Rivers and humans are inseparable. Settlements from the beginning have sprung from water sources to provide sustenance for crops, animals and people. Water is essential for agriculture and industries to flourish and forever expanding cities to thrive. Rivers are vital for supplying water and for conveying excessive rainfall, and they also transport unwanted waste products.

Malaysia has extensive river systems that drain its abundant rainfall from forested basins, agricultural areas, towns, wetlands and coastal habitats. Although nature is resilient, the rapid pace of our growth has caused the system to be overstressed. Pollution remains rampant as waste products from industry, agriculture, and sewage plague watercourses and sediment loads from clearing large tracts of land choke natural freshwater ecosystems. Opening up river basins to inappropriate development has led to uncontrolled flooding downstream. Some basins are now beyond easy water availability, necessitating the increase in storage dams and delivery mechanisms such as inter-basin water transfers.

INTEGRATED MANAGEMENT IS NECESSARY

The traditional, fragmented approach to river management placed responsibility upon many agencies, each trying to address a distinct component with a different agenda. This results in a lack of coordination and communication. And a separation of these functions is now viewed as an obstacle to effective river management. This predicament led to a change in thinking among water resource managers and policymakers.
The World Summit for Sustainable Development, held in South Africa last year, called for every nation to institute holistic management of precious water resources. And the recent World Water Forum in Japan also stressed the need for integrated approaches, as have many other meetings. The trend towards integration is global.

MALAYSIAN WATER POLICIES

Malaysia is now on course to implement the concept of integrated river basin management. Both the Eighth Malaysia Plan (2001-2005) and the Third Outline Perspective Plan (2001-2010) embrace IRBM and challenges each state government to "be encouraged to establish water management bodies...to ensure proper planning, monitoring, enforcement and management of water resources on a river-basin basis."

The task remains to effectively integrate planning, design and operations management. In some states a coordinating authority might serve as the best model towards a sustainable and holistic direction. The Selangor Waters Management Authority (LUAS) is taking this approach to manage the state's extensive water bodies. And in Kedah, IRBM is already in the early planning stages. These efforts bode well for the entire country and its vital water resources.

THE PROJECT

IRBM is only a framework with a set of guiding principles - to be sustainable, holistic, equitable and participatory. For successful execution, it requires improved professional and political competence, and increased financial, legislative and managerial capacity. The concept must be operationalised. The Department of Irrigation and Drainage has therefore taken the initiative to the IRBM project and is very pleased to see it implemented as a joint effort between the Governments of Malaysia and Denmark.

The IRBM approach is a challenge for water administration in Malaysia. The IRBM project acknowledges that strong relationships between federal and state agencies are fundamental for achieving positive results. We will continue to explore the right opportunities and models for integrated resource management to overcome past problems and move forward to revitalising the nation's rivers.

Dato' Ir. Hj. Keizrul Abdullah
WHAT IS IRBM?

Integration is a nice word. Like 'holistic' and 'sustainable'. But what exactly does integrated mean?

Everyone agrees that there is a need for seeing development in a wider context. The task then is to try to understand how the different elements are linked, how they interact or depend on each other. Things rarely occur in isolation, so developments in one area usually have an impact in other areas. This is true in economics and social development and especially in the environment.

Integrated River Basin Management is an approach to water resource management that takes into account all the factors linked to the resources, including social and economic activities. It is very broad in scope to not only cover water, but also environmental management aspects such as land use issues, pollution control, development pressures and biodiversity conservation.

Most people would agree that IRBM makes sense. However the key question is how to implement it?

WHY DO WE NEED IRBM?

The ecologist realises that everything in a river basin interacts: land use, economic activities, water resources, water supply, water pollution and aquatic life. But for others this is not the norm. One reason for this is due to the traditional set up of legal and administrative roles aligned with different sectors. This situation results in separate responsibilities for, among others, water supply, land management and pollution matters. For some this works because each institution has clear objectives and defined management duties. But nature is not segregated so easily; it functions as an integrated entity.

River basins are very important ecological units, crucial for water and for life. However, natural basin borders rarely coincide with political and administrative borders, making it difficult to oversee and attend to the ecological linkages across basins. Thus, it is necessary to establish a mechanism that can merge coordination and seek cooperation not only across sectors, but also across political and administrative borders.

HOW DO WE START?

The challenge is how to implement IRBM. Do we create new institutions? Do we add responsibilities to existing agencies? Can we merely amend legal and administrative frameworks to handle the job or are major changes required?

First, let’s check out how some of these questions are answered elsewhere?

International examples

The integrated management of river basins is a global trend that takes many forms:

- In Australia, the Murray-Darling catchment is beset by unsustainable land use and excessive water extraction in a very dry, agricultural zone. The collaboration among several neighbouring states seeks to address negative impacts by utilising economic instruments, such as marketable water rights, and other management tools.
In Europe, the European Union Water Framework Directive is a very ambitious legal initiative in water resource management. It gives clear direction for member states and requires each to introduce integrated river basin management plans, to implement legal and institutional arrangements and sets a binding timetable to achieve “good status” for all water bodies. The actual implementation of the directive varies in format with each participating country.

In the United States, the Clean Water Act requires states to prepare and maintain a continuing planning process that includes Water Quality Management plans. These plans should have a watershed focus, but are more limited in scope than the EU plans.

**IRBM PLANNING**

Planning is a key element of IRBM. It helps define environmental issues and considers the interests of various stakeholders. Planning sets the stage for integration and is a prerequisite for consistent implementation of policies, including the allocation of water resources, pollution abatement, zoning, granting of permissions and licences, and others. Each component requires a strategy by the authorities. Henceforth decisions can be made in a systematic and transparent manner that is able to withstand public scrutiny.

The IRBM plan must also provide overall guidance. Its intent is not to dwell on management details but to channel clear and specific actions that address water quantity and quality issues and land use matters. It is crucial that these plans adequately cover and integrate the full array of water concerns, such as resource use and flood mitigation, wastewater treatment, and catchment protection and zoning. The development of action plans is not limited to short-term solutions to amend immediate problems. Planning also requires a longer view to seek appropriate environmental investments that fulfil the entire objectives of IRBM.

Malaysia already has several examples of integrated watershed, catchment or river basin planning. Most initiatives have been in the form of IRBM plans, each with its own strengths and weaknesses.

**LEGAL AND INSTITUTIONAL FRAMEWORK**

Plans can be prepared by temporary committees or consultants, but plans are only really useful if they are implemented. This requires that they are fully supported by the authorities and that there is political commitment. In the longer term, it is necessary to establish a proper legal and institutional framework.

The Sabah Water Resources Enactment of 1998 was therefore an early and important step towards integrated management as it created the first legal framework for IRBM in Malaysia. In Peninsular Malaysia, Selangor pioneered the new paradigm with the creation of LUAS in 1999.

Examples from other countries may guide the development of such a framework in Malaysia. For example the EU Water Framework Directive structure may give inspiration. But adjustments are needed that agree with local circumstances as procedures and content have to correspond to the existing national framework. The environmental condition and economic situation of each state must be considered before designing a model that fits into the local legal and institutional support system.
In brief, integrated river basin management is not a new concept and the foresight for IRBM implementation was laid out in the Eighth Malaysia Plan and the Third Outline Perspective Plan. However, the approach has yet to be fully implemented in Malaysia. A joint four-year project by the Governments of Malaysia and Denmark is now assisting in this process. With strong federal government support, the IRBM project seeks to improve the understanding and commitment of all water-related agencies. How will the IRBM project do this?

The project focuses on building the capacity of institutions for implementing the IRBM approach. It works with a number of agencies to explore methodologies and facilitate communication and coordination. Each organisation is encouraged to take advantage of new strategies and opportunities provided by IRBM and respond better to environmental challenges. Although the project provides technical support to strengthen IRBM in the states, it is not a technical study, but a collaborative effort with the agencies.

THE COMPONENTS

There are three main components to the IRBM project: Federal, Selangor and Kedah. Each of these components has its own goals, but the components are linked and support each other. The project recognises the vital link between federal policies and state action. And also realises that states are not always similar in terms of water use and administration. Therefore, the project will compare various options and models in two states before trying to replicate successful results in other states. Let’s look at the three components and their functions:

• Federal - This component is led by the Department of Irrigation and Drainage in cooperation with other agencies. It is the central focus for the IRBM project to distil the lessons learned in the two states and provide technical guidance on suitable management models. It will also expand the outreach of IRBM to other states. The project will compare different IRBM options and management models and, building on the experiences, it will develop guidelines for river basin management which will facilitate replication of successful approaches in other states.
Selangor - The Sungai Selangor basin supplies drinking water for most of the population in Selangor and Kuala Lumpur. It was chosen as one of two state level project sites and is based with the state water authority, Lembaga Urus Air Selangor (LUAS). This component will focus on practical implementation of activities with various stakeholders to diminish environmental problems and improve water management.

Kedah - The Sungai Kedah basin not only covers a substantial area, but also contains two large irrigation dams and a water transfer scheme. It supplies water to the MADA irrigation scheme, which produces half of the rice in Malaysia. Kedah represents an early attempt to integrate river basin management within state institutions to secure water supply and prevent environmental deterioration, and there is not yet an institution with clear responsibility for IRBM. In Kedah the project will be based in UPEN with DID providing technical support.

The activities varies, but all three components will work with:
- Institutional and legal development
- Organisational development
- Human resources development
- Monitoring and information systems
- Awareness and information
- River basin planning and management
- Improved environmental practices and demonstration projects

THE ORGANISATION

At the apex of the project organisation is the Project Steering Committee, chaired by the Economic Planning Unit. It is responsible for overall implementation. Under its guidance are three committees that are responsible for each component. The Federal Technical Committee is chaired by the Director General of DID (the project manager), while the two state committees are chaired by the respective state secretaries. The committees are assisted by three component managers: the Director of River Engineering Division (DID) for federal, the Director of LUAS for Selangor and the state UPEN Director for Kedah.

THE INPUTS

During the next four years, both Malaysia and Denmark will provide inputs into the IRBM project. Marking its commitment to IRBM, over 300 person-months from Malaysian government staff will contribute to the project’s implementation. Malaysia’s direct financial contributions, expected to be over RM 7 million and allocated through DID, will support the project’s demonstration projects, studies and surveys. Denmark will fund international and national consultants and co-share costs, on a 50:50 basis, for training workshops, study tours, publications and other events.

The following chart gives an overview of the project organisation:
Embraced by the Eighth Malaysia Plan and the Third Outline Perspective Plan, the federal government is pushing for IRBM in Peninsular Malaysia to meet the present and future demands of consumers. Water resource management is a vital factor in sustaining the nation’s economic progress and environmental health.

Why the switch to IRBM?
At present there is no single agency to integrate the management of water resources and ecosystems, such as rivers, lakes and wetlands. Management is dispersed among a dozen agencies, resulting in fragmented and ineffective measures. A new approach is needed.

Spearheading the efforts at the federal level is the Department of Irrigation and Drainage, in conjunction with the Economic Planning Unit. Its mandate is to enhance the capacity of federal agencies to effectively apply IRBM practices and support state level activities. To accomplish its tasks, the federal component will focus on the following:

• Analyse options for IRBM at federal level and develop guidelines for establishing IRBM organisations at state level. It will also develop guidelines for interstate cooperation in water resources management.
• Develop training modules, organise workshops, seminars, study tours and other training activities
• Review monitoring and information systems and analyse options in relation to IRBM
• Develop awareness materials and disseminate information
• Support project activities in the states, including IRBM planning, environmental practices and demonstration projects

The Department of Irrigation and Drainage will provide leadership throughout the project implementation period, but some of the activities will mainly take place in the last year. Here the experiences gained from two states will be analysed, together with related experiences from other countries or other parts of Malaysia. This will lead to development of guidelines and recommendations for future implementation of IRBM in Malaysia.
Sungai Selangor stretches for over 140 kilometres and dissects a basin that encompasses nearly 2,000 km². The river is a major source - up to 70% - of water for Selangor and Kuala Lumpur. However, water quality continues to deteriorate due to land clearing and logging, livestock and pig farming, sewage, and waste from manufacturing and agro-based industries. Degraded forests lead to loss of biodiversity and depleted mangroves reduce already decreasing fish populations. Floods are now more common and extreme as land use changes from rural to urban expansion. All of these circumstances pose convoluted challenges for resource managers.

Sediment levels are high and wastewater from urban areas, industries and agriculture pollute the river. Inappropriate development encroaches rapidly upon the upper reaches. Middle sections are targeted for extensive growth. And even firefly colonies, an ecotourism hotspot, are threatened in the lower estuary.

How can drinking water supplies and quality concerns continue to be safeguarded under such conditions? How can the firefly habitats be protected when the water demand is so high?

Selangor seems therefore an ideal location for testing the IRBM approach and was chosen as one of two pilot sites under the Integrated River Basin Management project. In 1999, the Selangor State Government made a bold move to enact legislation establishing a water authority, known as LUAS, to take management control of all rivers and water bodies.

**THE MANAGEMENT COMMITTEE**

The river basin management committees are being established by LUAS for each of the rivers in Selangor to provide the leadership to administer an integrated approach among governments, private companies, communities and NGOs.

For example, the EXCO member who is also Chairman of the EXCO Standing Committees on Infrastructure, Information and Malay Reserves leads the Selangor River Basin Management Committee. Representation also includes directors and officials from DID, DOE, Health, UPEN and district level offices and councils.

In 2002, the Selangor River Basin Management Committee brought together the key stakeholders to get the job done:

- EXCO member, Chairperson
- LUAS Director, Secretary
- Department of Irrigation and Drainage
- Department of Environment
- Department of Town and Country Planning
- Department of Sewerage Services
- Department of Health
- State Planning and Development Unit
- Hulu Selangor District Officer
- Kuala Selangor District Officer
- Gombak District Officer
- Hulu Selangor District Council
- Kuala Selangor District Council
- Selayang Municipal Council

The committee is well on its way to setting the path for better water resource management. Its roles and responsibilities are not only wide-ranging, but also tackle difficult matters.

**AN IRBM ACTION PLAN**

The integrated management requires proper planning. The Selangor committee recognizes its pioneering role and seeks to develop a comprehensive river basin action plan to identify key issues, take decisive action and achieve selected targets.

In order to do this, the committee will set up a number of small working groups to deal with specific aspects. These groups combine the talents of existing agencies to propose relevant activities that are achievable within the current legal and administrative framework. Each of the groups may invite other agencies, stakeholders or consultants to assist in planning efforts, but it is crucial that the members are taking on the responsibility and are actively participating in the work.

The outcome will be an action plan for IRBM in the Selangor River basin. The project will support the Selangor River Basin Management Committee and the working groups.
After decades of deterioration of water quality, frequent incidences of flooding and repeated water shortages and confronted with poor overall supervision of water resources and insufficient coordination, Selangor found that “business as usual” was no longer acceptable.

The new millennium called for a new innovative approach. And in 1999, the Selangor State Government made the first move by passing the “Selangor Waters Management Authority Enactment”. A new agency was established with responsibility and mandate to regulate, monitor, plan and conserve river and water resources in Selangor.

In operation since August 2000, the Selangor Waters Management Authority, also known as Lembaga Urus Air Selangor or LUAS, embarked on a new era of sustainable water management practices.

The Authority has a board of directors chaired by the Menteri Besar and a technical committee chaired by the State Secretary. The other key agencies are represented in the board and in the committee.

As a new institution, LUAS is working hard with its initial staff of 50 to lay the foundation of sound water management. To reach its statewide goals it will eventually employ over 100 personnel, the majority at headquarters and fewer in regional offices.

LUAS is implementing the Selangor component of the IRBM project.

ORGANISATION AND RESPONSIBILITIES OF LUAS

As the overarching water agency in Selangor, LUAS’s responsibilities and scope are wide ranging. It is the central authority for rivers, lakes, wetlands, aquifers and coastal waters, inclusive of river basins and coastal zones. Entrusted with these resources, LUAS is a young and dynamic organisation ready to fulfil its mission and its objectives:

- To protect rivers and water resources and the surrounding environment;
- To promote an integrated approach to river and water resource management;
- To promote private sector participation in management and protect the public interest;

(continued to page 10)
Kedah State is well known for its rice production, but the economy is now developing rapidly and industry is more important in terms of economic production. Kedah has ambitious development targets expressed in the Kedah Maju 2010 Action plan that aims to give the state "developed" status in less than ten years. The state is rich in natural resources and tourists appreciate not only Pulau Langkawi, but also the forests. Resorts have been built on the shores of the Pedu reservoir and offer good opportunities for retreat in nature.

Kedah is also rich in water resources and actually exports water to Perlis (through the MADA scheme) and to Penang. The Sungai Kedah is a major river that not only receives water from its own catchment, but also from Sungai Muda through a tunnel that connects Muda Lake and Pedu Lake. However, the rapid development puts pressures on the natural resources. The State Government recognises this and realises that integrated approaches are needed to deal with the challenges.

Sungai Kedah supplies water to Alor Setar and other urban areas as well as to the MADA irrigation scheme that delivers half the padi grown in the country. Sungai Kedah is thus a very important river.

THE KEDAH COMPONENT

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How will LUAS carry out such a diversified management portfolio? The answer lies in building strong commitments among all stakeholders involved with the activities of the river basin. One of the tools is the establishment of river basin management committees.

LUAS is in a unique position to change the course of water management in Malaysia. If proven as a successful model, the LUAS approach is one that can be adopted and replicated in other river basins throughout the country.

SELANGOR WATERS MANAGEMENT AUTHORITY ENACTMENT 1999

The LUAS Enactment is comprehensive and far-reaching. It has provisions on:

Protection and development of water resources:
This section deals with the regulation and control of all water resources, including use, flow and diversion. It allows for charges for extraction, drainage and discharges. It requires integrated management plans and specific zones of protection, especially in protected areas. It also sets out to control water wastage and safeguard water quality.

Declaration of designated areas and protection zones:
River basins, catchment areas, ground water areas, among others, will be afforded proper protection. Licenses will be required for exploitation of resources and discharges, while other development projects are subject to prior advice and regulations.

Resource use efficiency and conservation:
A section that aims to develop and implement efficient resource use practices.

Mitigation Measures:
Droughts and floods are addressed in this section that controls peak drainage and flood flow, sets up a flood defence, constructs flood channels and requires water table management in problem areas.

Environmental Protection:
Supplementing the EQA 1974, all new activities in designated areas will require an EIA. Even existing projects in these areas may be asked to conduct an EIA. And pollution matters will be consulted with DOE to prescribe measures for improvements.

To promote public participation and awareness on the importance of rivers and water resources; and
To carry out coordination of research and development in the water sector.
INCEPTION WORKSHOP

The state has previously embarked on integrated river basin management, but there was no supporting institutional structure and the process lost steam. Now the IRBM project provides an opportunity for a fresh start.

The Menteri Besar will launch the IRBM project at an inception workshop to be held 22-23 September 2003. All the relevant government agencies will participate. The workshop will identify the key issues and discuss ways to address them.

ORGANISATION

The project will be based in UPEN which will establish a River Basin Management Unit that will function as secretariat for a River Basin Management Committee. DID will provide technical support. It is expected that a key activity will be the preparation of an IRBM action plan for Sungai Kedah.

PROJECT ACTIVITIES

- Institutional and legal development: Development of a framework for IRBM in Kedah
- Human resources development: Building capacity in UPEN and other agencies for IRBM
- Monitoring and information systems: Establish appropriate monitoring and information systems including GIS
- Awareness and information
- River basin planning and management: Development of an IRBM action plan for Sg. Kedah will be a major project activity
- Improved environmental practices: Demonstration projects in Sg. Kedah.
Danish environmental cooperation to Malaysia was initiated as part of the Environment and Disaster Relief Facility (EDRF) in 1994. The cooperation partners are primarily the government, with some support to NGOs and CBOs, and the private sector.

In the first phase of cooperation in environmental assistance (1994-1998) activities were based on mutual agreements on proposed project activities. Subsequently, the Second Country Programme (1999-2001) was launched on the basis of mutually agreed priorities as stated in the 7th Malaysia Plan and the Strategy for Danish Environmental Assistance. So far, some 518 million DKK (about RM 260 million) have been disbursed for the implementation of more than 100 projects and activities in Malaysia for the period 1994-2002.

In the third, and last Country Programme (2002-2006), the two governments had agreed to focus the next phase of cooperation on five areas namely: Environmental Planning and Strategy; Renewable Energy and Energy Efficiency; Solid Waste; Hazardous Substances; and Biodiversity. The first two areas would be funded as components of the Environmental Cooperation Programme (ECP) in 2003; the next two would be funded in 2004, and the last one in 2005. It was agreed early this year between the two governments that Malaysia-Denmark will also collaborate in the areas of Climate Change and the use of CDM or Clean Development Mechanism.

The over-riding Danish development policy objective of poverty reduction is indirectly addressed in the Programme, given that the costs of poor environmental management are often borne proportionally more by poor people than rich people. Malaysia is a relatively rich country in comparison with many others in which Danish development assistance is operating. Thus, it is appropriate that this last phase of support concentrates on capacity building in policy and planning aspects that can support Malaysia’s efforts to mainstream environmental issues into development priorities. This in turn will assist in maintaining the increases in the standard of living that Malaysians have achieved over the past two decades.

**DANISH PARTNERSHIP FACILITY**

The Danish Partnership Facility supports transfer of Danish environmental technology and know-how to private enterprises in Malaysia. Focusing primarily but not exclusively on hardware, the Partnership Facility aims at introducing Danish technology and know-how and adapting it to the local market conditions for the benefit of the environment, the society and the business partners. It offers a unique opportunity for Danish and Malaysian companies to develop business relations while they contribute to pollution reduction.