shared purpose and vision. Finding approaches which transcend barriers to shared purpose is a creative way to build partnerships in environmental management. This paper offers some problem-solving tools for releasing such creativity. It supports groups in linking experience, practice, policy and action with people and their places.

So where can we being?

Choosing a metaphor is a handy way to start

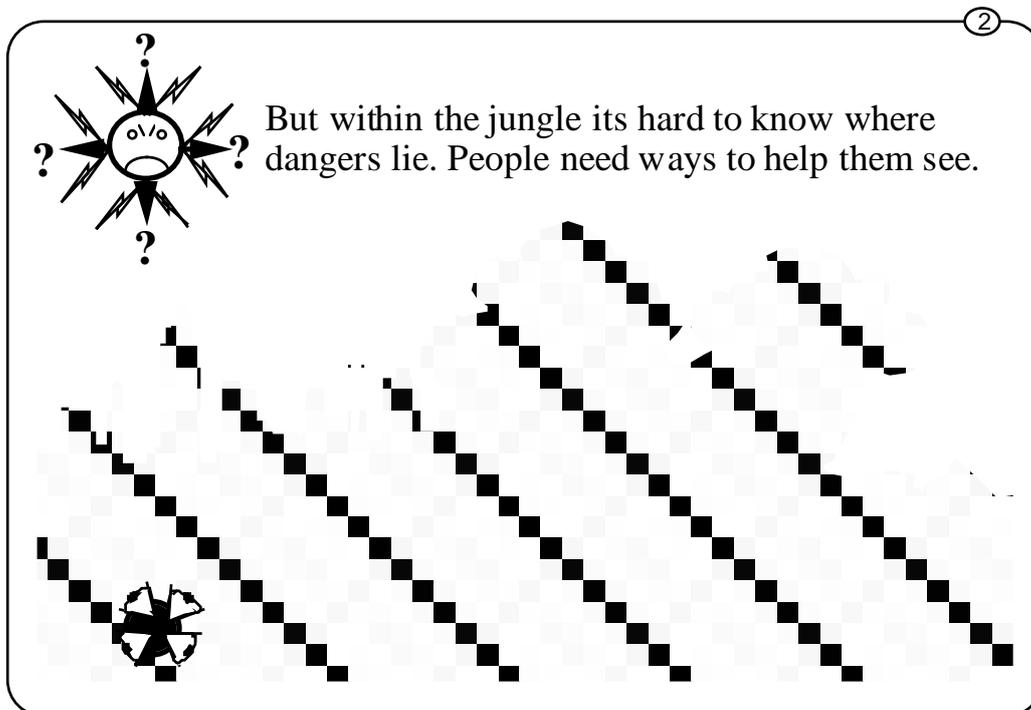
Cities are places of bricks and mortar - "concrete jungles". Natural environments at their climax are jungles of a different kind. Both are complex and cloud people's vision.

¹ © Jim Ireland: Collaborating Fellow, WHO Collaborating Centre for Environmental Health, School of Applied & Environmental Sciences, University of Western Sydney, Hawkesbury.



People need ways to help them see

Development can distort environments in subtle and incremental ways. People who live and work at developing interfaces sometimes fail to see how decisions might affect them and others. Often the people making policy are too far removed from the local action to associate cause and effect.



In order to manage the environment as an integral part of development, people who understand environmental management need ways to mingle with people who make plans, others who execute plans and those who live with the consequences.

People who manage the environment need to first see the big picture. Then they need to:

- think long term while acting short term
- think globally while acting locally
- think locally while acting globally.

So how do we lift people to gain a clear vision and define pathways?

We need a process

The pages that follow set out a process which can help. They offer a way for those affected by development and others with skills in environmental management to communicate effectively with people who cause change.

This paper adapts an ABCD thinking and design model

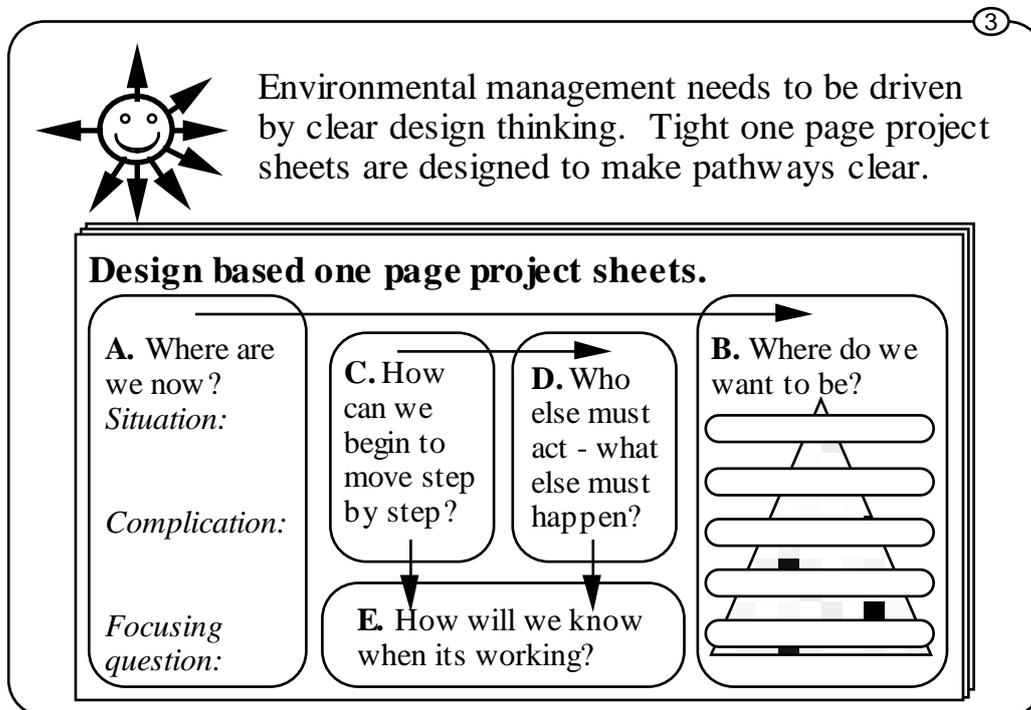
The model is grounded in communications design theory. It works by strategic questioning techniques. Rigorous use of the model delivers one page outputs which are clear and easy to read.

The model has been benchmarked by Golsby-Smith and Associates² with the leading Document Design Centre at Carnegie Mellon University in the United States. It is widely adaptable and is focused in this paper upon environmental management.

² Golsby-Smith and Associates (GSA) have developed and trademarked this process as an ACDB model. The company has, as an act of corporate citizenship, granted the author permission to use it in this paper.

What does the model look like?

This is a scale down of the one page output



Here is a summary of how the model works

A. poses the question "Where are we now?"

This is where we're now focused in the **AcDB™** Model → **A**

The answer to this question has three parts:

- *Situation:*
- *Complication:*
- *Focusing Question:*

We begin by first answering the *Situation* part of the question in A. Then move over to B and explore its question.

B. poses the question "Where do we want to be?"

The answer to this question takes the form of a number of one line statements each beginning with an action word (interactive verbs).

This is where we're now focused in the **AcDB™** Model → **B**

Then we cycle between A and B to get *Complication*, and *Focusing Question*.

This is where we're now focused in the **ACDBTM** Model → **A & B** 

C. poses the question "How can we begin to move step by step?"

This is very simple to answer when we know the answers to A and B.

This is where we're now focused in the **ACDBTM** Model → **C** 

D. poses the question "Who else must act - what else must happen?"

Again the answer is simply found when A, B and C are clear.

This is where we're now focused in the **ACDBTM** Model → **D** 

E. finally poses the question "How will we know if the model is working?"

This is where we audit and evaluate.

This is where we're now focused in the **ACDBTM** Model → **E** 

The completed sheet is an action plan which answers "What immediate path must we follow to integrate environmental management?"

This is where we're now focused in the **ACDBTM** Model → **All** 

So how doe we use this model?

Complexity is a major barrier to clear thinking

Complexity doesn't yield easily to casual processes of inquiry. Statistical or analytical tools have their place but generally following rather than preceding an event. By this time the damage has often been done. Understanding environmental management is more a process of active learning. People need tools to help them share their insights and find connections which are often hidden.

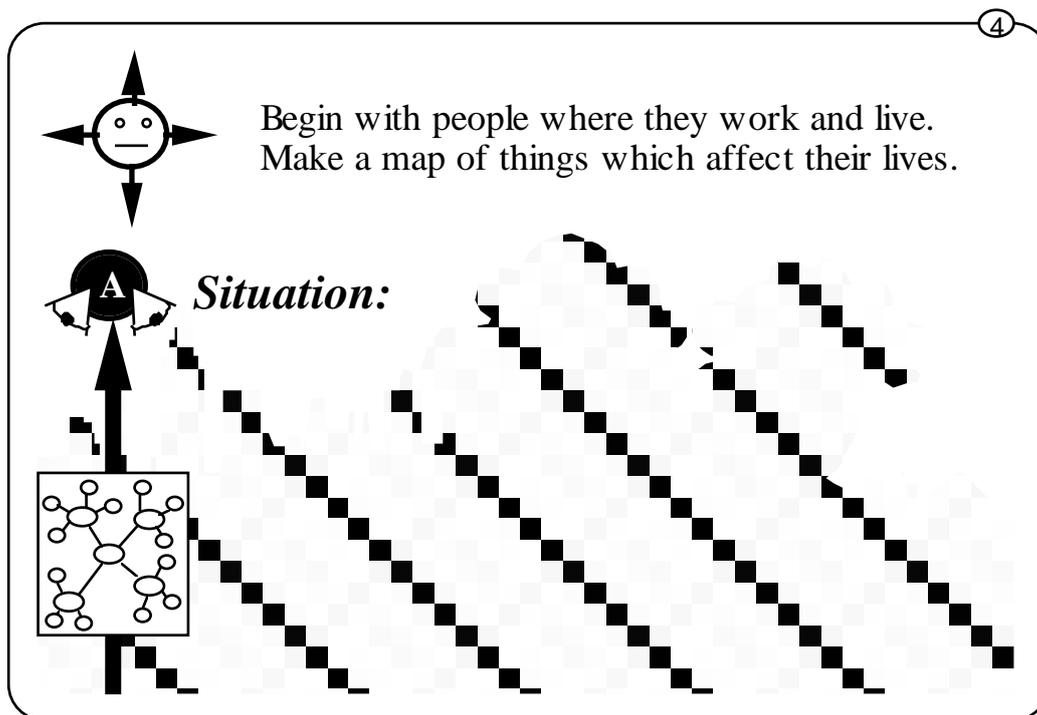
Mind-mapping is the first tool

Mind-mapping is a versatile way to share experience. Words in bubbles joined by lines tag issues on a single sheet of paper. This enables groups to explore and works best if people run pictures in their minds, suspend judgement and talk about what comes up. It is best not to priorities items or try to decide how important they are, until the whole picture is complete.

Mind-mapping works for people alone, one on one, or in small groups. It supports comfortable social processes of inquiry and sharing. Generally it invites disclosure, threatens nobody and helps people feel involved.

This is where we're now focused in the **ACDB™ Model** → A 

What does mind mapping look like and where does it take you?



One or two words in each bubble will tag an issue so its not forgotten. The group simply builds out the map as they explore. Bubbles already on the sheet trigger other ideas. The person holding the pen writes down the words that people use. They know they are being heard and the level of trust in the group can grow.

Examples of mind-mapping appear in the case studies at the end of this paper. It gave environmental managers a starting point for developing a Local Air Quality Management Plan in Sydney's Airshed. Mind mapping also worked as a cross cultural tool on a WHO mission in Cambodia. Groups were working with English as a second language, as many do with WHO. Writing in both languages within the bubbles kept every one in the picture. Conversations could happen one word at a time if some in the group were struggling. We will transmit the tool by doing it and use it throughout the workshop as a way to reinforce learning.

Why does mind-mapping work?

It helps people overcome complexity

Mind-mapping overcomes complexity by supporting short term memory. This is the mental processing we do in building up a picture as we explore. To make this picture clear we need to capture all its parts and fit them together. But short term memory works with only 6 or 8 items at any one time. When items of a complex issue exceeds this number, the mind begins to go in circles - so does the conversation.

Mind-mapping helps us make connections

Mind-mapping lets us hold many items in view while we explore others to see where they fit. It frees us from the need to organise and it allows us to explore ideas without saying what is right or wrong. We give ourselves room to relax with uncertainty while we examine all we know about the situation. Then we can hover and hunt for connections which we couldn't see before. This promotes lateral thinking and opens a pathway to creativity.

This is where we're now focused in the **ACDB™** *Model* → **A** 

Making connections using right brain thinking

Complexity clouds thinking until the full picture can be viewed as a whole. Clarity begins to come as connections which were previously hidden begin to reveal themselves to the group. Looking at a mind-map is a right brain process which enables the thinker to manage intuition. Mind-mapping is a non-linear multi-lateral

process. It is very different from making lists. Making lists is a linear left brain process which limits lateral thinking.

So what do you when you have a mind-map?

Draw out themes

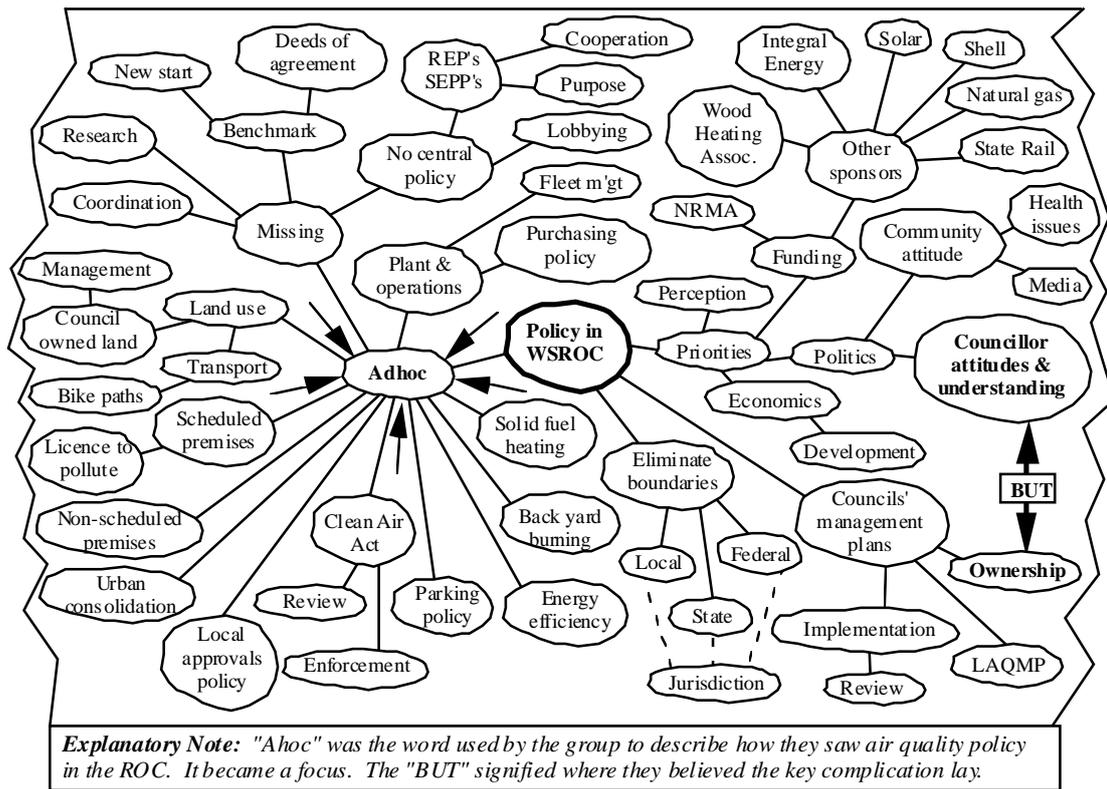
Once the mind-map is complete begin by hovering over it and look for bubbles which are interesting or important. Consider their importance - are they right or wrong, good or bad, relevant or irrelevant, helpful or unhelpful, reassuring or unsettling. Most of all look for connections between the interesting bubbles. Once connections between formerly unconnected items dawn, give the connections a name - these are the emergent themes around which partnerships can be built. These themes are the means of bringing order out of apparent chaos.

This is where we're now focused in the **ACDBTM** *Model* → **A** 

We are now ready to frame a situation statement. This is a few short sentences which sum up what “we” the group have discovered from the mind-map. The group then takes a position and searches for the feelings of uneasiness about it. This is a sentence or two beginning with the word “BUT”.

An example might help here

This is the mind map from the Sydney Airshed case study which follows this paper. The group who produced this map were Environmental Managers from the Western Sydney Regional Organisation of Councils (WSROC). They had focused on “policy” and “ad hoc” (meaning uncoordinated) was the dominant theme of their map and their complication had to do with “attitudes” and “ownership”.



This was how they summed it up

A. Where are we now?

“Situation: Air quality is a metropolitan issue to which we must contribute. We think a WSROC approach to collaborative local policy development is a place to start.”

“Complication: BUT we are unsure of support from the Board and our individual Councils. Some WSROC Councils are not here.”

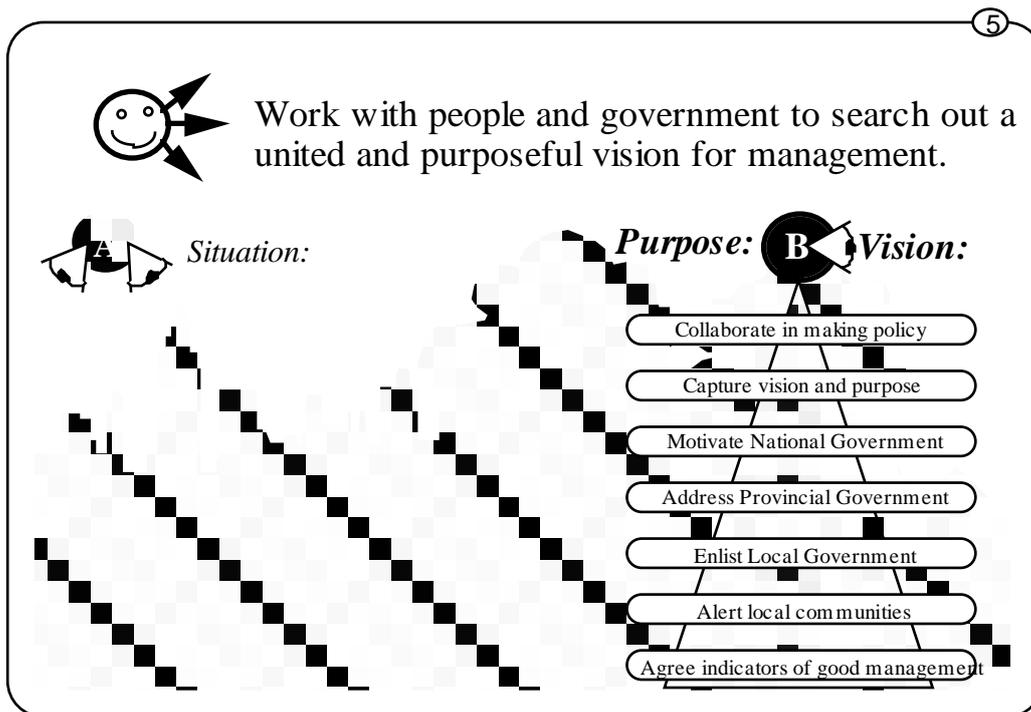
Note their use of the word “we” At this point they are sharing a problem not proposing a solution. The mind-map and this summing up of the situation and complication sets the scene for building a partnership. People unite over shared problems - they often divide over proposed solutions, particularly if these arise without consultation.

This is where we're now focused in the **ACDB™** Model → A 

Having formed the basis for a partnership within the existing situation the next need is to find shared purpose and vision. This takes us to the “B” in the strategic questioning model.

Finding shared purpose and vision

Purpose and vision become critical in balancing what is good for one sector against what is good for another. Partnerships in environmental management need to build from the local level through the scales of government. Agreeing about what matters most is important in defining local indicators of good environmental management.



Begin with the issue at the local level work upwards until the level of accountability for setting policy is reached. Then search out vision and purpose around which partnerships can form.

This is where we're now focused in the **ACDB™** Model → **B** 

Most communities have stake-holders at several levels

Clarity of purpose and vision is critical if environmental managers are to gain and retain credibility with stakeholders.

The B part of the model offers a rigorous thinking process which delivers this in succinct terms.

This is where we're now focused in the **ACDB™** Model → **B** 

How then do we think with purpose and vision for local sustainability?

First agree on indicators for environmental sustainability

Before we can begin to think about purpose we must know what matters most. In the field of environmental management this may differ from one community to another.

Criteria for local environmental sustainability apply in three areas

“Towards local sustainable development” (CRES 1994) offers a selection of these:

- environmental quality indicators - state of environmental resources
- environmental sustainability indicators - impact of human activities
- environmental health indicators - impact on human health.

People at the local level must be involved

Is agreement at the local level all its about?

No, because development choices are made in other places

There is a need for integrated local area planning. In CRES (1994) terms this involves:

- distinctiveness and difference of local and regional areas/communities
- shared understanding of local and regional issues and desired futures
- holistic linkage of environmental, social, economic & cultural issues
- partnership of three scales of government, community & commerce.

So whom do they tell about local sustainability?

They take the issue upwards to the level where accountability lies

They lift the issue through the tiers of government as high as necessary by:

- alerting local communities - BUT if the matter's still caught, by:
- enlisting the support of local government - IF that doesn't work, by:
- addressing administrators in provincial government - OR if need be, by:
- motivating national governments. What ever the ceiling - then seek to:
- capture purpose and vision at that level AND THEN:
- collaborate in operationalising policy at the local level.

Does knowing about local sustainability make the difference?

Probably not

Development is driven by interest groups who are motivated and single-minded. Where environment is concerned, developers need ways to see.

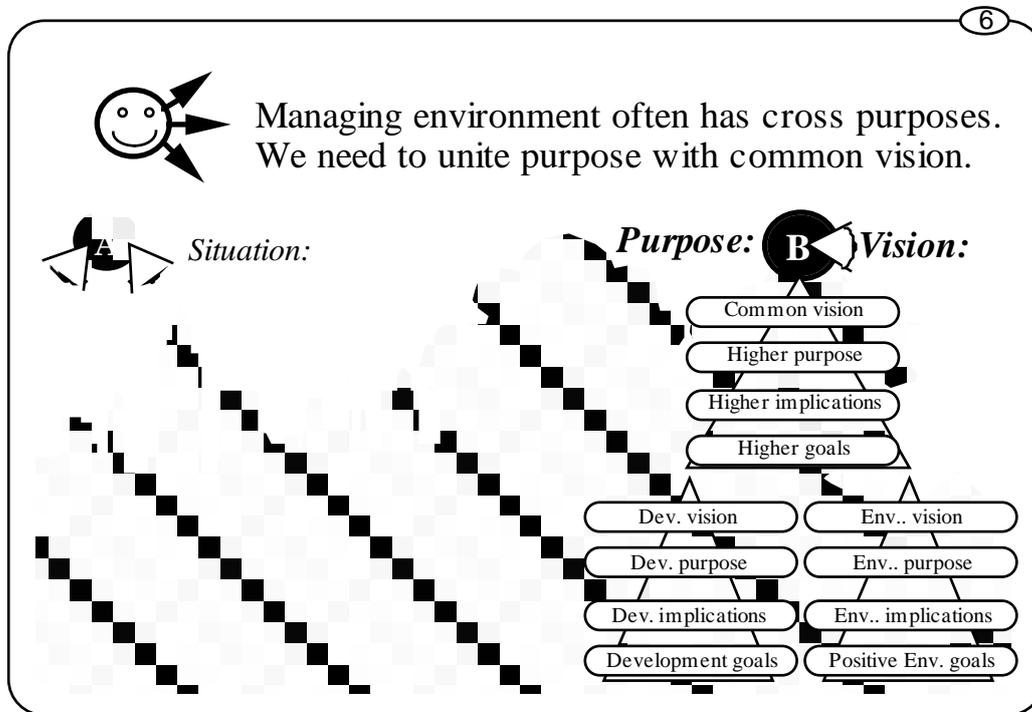
This is where we're now focused in the **AcDB™** Model  **B**

All parties need to see clearly

Development and sustainability are both desirable. But each have their costs.

So how do we help development and sustainability line up?

Before making choices both need clarity of purpose and vision. When each values the other, development will promote sustainability.



This offers a pathway for integrating local area planning across the gulf between developers and environmental managers.

But can people readily do this kind of thinking and writing?

Yes, but they need some tools

The quest for local sustainability will be won or lost in the mind. Clear thinking and clear writing will make it possible. Its done by posing questions and finding robust verbs with which to begin the answers.

Purpose is driven by action words – verbs

When answers add context to robust verbs, purpose is made clear.

Questions bring focus - tight answers bring clarity

Ask a good question and find a strong verb with which to respond. Add ten words or less linking people and place after the verb and meaning becomes crisp and clear.

Is there a process to help teams work like this?

Yes it begins with values

The group begins by examining values. It starts with the question - “*What matters most in this setting? AND What do we really care about?*” A scatter of words at the bottom of the “B” serves well enough to start the process. These are the statements of intent with which every one readily agrees. They are good like motherhood is good and it is very important to know what matters most, but such statements need grounding.

Many organisations describe their mission in terms of the values they hold. But the words give little indication of what the organisation will do, who will engage with it and where will they engage.

An example from this university

Mission:

“The Faculty is dedicated to the provision of excellence in education, research and community outreach for meeting present and future needs in Science and Technology.”

Goals:

- To provide an environment that encourages quality life-long learning for students and staff
- To foster excellence in teaching and in research and development
- To recognise the value of all staff
- To encourage and support the professional growth of all staff
- To honour individuality, rewarding equally excellence in teaching and research
- To achieve an exchange of information, ideas and services across all sections of the Faculty
- To provide quality outreach resources to industry, government and the wider community

- To enhance the university's reputation at the local, national and international levels.

Faculty of Science and Technology, UWS Hawkesbury 1994

This is an excellent and well worded mission, expressing values and goals to which all have subscribed, but for partnerships to form around these words more needs to happen.

So we must move beyond values and goals to establish purpose

Again the group asks itself a question: *“What can we do now to express these values?”*

Begin by answering “We need to:” then find a strong interactive action word and complete the answer in ten words or less. Make sure this answer identifies the people with whom the interaction must happen. Also be sure to signify the place where the results will show.

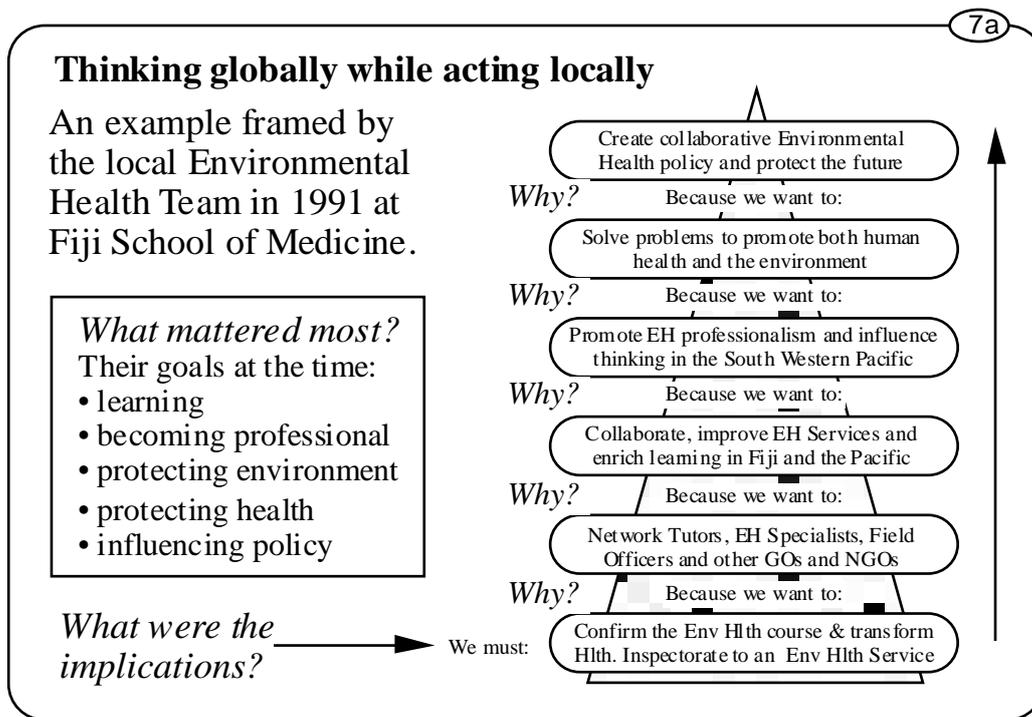
The stage is then set for more global thinking - the group asks itself another question: *Why do we want to do that?*

Continue by answering “Because we want to:” use another interactive verb then complete the sentence again linking people and place.

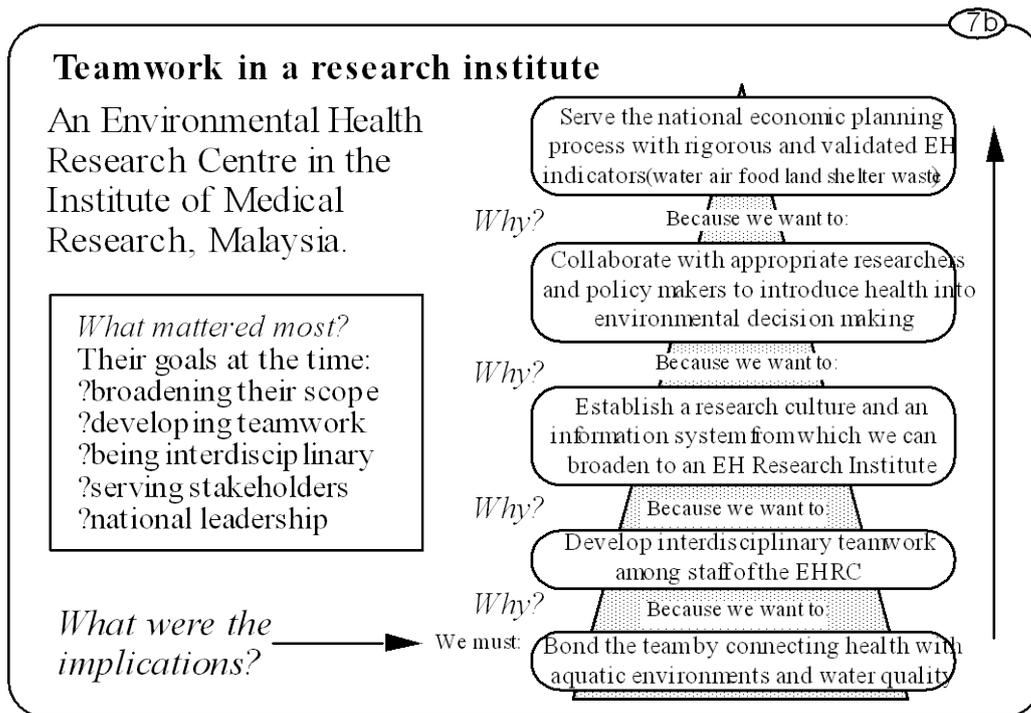
The “Why?” question is repeated with each new answer taking the partnership of purpose upwards and outwards. Unlike mind-mapping in the “A”, which is multilateral and non-linear, the “B” demands tight logic and hierarchical thinking. Each level builds upon the one below and broadens the scope from the local setting to regional, to national and even to global scales. Such a hierarchy of purpose is also longitudinal with respect to time. The higher the purpose the less immediately accessible it becomes and the further it reaches out into the future

Some examples might be helpful here

Environmental Health Officers at the Fiji School of Medicine used the model in 1991 to think about the future of their profession (Ireland 1992). This is how they viewed themselves and the partnerships they might form. Six years on in 1997 they are still working out these purposes.

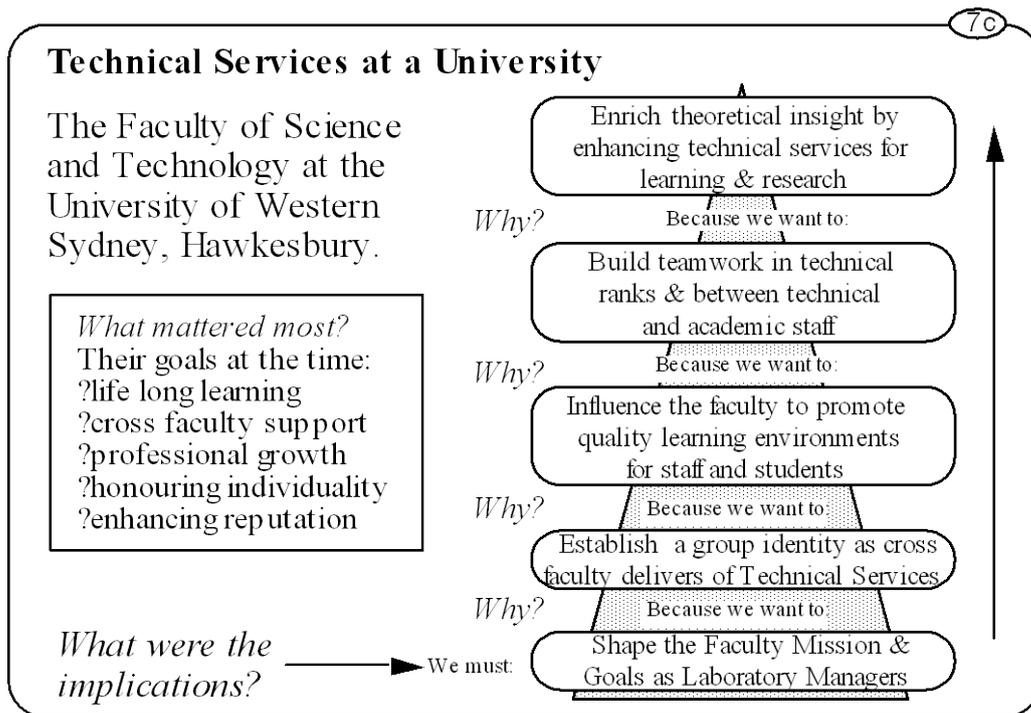


A Medical Ecology Division in the Institute of Medical Research was being transformed to an Environmental Health Research Centre in Malaysia during 1997. They were moving from disciplin based research to interdisciplinary team based research. They chose to bond the team around aquatic environments and water quality. In the longer term they were very clear about their mission to also serve the national economic planning process in a much broader way. They are now moving into partnerships with these purposes:



Being clear about purpose is very important so here is one further example. We examined the most admirable mission statement of the Faculty of Science and Technology and said that more needed to happen. A subsequent Faculty Review (Ireland 1996) picked up a number of themes around which the University might build and express this mission.

The work done by the Technical Services group is a good illustration of how purpose statements in the “B” can begin to ground high sounding policy with an organisation’s people and place. Finding purpose in this way created a sense of partnership amongst these Laboratory Managers, each of whom came from a separate School. Such a sense of partnership at Faculty level had not been present before.



What does purposeful thinking do?

When teams gain clarity, good intentions come true

The process of deciding what matters and finding highest purpose takes people to places of common interest. Answering *Why?* questions is difficult work but those with clear purposes, have a much better chance of finding common interests around which to form a partnership.



Once purpose is clear how does vision help - what, exactly, is it?

Vision is a means of raising hope

Visioning has a dreaming quality which invites people to hope for something which has not yet happened. People with true vision excite others around them. Those who can share their dreams gain a following and build partnerships. Martin Luther-King Jr. understood this principle. When he rose to speak he would say "*I have a dream!*" He would then paint word pictures of a day, in the future of his country, when people of all races would mingle in harmony. His people listened and they either loved him or hated him - few were indifferent.

The secret lies in language - an example from *Healthy Islands*

Visioning comes most readily when consider our purposes we ask ourselves if they were fulfilled: “*What could it be like?*” The answer needs to be in four lines of six words or less so that people can always remember it easily.

Such thinking (Ireland 1995) influenced the language the Yanuca Island Declaration. This arose from the meeting of Ministers for Health from Pacific Island countries which gave rise to ‘Healthy Islands’ (WHO 1995).

The declaration opens with these words:

“New challenges in health in the twenty-first century call for clarity of purpose and broad-based participation to achieve healthy islands.”

The vision: *“Healthy islands should be places where:*

- * children are nurtured in body and mind;*
- * environments invite learning and leisure;*
- * people work and age with dignity;*
- * ecological balance is a source of pride.”*

This vision invites the mind to make pictures and imagine what healthy islands might be like. It has potential to influence decision makers in the Pacific and in four lines, shift thinking about health from a curative to an ecological focus. These tools of strategic questioning, which gave rise to the words, had been introduced to Environmental Health professionals in Fiji in 1992 (Ireland, Powis and Litidamu 1997).

Forming partnerships was the dominant theme which emerged in the draft Rarotonga Agreement - *Towards Healthy Islands* at a WHO follow up Conference of the Ministers for Health in the Cook Islands two years later (Powis - personal communication 1997).

This is where we're now focused in the **AcDB™** Model → **B** 

Another example from Technical Services at a University

The Laboratory Managers who had developed partnership in finding purpose also captured a vision. They came to it by asking themselves the question: “*If our purposes were fulfilled, what would it be like?*” The vision is a little wordier than *Healthy Islands* so is less lyrical. In crafting it we were mindful that a science and technology audience might be less tolerant of poetic expression.

The Vision: “*Science and Technology will be a Faculty with centres where:*
* *each team member is valued for sharing some special skill*
* *solutions balance technology with environment*
* *industry comes to advance technology*
* *learning produces ethical graduates.*”

Let’s review what we have done so far?

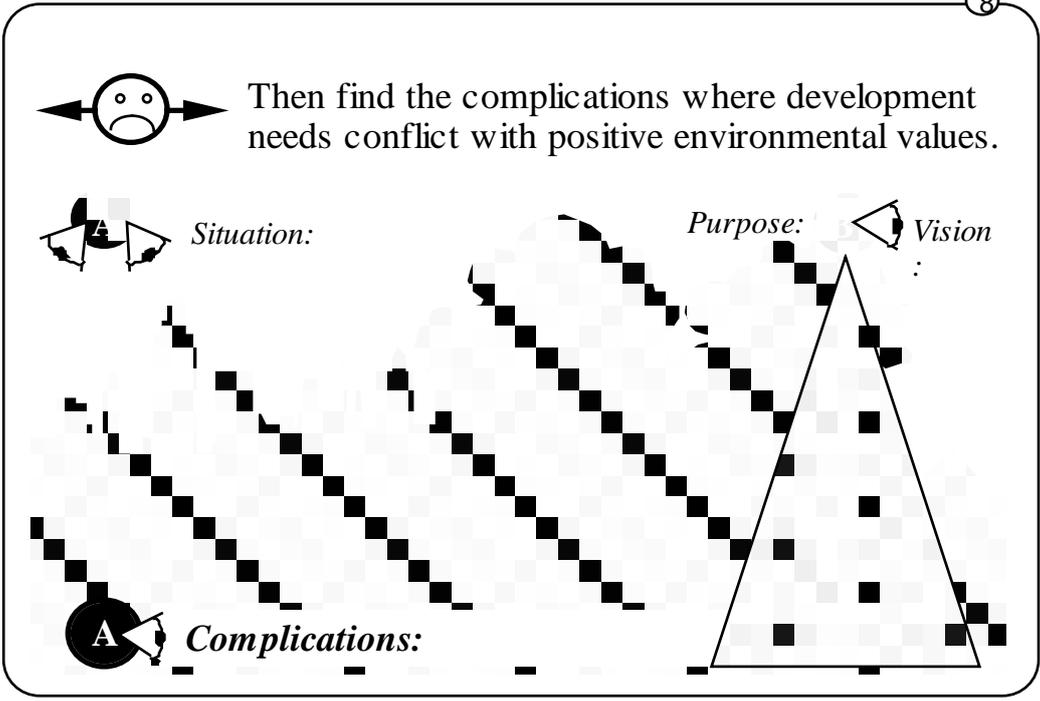
On our journey into partnerships we have examined tools to help us:

- understand the local situation by mind-mapping it and getting above it
- hover and find connections which were not at first obvious
- agree upon themes with which to work
- track issues in government to where accountabilities lie
- explore with developers to clarify our purpose and theirs
- work with local people on what matters most
- find areas of common interest upon which to act
- reach for common purpose and think globally
- capture a vision and excite imagination.

So we know how to gain purpose and capture vision - where to next?

There will always be complications

If the real world were as simple as defining purpose and capturing vision there would be no environmental problems. Complications are never planned and they are never welcomed. But we ignore them at our peril - we need ways of turning problems into opportunities.



Naming complications is like making trails in the jungle

We may find them on our mind-map in A - where the people are. But there is a fair chance that we will have seen them even more clearly as we went up B in search of purpose and vision.



Complications in the ABCD model are blocks and barriers - the topics of endless unhappy conversation. They always seem to begin with “BUT”. They have their roots in conflict of interest or contradicting purposes. Naming them is never easy it takes practice to do it well. But after we have found and expressed them, they seem so common-sense.

The people who are immersed in the problem say things like: “That’s it - we hadn’t seen it like that before but that’s where we’re stuck!”

If the stakeholders don't give that kind of reaction we probably need to keep looking. The most hidden complications come where mutually desirable purposes compete; OR where mutually undesirable issues compound each other.

In the first case working to capture one purpose will make it difficult to capture the other. OR In the second case working to escape one problem will worsen the other.

An example drawn from squatter settlements in Pacific Islands might help

Complications naturally form around the word *BUT*. They arise out of issues having two sides and abound in cases of rural to urban drift, eg.:

<i>Situation:</i>	<i>Developing islands promote prosperity in cities and sometimes degrade rural environments. So rural people move to cities, join squatter settlements and find poverty without services to protect their health.</i>
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After summing up the situation, as the above statement does, the ABCD model invites the Environmental Manager to take a position and nominate a way forward. Here are three possible scenarios which take a position in this way. Below each there is a complication.

Scenario 1: Maybe we believe that development is bad and limiting it is the way forward.

<i>Complication:</i>	<i>BUT blocking development harms the economy & worsens poverty.</i>
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Scenario 2: Maybe we believe that squatter settlements are bad and clearing them out is the way forward.

<i>Complication:</i>	<i>BUT uprooting settlements makes worse poverty in other places.</i>
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Scenario 3: Maybe we believe that servicing squatter settlements is better than uprooting people so laying on water, sanitation and electricity is the way forward.

Complication: BUT providing services makes unplanned settlements permanent.

It is impossible to know what is best from EITHER the stand-point of the squatters OR from the vantage-point of government. Paths driven solely from one or other direction can't guarantee sound solutions. Both ends need to meet in the middle.

How can we look from two ends at once?

Mind-mapping helps

This allows both squatter issues and government issues to be tagged on one page. Short term memory is supported so the mind can hover above both.

This is where we're now focused in the **ACDB™** Model → **A & B** 

Focusing Questions help more

Focusing questions in the ABCD model are framed in two parts around the phrases phrases:

“How can we in ways which?”

These must be questions which dignify stakeholders on both sides of the complication. They invite both parties to transcend the barriers and find over arching solutions which benefit both sides.

In framing focusing questions we:

- take some element from the *Situation* where we started among the people
- introduce a further element from the *Complication* where we now are in the A.
- AND weave in *What matters* words with appropriate *Purpose* words from the B.

Questions framed in this way enable us to look at an issue from both ends at once. The answers we might find will have much greater chance of meeting in the middle.

Here are some completed “A” statements for the squatter settlement scenarios

The “*Situation*” statement repeated here, sums up the squatters dilemma and remains the same for each scenario. The “*Complications*” name a likely consequence which differs in each scenario. The “*Focusing Questions*” each invite the mind to reach out for lateral possibilities, to transcend the problem and open the way for all parties to gain.

<i>Situation:</i>	<i>Developing islands promote prosperity in cities and sometimes degrade rural environments. So rural people move to cities, join squatter settlements and find poverty without services to protect their health.</i>
-------------------	---

Scenario 1: Maybe we believe that development is bad and limiting it is the way forward.

<i>Complication:</i>	<i>BUT blocking development harms the economy & worsens poverty.</i>
<i>Focusing Questions:</i>	<i>How can we manage development - in ways which benefit rural people and reward developers who promote health in cities?</i>

Scenario 2: Maybe we believe that squatter settlements are bad and clearing them out is the way forward.

<i>Complication:</i>	<i>BUT uprooting settlements makes worse poverty in other places.</i>
<i>Focusing Questions:</i>	<i>How can we relocate squatters - in ways which make rural areas more attractive and planned urban areas affordable?</i>

Scenario 3: Maybe we believe that servicing squatter settlements is better than uprooting people, so laying on water, sanitation and electricity is the way forward.

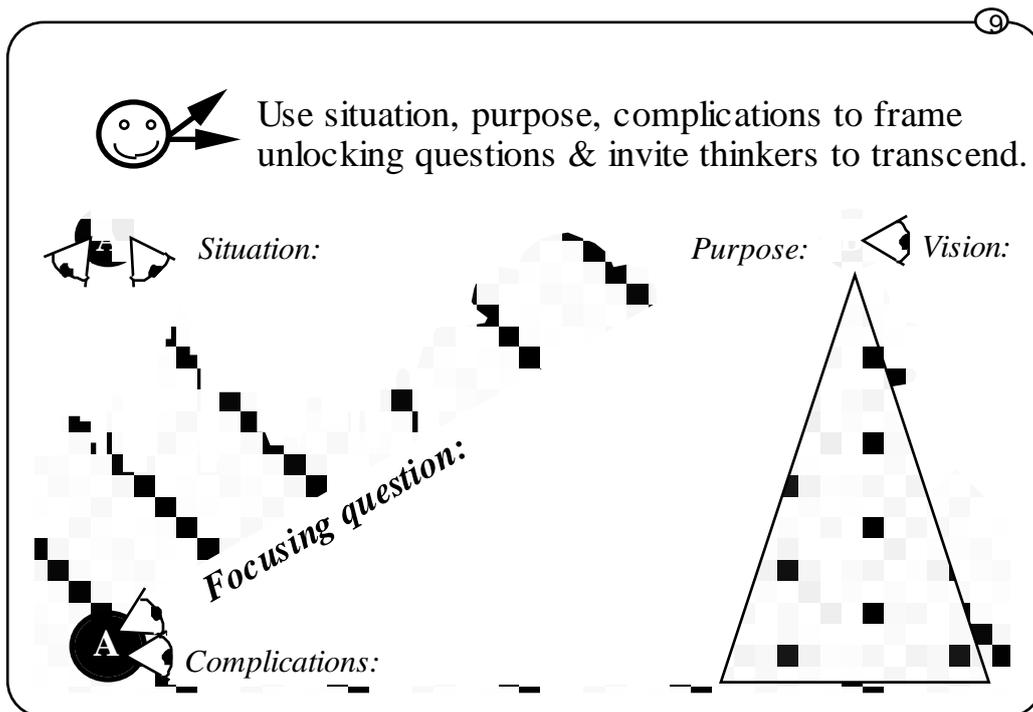
Complication: BUT providing services makes unplanned settlements permanent.

Focusing

Questions: How can we deliver services to squatters - in ways which raise incomes and offer planned, affordable housing?

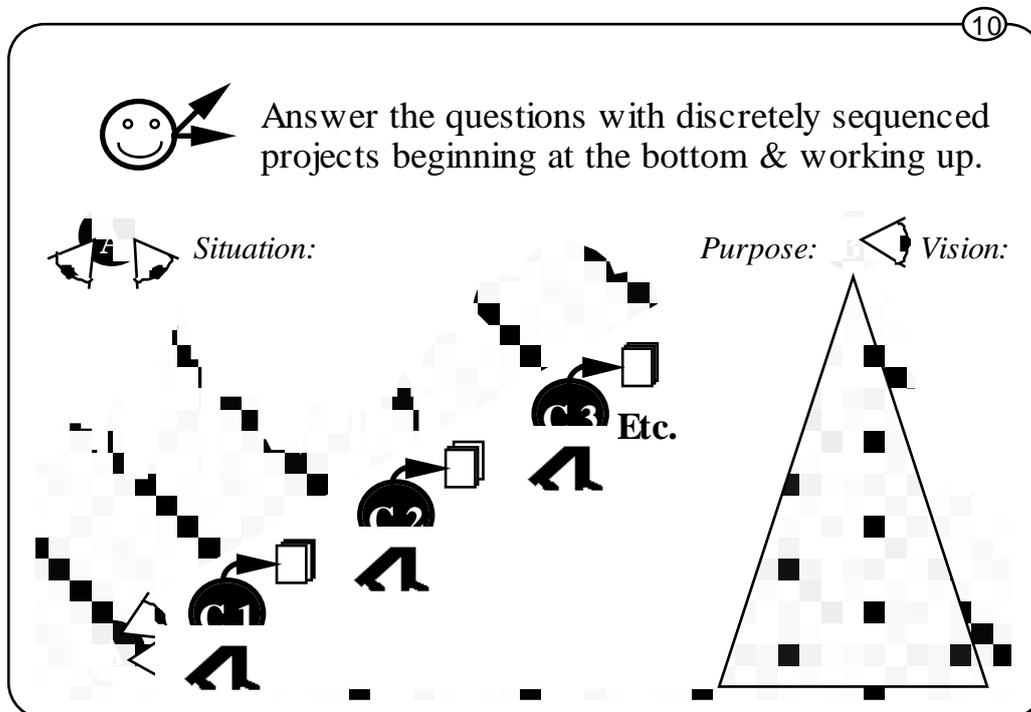
Focusing Questions are suspension bridges to support strategic thinking

The *Focusing Question* stretches between **A** where the people are and **B** where the future lies.



So we have a focusing question - what's the best way to answer it?

This is where the leg-work begins and partnerships grow



Think long term with purpose - plan short term with flexibility

Environmental management is always dealing with complex issues none of which ever remain static. Interventions almost always have unforeseeable secondary effects. Environmental management projects cannot be rigidly planned from start to finish. Circumstances almost always change as the work unfolds. What environmental managers need is a way to combine long term purposeful thinking with short term flexible planning.

The ABCD model works in cycles as a set tools to enable managers to work in this way. Getting purpose clear in the “B” is in fact long term thinking. Answering the question in “C”: “*Where can we begin?*” in responding the focussing question delivers a short term flexible plan.

The model does not require that every detail of the plan be determined from the beginning. It calls for only the first few steps of the journey. The “B” tells us where the project is heading - the “C” defines the pathway as far ahead as we can clearly

see. As the journey unfolds the project is kept on track with repeated cycles of ABCD each of which generate a single page update.

This is where we're now focused in the **AcDB™** *Model* → **C** 

Answers in **C** must be explicit, tight and very concrete. They must define outputs which can be produced and handed from person to person. Here are some examples:

- an experiment or survey delivering tables of data OR
- interviews delivering a tape recording or transcript OR
- a report or a research paper OR
- an agenda and a meeting with minutes circulated OR
- a video on an agreed topic or a press release OR
- a workshop programme held and reported upon OR
- construction of something physical OR
- some other tangible thing.

Reports need special attention

Reports are often managed badly. Teams of people do project work, write lengthy reports and make high sounding recommendations - then they gather dust. No one seems to know how to connect the report to the real world. Often this is because no one is really clear about the purpose of the work and of the report.

When purpose is clear project work can be appropriately designed. If it is responding to a focusing question it will be providing useful answers. In order to ensure that such a report does deliver its intended benefit, the following must be agreed at the start:

- what questions will the report answer
- who will do the work and where will they do it
- in what form will the report be delivered
- who will write the report and by what date will they deliver it
- to whom will the report be delivered and in what location.

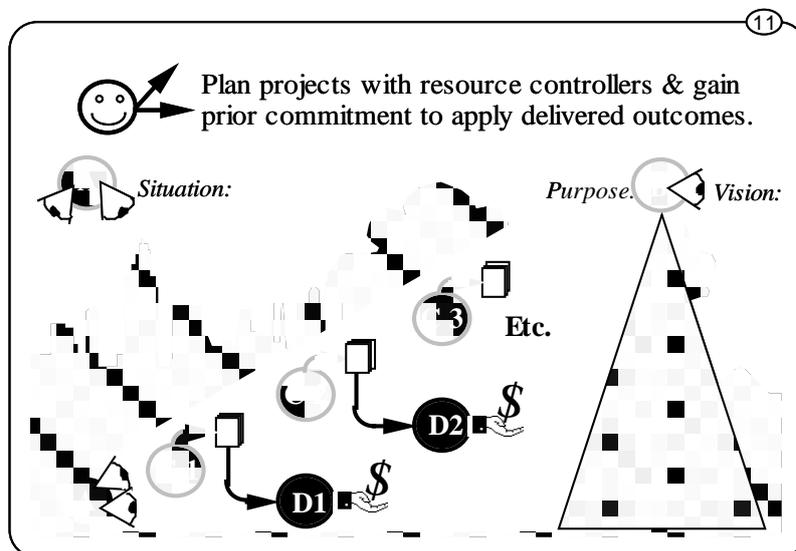
So we do work and deliver outputs why do projects still fail?

Projects and their outputs are often not connected to the organisation

We need a strategy to connect the output into the organisation - some one must ensure that it delivers a benefit.

This is where we're now focused in the **ACDB™** Model → D 

For each “C” we must have a “D” which answers the question: “*Who else must act - what else must happen?*”



It's time to establish managerial accountability

The “*Who*” in “D” will generally be some one senior who has power or prestige and who manages or controls resources. This will generally be the person to whom the output is delivered. It will be very important to identify this person before the work begins and if possible involve them in developing the initial ABCD.

Firstly, this person named in “D” must resource the work and be satisfied that the output will further the agreed purpose in “B” - they must agree to own the output.

Secondly, this owner in “D” must know what they will do with the output when it is delivered - they must take responsibility to ensure that this deliverable yields a benefit.

Thirdly, if partnerships are to grow, every one in the team must have the right to hold this senior person accountable for providing good managerial leadership.

This is where we're now focused in the **ACDB™** Model → D 

How will we know if our journey is on track?

This model helps make *Purpose* and *Vision* clear, informs project design and promotes strategic action plans. But the effort will be wasted if things people do never fall in line. The model is complete when its measures in “E” are clear.

We now need to ask ourselves a final question: “*How will we know when our strategy is working?*”

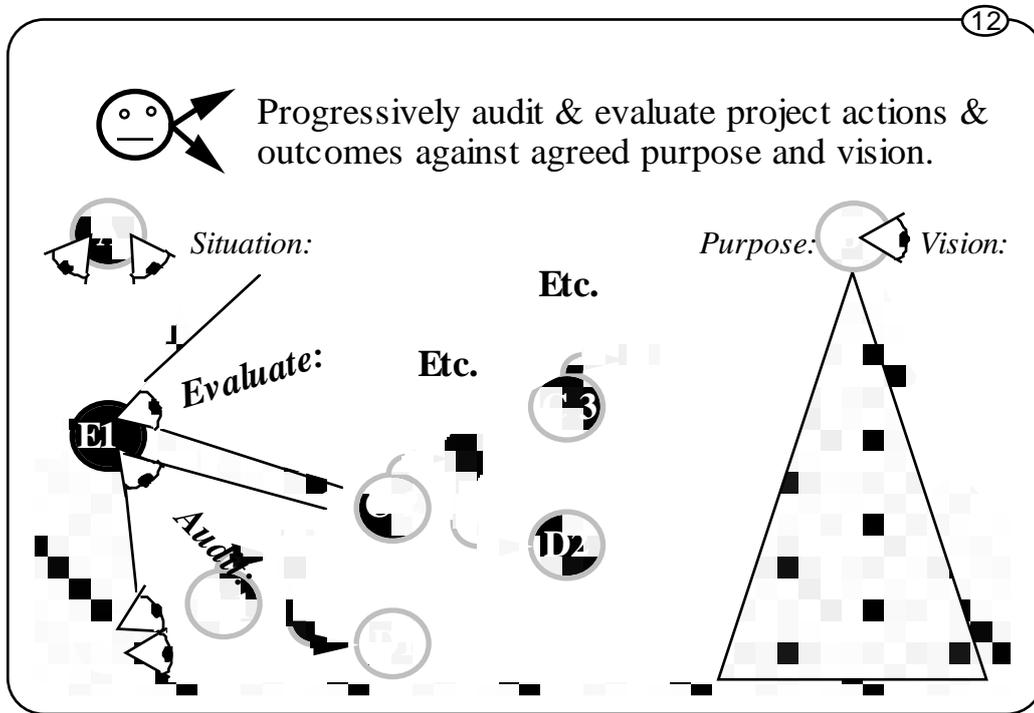
This is where we're now focused in the **ACDB™** Model → E 

We can treat this question in three ways - as an audit, OR as an evaluation, OR as an indicator.

An audit simply looks at the agreed strategy in “C “ and “D” and asks “*Are we following the action plan outlined in C?*” and “*Is the manager following through in accordance with D?*”

An evaluation examines how we are working in “C” and “D” and asks the question: “*Are the ways in which we are we doing C and D consistent with our purpose and vision in B?*”

An indicator outlines a proposition in the context of people and place in answer to the question: “What might we see happening?”

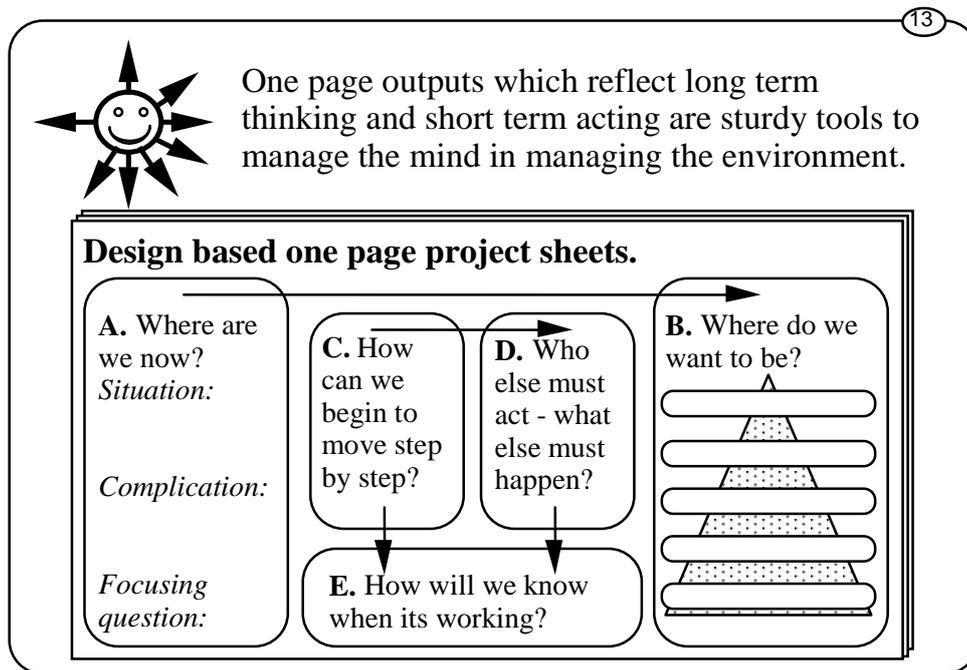


Using “E” for an auditing function is simply asking for yes no answers. It serves as a control mechanism to ensure that a project runs according to plan. Using “E” for evaluation is a higher level tool which examines how work is being done. It serves as an improvement mechanism to bring quality to the partnership. Both of these are inward looking. On the other hand, using “E” as an indicator is outward looking and can be motivational.

Some examples of motivational indicators

EHC

Recall where we started



Now an example from a small project - just to show the style

The next page shows an example of a project sheet generated at the beginning of a joint WHO/UNDP/World Bank mission in the South Pacific (Ireland and Davies 1994).

The brief was for a team of three to collaborate in exploring water supply and sanitation training needs in the Pacific. Work had been done by others over the previous decade in attempts to define training needs. Recommendations had been made at intervals. But no regional strategy had emerged.

Those who sponsored the mission believed that a networking approach held most promise. There were 22 countries within the area of interest, including Australia and New Zealand. The mission was of only 3 weeks duration and could visit only 5 of the countries.

These were the objectives of the mission:

- to review the current status of training in water and sanitation in Pacific Island countries
- to identify key needs for water sector human resource development (HRD) in the region
- to study opportunities for networking between training institutions
- to prepare a HRD and training strategy and inter-agency collaborative action plan including proposals for establishing a regional training network for the water sector.

Below is how the model unfolded in a short phase of work in 1994

We were to develop the strategy for a meeting in Honiara in June, 1994. After capturing A & B, complications were clear, so we set 2 targets not 1:

- a draft report to be table and refine at Honiara in June 1994
- a final strategy for a later meeting at Majuro in September 1994.

This is where we're now focused in the **AcDB™** *Model* → **All** 

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SECTION D:

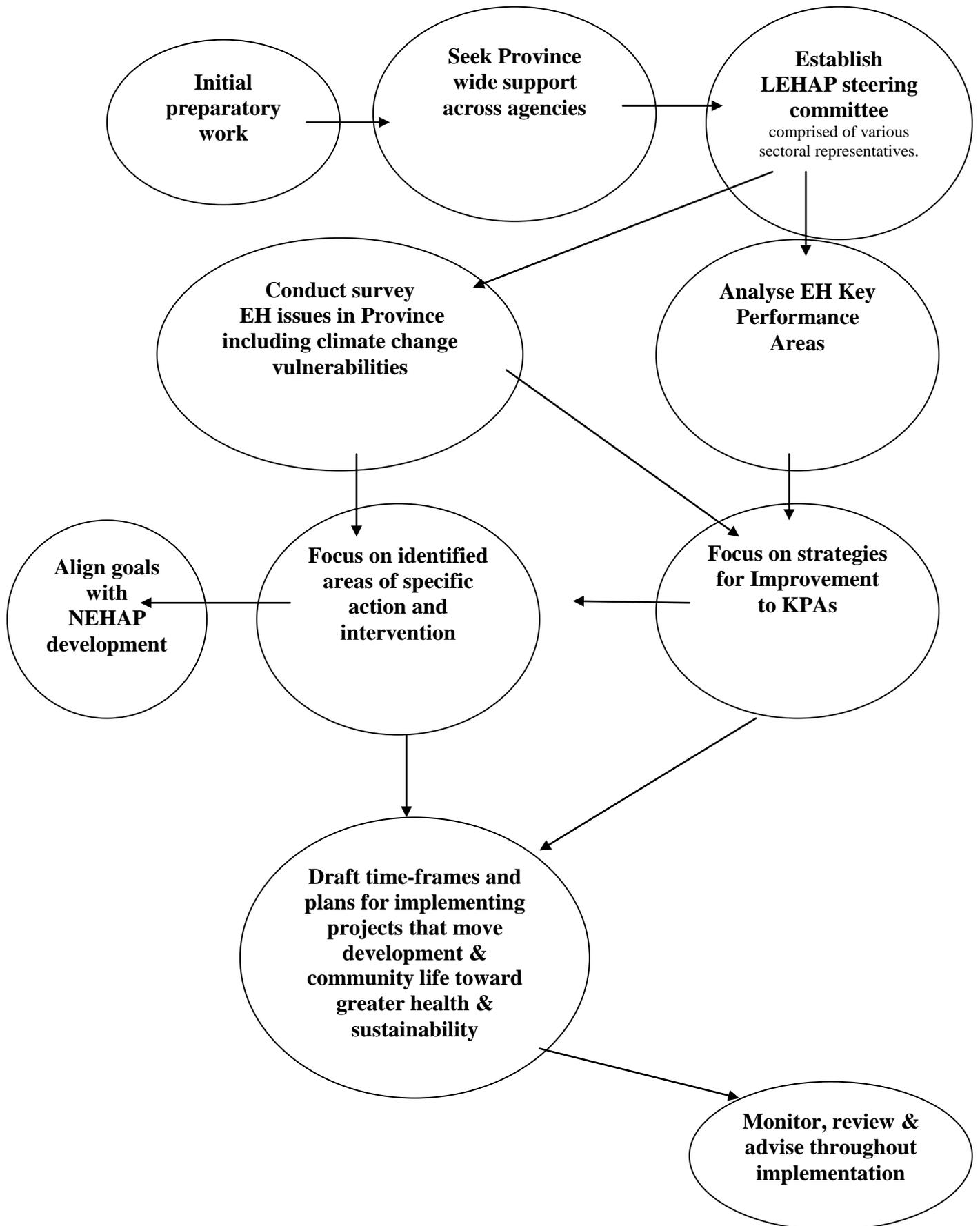
LEHAP development within China

A LEHAP Model for Provinces

An intrinsic aspect of LEHAPs is that they be drafted and developed within and by the community/locality they represent. As previously outlined, this process may involve a varied amount of public participation and government and NGO leadership depending on the particular make up of an individual locality and community and the presence of existing planning processes (such as LA21 for example). The model that follows is therefore the basis from which to further develop the LEHAP locally in China at the Provincial Level. It is a model based on the experience of LEHAP planners from other nations and the identified needs, strategic tools and work that has already been conducted in the China NEHAP.

Figure 8 (over page) occurs in the context of the LEHAP being undertaken as a planning instrument for the parallel development of a NEHAP. The process outlined begins with a period of initial preparation and moves through to the monitoring and review of the plan throughout its implementation. This is a cyclical process whereby the review phase constitutes the identification of further need for refinement and specific project areas for consideration.

Figure 8 LEHAP Model for China Provinces



A checklist has been developed for the implementation of the Municipal Public Health Plan (MPHP) strategy in Victoria, Australia. The selection of these strategies rests on comparing all alternatives. Decisions need to be made on agreed selection criteria. The checklist is as follows:

- Acceptability to key decision-makers and stakeholders (this could also include funding bodies).
- Acceptance by the general public.
- Technical feasibility.
- Relevance of the issue.
- Cost effectiveness.
- Timing.
- Client or user impact.
- Long-term impact.
- Flexibility and adaptability.
- Coordination and integration with other strategies, programs and activities.

(Victorian Department of Human Services, 2001)

The MPHP follows a similar process to that of LEHAP and is outlined further in section 12.5 of this resource guide.

Table 3 (over page) outlines a series of possible steps, towards LEHAP development, based on the experiences of other LEHAPs around the world. As previously stated, LEHAPs are intrinsically a local process and as such these steps may only form a basis from which to guide decision-making.

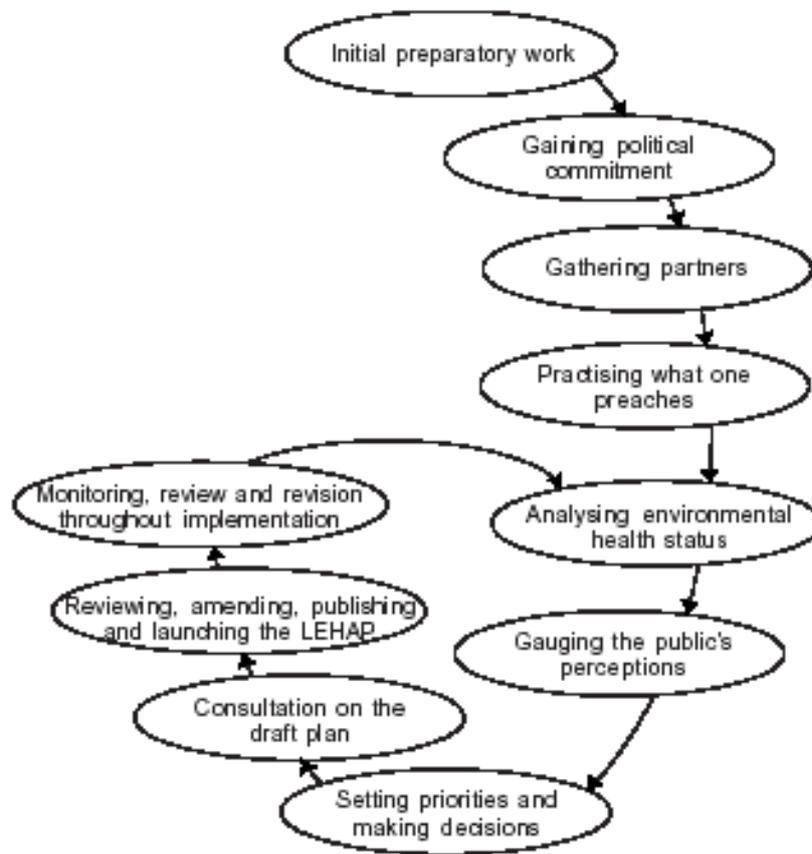
Table 3: Steps in the LEHAP process relevant to LEHAP in China

Step	Actors	Action
1. Initial Preparatory Work	National government; WHO; Province	Establish agreements Provinces to undergo training in 1)climate change adaptation, 2)LEHAP development
2. Seek Political Commitment	National government; Provinces	Get Provincial government leaders to endorse and promote the LEHAP process.
3. Gather Partners	Establish LEHAP Steering Committee	Invite key government stakeholders, locally groups from community, business and NGO sectors. Eg. LA21 Committee.
4. Review Key Performance Areas for EH	Health Bureau and CDC in each Province	Develop databases of practices and data management
5. Conduct EH Survey of Province	Health Bureau and CDC in each Province/ other relevant government agencies	Survey community, NGO state & national government departments, to assess climate change vulnerability and other E &H issues
8. Focus on identified areas for specific action	Steering committee; National and municipal government; WHO; EHRC; EH and other professionals; locally active groups from community, business and NGO sectors.	Use a variety of approach to develop improvement strategies for EH.
9. Align goals with NEHAP development	National and municipal government; WHO; EHRC; EH and other professionals.	Feedback information and priorities in planning into NEHAP process.

10. Consolidate public involvement and participation in projects	Align projects with identified needs of community and special interest groups (eg. disabled access).	Develop specific plans of action in consultation with identified groups.
11. Draft time-frames and project implementation plans	Steering committee; National and municipal government;EH and other professionals.	Identify and document activities according to a time frame for implementation.
12. Monitor, review and advise throughout implementation.	EHRC; EH and other professionals.	Seek feedback from all stakeholders regarding a variety of issues from individual projects to data access issues.
13. Identify new Province based improvement strategies.	Steering committee; National and municipal government; EH and other professionals; locally active groups from community, business and NGO sectors.	Actors and stakeholders to be guided by the cycle of action and reflection.

These processes can be compared with those utilised within the European approach to LEHAPs as outlined in **Figure 9** below:

Figure 9 The ten stages of the LEHAP process in the European context (MacArthur, 2002).



This approach has been utilised extensively in the development of LEHAPs in the former Soviet nations of Eastern Europe. The approach generalised so as to allow for the complexities that emerge in each locality and for the specifics of the plan to locally grounded.

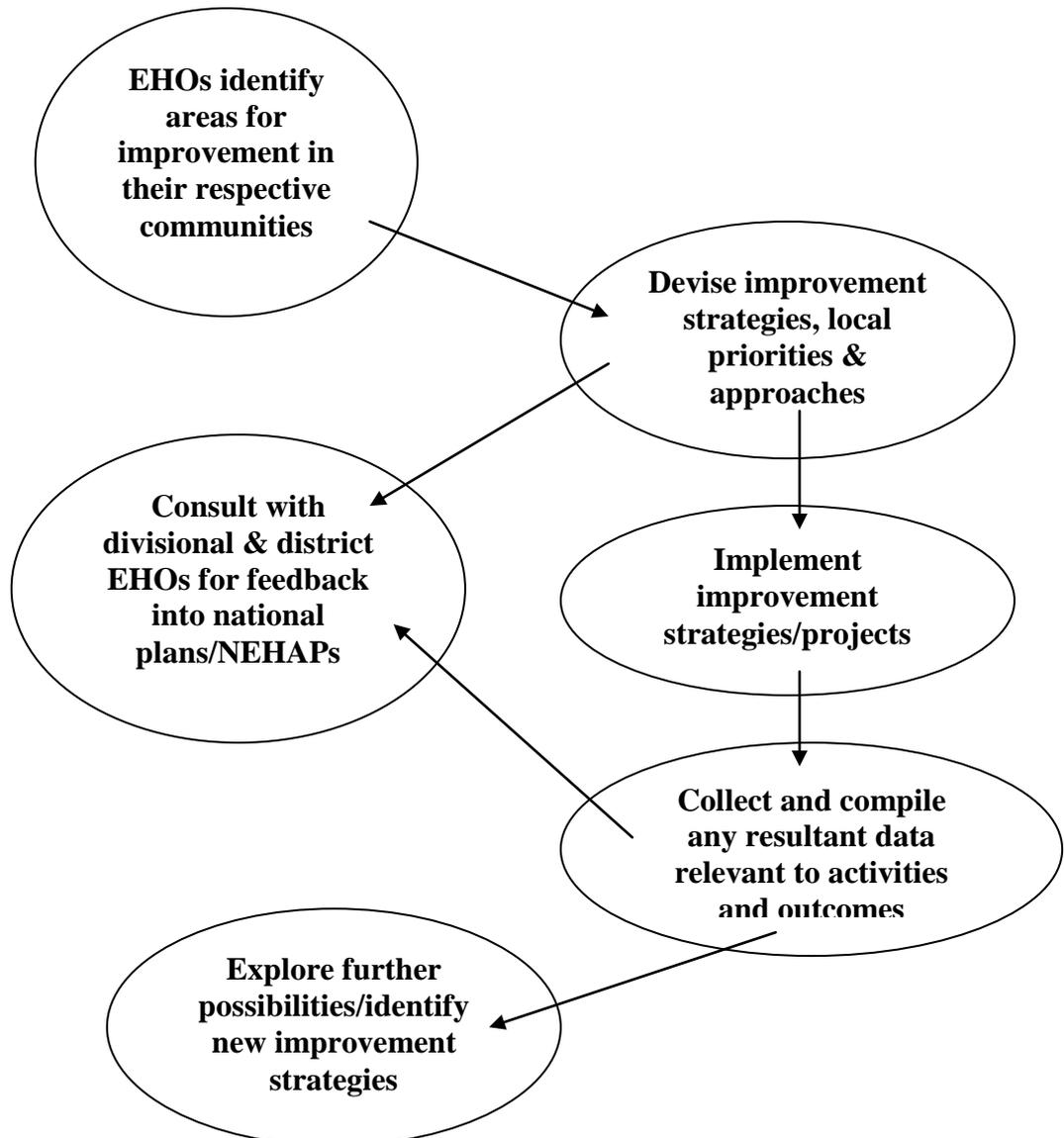
The LEHAP process in Fiji has taken a different approach and is outlined further in section 6.0 of this resource guide. A model outlining this approach is illustrated over page.

Figure 10 (below) illustrates the simplified/EHO driven LEHAP process as undertaken in the Fijian context. This is a process that has taken place separately to

other planning frameworks and as such is identified as a specific EH planning tool for local action. It is driven and managed largely by EH professionals in the field.

Figure 10 Fijian LEHAP processes

Adapted from: (Fiji Ministry of Health and WHO Western Pacific Regional Office, 2002).



Local Environmental Health Services: Key Performance Framework (KPAs)

The MDG Joint Program has, as one of its key objectives, to develop both adaptation and mitigation strategies to reduce the impact of climate change on health. The program of activities for 2009-10 includes a number of projects aimed at improving the capacity of environmental health services to address climate change impacts and to develop community wide strategies to reduce GHG emissions, with a particular focus on mitigation strategies that have significant public health benefit.

Program activities aimed at improving the 'adaptive capacity' of environmental health services include the development of new environmental health indicators, support to upgrade monitoring systems and workforce development strategies, all identified within the China National Environmental Health Action Plan as key element of China's EH Management systems in need of review.

Integrating both improvements to the delivery of environmental health services with strategic mitigation policy will, under the MDG plan, be delivered at the local (Provincial level) thru Local Environmental Health Action Plans. It is critical that the process of Plan development begin with an overview of the strengths and weakness of environmental health service delivery at the Province level. This is now proposed to be undertaken as the 'critical review of EH Service APW'. This paper proposes a draft framework for adaptation by the 4 Pilot Provinces selected, as they begin their LEHAP development.

Developing a Framework Model: International Constructs

While China's Environmental Health Systems reflects its unique history and context, there are now considerable international experiences that serve to provide potential models for use in any evaluation process. WHO and CDC in the US have led this conceptual development beginning with useful definitions from WHO regarding the nature of the EH Service:

Environmental Health Services are:

“Those services which implement environmental health policies through monitoring and control activities. They also carry out that role by promoting the improvement of environmental parameters and by encouraging the use of environmentally friendly and healthy technologies and behaviors. They also have a leading role in developing and suggesting new policy areas.” (Fitzpatrick and Bonnefoy 1999 p8)

“Environmental health services act as the direct interface between policy makers and those who are subject to that policy. They also have a direct relationship with the general public, in dealing with their complaints and concerns relating to environmental health issues. There is a need for such services to be independent, appropriately targeted and sympathetically responsive to public needs, while representing the view of the empowered authorities, be they local, regional or national”

(WHO Regional Office for Europe, 1995 p36)

Key terms which reflect the functions of the ‘EH Services’ include; *monitoring, controlling, promoting and policy advocacy*. Reflecting the historical development of this area, there has and continues to be a strong emphasis on enforcement of regulations related to sanitation, water supply and food safety and while these remain of critical importance particularly in developing countries there is now a move to functions which are less reactive and more proactive. This trend has been noted in the recent Australian National Local Government Environmental Health Workforce Summit which outlined changes in both legislation and local government work culture which has seen shifts from roles of *“regulators and enforcers”* to *“educators and health promoters”* (AIEH 2007 p26). Examples provided in this review included the State of Victoria’s health promoting approach to environmental health using Municipal Public Health Plans and the increasing use of food safety education and integration of *well being* drawing on areas such as ‘physical activity’ into core functions of the EHO, areas hitherto the domain of health promotion professions. In the UK, the fixed and reactive nature of environmental health is being challenged with the increasing focus on the ‘community engagement’ role of the EHO along with a risk based approach to tackling the wider determinants of health. Here the

EHO often has a lead role in implementing community health and wellbeing strategies with a focus on health inequity. The role extends to developing community strategies in partnership with key stakeholders. As outlined in Australia's National EH Strategy drivers for this change in function have included:

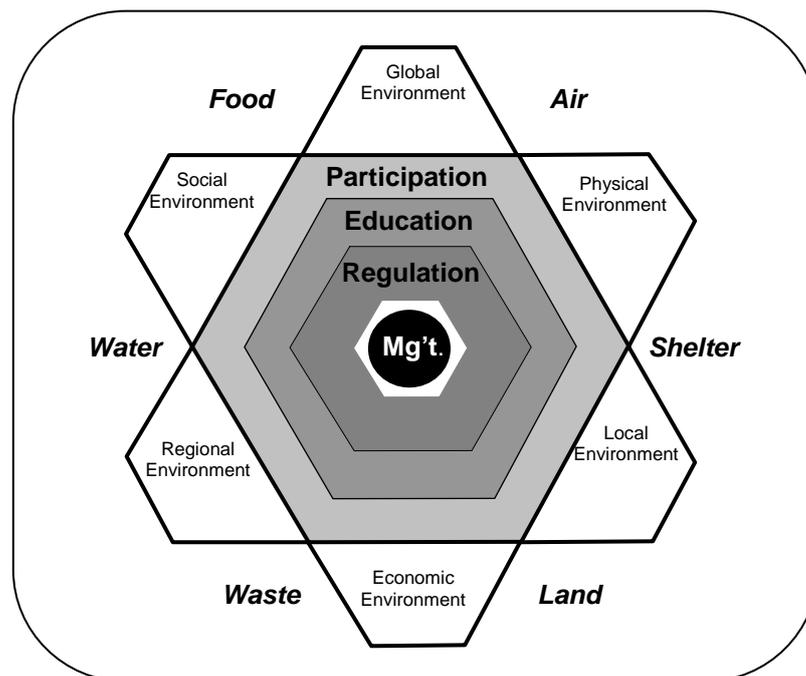
- Government moving to co-regulation
- Performance based management
- Outsourcing of services
- Third party compliance
- Broadening of environmental health
- Downsizing and government mergers

In her review of environmental health functions for WHO, Peralta (2002) concluded that while each country has to set its own priorities the main functions have expanded as need countries transition from less developed rural based economies to the modern industrialised state. Peralta points out that throughout the Western Pacific Region including China, environmental pollution has become an area of key concern for environmental health and while the more 'traditional areas such as solid waste management, food safety and vector borne diseases remain core functional areas so to are the more 'contemporary' areas of hazardous waste management, chemical safety, poison control and health and risk assessment. While universal in relevance issues such as, clean fuel technology, ionising and non-ionising radiation and drug quality are found to feature mainly in the more 'developed' European and American countries with developing countries needing to address the more immediate impacts associated with poverty.

It should be noted that most rural areas and commonly in developing countries a more generalist role for environmental health staff has been adopted as opposed to the emerging trend in some of the more developed urban based areas (cities / states/ national levels) where specialist are employed in areas such as vector control, waste management etc. It is also important to note the trend in many countries to include community based roles particularly reflecting the need to compliment control and regulatory functions with more enabling and community management/ health promotion roles.

A conceptual set of environmental health functions has also emerged from work of the WHO Collaborating Centre conducted in several countries in the Western Pacific (Powis and Ireland (1998). The framework developed captures the importance of both ‘Place’ (in terms of working locally, regionally, nationally and globally) and disciplinarily (in terms of addressing the social, economic and bio-physical elements of the environment). The Centre identified that the challenge for Environmental Health professionals is to integrate all these aspects utilising necessary skills and tools such as education, participatory governance, management and regulatory functions to address the wide range of environmental facets of environmental health (air, water, shelter, land food and waste). The ‘Checker Board model for Environmental Health Functions (Fig 1) which emphasises these multi-dimensions inherent in describing these roles.

Figure 1 – A Checkerboard Model for EH

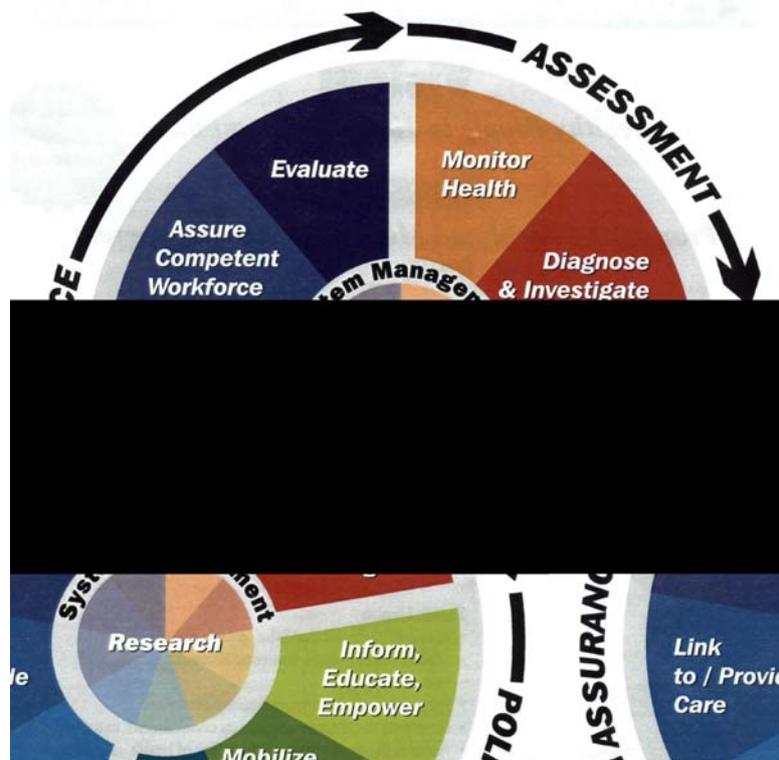


“In developing countries the most immediate emphasis centres on sanitation to combat spread of communicable disease. Some countries in Asia are developing very rapidly. These nations must design holistic environmental health systems. These must span immediate local sanitation needs while also countering the longer term threats to health from environmental degradation” Powis and Ireland (1998)

In recognition of the declining performance of many public health service agencies in the US, the 2002 Institute of Medicine report, *The Future of the Public's Health in the 21st Century* identified the need for renewal and proposed the National Public Health Performance Standards. The purpose of the standards were to:

1. Providing performance standards for public health systems,
2. Improving quality and accountability of public health practice,
3. Conducting systematic collection and analysis of performance data, and
4. Developing a science-base for public health practice improvement.

The resultant 10 Essential Public Health Services provide the fundamental framework for subsequent development of assessment tools, by describing the public health activities that should be undertaken in all communities. The 10 core service elements as shown below (Figure 2) are a model for the entire public health system and not aimed at any one sector. However the model provides us with a useful adaptable model, one which includes the assessment of not only core functions related to assessment and policy development but assessment of the 'infrastructure' such as budget, workforce and research for inclusion in any performance evaluation.



Drawing on both models and other experience and applying it more specifically to the needs of environmental health services, the emerging framework has identified core functions and infrastructure elements from which 8 KRAs were developed.

The Core Elements of the framework are;

- Control: Enforcement of Legislation, Regulations
 - *Ongoing community health status assessment*
 - *Identification of threats to health*
 - *Identification of vulnerable groups*
 - *Determination of service needs*
 - *Attention to special high risk populations*

- Promotion: Education of community, Engagement with community
 - *Social marketing and targeted communication*
 - *Provide accessible health information*
 - *Convening and facilitating partnerships*
 - *Building coalitions to draw upon the full range of potential human and material resources to improve community health*

- Assessment: Surveillance of disease/injury & Environmental Risk Factors
 - *Monitoring trends; analysing causes; and identifying needs*
 - *Risk assessment, management and communication*

- Policy Development
 - *Cross-sectoral communication & Collaboration*
 - *Systematic community-wide planning for health improvement*
 - *Broad community involvement; promote scientific basis of decision-making; strategic approach;*

- Workforce Capacity
 - *Education, training, assessment of personnel*
 - *Active partnerships with professional training programs*
 - *Continuing education to management and leadership*

- Planning and Program Evaluation
 - *Development of Strategic Plans*
 - *Assessing program effectiveness*
 - *Providing information necessary for allocating resources and reshaping programs*
- Research and Innovation
 - *Participate in and support full continuum of innovation*
 - *Continuous linkage with institutions of higher learning*
 - *Internal capacity to mount timely epidemiologic & economic analyses and conduct health services research*

8 Key elements, from which emerged 8 Key Results Areas. Each KRA has a number of specific Indicators for review and assessment. The 8 KRAs are as follows:

1. KRA#1 - Monitor Environmental Health Status to Identify Community Health Problems
2. KRA#2 - Diagnose and Investigate Environmental Health Problems and Environmental Health Hazards in the Community
3. KRA#3 - Educate, Empower and Engage with Community
4. KRA#4 - Enforce Laws and Regulations that Protect Environmental Health and Ensure Safety
5. KRA#5 - Effective policy development to enable response priority environmental health issue
6. KRA#6 - Assure a Competent Environmental Health Workforce
7. KRA#7 - Plan and Evaluate Effectiveness, Accessibility of Population-Based Environmental Health Services
8. KRA#8 - Research for New Insights and Innovative Solutions to Environmental Health Problems

Monitoring for an Environmental Health Profile of Province

What's going on in our Province? How healthy is our community and environment?"

KRA 1# 1 - Monitor Environmental Health Status to Identify Community Health Problems

Indicator 1: Population-Based Community Environmental Health Profile

- What are the most significant environmental health issues identified in 2008/9 across the community profiles
- Is there an existing database which can identify the nature and extent of significant health issues within Province/ City/ Town etc? across a community profile related to age/ gender/ ethnicity/ rural vrs city etc
- What data is collected and how frequently?
- What are the limitations in collection of data and the reasons?

Indicator 1.1 - Reporting and use of technology

- How is the data reported?
- What is the current use of current Technology to Manage, Display, Analyze and Communicate Population Environmental Health Data?
- How can the collection of this data be improved?
- What new data is needed and how can this be collected?

Indicator 1.2 - Populations with Barriers to Environmental Health Services

- Identify if any specific groups in the community have particular needs in terms of their vulnerability to environmental threats – who are they where are they and what is the nature of their barriers.
- Identify any resourcing that the EH Management needs in relation to the above.

Diagnose and Investigate Threats

Are we ready to respond to health problems or environmental threats? How quickly do we find out about problems? How effective is our response?"

KRA#2 - Diagnose and Investigate Environmental Health Problems and Environmental Health Hazards in the Community

Indicator 2: Surveillance of Environmental Health Threats

For each of the following environmental threats indicate frequency of surveillance, indicators monitored, significance of issue in the Province, data reporting systems and reasons why surveillance may be limited or not current practice:

- Water quality
- Wastewater management
- Excreta management
- Solid waste management
- Vectors
- Food hygiene and safety
- Drinking Water , air quality and noise
- Building codes
- Others

Indicator 2.1 - Field Equipment for Investigating Environmental Threats

- Identify the specific nature of equipment currently used in the field for each of the areas above and the need for additional equipment.

Indicator 2.2 - Laboratory Support for Investigation Health Threats

- Indicate the accessibility of laboratory support for environmental health monitoring in terms of the ability to provide services and adequacy of equipment

Working for and with Community

How well do we keep all people and segments of our Province informed and engaged with environmental health issues?"

KRA# 3 - Informing, Educating , Empowering and Partnering with Community

Indicator 3: Education

Indicate the topics and target groups and delivery strategies utilized during 2008 /9 to inform the public about environmental health risks including where relevant;

- Food Safety
- Water Quality
- Climate Change
- Emergencies
- Communicable Diseases
- Healthy Lifestyle – tobacco
- Air Quality
- Others

Indicator 3.1 – Educational Resources

- Indicate the extend of availability of financial and human resources
- Was there a budget for the programs?
- Do the staff need additional training to support these programs?
- What additional resources are needed for the future?

Indicator 3.2 - Environmental Health Promotion Activities to Facilitate Healthy Living in Healthy Communities

- Indicate any activities undertaken during 2008/9 related to;
- Healthy/Hygenic Cities

- Healthy Schools
- Healthy Towns
- Other

For each of the above where relevant indicate the location, duration and outcomes of each activity.

Indicator 3.3 - Community Partnerships and Community Participation

- List the extent of any formal or informal community partnerships - for each identify their purpose and activities.
- Identify reasons that limit such activity
- Describe the existence of community participation in programs related to environmental health outlining the nature of the community involvement for activities 2008-9

Indicator 3.4 - Resources to support Environmental Health Promotion

Indicate the extent of availability of financial and human resources:

- Do the staff need additional training
- What additional resources are needed for the future?
- Was there a budget for the programs?

Enforcing the Legislation

“When we enforce laws and regulations are we up-to-date, effective?”

KRA# 4 - Enforce Laws and Regulations that Protect Environmental Health and Ensure Safety

Indicator 4: Enforce Laws, Regulations and Ordinances

- Identify the relevant laws and regulations under which enforcement is undertaken
- Describe the methodology/ implementation systems utilized to implement enforcement.
- Identify the limitations /barriers to greater levels of enforcement.

Indicator 4.1 - Resources to support Enforcement

- Was there a budget for the programs?
- Do the staff need additional training to support these programs?
- What additional resources are needed for the future?

Indicator 4.2 - Evaluate Implementation and Enforcement

- Indicate if any formal evaluation of enforcement is undertaken and if so how?
- Indicate areas where improvement to local legislation can be considered
- List number of inspections, notices and penalties in 2008-9

Policy Development and Planning

What policies promote environmental health in our Province? How effective are we in planning and in setting environmental health policies?"

KRA#5 - Effective planning and policy development to enable response to priority environmental health issues

Indicator 5: Public Environmental Health Emergency planning and response

- Is there emergency plans available (floods, earthquakes, fires , chemical spills and typhoons indicate;)
- When any such emergencies occurred during 2008/9
- The involvement of the EH Services in each emergency agencies
- The strengths and weaknesses of the Plans

Indicator 5.2 - Engagement with Cross-Sectoral Collaboration

List and describe the purpose and nature of any formal collaborative activities undertaken with other government, non- government and private the sector during 2008/9 in relation to:

- Formal and informal communications
- Specific involvement in joint committees
- Conduct of joint programs /activities
- Provision of advise/ information to other agencies
- Limitations to greater cross secotoral collaboration

Indicator 5.3 - Engagement with management policies and tools.

For each of the following indicate if any of the activities were undertaken, the size, duration and lessons learnt regarding the services capacity to implement these activities:

- Environmental health risk assessment
- Health impact assessment
- Integrated pest management
- Chemical hazards management
- Cleaner production
- Waste management and recycling

Assure Competent Workforce

Do we have a well trained environmental health staff? How can we be sure that our staff stays current?"

KRA#6 - Assure a Competent Environmental Health Workforce

Indicator 6: Existence of well trained staff.

- List the EH staff , and qualifications
- For each staff member indicate most recent training undertaken
- Identify any specific short-term training undertaken by staff during 2008/9 - where the training was held, who were the trainers, the topics

Indicator 6.1 - Human Resource Plan

- Is there an annual plan for training?-if so provide details?
- Identify the needs for future training in terms of specific issues and competencies

Plan and Evaluate Effectiveness, Accessibility and Quality

Are we doing any good? Are we doing things right? Are we on track to meet goals?

KRA# 7 - Evaluate Effectiveness, Accessibility, and Quality of Personal and Population-Based Environmental Health Services

Indicator 7: Evaluate Population-Based Environmental Health Services

- Indicate how the environmental health programs are regularly evaluated formally or informally.
- Describe any reporting system that requires assessment of performance.

- If no formal evaluation is undertaken identify the resources needed to develop and undertake such an evaluation.

Indicator 7.1 - Strategic/Management Plans

- Indicate how environmental health programs/activities are planned and resourced
- Describe any management plans developed during 2008-9
- Indicate the limitations to development of such plans

Research and Innovation

“Are we discovering and using new ways to get the job done?”

KRA# 8 - Researches for New Insights and Innovative Solutions to Environmental Health Problems

Indicator 8: Research activities and linkages

- Identify the current research activities being undertaken to support programs and policy development
- Identify research gaps that are needed to be filled
- Describe any formal linkages with research organisations

SECTION E:

CLIMATE CHANGE ADAPTATION & MITIGATION

Guidance for Conducting Assessments of Health Vulnerability and Public Health and Health Care Interventions to Address Climate Change

D R A F T only FOR TESTING AND REVISION (PAHO/WHO October 2009)

Background

Climate change is adversely affecting human health, with the extent and magnitude of impacts expected to increase with additional climate change. The scientific evidence of the effects of the anthropogenic release of greenhouse gases in the atmosphere, and of the health impacts resulting thereof, has led to calls for significant and immediate action to protect human health from the risks of climate change. The World Health Assembly requested the Director-General to develop appropriate methods and tools to assist Member States in assessing their health risks from climate change and in identifying and implementing effective health protection strategies (WHO 2008). The World Health Assembly further recognized that solutions to the health impacts of climate change should be seen as a joint responsibility of all States and that developed countries should assist developing countries in this regard.

Weather and climate have wide-ranging effects on health, from providing recreational opportunities to mortality from large-scale disasters. Changes in the mean and variance of weather variables (such as temperature and precipitation) as a result of climate change will alter the incidence and geographic range of many climate-sensitive health determinants and outcomes, with impacts varying across geographic and temporal scales. While populations in all countries will be exposed to increased health risks, the risks will be much greater in low-income countries because the current burden of climate-sensitive health outcomes is high and because

public health systems that could substantially reduce health risks tend to be relatively weak.

The ability of a nation or community to identify and implement effective response options depends on a range of factors. Of primary importance is that policy-makers and the public have sufficient knowledge of the health risks of climate change and the range of responses needed to reduce current and projected adverse health impacts. Once there is motivation for action, policy-makers need to know at least the range of available options (including their feasibility, benefits, effectiveness, and costs); the availability of resources and their distribution across the population; and the structure of critical institutions, including the allocation of decision-making authority. Thus, local policy making processes, institutions, and resources will influence the choices of which programs and activities to implement to address the current and likely future health risks of climate change.

The primary health concerns with climate change are problems today. Malnutrition, diarrheal diseases, malaria and other vectorborne diseases, and morbidity and mortality attributed to weather disasters are major causes of childhood morbidity and mortality. Therefore, one focus of a vulnerability and adaptation assessment is to identify modifications to current and planned programs designed to reduce burdens of climate-sensitive health outcomes to ensure that current vulnerabilities to climate variability are effectively addressed (i.e. focusing on shorter-term decisions, such as development of heatwave early warning systems). Determining where populations are affected by climate variability facilitates identifying the additional interventions that are needed now.

At the same time, implementing interventions that only address current vulnerabilities is not sufficient to protect against health risks from future and possibly more severe climate change. Because of the inherent inertia in the climate system and the length of time required for carbon dioxide to come to equilibrium in the atmosphere, the world is committed to three to five decades of climate change no matter how quickly greenhouse gas emissions are reduced (IPCC 2007). The future health impacts of climate change will vary over spatial and temporal scales, and will depend on changing socioeconomic and environmental conditions, with possibilities for diseases to increase in incidence and/or change their geographic range, resulting

in significant outbreaks. Therefore, capacity needs to be built within public health and health care organizations and institutions to evaluate proposed programs, both within and outside the health sector, to assess how climate change might alter their effectiveness, or might affect future population health in the case of options implemented outside the health sector (i.e. whether changes in land use proposed to address climate change could alter vector breeding sites). These evaluations should consider short-term rapid climate change as well as longer-term changes in means of meteorological variables. Programs and activities to address the health risks of climate change also should explicitly consider how to avoid cumulative or catastrophic events with large health impacts.

Reducing current and projected health risks attributable to climate change is a risk management issue. The two primary responses are mitigation, or reduction of greenhouse gas emissions, and adaptation, or programs and activities designed to reduce health burdens (prevention). Mitigation and adaptation are not mutually exclusive; co-benefits to human health can result concurrently with implementation of actions to reduce greenhouse gas emissions, and adaptation measures can reduce emissions. As the context for adaptation will change with changing climatic conditions, along with changes in demographics, technology, and socioeconomic development, an iterative risk management approach is likely to be most effective. Because climate change is one of many public health issues that need to be addressed, policies and measures need to ensure that actions to reduce climate-related health risks support current programs to address health burdens and explicitly consider key uncertainties.

The intent of this guidance is to describe an approach for conducting a vulnerability and adaptation assessment to identify, prioritize, and implement public health and selected health care interventions to address the current and projected health risks of climate change. The guidance will not address the tasks required to conduct a mitigation assessment of activities to reduce greenhouse gas emissions, although this is as important as conducting a vulnerability and adaptation assessment. This guidance focuses on identifying, at national and sub-national scales, current vulnerability and likely vulnerability in 2030 using primarily qualitative approaches, as well as discussing approaches to identifying health risks over longer-terms.

Vulnerability and adaptation assessments can be quantitative or qualitative. In many countries, limited data will make quantitative assessments difficult. Therefore, this guidance focuses on qualitative approaches. The user is referred to the WHO Methods for Assessing Human Health Vulnerability and Public Health Adaptation to Climate Change (http://www.euro.who.int/globalchange/Publications/20031125_1), as well as in the WHO Environmental Burden of Disease guidance for quantifying the health impact of climate change at national and local levels (see http://whqlibdoc.who.int/publications/2007/9789241595674_eng.pdf), for methods to quantify relationships between climate variables and adverse health outcomes.

Conducting a vulnerability and adaptation assessment will address questions such as the following. Note that an assessment need not cover all questions, but may focus on particular components. For example, there may be interest only in identifying populations and regions vulnerable to extreme weather events.

- What is the current burden of climate-sensitive health outcomes, including which regions and populations are more vulnerable to climate variability and change? What factors other than climate determine this vulnerability? How effective are current programs and activities in addressing climate-sensitive health outcomes?
- How is the burden of climate-sensitive health outcomes likely to change over the coming decades, irrespective of climate change? This includes consideration of demographic trends and development plans.
- What are the likely health impacts of climate change over the next 20 years? Which regions and populations will likely be at highest risk?
- How might planned programs and activities address any additional burden of climate-sensitive health outcomes? What additional public health interventions will likely be needed? What are the estimated costs and benefits?
- What are the potential health risks of adaptation and GHG mitigation measures implemented in other sectors, such as water resources, land use, and transport? This question can be approached from the perspective of the

health sector, through conducting health impact or other assessments, or could be mainstreamed into other sectors through a sustainable development approach.

Although the process of conducting an assessment is similar across nations and regions, the context and content will vary depending on local circumstances, socioeconomic conditions, legal and regulatory frameworks, and other factors. Case studies are included in the Annex to illustrate different approaches taken.

Definitions

A number of terms will be used throughout these guidelines; key terms are defined here to ensure a common understanding. For a full glossary of terms the user may refer to: <http://www.who.int/globalchange/publications/climatechange/glos.pdf>

Health is defined by WHO in its constitution as a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity. The assessment should, therefore, focus not just on physical or mental disease patterns but be more comprehensive to include the social wellbeing of the populations affected by climate change.

Vulnerability is the susceptibility to harm, which can be defined in terms of a population or a location. The IPCC defines vulnerability to climate change as the degree to which a system is susceptible to, or unable to cope with, the adverse effects of climate variability and change (IPCC 2007). Vulnerability to climate change is described as a function of the character, magnitude, and rate of climate variation to which a system is exposed, its sensitivity to that exposure, and its ability to avoid, prepare for, and effectively respond. Vulnerability is dynamic and may itself be influenced by climate change (i.e. extreme weather events affecting health infrastructure). Climate change is a stress multiplier that has the potential to augment the negative impacts of other factors, such as demographic change, land use and land use change, etc., to increase the vulnerability of individuals, communities, and institutions to a variety of stresses.

From a health perspective, vulnerability can be defined as the summation of all risk and protective factors that ultimately determine whether a subpopulation or region experiences adverse health outcomes due to climate change (Balbus 2009). Characteristics of a region, such as baseline climate, abundance of natural resources (i.e. access to freshwater), elevation, infrastructure, and other factors can alter vulnerability. For example, coastal zones may be vulnerable to sea level rise or to typhoons.

Resilience is defined by IPCC as the ability of a social or ecological system to absorb disturbances while retaining the same basic structure and ways of functioning, the capacity for self-organization, and the capacity to adapt to stress and change. The process outlined is concerned with identifying factors that affect the vulnerability of a population, and to increase resilience through adaptation.

Sensitivity can be defined as an individual's or subpopulation's increased responsiveness, primarily for biological reasons, to a particular exposure. Biological sensitivity may be related to developmental stage; pre-existing medical conditions; acquired factors (such as immunity); and genetic factors (Balbus 2009).

Socioeconomic factors also play a critical role in altering vulnerability and sensitivity, by interacting with biological factors that mediate risk (such as nutritional status) and/or lead to differences in the ability to adapt or respond to exposures or early phases of illness and injury. For example, adults who may be vulnerable during a heatwave include those over the age of 65, those with chronic diseases or taking certain medications, and other sub-populations.

A climate-related **risk** is the result of the interaction of a physically defined hazard (i.e. floods and other extreme weather events, increasing temperature, and other factors) with the properties of the exposed system (its vulnerability) (Lim et al. 2004). Risk also can be considered as the combination of an event, its likelihood, and its consequences (risk = the probability of a climate hazard multiplied by a given system's vulnerability). Therefore, system vulnerability is a critical determinant of the risk the region or subpopulation faces when exposed to a particular hazard. This means that programs to decrease vulnerability will decrease risk. For example, Cuba,

which has extensive programs for reducing vulnerability to hurricanes, faces less risk than neighbouring countries with less extensive disaster risk reduction programs.

Adaptation is the term used by the climate change community to describe the process by which strategies and measures to moderate, cope with, and take advantage of the consequences of climatic events are enhanced, developed, implemented, and monitored (Lim et al. 2004). In public health, prevention is the term analogous to adaptation. Various types of adaptation exist, including anticipatory and reactive, private and public, autonomous and planned. In disaster risk reduction and emergency management, the term mitigation is used for measures to prevent population exposure to extreme events and disasters; the climate change community would consider this adaptation.

Adaptive capacity describes the general ability of individuals, communities, and institutions to effectively prepare for and cope with the consequences of climate variability and change.

Co-benefits refer to the benefits (often health benefits) associated with reductions in greenhouse gas emissions. For example, reduced emissions of air pollutants can have immediate health benefits. In addition, there can be co-benefits of adaptation measures, such as new surveillance systems that monitor climate and non-climate related infectious diseases.

Mitigation refers to policies and measures to reduce greenhouse gas emissions and/or enhance sinks. This is analogous in public health to eliminating or reducing the risk to a safe level.

Conducting a Vulnerability, Impact, and Adaptation Assessment

The purpose of conducting a vulnerability, impact, and adaptation assessment is to identify populations and regions that are currently not well adapted to climate variability and change (i.e. to current extreme events), as well as those populations and regions that are more likely to suffer adverse health consequences and have less

ability to effectively respond to stresses imposed by climate change. This information is needed to identify possible interventions to reduce exposure to climate-related hazards (e.g. by reducing urban heat islands to decrease temperatures experienced during a heatwave) and/or to decrease vulnerability (e.g. by implementing heatwave early warning systems).

Current national and international programs and measures that aim to reduce the burdens of climate-sensitive health determinants and outcomes may need to be revised, reoriented and, in some regions, expanded to address the additional pressures of climate change (IPCC 2007). The degree to which programs will need to be augmented will depend on factors such as (Yohe and Ebi 2005; Ebi et al. 2006):

- the current burden of climate-sensitive health outcomes. The focus of adaptation assessments is often on outcomes that cause the largest health burdens now. For example, adaptation options that reduce high current burdens of malnutrition, malaria, or diarrheal diseases will help populations prepare for changes that could increase the incidence or geographic range of these health outcomes or that make their control more difficult.
- the effectiveness of current interventions. Current programs and activities may not be as effective as desired, with opportunities for improving their effectiveness under current and future climatic conditions. It can be important to have independent evaluations of current interventions. For example, heatwave early warning systems have been shown to save lives, but an evaluation of systems in four cities in the United States found that although older adults, who are at higher risk, had high awareness of when a heatwave warning was called, less than 50% actually took any action to reduce their individual risk (Sheridan).
- projections of where, when and how the burden could change with changes in climate and climate variability. Multiple assessments have been conducted as part of National Communications to the United Nations Framework Convention on Climate Change (UNFCCC) (http://unfccc.int/national_reports/items/1408.php) or for least developed

countries, as part of National Adaptation Programmes of Action (NAPAs) (http://unfccc.int/national_reports/napa/items/2719.php). These may include projections of how health impacts might change under different climate change scenarios.

- access to the human and financial resources needed to implement activities. An adaptation assessment needs to identify how resources can be raised, whether within Ministry of Health budgets, from donors and funders, bilateral agreements or other sources.

All interventions need to take into account the social, economic and political context within which they will be implemented. Differences between communities and nations will affect the exact structure and implementation of interventions. For example, some communities and nations have vectorborne disease surveillance systems that legally require individuals to clean up vector breeding sites within their living areas; most nations do not have this option for improving vector control.

Framework for Vulnerability, Impact, and Adaptation Assessment

Figure 1 presents the framework for conducting a vulnerability, impact, and adaptation assessment:

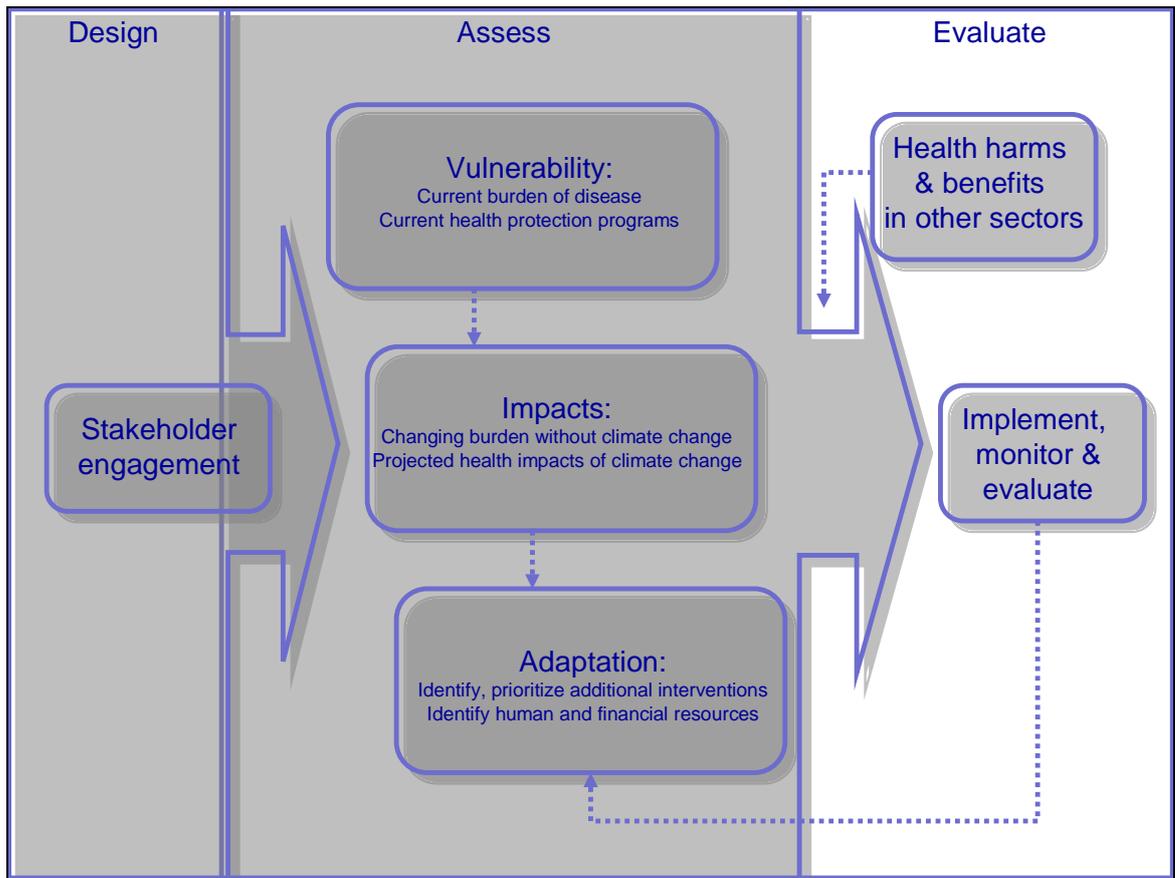
- Stakeholders should be engaged at the start and be involved throughout all steps.

The steps conducted in a particular assessment will depend on the interests of the users. For example, if the primary concern is about preparedness for extreme weather events, then the focus of the assessment would likely be on describing current vulnerability and on identifying adaptation options to increase community resilience. If a vulnerability assessment was conducted as part of a national assessment, then stakeholders might be more interested in projecting health impacts and designing adaptation options to address future risks.

- Describe vulnerability to current climate variability and change. This includes:

- Describe the current burden of climate-sensitive health outcomes, including the populations and regions that are most vulnerable
- Describe current programs and activities, and their effectiveness for addressing the health risks of climate change
- Project health impacts due to climate change. This includes:
 - Describe how the current burden of climate-sensitive health outcomes is likely to change over coming decades irrespective of climate change
 - Estimate the possible additional burden of adverse health outcomes due to climate change; this can be done qualitatively or quantitatively
- Identify and prioritize adaptation options to address current and projected health risks. This includes:
 - Identify and prioritize additional public health and health care interventions to reduce likely future health burdens
 - Identify human and financial resources needed for implementation, and potential challenges that will need to be addressed
- Determine the potential health risks and benefits of adaptation and mitigation measures implemented in other sectors, such as water resources, land use, and transport, and identify possible interventions to reduce any identified risks.
- Implement, monitor, and evaluate the burden of climate-sensitive health outcomes and interventions to address these burdens, to ensure continued effectiveness in a changing climate

Figure 1: Framework for Vulnerability, Impact, and Adaptation Assessment



Steps in Conducting a Vulnerability, Impact, and Adaptation Assessment

1. Identify stakeholders to be included in the assessment

The actual impacts experienced in a particular location over a particular time period will depend not only on the actual climate change experienced, but also on the vulnerability of that region and the actions taken within and outside the health sector to address the risks and vulnerabilities. Examples include the effectiveness of vectorborne disease surveillance and control programs, choices made by other sectors that affect access to safe water, and that ability of infrastructure to withstand flooding events. Therefore, it is critical that a vulnerability and adaptation assessment include a broad range of stakeholders, including representatives of those who will implement identified adaptation options and those who may be affected by climate change or the intervention. Stakeholders contribute significantly to understanding current vulnerability and to identifying necessary public health and

health care interventions. At the same time, their involvement in the assessment process will educate them about the risks of climate change and motivate them to continue the adaptation process after the assessment.

Ensuring effective stakeholder engagement requires identifying stakeholders for inclusion in the assessment process; specifying their roles and responsibilities; and ensuring their continued involvement. For national assessments, countries typically hold at least one stakeholder meeting with representatives from all relevant ministries, nongovernmental organizations (NGOs), universities, and others, where the assessment goals are presented and discussed, with input sought on priority issues to address (including geographic region or vulnerable populations). Ideally, stakeholders should be included who represent the programs that deal with the health outcome, organizations and institutions knowledgeable about climate change and development plans, local, regional, and national policymakers, and the most vulnerable groups. If, for example, waterborne diseases are a priority issue, then stakeholders could include representatives from the department(s) in the ministry of health that deal with waterborne diseases, the ministries of the environment (assuming they are the primary ministry dealing with climate change) and finance (assuming they oversee development infrastructure planning), water managers, university scientists involved in water-related issues, and community leaders and others who understand patterns of water use and misuse in their community.

Possible Stakeholders to Include in Vulnerability and Impact Assessments

Stakeholders include policy- and decision-makers, scientists, program managers (from ministries, departments, NGOs, in health, agriculture, water resources, urban planning, transport, development and others), and those most likely to be affected by the health risks of climate change. Including their expertise and experience during the assessment will help ensure that key issues are identified.

The output from an initial stakeholder meeting will include further specification of the content and process of the vulnerability and adaptation assessment, as well as details of how to ensure active and sustained stakeholder dialogue throughout the assessment. Note that the stakeholders included may change during an assessment as different expertise and experience is needed to inform the process. For example,

stakeholders with information on vulnerability may differ from those with information on the effectiveness of different public health and health care programs to address a particular health outcome. A plan for identifying and engaging appropriate stakeholders throughout the process should be developed at the beginning of the assessment. Consideration also should be given to using the assessment to develop a network of partners engaged in or concerned about the health impacts of climate change.

When identifying possible stakeholders, consideration should be given to stakeholders who will be involved with the effective design, implementation, and monitoring of public health and health care interventions. These stakeholders may differ from those involved in the vulnerability and adaptation assessment. It would be beneficial to include them early in the assessment cycle, to ensure their perspectives are incorporated from the beginning.

A substantial literature exists on stakeholder engagement, including approaches, the role of the facilitators, and principles of effective engagement. See, for example, the Adaptation Policy Framework (Lim et al. 2004).

2. Describe vulnerability to current climate variability and change

2.1 Describe the current burden of climate-sensitive health outcomes, including the populations and regions that are most vulnerable

This step involves describing, either qualitatively or quantitatively, the current distribution and burden of climate-sensitive health outcomes by vulnerable populations and regions. The health outcomes chosen should focus on those that are priorities for the Ministry of Health and/or for the local community. Qualitatively, the burden can be described relative to other health burdens (i.e. there is a high burden of endemic malaria in a particular district, or there is a medium risk of epidemic malaria in another region). Expert judgment can be used to estimate current health burdens.

National and sub-national data, when available, can be used to quantify the burden. National data are available from WHO at <http://apps.who.int/whosis/data/Search.jsp>.

Information also may be available from climate-health risk maps and surveys conducted by NGOs and other organizations. A challenge is that data are preferably at sub-national scales and cover several decades. Identifying gaps can inform the data needed for monitoring and surveillance programs.

This step also should identify the factors other than climate that increase or decrease vulnerability to weather and climate. For example, adults with chronic respiratory disease, people with asthma, children and outdoor workers are at increased risk during episodes of poor air quality. Populations with greater proportions of these groups may be at increased risk. In another example, land use change may be one of the drivers of the distribution of a particular vector, so land use change may facilitate the geographic spread of pathogens and vectors.

Although climate change will affect all populations and regions, some are more likely to suffer harm, have greater vulnerability and less ability to respond to climate-related stresses. For example, all persons living in a flood plain are at risk during a flood, but those with lowered ability to escape floodwaters and their consequences (such as children and the infirm, and those living in substandard housing along riverbanks) are at higher risk.

The text box describes trends in climate change-related exposures of importance to human health. Assessments should consider these trends scaled down to the area of interest where possible.

Projected trends in climate change-related exposures of importance to human health (IPCC 2007).

Heatwaves, floods, droughts and other extreme events: Heatwaves are projected to increase, cold days to decrease over mid- to low-latitudes, and the proportion of heavy precipitation events to increase, with differences in the spatial distribution of the changes (although there will be a few areas with projected decreases in absolute numbers of heavy events). Water availability will be affected by changes in runoff due to alterations in the rainy and dry season. Changing temperature and precipitation patterns also could affect the geographic distribution and abundance of vectors and pathogens.

Air quality: Climate change could affect tropospheric ozone by modifying precursor emissions, chemistry and transport; each could cause positive or negative feedbacks to climate change. Future climate change may cause significant air quality degradation by changing the dispersion rate of pollutants, the chemical environment for ozone and aerosol generation, and the strength of emissions from the biosphere, fires and dust. The sign and magnitude of these effects are highly uncertain and will vary regionally.

Crop yields: Crop productivity is projected to increase slightly at mid- to high latitudes for local mean temperature increases of up to 1-3°C depending on the crop, and then decrease beyond that in some regions. At lower latitudes, especially seasonally dry and tropical regions, crop productivity is projected to decrease for even small local temperature increases (1-2°C), which would increase risk of hunger, with large negative effects on sub-Saharan Africa.

Table 1 lists some of the particularly vulnerable groups by climate-sensitive health outcome. While there are baseline sensitivities that must be taken into account, vulnerability among populations can differ dramatically between countries and even communities.

Table 1: Climate-Sensitive Health Outcomes and Particularly Vulnerable Groups

Climate-Sensitive Health Outcome	Particularly Vulnerable Groups
Heat stress	Elderly, chronic medical conditions, infants and children, pregnant women, urban and rural poor, outdoor workers
Air pollution	Children, pre-existing heart or lung disease, diabetes, athletes, outdoor workers
Extreme weather events	Poor, pregnant women, chronic medical conditions, mobility and cognitive constraints
Water- and food-borne diseases	Immunocompromised, elderly, infants; specific risks for specific consequences (e.g., <i>Campylobacter</i> and Guillain-Barre syndrome, <i>E. coli</i> O157:H7)
<i>Vectorborne and zoonotic diseases</i>	
Malaria	Children, immunocompromised, pregnancy genetic (G6PD status), non-immune populations
Dengue	Infants, elderly
Other	Poor, children, outdoor workers, others

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Particularly vulnerable populations and regions highlighted in the Human Health chapter of the IPCC 4th Assessment Report include the following. Users can use this information to help identify particularly vulnerable groups for their assessment.

Vulnerable urban populations: Urbanization and climate change may work synergistically to increase disease burdens. Urbanization can positively influence population health; for example, by making it easier to provide safe water and improved sanitation. However, rapid and unplanned urbanization is often associated with adverse health outcomes. Urban slums and squatter settlements are often located in areas subject to landslides, floods and other natural hazards, as well as exposure to high-polluting energy sources. Lack of water and sanitation in these settlements are not only problems in themselves, but also increase the difficulty of controlling disease reservoirs and vectors, facilitating the emergence and re-emergence of infectious diseases. Populations in high density urban areas with poor housing will be at increased risk with increases in the frequency and intensity of heatwaves, partly due to the interaction between increasing temperatures and urban heat island effects.

Vulnerable rural populations: Climate change could have a range of adverse effects on some rural populations and regions, including increased food insecurity due to geographical shifts in optimum crop-growing conditions and yield changes in crops, reduced water resources for agriculture and human consumption, flood and storm damage, loss of cropping land through floods, droughts, a rise in sea level, and increased rates of climate-sensitive health outcomes.

Food insecurity: Expert assessments of future food security are generally pessimistic over the medium term. There are indications that it will take approximately 35 additional years to reach the World Food Summit 2002 target of reducing world hunger by half by 2015 (Rosegrant and Cline, 2003; UN Millennium Project, 2005). Child malnutrition is projected to persist in regions of low-income countries, although the total global burden is expected to decline. However, this projection does not consider the impact of climate change. Attribution of current and future climate change-related malnutrition burdens is problematic because the determinants of malnutrition are complex. Due to the very large number of people that may be affected, malnutrition linked to extreme climatic events may be one of the most important consequences of climate change. Overall, climate change is projected to increase the number of people at risk of hunger (FAO 2005).

Populations in coastal and low-lying areas: Climate change could affect coastal areas through an accelerated rise in sea level; further rise in sea surface temperatures; an intensification of tropical cyclones; changes in wave and storm surge characteristics; altered precipitation/run-off; and ocean acidification. These changes could affect human health through coastal flooding and damaged coastal infrastructure; saltwater intrusion into coastal freshwater resources; damage to coastal ecosystems, coral reefs, and coastal fisheries; population displacement; changes in the range and prevalence of climate-sensitive health outcomes, such as malaria, dengue, diarrheal diseases; and others.

(See <http://www.who.int/globalchange/climate/en/oeh0402.pdf>
and <http://www.who.int/globalchange/publications/climvariab.pdf>)

Populations in mountain regions: Changes in the depth of mountain snow packs

and glaciers, and changes in their seasonal melting, can have significant impacts on the communities from mountains to plains that rely on freshwater runoff. Little published information is available on the possible health consequences of climate change in mountain regions. However, it is likely that vector-borne pathogens could take advantage of new habitats in altitudes that were formerly unsuitable, and that diarrheal diseases could become more prevalent with changes in freshwater quality and availability (WHO Regional Office for South-East Asia 2006). More extreme rainfall events are likely to increase the number of floods and landslides. Glacier lake outburst floods are a risk unique to mountain regions; these are associated with high morbidity and mortality and are projected to increase as the rate of glacier melting increases.

For example, a joint WHO/WMP/UNDP/UNDEP workshop was conducted in the Hindu Kush-Himalaya region because of concerns about health vulnerabilities to climate change (Ebi et al. 2007). Only crude estimates of the current burden of climate-sensitive diseases in the Hindu Kush-Himalaya regions were available due to the lack of health surveillance data at the local level. As a first step at generating this information, a qualitative assessment was conducted (Table 2).

Table 2. Current climate-related health determinants and outcomes in the Hindu-Kush Himalaya regions

Country	Afghanistan	Bangladesh	Bhutan	China	Nepal	India
Heatwaves	M-P	P	–	P	P	P
Flood deaths/morbidity						
Glacial lake floods	M-P	–	M-P	M-P	M-P	M-P
Flash	M-P	P	M-P	M-P	M-P	M-P
Riverine (plain)	P	P	–	P	P	P
Vectorborne disease	P	P	P	P	P	P
Malaria	P	P	P	P	M-P	P
Japanese encephalitis	–	P	–	P	P	P
Kala-azar	P	–	–	–	P	P
Dengue	–	P	P	P	–	P
Waterborne diseases	M-P	P	M-P	M-P	M-P	M-P
Water scarcity, quality	M-P	P	P	M-P	M-P	M-P

Drought-related food insecurity	M-P	P	–	M-P	–	M-P
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An “*M-P*” indicates the health determinant or outcome occurs in the mountainous and non-mountainous (i.e. plains) areas; a “*P*” indicates the health determinant or outcome only occurs in the non-mountainous (i.e. plains) areas; a “–” indicates the health determinant or outcome is not present in the country (see http://www.searo.who.int/LinkFiles/Publications_and_Documents_healthImpacts.pdf)

Other populations: There are other populations who also will be at increased risk, such as those living in fragile ecosystems (e.g. forests and deserts). Ecosystem services are indispensable to human health and well-being by providing food, safe water, clean air, shelter, and other services. Changes in their availability affect livelihoods, income, local migration and, on occasion, political conflict. The resultant impacts on economic and physical security, freedom, choice and social relations have wide-ranging impacts on well-being and health (see for example the Millennium Ecosystem Assessment Health Synthesis, <http://www.maweb.org/documents/document.357.aspx.pdf>).

2.2 Describe current programs and activities, planned changes to these programs, and their effectiveness for addressing the additional health risks of climate change

The health outcomes of concern with climate change are among the leading causes of morbidity and mortality: every year there are millions of cases of malnutrition, climate-sensitive infectious diseases, such as diarrheal diseases, malaria, and dengue, and injuries and deaths due to extreme weather events. A wide range of programs and activities exist to control these health burdens. It is important to understand the strengths and weaknesses of these programs, as well as their flexibility for addressing the additional health risks of climate change. The health ministry/department, NGOs, and others may have responsibility individually or jointly for these programs. For example, ministries/departments of health typically have responsibility for vectorborne disease surveillance and control programs. Other programs, such as disaster risk response activities, may be joint activities across ministries/departments

(including health, emergency management, and others) and NGOs, such as the International Federation of Red Cross/Red Crescent Societies. Representatives from all relevant organizations and institutions should be canvassed to understand what is working well, what could be improved, and the capacity of the program to address possible increases in incidence or changes in geographic range of the health outcome of concern.

It will also be important to know of any planned changes to these programs and activities. Ministries/departments of health often have 5- and 10-year plans. These will detail proposed changes that could affect the reach and effectiveness of programs. Understanding these changes is necessary when developing modifications to address climate change health risks.

It could be helpful to create a series of questions to answer for each program, including:

- What is the management structure for the program? This information will be necessary to identify constraints and opportunities for modifying the program.
- What human and financial resources are available for the program? Cataloguing these assets is important when planning additional activities.
- How effective is the program in controlling the current health burden? Less than optimal effectiveness may be the result of limited human and financial resources, limited laboratory and material supplies, etc. This should include not only an overall assessment, but also evaluation of effectiveness in particularly vulnerable populations and regions.
- Are any changes to the program planned in the next 5- to 10-years?
- What changes are needed to effectively handle the additional health burden (i.e. more cases in more regions) due to climate change?

3 Project the health impacts of climate change

This step includes (1) describing how the current burden of climate-sensitive health outcomes is likely to change over coming decades irrespective of climate change;

and (2) estimating the possible additional burden of adverse health outcomes due to climate change; this can be done qualitatively or quantitatively

3.1 Describe how the current burden of climate-sensitive health outcomes is likely to change over coming decades irrespective of climate change

This step involves combining the evaluation of current and planned surveillance and control programs with demographic trends and trends in other risk factors to estimate the likely burden of climate-sensitive health outcomes in 2030. Information on the current burden of climate-sensitive health outcomes (by region and vulnerable groups whenever possible) will be available from a previous step in the assessment. The 5- or 10-year plan should be evaluated to identify planned modifications to reduce current burdens. For example, there are currently *n* cases of malaria in a particular region, with a new program planned to reduce the burden by 20%, taking population growth into account, through distribution of insecticide-treated bednets and integrated vector management programs. Therefore, the burden of malaria in 2030 would reasonably be expected to be between the current burden and 80% of the current burden. In another region, control programs are not expected to change but demographic growth is expected to increase the number of cases by 10%. It is also important to note where climate-sensitive health outcomes are currently absent or where the burden is not expected to change; for example, there may be regions where certain vectorborne diseases do not exist or where there is limited vectorborne disease control. This description is the baseline against which the possible additional health burdens of climate change will be assessed.

3.2 Estimate the possible additional burden of adverse health outcomes due to climate change

The possible additional burden of climate-sensitive health outcomes can be estimated qualitatively or quantitatively.

Qualitative estimates can be based on simple scenarios of climate change, such as a 1°C increase in average temperature within 20 years, with a 10% increase in

precipitation variability. Climate projections used in the National Communication³ or other assessment should inform the scenario used. Based on the results of previous steps, possible future health burdens can be estimated by those with experience with the health outcome. For example, in rural areas in tropical countries with limited access to safe water and improved sanitation, increasing average temperatures and precipitation variability will likely increase the burden of diarrheal diseases. The implications of this increase for diarrheal disease control depend on the effectiveness and geographic coverage of current programs. When possible, future health burdens should be estimated at the scale at which interventions are implemented, such as community, city, or region.

For example, qualitative storylines were used during the assessment of health risks and responses in the first Portuguese national assessment (Climate Change in Portugal: Scenarios, Impacts and Adaptation Measure). The assessment included consideration of the possible impacts of climate change on vectorborne diseases, including malaria, West Nile virus, schistosomiasis, Mediterranean Spotted Fever, and leishmaniasis; the latter two are endemic to Portugal. Although human cases of vectorborne diseases have generally decreased in Portugal over recent decades, many competent vectors are still present. Disease transmission risk was categorized qualitatively based on vector distribution and abundance, and pathogen prevalence. Four brief storylines were constructed that differed according to key climate variables, including current climate and projected climate change, and assumed either the current distribution and prevalence of vectors and parasites, or the introduction of focal populations of parasite infected vectors (Tables 3 and 4). These storylines were discussed with experts to estimate transmission risk levels. For Mediterranean Spotted Fever, the risk of transmission was high under all storylines, suggesting that climate change is likely to have a limited impact. For the other diseases, the risk level varied across the storylines. For example, the risk of leishmaniasis varied from medium under current climate to high under both climate change storylines. The risk of schistosomiasis varied from very low (current climate and current vector distributions) to medium (climate change and focal introduction).

³ All countries that are signatories to the United Nations Framework Convention of Climate Change are required to produce regular National Communications that cover emission inventories; vulnerability, impacts, and adaptation; and mitigation (www.unfccc.int).

Table 3: Scenarios Used in Portuguese Vectorborne Disease Risk Assessment

Climate Model Scenario	Assuming Current Knowledge of Vector and Parasite Prevalence	Assuming the Introduction of Focal Populations of Parasite-Infected Vectors
Current climate	Scenario 1	Scenario 2
Climate change	Scenario 3	Scenario 4

Table 4: Vectorborne Disease Transmission Risks for Portugal

Disease	Transmission Risk Levels			
	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Malaria				
P. vivax	Very low	Low	Very low	Low-medium
P. falciparum	Negligible	Low	Negligible	Low-medium
West Nile	Low	Low	Low-medium	Low
Leishmaniasis	Medium	Medium	High	High
Lyme	Medium	Medium	Medium high	Medium high
Mediterranean Spotted Fever	High	High	High	High
Schistosomiasis	Very low	Low	Very low	Medium

4 Identify and prioritize implement adaptation options to address current and projected health risks

Based on expert judgment and stakeholder input, a list can be created of all possible (reasonable) adaptation options that could improve the effectiveness of current programs and activities, as well as new programs that are needed. These additional options can range from additional personal and equipment to increase the coverage of current programs, to vaccine development, to a department specifically focused on climate change and health). This list of options should address distal and proximal

drivers of the disease, and should consider factors such as inequities that result in differential disease burdens within and between different populations.

The approaches used by public health authorities to manage health risks depend on the nature of the risk, the health outcome, and the enabling conditions. Policy responses to the health risks associated with climate variability and change range from implementing successful measures used by other countries/regions to developing new policies for addressing emerging health threats. In most cases, the primary response will be to enhance current health risk management. The degree to which programs and measures will need to be augmented to address the additional pressures due to climate change will depend on factors other than climate change, such as the social, economic, and political context. The critical factors should be identified during the assessment, as well as possible approaches to overcome any barriers. Adaptation will be a process of continual adjustment to increases in the degree and rate of climate change.

Given the broad range of climate-sensitive health outcomes that communities face, priorities will need to be set for which issues to tackle first. There are multiple criteria that can be used when setting priorities; those commonly considered include significance, benefits and effectiveness, costs, and feasibility. There may be other criteria of importance to stakeholders, including maintaining cultural and social institutions. Significance is used to assess the relative importance of the anticipated impact, such as the possible burden of additional adverse health outcomes. Benefits and effectiveness is used to assess the degree to which the option would likely reduce vulnerability to the anticipated health or culture impact. The benefits of the interventions should exceed their cost, however stakeholders agreed on the metrics for measuring benefit. This criterion also considers the flexibility of the option to be modified in a changing climate. The cost of the option includes operation and maintenance, administration and staffing, required equipment, etc. Feasibility is used to evaluate whether the option can realistically be implemented in the context of current and planned programs and activities. Stakeholders may want to include additional criteria, such as whether the proposed adaptation will reduce social inequities. The costs of these interventions should be estimated.

For each priority option, it is helpful to write a brief (i.e. up to several page) description of the option, including benefits and effectiveness for reducing vulnerability; the human and financial resources required; feasibility; and constraints to implementation. There should be a discussion of the current programs and measures designed to address the health outcome, and where and when modifications are needed to increase their effectiveness. This discussion should consider how to ensure active and continued stakeholder engagement, how to address changes in climate and vulnerability over times, how uncertainties in climate projections and development pathways can be incorporated, and social justice concerns.

The options should explicitly identify objective indicators for monitoring and evaluation of policies and measures to ensure the necessary information is collected to determine whether the changes made are effective in reducing climate-related disease burdens. The option should note if the necessary information is currently being collected or if new programs will be needed.

It is often helpful for decision-makers to have a summary of the costs and benefits of each option, including how the option is planned to reduce the burden of climate-sensitive health outcomes and other benefits, the possible consequences for population health if the option is not implemented (i.e. increased likelihood of disease epidemic), and estimates of the costs over time of implementing and continuing support for the option.

Finally, it would be helpful to provide a summary of the process, stakeholders included, priority adaptation options, including the more detailed descriptions, to decision-makers for their action.

5 Determine the potential health risks of adaptation and mitigation measures implemented in other sectors, such as water resources, land use, and transport, and identify possible interventions to reduce any identified risks

Climate change mitigation and adaptation decisions taken in other sectors can have important implications for public health. For example, the IPCC stated that the "there is general agreement that health co-benefits from reduced air pollution as a

result of actions to reduce greenhouse gas emissions can be substantial and may offset a substantial fraction of mitigation costs" (IPCC 2007). Co-benefits, or ancillary benefits, of greenhouse gas mitigation policies have been defined as health improvements other than those caused by changes in greenhouse gas emissions, arising as a consequence of mitigation policies (Bell et al. 2008). Potential health effects are not limited to air quality impacts - for example, development and promotion of active modes of transport would likely have an impact on the 1.9 million annual deaths associated with physical inactivity, and the 1.2 million deaths occurring in road traffic accidents. Decisions on promotion of biofuels can affect food availability and prices, in turn impacting on the 3.5 million annual deaths from under nutrition (Black et al. 2008). With respect to adaptation, decisions taken by, for example, the water sector, have the capacity to increase or decrease risks from vector-borne diseases and other health risks associated with water resources management.

Co-benefits, or ancillary benefits, of greenhouse gas mitigation policies have been defined as health improvements other than those caused by changes in greenhouse gas emissions, arising as a consequence of mitigation policies. While WHO and other agencies are beginning to provide qualitative descriptions of the range of links between energy policies and health, this has not yet been carried out in a systematic manner. Decisions taken by water and agriculture ministries and agencies, for example, have the capacity to increase or decrease risks from a range of infectious diseases, under nutrition, and other health risks.

Energy production and use are associated with greater environmentally mediated premature morbidity and mortality than any other sector, primarily through exposure to harmful indoor and outdoor air pollutants. In addition to harm from exposure to air pollution, patterns of energy use and transportation may also contribute to human morbidity and mortality through accidents (both occupational and non-occupational) and unhealthy changes in physical activity.

Climate change (including impacts on sea level rise, temperature, rainfall, run-off from snowfall, and storm intensity) is one of multiple stresses on the quantity and quality of freshwater sources; other factors include economic growth, land use, and

urbanization. Considerable attention has been paid to the implications of climate change for water quantity, with less paid to the extent to which water quality also may be affected. Adaptation steps implemented for the water sector, including infrastructure development, irrigation, and use of treated wastewater, may have implications for human health and well-being.

The four dimensions of food security (food availability, stability of food supplies, access to food, and food utilization) will be affected by climate change. Climate change impacts on food availability will be mixed, and will vary regionally. Limited research has been conducted on the health impacts of options designed to address the global food challenge for example, biotechnologies.

Conducting health impact assessments in collaboration with stakeholders from other sectors can identify where and when adaptation and mitigation choices could affect population health. Some cities and countries have established inter-ministerial climate change committees to coordinate these assessments.

6 Implement, monitor, and evaluate the burden of climate-sensitive health outcomes and interventions to address these burdens, to ensure continued effectiveness in a changing climate

Once the adaptation options are chosen, they need to be implemented in a manner that allows for monitoring and evaluation to ensure continued effectiveness in a changing climate. The only difference in implementing, monitoring, and evaluating interventions to address the health risks of climate change from other public health programs is that these activities should be designed with greater flexibility so that they can be adjusted as climate and other factors change. It is important to identify good indicators to allow the follow-up and to observe the effects of the interventions chosen.

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Annexure A - Selections from various District LEHAPs in Fiji covering each of the 9 KRAs

Macuata District

LEHAP KRA 1: Environmental Health Planning and Management

Improvement Strategies this Biennium	Improvement Activities	Officer	By Date	Indicators of Success
1. Strengthen the knowledge of EHOs in EHIA and auditing of developments for compliance.	1.1 Share knowledge of EHIA within the team. 1.2 Request for resource materials. 1.3 Develop case studies around auditing issues. 1.4 Develop library and access to internet for information.	J Karan J Karan J Karan	Ongoing	District will have EHIA answers to common questions.
2. Devise assessment protocols to ensure uniform advice to planners and developers.	2.1 Improve checklist for all types of development from local experience – send to HQ. 2.2 Register all applications. 2.3 EIHA for all major development. 2.4 Documentation – inspection report. 2.5 Check register on weekly basis for compliance.	Ganesh and Manasa	March 2002	HQ will have a growing body of experience based advice.
3. Establish criteria for planning advice on public amenities e.g. market place, transport bases.	3.1 Expand networking with other GOs involved in planning. 3.2 Review past planning decision and document failures. 3.3 Involve Advisory Council members of the Rural Local Authority in reporting breaches. 3.4 Create a development watch awareness program. 3.5 Monitor the complaint register to identify trends.	District Team Sec MRLA G Prasad Manasa Rakesh	Ongoing Mar 2001 Ongoing	Local planners will be asking our advice.
4. Engage CBH in commissioning a feasibility study to augment burial/cremation grounds.	4.1 Do an audit of burial grounds and report to HQ.	Sec MRLA	Dec 2002	Standard design adopted.
5. Revise the standards under Public Health Act, Local Government	5.1 Peruse the standards and relay comments to HQ.	Sec MRLA	Dec 2010	Realistic building standards within the reach of local communities and safer buildings.
6. Allocate budget for operation research into “cooperative resettlement strategies”.	6.1 Make submission to CBH for consideration.	SDHI		SDHI Resettlement program in place.
7. Other possible ideas.				

Source: (Fiji Ministry of Health and WHO Western Pacific Regional Office, 2002)

Rakiraki District
LEHAP KRA 2: Pollution Control

Improvement Strategies this Biennium	Improvement Activities	Officer	By Date	Indicators of Success
1. Strengthen the linkages and teamwork between district, divisional and national scales to manage pollution.	1.1 Inform DHI and HQ on activities. 1.2 Share pollution control experience across divisions.	SDHI	Dec 2001	Divisional and HQ will be aware of pollution problems in district.
2. Ensure proper recording/attending to complaints at district level.	2.1 Update existing complaint register. 2.2 Daily checks of complaints for compliance.	Kumar SDHI	Ongoing	All complaints recorded and community satisfied.
3. Design data recording systems in consultation with researchers.	DHI/HQ			
4. Disseminate a list of monitoring equipment. Ensure HQ technical support and train users on equipment.	HQ			
5. Consult with divisional and district EHOs in drawing up national guidelines for pollution control.	5.1 Provide HQ with suggestions and feedback.	SDHI	Mar 2002	District pollution unit will know what they must do.
6. Create inventories of potential pollution sources in districts – report new entries to HQ.	6.1 Identify established sites within the district.	Peni & Kali	Mar 2002	District pollution unit will know where to direct their effort.
	6.2 Conduct surveys and inventories of all pollution sources.		Mar 2002	
	6.3 Plot on district map all sites to be monitored.		Dec 2002	Resources for monitoring will be identified.
	6.4 Report new establishment/point sources to HQ.			
7. Gather baseline data from point source, non-point source and pristine environment.	7.1 Carry out sampling – point source: non-point source; pristine environment.	SDHI Peni & Kali	Dec 2001	Rakiraki office will be monitoring its pollution sources.
	7.2 Identify parameters to be tested and send for analysis.		Ongoing	
	7.3 Tabulate results to get the baseline data.			
8. Explore possibilities in Local Government and the private sector for managing solid waste.	DHI/HQ			

Source: (Fiji Ministry of Health and WHO Western Pacific Regional Office, 2002)

Sigatoka District
LEHAP KRA 3: Health Promotion

Improvement Strategies this Biennium	Improvement Activities	Officer	By Date	Indicators of Success
1. Access existing research findings and extend research into “grey areas” to improve profiling.	1.1 Liaise with networking partners, NGO/GOs for inclusion of available information. 1.2 Carry out study on untapped areas. 1.3 Review existing format. 1.4 Consult/submit the profile format to the NCHP.	M Pillay	Nov 2001	Reliable baseline data.
2. Record “Healthy Islands” activities in settings, document, analyse processes and share learning.	2.1 Open a register. 2.2 Prepare poster paper for each setting. 2.3 Prepare progress reports for all settings. 2.4 Distribute report to stakeholders. 2.5 Create video clips on settings in consultation with NCHP. 2.6 Distribute quarterly news for information sharing.	Jese	Ongoing	Up-to-date healthy island report.
3. Engage other health professionals to profile settings and develop Healthy Island strategies.	3.1 Identify related health professionals. 3.2 Submit training proposal. 3.3 Provide training. 3.4 Share responsibilities.	Jese	July 2002	New settings profiled.
4. Train stakeholders, GOs and NGOs during seminars, workshops on Healthy Islands concept and application.	4.1 Identify needs/resource/personnel/ stakeholders. 4.2 Submit training proposal to NCHP. 4.3 Provide training.	Jese	Dec 2002	Team approach towards Healthy Island work.
5. Re-orientate all EHOs to be proactive in Healthy Islands ventures.	5.1 In-house training. 5.2 Refresher courses (new trends). 5.3 Observation tour within district settings. 5.4 Turn project to settings. 5.5 Try new approaches.	M Pillay	Ongoing	Ongoing Increase of settings. Untried areas identified
6. Incorporate reference to Healthy Islands in reviewing the Public Health Act.	6.1 Identify areas within Public Health Act where Healthy Islands can be incorporated. 6.2 Make submissions to CBH.	M Pillay	2005	Healthy Island incorporated in Public Health Act.
7. Other				

Source: (Fiji Ministry of Health and WHO Western Pacific Regional Office, 2002)

Ba District
LEHAP KRA 4: Water and Sanitation

Improvement Strategies this Biennium	Improvement Activities	Officer	By Date	Indicators of Success
1. Ensure sanitary surveys are systematically conducted to gather baseline data.	1.1 Develop area mapping. 1.2 Carry out house to house surveys. 1.3 Compile and document data. 1.4 Consult other stakeholders for data.	Varo & Luke	Dec 2003	Availability of baseline data. Surveys conducted.
2. Use mass media to build awareness program on sanitation issues.	2.1 Create awareness of success achieved and problem issues.	J Singh	Dec 2003	Improved health standards. Community satisfied.
3. Improve sanitary services (e.g. waste management).	3.1 Carry out survey to determine viability. 3.2 Make submissions to CBH for approval. 3.3 Implement sanitary services on approval.	J Singh	Dec 31, 2002	Improved waste management.
4. Develop networking with relevant GOs and NGOs to improve water and sanitation at village level.	4.1 Identify relevant GOs and NGOs. 4.2 Meet with identified GOs/NGOs/communities. 4.3 Carry out profiling/needs assessment in village.	Varo	Dec 31, 2002	Health promoting villages.
5. Integrate research into Healthy Islands approaches to sanitation in villages.	5.1 Request FSM final year students for assistance. 5.2 Support FSM final year students in the research.	J Singh	2002	2002 Emergence of new Healthy Islands approaches.
6. Devise a national strategy for recruiting and training EH volunteers for Healthy Islands ventures.	6.1 Identify appropriate needs or personals. 6.2 Submission to HQ.	Varo		Increase in number of EHW volunteers.
7. Other	HQ			

Source: (Fiji Ministry of Health and WHO Western Pacific Regional Office, 2002)

Nadi District
LEHAP KRA 5: Food Quality Control

Improvement Strategies this Biennium	Improvement Activities	Officer	By Date	Indicators of Success
1. Ensure proactive and systematic approaches in monitoring food quality control.	1.1 Registration/Licensing of food establishments/outlets. 1.2 Prepare checklist. 1.3 Inspection of food premises, open air and roadside sales. 1.4 Medical examination of food handlers. 1.5 Carry out sampling along the food chain and port of entry. 1.6 Formulation of food surveillance activity program. 1.7 Analyse results and take necessary action. 1.8 Check complaint register regularly for compliance. 1.9 Enforcement on non-compliance.	SDHI Zone Officers	Jan 2002 Dec 2001 Ongoing Annually Jan 2002 Ongoing Ongoing	Reduce incidence of food borne diseases.
2. Train Pure Food Inspectors on HACCP and codex.	2.1 Prepare training proposal and submit to HQ. 2.2 Training/evaluation.	SDHI SDHI/HQ	Jan 2002	Food hygiene/standard complaints.
3. Mobilize political support for endorsement of Food Safety Bill.	HQ			
4. Train food handlers and stakeholders on food safety and hygiene.	4.1 Prepare a training program for food handlers. 4.2 Request for assistance from HQ – expertise/finance. 4.3 Conduct training for food handlers/stakeholders.	SDHI SHI	2002	Improve on food handling skills, hygiene and safety.
5. Create inventory of food establishment and consolidate with HQ.	5.1 Identify and list all food establishments. 5.2 Inspection of food premises and food processing plants. 5.3 Documentation of food process – producers to consumers.	Zone Officer	Dec 2001 Jan 2002 Jan 2002	Proper records of food process and food chain in place.
6. Create data collection system on food borne illnesses and contaminants – display trend.	6.1 Collect data from reliable sources. 6.2 Analyse and display data. 6.3 Inform HQ and other relevant authorities, manufacturers and distributors on the illnesses and contaminant trends.	Amini Z/Off Z/Off SDHI	Jan 2002 Feb 2002 Mar 2002 Ongoing	Available data for decision making.

7. Design and pre-test protocol for food recall in market place.	7.1 Improve on existing food recall format. 7.2 Strengthen linkage with food establishments and distributors. 7.3 Test format in all food outlets and randomly sample foodstuff. 7.4 Documentation.	SDHI Chris Z/Off Z/Off	2002 Mar 2002	Provision of high quality food in marketplace.
8. Submit budget for food purchase of food sample and cost of analysis.	8.1 Prepare and submit budget to HQ.	SDHI		Random sampling and analysis is done.
9. Other				

Source: (Fiji Ministry of Health and WHO Western Pacific Regional Office, 2002)

Tavua District
LEHAP KRA 6: Vector Borne Disease Surveillance and Control

Improvement Strategies this Biennium	Improvement Activities	Officer	By Date	Indicators of Success
1. Organise workshop/training on vector surveillance and control measure.	1.1 Identify training needs. 1.2 Request for funding. 1.3 Conduct training workshop/ attachments.	Sudhir	June 2001	EHOs possess improved knowledge on vector surveillance and control in the district.
2. Extend IEC material to educate the public on vector borne disease and control of vectors.	2.1 Identify vector borne diseases, their related vectors and their public health importance. 2.2 Research to identify needs. 2.3 Design and pre-test IEC material. 2.4 Request funding. 2.5 Liaise with NCHP and other NGOs for production.	Sudhir	Dec 2002	Extended IEC material produced and published to increase public awareness.
3. Research rodents as possible reservoirs of leptospirosis and create community awareness.	3.1 Consult National Centre for Scientific Research and virology. 3.2 Research information from FSM, KRS, USP and WHO on leptospirosis risks.	SDHI Sudhir	Dec 2002	Possible reservoir of leptospirosis identified.
4. Develop a systematic national to local approach on vector surveillance and control.	4.1 Carry out monthly larval survey. 4.2 Identify high risk areas. 4.3 Convey results to communities, provincial council Advisory council. 4.4 Mobilise community for clean up campaign.	Sudhir	Dec 2002	Decrease in larval indices.
5. Improve clinical and serological surveillance and notification of DF/ DHF and devise a contingency plan to counter outbreaks.	5.1 Confirm with Medical Officers suspected or confirmed cases. 5.2 Maintain close liaison with hospital/health centres/nursing station about cases reported. 5.3 Establish a register for notified cases of DF/DHF and map distribution of cases. 5.4 Investigate all cases reported.	SDHI Sudhir	Dec 2002	Decrease incidence of vector borne disease.

Source: (Fiji Ministry of Health and WHO Western Pacific Regional Office, 2002)

Suva District
LEHAP KRA 7: International Quarantine, Port and Airport Health

Improvement Strategies this Biennium	Improvement Activities	Officer	By Date	Indicators of Success
1. Ensure proper quarantine measures of used vehicles, containers and clothing.	1.1 Manifest to be thoroughly checked/registered. 1.2 Liaise with Customs for items to hold. 1.3 Thorough inspection.	Salote	Ongoing	Lower incidence of quarantine related diseases.
2. Ask the Ports Authority to ensure that pilots observe quarantine line.	2.1 Conduct meetings with responsible authority. 2.2 Quarantine line to be verified and identified. 2.3 Observation of vessels movements within the Port area.	HI, Suva	2002/3	Quarantine line identified and observed.
3. Ensure that residual spraying of international carriers is effective and that crews comply.	3.1 Periodic entomological test to verify effectiveness of program. 3.2 Test effectiveness of insecticides used. 3.3 Training of crews on spraying procedures.	Tikaram	Ongoing	Efficacy of insecticides.
4. Maintain random surveillance of air crews for Top of Descent spraying.	HQ			
5. Provide quarantine officers with safety and other essential equipment.	5.1 Provide officers with uniforms and essential equipment.	SDHI Tikaram	July 2002	Quarantine Officers are presentable while on duty.
6. Implement recovery of arrears of fees.	6.1 Timely billing. 6.2 Regular follow ups. 6.3 Monthly reminders. 6.4 Refer non-compliance to MOH for further action.	Tikaram	Ongoing	Improved collection of fees.
7. Seek external support to deliver training and send key staff to overseas attachment.	7.1 Identify training needs. 7.2 Request funding. 7.3 Organise and conduct in-house training twice a year.	Tikaram	March 2002	Officers will broaden their knowledge on quarantine.
8. Review Quarantine Act	HQ			
9. Arrange office space for quarantine officers to operate from wharf areas at Ports of Entry.	9.1 Liaise with Ports Authority for space. 9.2 Seek quarantine authority's approval.	SDHI	2003	Office space provided.
10. Upkeep and maintenance of wharf area.	10.1 Periodical inspection. 10.2 Rodent and vector control measures.	Tikaram NVCU	Ongoing	Health promoting wharf.

Source: (Fiji Ministry of Health and WHO Western Pacific Regional Office, 2002)

Suva District
LEHAP KRA 8: Legal Enforcement

Improvement Strategies this Biennium	Improvement Activities	Officer	By Date	Indicators of Success
1. Submit budget for prosecution works through Central Board of Health.	1.1 Prepare and submit proposal to HQ.	SDHI DHI	2002/3	There will be no delay in prosecution works.
2. Train key EHOs to gather evidence, prepare charges, serve summons, lay charges, prosecute.	2.1 Identify training needs/institution. 2.2 Staff to attend training.	SDHI Raghwa	Mar 2002	Number of staff trained for prosecution.
3. Train EHO prosecutors in media relations to publicise prosecution and deter offenders.	3.1 Seek approval from HQ. SDHI 2003 Public made aware.	SDHI	2003	Public made aware.
4. Amend the Public Health Act to increase fines and make them effective deterrents.	4.1 Make amendments and submit to HQ.	SDHI Staff		Amendment made.
5. Amend the Pure Food Act to increase fines and make them effective deterrents.	5.1 Make amendments and submit to HQ.	SDHI Staff		Amendment made.
6. Amend the Quarantine Acts to increase fines to make them effective deterrents. Improve data base system.	6.1 Make amendments and submit to HQ.	SDHI Staff		Amendment made.
7. Devise and install database.	7.1 Collate relevant data. 7.2 Submit proposal for database system. 7.3 Register all cases. 7.4 Register all legal documents. 7.5 Carry out sampling as evidence and analyse. 7.6 Record all analysis results.	SDHI DHI Raghwa Raghwa Raghwa Raghwa	2005	Database system installation.

Source: (Fiji Ministry of Health and WHO Western Pacific Regional Office, 2002)

Suva District
LEHAP KRA 9: Central Board of Health and Local Authority Services

Improvement Strategies this Biennium	Improvement Activities	Officer	By Date	Indicators of Success
1. Develop a case for additional EHOs, seek support and make a submission to PSC.	1.1 Prepare submission for additional EHOs. 1.2 Submit CBH.	SDHI	Dec 2001	Increase in establishment.
2. Engage program managers in allocating transport and other resources to district EHOs.	2.1 Submit LEHAP and monthly activity plan to program managers and SDMO. 2.2 Request for other resources.	SDHI	Jan 2002 Monthly	Availability of resources for our use.
3. Train all SDHIs in basic accounting procedures and financial management of sanitary services.	3.1 Consult with Auditor General's office for training need. 3.2 Conduct training with Auditor General. 3.3 Request for funding.	SDHI	Jan 2002	EHO and SDHI are familiar with basic accounting and financial management procedures.
4. Institute regular quarterly visits to Local Authorities by Program Managers.	4.1 Liaise with area inspectors/ program officers. 4.2 Submit to HQ to accompany visits.	SDHI	Jan 2002	Better team work.
5. Report district activities monthly and turn this data into management information at HQ.	5.1 Timely submission of monthly report.	Staff SDHI	Monthly	Evidence based decision by HQ.
6. Amend the Public Health Act to guide the Minister in appointing CBH members with KRA expertise.	HQ			
7. Make a case for Environmental Health budgets in HQ, Divisionals and Sub-divisions.	HQ			
8. Other possible ideas.				

Source: (Fiji Ministry of Health and WHO Western Pacific Regional Office, 2002)

Annexure B LEAP for Identified Problems and Issues in Antananarivo, Madagascar. Source: (MELISSA, Online)

DESCRIPTION	RESPONSIBILITY	PROGRAMME	ACTION	
<u>Vegetation / Open Areas / Parks</u>				
Cleaning of city, planting of more trees	Whole community	Ongoing	Leaflet, brochure, info	City to compile information brochures
Utilisation of compost in parks, open areas, nurseries	City Staff	Next year - ongoing	Revive compost plant	Get private entrepreneur for compost plant
Misuse of public gardens	Officials, businesses	Immediate - ongoing	Enforcement officers	Training of officers. Environmental education
Maintenance and management of public gardens	- Do -	Next year - ongoing	Budget and implement	Private business should manage gardens
Establish partnerships for public gardens	Officials	Next year – ongoing	Partnership guidelines and procedures	Establish partnership between city and private sector
Increase availability / extent of public spaces	Council / Business	Three years from now – ongoing	Budget and implement	Develop a green plan inventory
Public amenities extended / upgraded / managed	Council / Business	Immediate – ongoing	Budget and implement	Seek financial assistance from private sector
Reinforcement of city area	- Do -	Three years from now – ongoing	Information distribution	Start cultivating trees and shrubs
Erosion guidelines / requirements / standards	Government officials	Next year – ongoing	Guidelines and regulations enforcement	Develop erosion guidelines together with community
<u>Environmental Management</u>				
Develop environmental policy	Council, officials, public government	Immediate	Co-ordination between government officials	Get all role players input for policy
Education and capacitation regarding environment	Officials, business, industry	Next year	Guidelines, programmes, resources	Organise environmental workshop etc.
Co-operation between Council officials and Department of Environment (ONE) to be improved	Officials	Immediate	Programme, meeting schedule	Prepare agenda for meeting
Guidelines for management of environmental system	Council, ONE	Next year	Guidelines	Get international help and expertise to develop guidelines
Integrated environmental management	- Do -	Next year	Guidelines and procedures	Get assistance from GPMC

	RESPONSIBILITY	PROGRAMME		PROCESSES
approach				
Co-ordination between local and national environmental policies and areas	All government structures	Immediate	Programmes, schedule of meetings	Prepare agenda for meetings
Interaction between environmental, human behaviour and culture	Council, ONE, other structures and organisations in environment	Next year – ongoing	Flow of information, workshop, press releases, public meetings	Arrange public meetings. Print environmental brochures
Hotspot areas / sectors managed	Council and community	Immediate	Press complaints register, site visits	Appoint officers to follow-up complaints
Water eco system management	All relevant government structures	Next year –ongoing	Procedures, goals and objectives	Officials to monitor the system and get training
Guidelines and requirements for advertising and billboards on street poles and along streets	Governments, Council	Immediate	Develop regulations, implement and police	Enforcement officers to be trained
<u>Land-use Planning and Zoning</u>				
Develop and maintain land-use plans	Officials, Council	Immediate	Guide plan for land zoning and development	All available plans must be plotted on one plan
Enforce land-use zoning	Council	Immediate	Implement guide plan	Appoint enforcement officers
Impact assessment on new developments	Officials, Councillors	Next year	Procedures for impact assessments	Develop guidelines for impact assessments
Guidelines for impact assessments	Officials, ONE	Next year	Develop guidelines for impact assessments	Get help from GPMC
Overall land-use guide plan	Officials, Council, business, industry, public, Government	Next year	Land-use guide plan	GPMC's assistance could be sought
<u>Water</u>				
Maintenance of Water system	Contractor, officials	Immediate	Maintenance plan and procedures	Get officials and contractor to develop maintenance plan
Payment of water tariffs	Officials	Immediate	Record keeping, follow-up	Penalties to non payers
Education of users regarding system	Contractor, officials	Immediate	Information brochure, communication	Environmental awareness campaigns and workshops
Community involvement in water system	- Do -	Next year	Guidelines and regulations for involvement, partnership agreements	Arrange meeting with public
Adjustment, calculation of water tariffs	Officials, contractor, councillors	Immediate	Recalculate tariffs, record keeping	Contractor to investigate situation
Workshops	Contractor	Immediate	Design of implement	Communicate to public

DESCRIPTION	RESPONSIBILITY	PROGRAMME	ACTION	PROCESSES
				information
<u>Sewage</u>				
Upgrading of existing service	Council, contractor, business, industry public	Next year	Evaluate, design, implement	Educate public to use system properly
Extension of sewerage services	- Do -	Next year – ongoing	-Do-	Start planning the extension
Treatment of waste water	- Do -	Next year – ongoing	-Do-	Do research regarding treatment
Sanitation collection vehicles	Council	Immediate	Repair, upgrade, commission	Get private sector donors
Sanitation workshop	Council, contractor	Immediate	Evaluate, repair, commission	Train people to help at workshop
Servicing of septic tanks	Contractor, officials	Immediate	Upgrade and enforce	Proper control by officers
<u>Solid Waste</u>				
Management of landfill site	Contractor, officials	Next year	Evaluate, design, budget, commission	Train officials to manage process
Reactivate composting plant	- Do -	Immediate	Evaluate, design, implement	Budget or get Private finance
Separation of wastes	- Do -	Immediate	Evaluate, design, implement	Train public to separate waste
Treatment of waste classes	- Do -	Next year	-Do-	Budget for it
Dumping to be controlled (lakes, open areas)	- Do -	Immediate	Policing, signing, communicate, educate	Appoint and train enforcement officers
Education and capacitation of public	- Do -	Next year	Design programmes, communicate and inform	Arrange education workshops, TV talk shows etc.
<u>Stormwater</u>				
Upgrade and extension of stormwater system	Council, officials	Immediate	Clean, chains and channels	Plan process and get sponsors
Management of City lakes as flood alteration system	Officials	Immediate	Monitor programme, record keeping	Put information on computer
<u>Health</u>				
Upgrade and extend health care centres	Council, officials	Immediate	Evaluate, design, budget, implement	Investigate present situation and then do planning
Co-ordination between government levels responsible for health services	Officials	Immediate	Liaise, schedule of meetings, communicate and inform	Arrange meeting between 3 levels of government
Education and capacitation of public regarding health care	Officials	Immediate	Brochures, leaflets, information, programmes	Get donors to sponsor leaflets, education etc.
Information system regarding health	Officials	Immediate	Record keeping, communicate and	Put all info on computer

DESCRIPTION	RESPONSIBILITY	PROGRAMME	ACTION	PROCESSES
			information flow	
Ambulance services to be extended / upgraded	- Do -	Next year	More vehicles, partners	Form partnerships
Maintenance of ambulances	- Do -	Immediate	Maintenance programme	Develop a maintenance programmes for vehicles
Fire Protection				
Maintenance and extension of fire hydrants	Contractor, Council	Next year – ongoing	Plan, design, budget, implement as part of water services	Develop proper contract with service provider
Maintenance of fire engines	Officials	Immediate	Maintenance programmes	Train officials properly
Extension of fire engine fleet	Business, industry	Next year	More vehicles, partners	Get partnerships
Training of fire fighting staff	Council	Immediate	Training programme and certification	Award certificates to fire fighters after training
Extension of fire fighting staff complement	Council	Next year	Design, budget, implement, partners	Get partners to finance staff
Development satellite fire stations	Business, industry	Three years	Evaluate design, budget, implement, partners	Determine sites for satellite stations
Pollution				
Develop air pollution policy / standards	Government	Next year	Regulations and record keeping	Get GPMC advice to develop policy
Enforce air pollution policy / standards	Council, Government	Next year	Recording and enforcement	Appoint and train officers
Monitor and control vehicle emissions	Council, Government	Next year	Design, equipment purchasing and recording enforcement	Budget for vehicles
Develop Water pollution policies / standards	Government	Next year	Regulations and record keeping	Officials is to seek expert advise
Enforce Water pollution policies / standards	Government	Next year	Equipping, recording and enforcing	Appoint enforcement officers
Develop policies / standards regarding littering	Government	Next year	Regulations and procedures, monitoring system	Seek advice in development of policies
Enforce policies / standards regarding littering	Local government	Next year	Recording, monitoring, communicating enforcing	Enforce through officers
Importation control in respect of pollution second land vehicles	Officials, all levels	Immediate	Guidelines and regulations, record keeping, monitoring communicating	Importation control officers to be informed
Soil contamination policies of standards	Government	Next year	Guidelines and regulations	Policies to be revised and evaluated
Enforce soil contamination policies / standards	Local government	Next year	Recording, monitoring, communicating, enforcing	Communicate new policy to public

	RESPONSIBILITY	PROGRAMME		PROCESSES
<u>Financial control / Management</u>				
Internal audit control	Officials	Immediately	Financial regulations, recovering	Train officials in auditing
Collection of rates / taxes – enforcement	Officials	Immediately	Record keeping, follow-up	Penalties for non-payment
Setting of tax / rate levels and regulating	Council	Immediately	Recording, evaluate control	Determine fair tax rates
Control of vehicle license payment	Officials	Immediately	Recording, control enforcement	Fines to be given to perpetrators
Payment of rates on property	Officials	Immediately	Recording, control follow-up	Keep records on computer and penalise people
User pay principle to be applied	Council, business, industry	Next year	Guidelines, needed, application principles	Educate community
Budgeting process to be open and transparent	Council, business, industry, public and officials	Next year	Public impact and consultation re needs	Public to participate in budget procedure
Central / provincial government to pay land tax	Government	Next year	Bi-lateral discussions	Collect money from other levels for land-use
<u>Human Resources</u>				
Extension of workplace	Council	Next year	Identify suitable space, acquire	Investigate possible sites
Capacitation of current staff	Council	Next year	Formalise development program	Train current staff
Disciplinary code for staff	Council	Immediate	Develop and enforce code	Act against perpetrators
Performance based assessment of staff	Council	Immediate	Develop performance criteria, implement and monitor, report	Promote staff who comply with criteria
Sustainable development of workplace	Council	Next year	Optimise utilisation of all existing facilities	Use available equipment optimally
Training of staff	Council	Next year	Develop formal training programme and implement such	Identify people for training
Training of team leaders and trainers	Council	Immediate	Identify needs, develop and implement program	Develop training for trainers programme
Career development program and system	Council	Next year	Develop long term career development and implement	Keep record of staff
Training of staff in integrated planning approach	GPMC, officials	Immediate	Visit Pretoria, training session study documentation	Get assistance from GPMC
<u>Information Technology and Systems</u>				

	RESPONSIBILITY	PROGRAMME		PROCESSES
Information systems should be upgraded	Officials, government, bu-	Immediate	Evaluate, communicate, monitor, extent	systems
Training and other people regarding IT	Council		Identify needs, training courses	Train IT personnel regarding
Internal and external flow of information	business, industry	Immediate		Start internal news letters etc.
	World Bank agents, Council		Purchase computer, station, effect internet	computers and Internet
Communication and Marketing				
processes to address these issues	Government, Council, officials	Immediate	recording	Use newspapers, radio, TV to
Empowerment and capacitation of	Government / Council	Next year	workshops, inform, communicate	Meetings, workshops with
Internal and External flow of information	business, industry	Immediate	recording	Develop information flow
Annual reporting of activities	Council, officials		Annual reports	Collect info for reports
	Council, officials	Before next election		Start training voters
Involvement of media (TV, newspapers,	Council, officials	Immediate	press releases	Get sponsors for marketing
	Officials	Immediate		Budget for assistance
Community Involvement and				
Annual meetings to report and discuss performance		Immediate	Schedule meetings, communicate,	Private business to sponsor meetings
partnerships	Government, Council		Develop guidelines	Arrange meeting with role
Establish partnerships for rendering of services	business, industry	Next year	estab-	and partners
Management and administration to be	- Do -	Immediate	feedback	Arrange the interviews etc.
capacitation of partners		Immediate	Communicate, inform, feedback	
Participation of community in budgets, processes, delivery, activities, etc.		Immediate	Communicate, inform, monitor, ding, feedback	Invite public to render input

DESCRIPTION	RESPONSIBILITY	PROGRAMME	ACTION	PROCESSES
<u>Institutional</u>				
Clarification of roles and responsibilities of government system	National, provincial and local government, business, industry	Immediate	Communicate, schedule meetings, discuss feedback	Develop relationship and responsibilities between levels
Central government support to local government to be enforced	Government	Immediate	Communicate, support system	Arrange first meeting
Co-ordination between structures in government to be enhanced	Officials	Immediate	Schedule meetings	Prepare agenda
Interaction with international bodies and organisations to be upgraded	Officials and politicians	Immediate	Identify role players, set up meetings, discussion groups, support systems	Arrange meetings and prepare agenda
Co-operation between local council and Department of Environment to be improved	Officials, ONE	Immediate	Schedule meetings, support systems	Start with communication strategy
Enforcement of legislation and supporting regulations	Council, officials	Immediate	Communicate, recording, feedback, monitor	Get GPMC support
Siting and location of offices and contact points with community to be optimised	- Do -	Next year	Evaluate, identify needs, design, budget, implement	Plot sites on map and get financing
Integrated planing which include all council processes and activities	Officials	Immediate	Develop LEAP, implement monitor, feedback	Get GPMC support
Development of business and action plans for implementation of projects	Officials	Immediate	Business plans, action plans and progress monitoring	GPMC support. Involve community
<u>Educations</u>				
Availability of educational material to be enhanced	Government, Council, business, industry	Next year	Identify needs, develop material, communicate	Seek donors and sponsors
Involve community in education system and programmes	Government, Council	Next year	Develop procedures and systems	Ask community what they need
Maintenance of schools	Government, Council, business, industry	Next year	Identify needs, budget, partnerships, monitor	Arrange meeting with school principals
<u>Logistics</u>				
Purchasing and holding of stock	Officials	Immediate	Develop policies and procedures, apply	Store rooms to be controlled
Maintenance of vehicle fleet	Officials	Immediate	Policy, program monitor	Budget for maintenance
<u>Streets and Sidewalks</u>				

DESCRIPTION	RESPONSIBILITY		ACTION	PROCESSES
	Council, officials, busi-	Next year	Partnerships	
Road signs and traffic control mechanisms		Immediate	Policy, design, implement	
Traffic flow study	Council		Traffic study	Get advice from GPMC
	Council, business, industry, community		Partnership	Get private companies involved
Traffic policing	Council, business, industry		Partnership	Arrange meetings
	Council, business, industry	Next year		Arrange meetings
<u>Electricity and Energy</u>				
city area	Contractor, Council		Design and implement	Develop contract with provider
	Business, industry, community		Information, communication	Get industry involved

Source: (MELISSA, Online)