



Mekong River Commission

**THE INFORMATION AND KNOWLEDGE MANAGEMENT
PROGRAMME 2011-2015**

PROGRAMME DOCUMENT

FINAL

November 2010

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ABBREVIATION

AFD	Agence Française de Développement
AHNIP	Appropriate Hydrologic Network Improvement Project
BDP	Basin Development Plan
CCAI	Climate Change and Adaptation Initiative
CEO	Chief Executive Officer
CTA	Chief Technical Advisor
GIS	Geo-Information System
DSF	Decision Support Framework
EP	Environmental Programmes
FMMP	Flood Mitigation and Management Programme
HYCOS	Hydrological Cycle Observing System
ICBP	Integrated Capacity Building Programme
ICCS	International Cooperation and Communication Section
IKMP	Information and Knowledge Management Programme
IKMP-2	Information and Knowledge Management Programme, phase 2
IS	Information System
IWRM	Integrated Water Resources Management
LA	Line Agency
LC	Learning Centre
LMB	Lower Mekong Basin
MRC	Mekong River Commission
MRCS	Mekong River Commission Secretariat
NMC	National Mekong Committee
PCC	Programme Coordination Committee
PDIES	Procedures on Data, Information Exchange and Sharing
PS	Private Sector
PWUM	Procedures on Water Use Monitoring
SC	Steering Committee
SP	Strategic Plan
TACT	Technical Assistance and Coordination Team
TSD	Technical Support Division
TWRM	Transboundary Water Resources Management
VMB	Virtual Mekong Basin

1. Background

1.1. Introduction

The Information and Knowledge Management programme (IKMP) was designed as a cross cutting programme of the Mekong River Commission (MRC) which provides information and knowledge services to other programmes as well as to National Mekong Committees and line agencies. The programme was formulated in December 2006 with the goal of building a solid foundation of data, information and knowledge products, systems and services that supports the goal of the Mekong River Commission.

The IKMP is supportive of the goal and objectives of the MRC Strategic Plan 2006-2010 and, in particular, of being a “centre of excellence” for information and knowledge base by providing the latest analytical and management systems on water related and environmental resources of the Mekong basin.

To operate as a cross cutting programme, the IKMP was designed to cover three key areas as follows

- (i) MRC Data, Information and Knowledge Keeper: this includes the development and maintenance of high quality baseline data, data management; setting of standards, modelling tools and, in particular, the Decision Support Framework (DSF), suite of models and outreach tools for the MRC. This also includes capacity building of National Mekong Committees and line agencies in these areas.
- (ii) Service Provider to MRC Programmes: the IKMP provides hydrological modelling and analysis; spatial and time series data products; advises on the implementation of other MRC projects as well as provides technical assistance to relevant programmes.
- (iii) Service Provider to Countries and Other External Clients: this includes the provision of GIS-based and hydrological data to commercial and non-commercial data users in both riparian and non-riparian countries; modelling services, data supported to the implementation and monitoring of projects in MRC member countries.

The activities of IKMP have been carried out with funding from the governments of Australia, Finland and France with a total of US\$ 14,114,000. The IKMP has strategic importance to sustainable development of the Mekong Region and links to the Millennium Development Goals. The increased population and development pressures necessitate improved understanding of the river basin conditions, management options and environmentally, socially and economically sound practices. Informed decisions are essential if the overall goals of sustainable and equitable development of the Mekong Basin are achieved and which have an influence on many of the region's poor population. The IKMP provides direct guidance to development and investments taking into account impacts on the environment and livelihoods, and will thus contribute to sustainable development and poverty reduction in alignment with the Millennium Development Goals.

1.2. Key Achievements of the IKMP phase 1

The main achievements to date of the IKMP related to the IKMP component objectives, as concluded by independent consultants of IKMP's Mid-term Review in October-November 2009, can be generally described as follows:

- (i) The IKMP is broadly on track to meet the objectives of programme management. Supervision arrangements have been put in place, including the programme plans, progress reports and monitoring matrix. Efforts and remedial actions have been taken to ensure the timely implementation of the programme and to meet budget commitments. A strong project management approach has been applied effectively to deliver a number of qualified outputs and products. Moreover, one of strengths of the programme's management is the direct involvement of National Mekong

Committee Secretariats (NMCS) and the effective operation of the National IKMP Units with strong commitment from NMCs in the programme management arrangements of IKMP.

- (ii) A very significant achievement IKMP has gained so far is the setting up of a system of exchange, auditing, improvement and quality assurance processes for hydro-meteorological data and correcting the main databases to an international standard. The hydro-meteorological component has achieved this through quality assurance and correction of historical data including 2,500 datasets, establishment of a real-time river monitoring network and dataset from 49 stations (32 Hydrological Cycle Observation System - HYCOS and 17 Appropriate Hydrological Network Improvement - AHNIP) and on-going management of fundamental hydro-met services. Progress with the development, implementation and maintenance of an operational basin-wide automated and near real-time water level and rainfall monitoring and telemetric reporting system is another major achievement of IKMP that will lead to important future MRC outcomes and recognition. This has included building capacity of line agency staff including in remote locations and involving considerable improvement of the sustainability of the system. Moreover, the component has also delivered and published papers on research findings and hydrological yearbook and designed and implemented the integrated discharge and sediment monitoring project. Last but not least, under a new joint AFD and Finland funded project, the integrated monitoring networks between discharges, sediments, water quality (implemented by the Environmental Programme-EP) are being improved.
- (iii) The provision of fundamental data and information services has significantly supported the implementation of development projects and studies/researches that contributes to tangible outputs for decision making. This service has created sound foundations for effective and efficient management of data and information. In addition, the development and quality assurance of nine related relational geo-referenced databases (socio-economic, fisheries, discharge, water quality, sediments, bio-monitoring, hydropower, irrigation) have been created in order to provide a firm foundation for future planning, modelling and research within IKMP, and, crucially, for other MRC programmes as well. The GIS and Database component has also achieved topographic data asset improvement in cooperation with Viet Nam, river network GIS improvement and development of deep pool atlas with EP. Supplementing and correcting GIS metadata have been critical and the Master Catalogue to be launched in mid-2010 is going to improve the accessibility of the information and data.
- (iv) Modelling and assessment tools have been successfully developed and provided for riparian countries, especially in the form of a Decision Support Framework (DSF) and its recent improvements (including its interface) include a number of capacity building activities (training courses, case studies etc). Updates of modelling and assessment tools have been taken into account and implemented under consultancy services of the Basin-wide Modelling Support (BMS) and Detailed Modelling Support (DMS). As for results, scenario analysis using DSF have significantly supported the Basin Development Plan Programme (BDP) and Flood Management and Mitigation Programme (FMMP) in their assessments. Integration of different models in the MRC toolbox, which enhances the use of various models at NMCS and line agency levels, is considered a good direction for IKMP to take in this current stage. In addition, technical assistance to countries in terms of modelling services has also been provided to projects, including the Kok River flood model, Nam Ngum 2 hydropower model and other developing models under DMS.
- (v) Establishment of a Documentation and Learning Centre in the MRC is considered a significant achievement of IKMP component 5 – Knowledge Management and

Communication. It includes the development of the Master Catalogue with about 90,000 registered datasets of all MRCS data and information holding; collection and digitization of all MRC data assets under one digital system and on-going upgrades of MRC portal and Mekong Info for data and information sharing etc. Moreover, international cooperation with other institutions within and outside the region has been promoted by a number of joint researches such as the Virtual Mekong Basin and sediment analysis.

In addition, the programme's activities also have many achievements over the past four years. The countries, through the NMCSs and line agencies have indicated a strong knowledge of IKMP. IKMP was agreed by all stakeholders consulted to be a core and essential component of the MRC activities and has very important activities and tools. Subsequently, Member Countries find the following activities highly valuable (i) Collection and Quality Assurance of hydro-met data (especially real time data) which is then used for flood forecasting; (ii) Databases, sharing and associate procedures; (iii) DSF modelling activities including capacity building activities and scenario studies. All countries indicated that their capacity to undertake IKMP related activities have greatly improved.

However, the MRT team also pointed out some limitations and constraints that IKMP needs to improve on in its second phase, including the following:

- (i) It is important that in general, and certainly for technical positions, exemption from Article 33 on the constraints on period of employment should be sought. Amendment of the agreement in this regard should be considered.
- (ii) A more systematic assessment of all factors restraining recruitment and retention of specialist staff is required and should include: a) a review and revision of contractual terms (e.g. one year rolling contracts, lack of access to employer superannuation, conditions of long term staff consultants) and other disincentives for working at MRCS to comply with more standard international employment conditions; and b) consideration of a professional HR recruitment firm in order to consider approaches (marketing, head hunting) services to assist successful recruitment.
- (iii) Capacity building and maintenance of a high quality IKMP team should be an explicit component of the next IKMP work-plan with specific objectives and targets. This should be prepared with reference to the recent final report of the former Senior Modelling Advisor as well as consideration of the needs of a future distributed model for river basin management (if adopted in the next Strategic Plan).
- (iv) In devising an organisational structure for the next Strategic Plan, consideration be given to an arrangement which integrates IKMP services more directly with the end using Programmes as a mechanism for improving Programme efficiencies and effectiveness. This should follow a review of the strengths and weaknesses of the various options including consultation with key staff.
- (v) The MRC and development partners consider the feasibility of options of moving from a DP-single Programme/project funding model, to a model whereby DP funding is for the implementation of the MRC Strategic Plan with the MRC and development partners agreeing on the Plan's priorities and overall balance. This approach could be based on a matching formula with country contributions so that countries have a greater influence and interest in funding priorities.
- (vi) As part of preparing the next Strategic Plan, the IKMP develop a model and strategy for moving from the current, largely centralised approach for IKM to a more distributed model which can be moved to over the next 2 strategic planning periods.

More details on what and how IKMP should focus on its current operation and its second phase are presented in annex 5 of this document.

1.3. Considered Issues for IKMP 2011-2015

As the current phase of IKMP is going to end in December 2010, when key products and services of IKMP are still considered as priority needs in the MRC, IKMP 2011-2015 has been formulated, in order to:

- Consolidate the outputs/achievements from phase I and sustain the results of IKMP.
- Continuously provide services and capacity building; transfer knowledge to line agencies from member countries in modelling, river monitoring, database management etc., which are still considered as “knowledge gaps” in the region.
- Take the lead role in the implementation and delivery of two Core River Basin Management Functions that are identified in the next Strategic Plan (SP) of the MRC 2011-2015, including the functions of “Data Acquisition, Exchange and Monitoring” and “Analysis, Modelling and Assessment”.

Moreover, the operation of IKMP 2011-2015 will significantly contribute to the MRC in implementing activities as follows:

Effectively maintain, consolidate and strengthen the network of water related monitoring stations that provide near real-time data on hydro-met, water quality and sediment conditions. With support from GIS and remote sensing tools, the fishery resources, biota and ecosystem are monitored regularly. Data and information is collected, collated and quality assured and registered in the MRC Master Catalogue. The aim is to make the catalogue available on MRC’s web site for the public to search and download available data or request data subject to agreed conditions under the Procedures for Data and Information Exchange and Sharing and related MRC policies (e.g. in relation to copyrights, copying or shipping costs of publications).

Continue to improve the monitoring system of water level and rainfall at its automatic stations and support Member Countries with sediment monitoring and discharge measurements at selected stations, with appropriate improvements to existing installations. A sediment monitoring system is being set up as sediments are extremely important as natural fertilizers in flooded areas, sediment flows influence bank erosion and deposition and in recognition that sediment transport in the Mekong mainstream and tributaries is expected to substantially change with the construction of hydropower dams. These dams themselves provide a new source of hydro-meteorological and related data obtained by the private sector developers and it will be important for countries to put in place necessary regulatory mechanisms for the data to be made available to both relevant national agencies and the MRCS.

Supporting studies for drought management including vulnerability assessment, drought mapping and scenarios development is planned in response to increased drought situations in frequency as well as in greater areas. In relation to drought studies, the ground water database will be set up and regularly updated which provides inputs for other assessment and analysis on land use planning as well as supports the implementation of the procedure on Water Use Monitoring (PWUM).

Periodic upgrades and new model of development established to provide a more comprehensive analytic toolbox for MRC, including time series and spatial analysis capability. A framework of indicators will also be developed more generally for MRC to routinely use in the analysis and assessment of results. The MRC toolbox will provide most of the technical support to BDP in the assessment and analysis of basin wide flow, sediment movement and water demand etc.

The analysis of climate change effects and their influence on water resources will overlay the entire basin-wide modelling work to provide an assessment of additional changes to be expected in the medium to long term. Downscaling of Global Climate Change scenarios and modelling of the hydrological consequences has already increased the knowledge and

awareness of climate change impacts on river flows and produced information about the combined effects of climate change and development. Assessment of climate vulnerability and the resilience of population to climate change are fundamental activities of the Climate Change Adaptation Initiative (CCAI) for which knowledge from the modelling team on the likely scale of changes is essential. Uncertainty of the global climate change modelling and downscaling methodologies will be a major challenge.

At a more general level, MRC can provide an overall assessment of the condition of the water and related resources of the Basin on a regular basis. These assessments would track trends over time and highlight the key drivers of change and approaches to address them. Opportunities to partner with other organizations in preparing such assessments can be explored.

2. Context and Rationale

2.1. Relevance

The MRC currently intends to move towards a new operational structure with a greater focus on sustaining the MRC through in-country activities. Accompanying this, it is expected that the MRC Secretariat (MRCS) will gradually shift from its current wide-ranging programme-based approach to a more focused organization built around core functions. The first MRC Summit which took place in Hua Hin, Thailand, in April 2010 recognizes that this will take some time and set a target of 2030 for the MRC to be financially sustained by the member countries.

Moreover, the MRC has agreed to adopt the approach of Integrated Water Resources Management (IWRM) in which it delivers the long term goals of alleviating poverty while protecting the environment. IWRM is a process that promotes the coordinated development and management of water, land and related resources, in order to maximize economic and social welfare in a balanced way without compromising the sustainability of vital ecosystems.

This approach has driven IKMP 2011-2015 into a broader context for its provision of knowledge-based products and services, supporting decision-making processes at national and regional levels. Modelling and assessment tools and real-time monitoring data provided by IKMP 2011-2015 will be primary inputs for scenario analysis and assessment that helps in basin planning and management. The MRC Information System (MRC-IS) developed by IKMP will be seen as a central platform to fulfilling the commitment to promoting the sustainable use of water and related resources in the basin. Together with a powerful IWRM-based analytical capacity, IKMP 2011-2015 will act as one of the focal points for promoting transboundary water resources management in the region.

In this next phase, IKMP will address the “the knowledge gaps” as follows:

At the basin level, the joint selection of “development opportunity space” for water and related resources development by MRC countries and their stakeholders has been adopted as a principle in M-IWRM project implementation. Monitoring the use of and making decisions on the development opportunity space will need further technical support frameworks such as modelling analysis results and river monitoring data (flow and sediment transportation, nutrition etc). IKMP 2011-2015 will play a critically important role in improving knowledge based and scientific indicators through the application and implementation of the MRC’s tools, river monitoring networks, PDIES, PWUM, MRC-Information System (IS) and the knowledge hub for Transboundary Water Resources Management (TWRM)¹. Moreover, the engagement of different stakeholders at basin level

¹ MRC has been designated as one of the networks of the Knowledge Hub under the Asia Pacific Water Forum

will be fostered through joint implemented activities and collaborations between IKMP and its stakeholders.

At the national level, there is still a need for capacity building and some technical assistance in terms of modelling and assessment; data quality control and integrated data collection; sustainable operation and maintenance of river monitoring stations; information generation and knowledge base management and implementation and dissemination of procedures and guidelines etc. Needs for strengthening the capacity of national line agencies in water resources management will give IKMP 2011-2015 the direction to move forward not only to provide services and capacity building to line agencies but also to transfer some tasks under IKMP to be implemented by line agencies. This approach will help strengthen the ownership of countries in taking their roles in joint management of the basin resources while MRC will play more a broader role in coordination in a long term plan.

At the programme level, IKMP will operate to meet the needs of other programmes in information and knowledge based products and services. Products and services from IKMP will support M-IWRMP and BDP in joint basin planning and management, FP in mapping fish production and migration, EP in environmental impact assessment, water quality monitoring and wetland management, FMMP in flood warning and forecast, and CCAI in scenario assessment and adaptation measures and etc. IKMP 2011-2015 will benefit NMCSs, line agencies and other programmes in different ways depending on their needs and gaps in information and knowledge.

2.2. Stakeholder and Target Beneficiaries

Implementation of IKMP 2011-2015 will engage a wide range of stakeholders who have different interests and will contribute to IKMP implementation with skills and resources. As it was designed in phase 1, the stakeholders of IKMP 2011-2015 are primarily NMCs, line agencies and MRC programmes. Meanwhile, secondary stakeholders include NGOs, private sectors, civil society and research and development institutes etc. A summary of key stakeholders is presented in Table 1.

Table 1: IKMP 2011-2015 stakeholders

Stakeholder	Interest	Role
NMCs and NMCSs	Fulfill their coordination functions in the context of programme implementation	Link and coordinate the IKMP with national line agencies
Line agencies with the mandates of water resources management in LMB	Knowledge management in line with national priorities and related to extreme events (flood, drought e.g.) Data quality control and assurance Development and application of assessment tools Responsibility for using of guidelines, data, products	Primary custodians for data provision Implementation of the MRC rules/procedures within the national context Implementation of national case studies/project Operation and maintenance of river monitoring networks Main users of the MRC modelling toolbox within national context

		Key partners in the Knowledge Hub
MRC programmes	Finalization and translation of MRC technical capability into practical applications in national and regional levels	Secondary custodians for data provision Coordination assistance to IKMP implementation
Development partners (Finland, AFD etc)	Sustainable development for poverty reduction Political stability	Programme funding and implementation
Other IKMP partners (NGOs, PS, CS, R&D etc)	Technical assessment and papers Sustainable development Data and information Assessment and learning tools	Awareness raising in knowledge management to community level Secondary application of IKMP products and tools Joint implementation of some IKMP activities

Target beneficiaries of the programme are described in Table 2.

Table 2: IKMP 2011-2015 target beneficiaries

Target Beneficiaries	Justification	Potential Benefits
Line agencies and national R&D institutions	Capacity building and technical capability strengthening for water and land management	Knowledge base products and services provided Tools recommended with capacity building provided Technical capability improved in information and knowledge management and implementing national activities/projects
NMCS	National commitment in coordination and linkage between MRC and national line agencies and decision makers	Coordination and management capability strengthened Roles in TWRM promoted within country
MRC programmes	Use of data, products and services provided by IKMP to deliver programme' outcomes	Quality assured data and modelling outputs Tools recommended and technical capacity building provided Other technical assistance when needed

National decision makers	Taking decision in planning and management based on technical supported and indicators provided	Policies and national activities are in line with natural trends as requirement for sustainable development
Other IKMP partners	Use of data, information and tools for different development purposes	Data, information and learning tools shared through MRC portal Other services under knowledge hub for TWRM

2.3. Cross Cutting Issues

Similar to its current phase, IKMP 2011-2015 is designed as a cross cutting programme in the MRC which allows IKMP to support other programmers, national line agencies and other partners through providing knowledge-based operational services and products. Especially, through its services, products and technical assistance to other programmes, IKMP 2011-2015 not only takes the lead in implementation of the first two river basin management functions but also contributes to the implementation of other functions. During its operation of this next phase, IKMP will try to ensure that the following cross cutting issues will be taken into account:

- Climate Change Adaptation and Mitigation: for implementation of joint study on drought mapping and impact assessment; down-scaling of climate change scenarios; and resilience to climate change of different sectors at basin wide level. Moreover, IKMP would also support FMMP in covering the areas of drought forecasting and AIP on studying mitigation measures etc
- Integrated Water Resources Management (IWRM): IKMP will continue to identify IWRM needs regarding appropriate tools at basin-wide and at national levels including transboundary perspectives. The development and regular updates of the MRC toolbox for IWRM are also main tasks of IKMP which will enable the capability of the MRC and national line agencies to apply new tools for planning at basin-wide (transboundary) and national levels. Moreover, the expansion, improvement and update of the use of quality-assured data; implementation of Water Use Monitoring procedures etc will also be priorities of IKMP's next phase.
- Integrated Capacity Building: IKMP will work closely with the Integrated Capacity Programme (ICBP) and other relevant programmers in order to ensure that the capacity building strategy of IKMP in MRC toolbox application and Data and Information System and Knowledge Management will be integrated into the MRC's capacity building programme and be in line with similar activities of other MRC programmes. In addition, IKMP will take the lead in delivering some technical trainings or hosting on the job trainings such as the Associate Modeller or Junior Riparian Professionals programmes.

2.4. Relationship to the MRC Strategic Plan

Since it was established in 2006, IKMP has significantly contributed to delivering the strategic goals of the MRC. As mentioned earlier, under the next Strategic Plan period (2011-15) which will soon be finalized, it is expected that MRC will progressively re-orient its operations around a set of core functions rather than the current programme approach. These core functions were endorsed by the MRC Joint Committee at its 29th meeting and

are focused around following categories (i) administrative and management function, (ii) river basin management function, (iii) capacity building and tools development function, and (iv) consulting and advisory services. In draft versions of the results chain for the MRC Strategic Plan 2011-2015, the IKMP can be found with a strong correlation to Specific Goal 2 – *“Operational basin-wide monitoring, impact assessment, modelling, forecasting and knowledge management system to support effective decision making”*. Moreover, the IKMP will also contribute indirectly to achieve four other specific goals through providing services and technical assistance to other MRC programmes.

Figure 1 describes in detail the relationship in which IKMP 2011-2015 directly and indirectly contribute to the MRC achieving the specific goals of Strategic Plan 2011-2015.

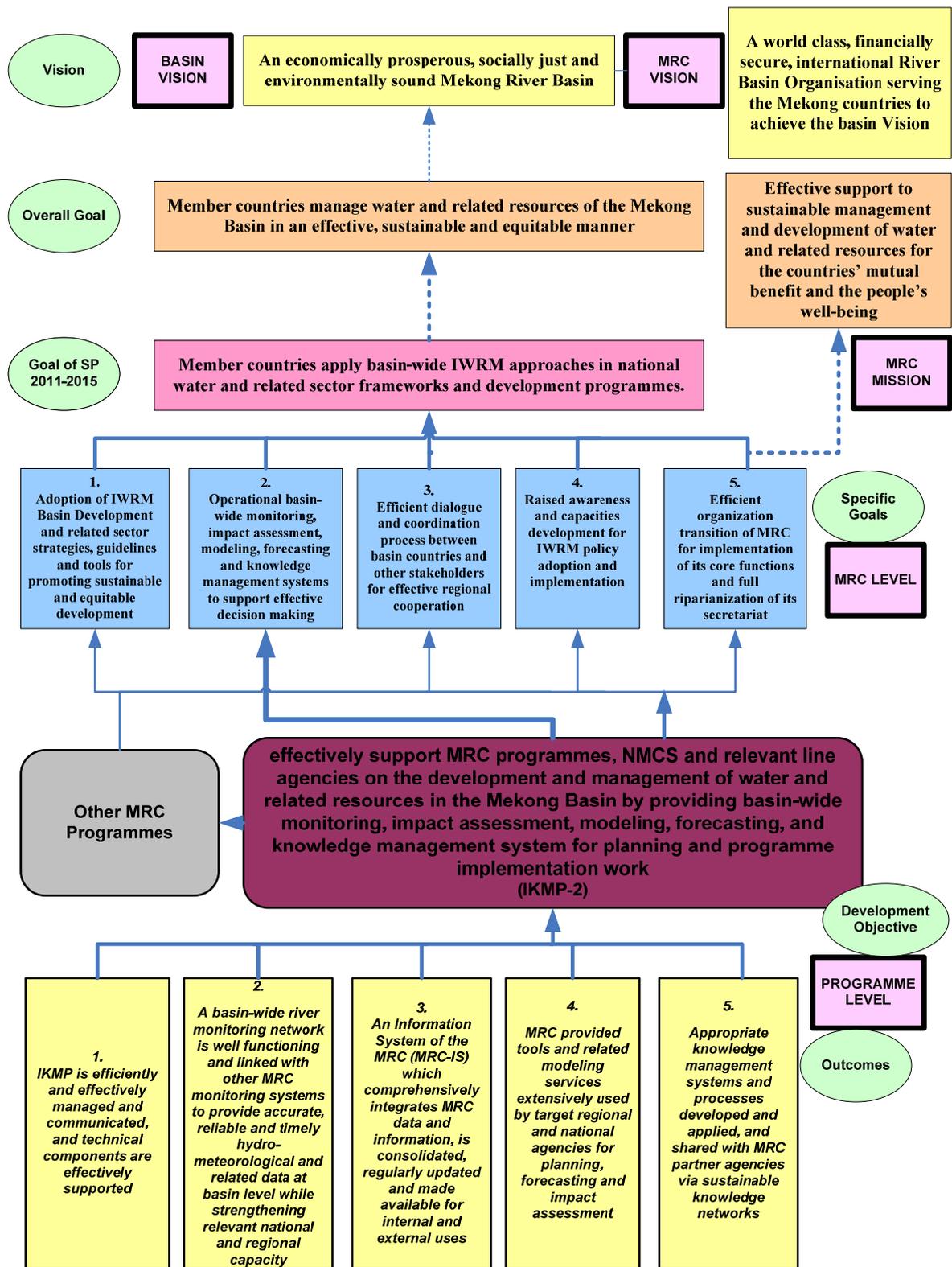


Figure 1: IKMP 2011-2015 in relation to the draft MRC Strategic Plan (2011-2015)

The recent Mid-term Review of the MRC Strategic Plan 2006-2010 recalls the need for a sector-wide planning approach and recommends the MRC to concentrate on its core river basin management functions. These MRC core river basin management functions are directly and indirectly relevant to the IKMP as they include seven broad categories as follows:

- (i) *Data acquisition, exchange and monitoring:* Article 5 of the 1995 Mekong Agreement calls for the development of the Procedures on Water Utilisation and Inter-basin Diversion. Relevant data on river flow, domestic and industrial water consumption and irrigation use are needed to monitor water utilisation in the river basin. In accordance with Article 6 and 7 of the 1995 Mekong Agreement, data acquisition, exchange and monitoring provide a transparent foundation for the maintenance of flows on the mainstream and mitigation of any harmful effects to the environment, especially on water quantity and quality, the aquatic conditions including fisheries resources and habitats, sedimentation, and ecological balance of the river system.
- (ii) *Analysis, modelling and assessment:* The assessment function is clearly described in the 1995 Agreement. Article 2 and 30 of the 1995 Agreement provide the mandate for MRC to apply analysis, modelling and assessment tools to investigate future development scenarios, strategic planning processes and the sustainable management of the basin's water resources. Given that the national modelling capacity has been strengthened, and the sector and sub-basin modelling activities are believed to be designated under responsible national institutions, modelling functions would be the first to be gradually transferred to national institutions. Under that scenario, MRC will still retain some modelling capacity, particularly basin-wide modelling, to oversee and support national efforts for the foreseeable future.
- (iii) *Planning support:* Article 2 of the 1995 Mekong Agreement calls for the formulation of a Basin Development Plan (BDP). This mandate is unique to the MRC with no other regional organisation undertaking development planning at this scale and across such a wide range of sectors. Its key objective is to identify the economic, environmental and social implications of on-going and proposed developments in the Basin, alternative options to national plans, and build shared views and directions for the sustainable development of the Basin's water and related resources. The information generated should then guide national planning and design of projects, and assist in identifying beneficial basin-wide projects and programmes.
- (iv) *Forecasting, warning and emergency responses:* The forecasting of any possible impacts of incidents, both naturally occurred and human-induced, that would have trans-boundary consequences is largely considered a required function of the MRC. This includes flood forecasting and drought impact forecasting, and mitigation plans for projected impacts caused by flood and drought incidents, as well as plans for emergency responses to pollution incidents especially the risk of oil spills and the hazards associated with the transport of dangerous goods, and activities related to least available depth forecasting for shipping. Forecasting activities to date have focused mainly on the short and medium term regional flood forecasts. Future activities are being explored in flash flood forecasting, drought forecasting and contingency planning for pollution incidents. Addressing emergency situations is covered in Article 10 of the 1995 Mekong Agreement.
- (v) *Implementing MRC Procedures:* implementation of MRC Procedures function is very unique and specific to the Mekong River Commission and the Mekong River Basin. In accordance with Article 5 - Reasonable and Equitable Utilisation - of the 1995 Agreement, five Procedures have been developed to implement various Articles of the 1995 Agreement. The MRC as the administrative and technical arm of the Member Countries are well placed to provide coordinated support to the Member Countries to develop and implement the approved Procedures that form the basis of the long-term cooperation of the Mekong countries for reasonable and equitable utilisation of the Mekong including inter-basin diversions, for maintenance of flow on the mainstream and water quality, and for the protection of the environment and ecological balance of the Basin. The implementation of MRC

Procedures is prerequisite for basin planning and overall cooperation between and amongst Member Countries.

- (vi) *Promoting dialogue and coordination*: Dialogue on a range of trans-boundary and regional issues is fundamental to many of the provisions of the 1995 Mekong Agreement under the broad areas outlined in Article 1, for the BDP under Article 2, for prevention of harmful effects under Article 7 as well as for coordination and addressing differences and disputes under Article 18 and 24 explaining the functions of the Council and Joint Committee. The 1995 Mekong Agreement also refers to resolutions and negotiations and the role of the MRC as facilitator. Article 9 encourages the Commission to use freedom of navigation as a tool to promote regional cooperation and economic development. The MRC is a dialogue platform amongst Member Countries for coordinated cooperation and conflict prevention on trans-boundary water issues, between Member Countries and a wide range of stakeholders through multi-stakeholder consultations on regional activities, promoting the application of the IWRM principles among private sector developers and the wider public. In line with the 1995 Mekong Agreement, the MRC also facilitates the development and implementation of legal frameworks for cross-border navigation, networks on water and related resources management, and supports initiatives to harmonise national standards and regulations of waterborne transport safety, environmental assessment, IWRM implementation guidelines, etc.
- (vii) *Reporting and dissemination*: Implementation of the 1995 Mekong Agreement requires data and knowledge to inform decision-making processes. Under Article 30, the MRC Secretariat needs to maintain databases and conduct studies and assessments as required in order to obtain needed data and information. Reporting and dissemination of knowledge is essential to inform decision-making. Dissemination of information will increase in the future and become more publically available in line with MRC's Communications and Disclosure Policy. This function is particularly essential for the MRC as a regional knowledge hub for trans-boundary water resources management, which Member Countries aspire it to be.

The role of IKMP during 2011-2015 will undoubtedly evolve but is expected to be central to the first two river basin management core functions. Moreover, the MRC has agreed to adopt the approach of Integrated Water Resources Management (IWRM) in which it delivers the long-term goals of alleviating poverty while protecting the environment. IKMP 2011-2015 will be set up and operated in ways that follows the concepts and principles of IWRM.

In principle, to directly perform the first two river basin management core functions while contributing to other functions of the MRC, a MRC toolbox that covers different assessment and analysis tools must be developed and established in which they are strongly connected with the MRC Information System and River Monitoring Network. A model of operation of IKMP 2011-2015 could be described in figure 2.

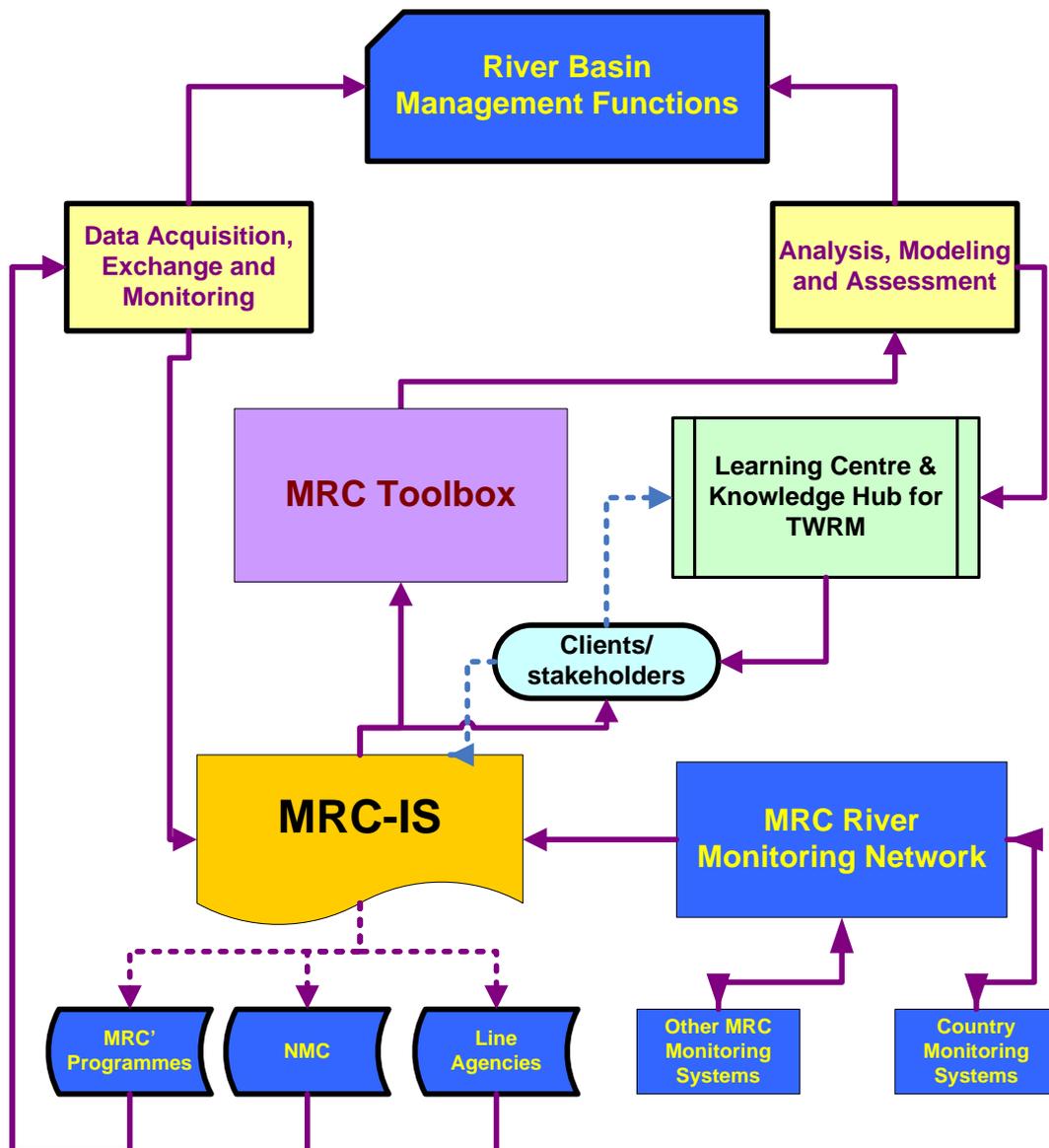


Figure 2: Operational Model of IKMP 2011-2015

2.5. Regional and National Priority

Regional priorities of IKMP would include the following

- Support the implementation of the IWRM-based Basin Development Strategy; the Preliminary Design Guidance for Mainstream Dams; and other strategic guidelines
- Technical assistance to effectively manage the risks from flood, drought and other natural hazards that occur more often due to the impacts of climate change
- Take measures to improve river monitoring network in mainstream and tributaries and analysis of hydrological condition, particularly extreme events.
- Improve the implementation of the Procedure for Data and Information Exchange and Sharing, the Procedure for Water Use Monitoring and provide technical support to implement other signed procedures (PMFM, PNPCA, etc).

- Consolidate channels for information and knowledge on Transboundary Water Resources Management (TWRM) at regional and international levels. Act as a hub for TWRM in the region.
- Develop the MRC toolbox that includes a wide range of modelling software (e.g. SWAT, URBS and VMOD, IQQM and HEC Resim, ISIS and Mike 11 and DMS tools). Assessment/analysis will put a greater emphasis on sediment movement, geomorphology/bank erosion, water quality, temperature and environmental modelling. The toolbox will serve not only modelling needs, but could also serve as an access and distribution channel to other developments that may be defined by programmes/countries.
- Implement capacity building both in MRCS and in national line agencies which consider four main components including (i) Legal, regulatory and procedural development – to enable organizations to effectively and sustainably address development issues in a transparent and accepted manner; (ii) Institutional development – organizational structures that enable staff competencies to be effectively and efficiently leveraged; (iii) Human resources development – development of necessary competencies among staff to be able to effectively address development challenges; and (iv) Technology development – development of knowledge management systems, databases, and analytical processes and tools to supplement and enable acquired competencies to be effectively deployed.

Selection of national priorities is based on the needs of member countries in strengthening capability in river monitoring, flood and drought forecasts, and transboundary planning etc. It will vary from provisions of quality assured spatial and time series data for analysis and assessments to technical assistance for national project implementation. Issues of “knowledge gaps” among member countries will be taken into consideration for selecting the national priorities in IKMP 2011-2015.

3. Objective and Programme Design

3.1. Programme Objective

The development objective of the Information and Knowledge Management Programme 2011-2015 is to **“effectively support MRC programmes, NMCS and relevant line agencies on the development and management of water and related resources in the Mekong Basin by providing basin-wide monitoring, impact assessment, modelling, forecasting, and knowledge management system for planning and programme implementation work”**

3.2. Expected Outcomes

The IKMP 2011-2015 will achieve its development objective through delivering outcomes and outputs as follows:

Outcome 1: IKMP is efficiently and effectively managed and communicated, and technical components are effectively supported

Output 1.1: IKM programme implementation plans and annual work-plan achieved

Output 1.2: Programme fully staffed and staff development plans achieved

Output 1.3: Programme approach, plans and results effectively communicated to stakeholders

Output 1.4: The perceptions and needs of programme clients, in relation to the programme, regularly assessed

Outcome 2: *A basin-wide river monitoring network is well functioning and linked with other MRC monitoring systems to provide accurate, reliable and timely hydro-meteorological and related data at basin level while strengthening relevant national and regional capacity*

Output 2.1: An appropriate and effective hydro-meteorological network covering mainstream and tributary boundaries upgraded and strengthened.

Output 2.2: A system for acquiring real-time hydro-meteorological data (discharge/water level, rainfall) for flood monitoring and forecast in place and regularly upgraded

Output 2.3: A network and database for sediment monitoring (mapping and analysis etc) developed and implemented

Output 2.4: Drought management studies and ground water monitoring in place to provide data and information for monitoring and forecasting water use

Output 2.5: The MRC's programmes and national project adequately and timely supported with the required hydro-meteorological and related data

Output 2.6: Critical hydrological situations in the basin monitored and explained in a timely manner

Output 2.7: Procedures on Water Use Monitoring effectively implemented in cooperation with NMCS and national line agencies

Output 2.8: Capacity related to the operation and maintenance of the system in a long run effectively built up

Outcome 3: *An Information System of the MRC (MRC-IS) which comprehensively integrates MRC data and information, is consolidated, regularly updated and made available for internal and external uses*

Output 3.1: Data storage system and IT infrastructure at MRCS and NMCS improved

Output 3.2: Manuals of standards and guidelines for data and information management and systems developed and made available for uses

Output 3.3: Quality control and correction of important datasets at MRCS and NMCS in place

Output 3.4: Data integration, content management and Metadata management system further developed in the Master Catalogue

Output 3.5: An up-to-date MRC database maintained and made available to other MRC programs, NMCSs and national line agencies

Output 3.6: National Information Systems (NIS) at NMCS and Line Agencies implemented

Output 3.7: The operation and maintenance of the National Information System successfully transferred to Line Agencies

Output 3.8: The Procedures on Data, Information Exchange and Sharing (PDIES) successfully implemented

Outcome 4: MRC provided tools and related modelling services extensively used by target regional and national agencies for planning, forecasting and impact assessment

Output 4.1: The MRC Toolbox continuously developed, improved and widely used by other MRC programmes, NMCS and national line agencies.

Output 4.2: Strategic studies at basin, national and transboundary levels supported with effective modelling services

Output 4.3: Capacity building for MRC and national line agencies in analysis, modelling and assessment, designed and implemented under Integrated Water Resources Management (IWRM) principles

Outcome 5: Appropriate knowledge management systems and processes developed and applied, and shared with MRC partner agencies via sustainable knowledge networks

Output 5.1: the MRC portal successfully operated, regularly maintained and updated, act as an access point for information and data exchange and sharing²

Output 5.2: Mekong Info upgraded, operated and maintained to be a focal point for information about the Mekong River³

Output 5.3: Virtual Mekong Basin developed and maintained for understanding the main balances of river parameters of flow, sediment, nutrition etc

Output 5.4: a Learning Centre established for having learning tools covering areas of the MRC operation⁴

Output 5.5: Knowledge Hub for Transboundary Water Resources Management established for sharing tools, best practices and other knowledge on TWRM with partners and clients

Output 5.6: Partnership with relevant institutions established and strengthened

4. Implementation and Management

4.1. Management Structure

Under the Technical Support Division (TSD), IKMP 2011-2015 is established with five key components based on its delivered products and services. The description of each component of IKMP is presented in table 3:

Table 3: Key components of IKMP 2011-2015

² The MRCS Portal is the access point for data, information and services provided by MRCS via the Internet. It provides access to quality assured datasets, Atlases, model setup, model results, Google Earth overview, map services etc. A Portal is a World Wide Web site whose purpose is to be a major starting point for users when they connect to the Web.

³ MekongInfo is a catalogue of Information about the Mekong River Basin provided by different sources. MekongInfo is accessible via the MRCS portal. A catalogue is a list of articles arranged methodically, i.e. in alphabetical order.

⁴ The MRCS Learning Centre provides access to electronic learning tools related to issues about the Mekong River Basin. This can be via interactive CDs, animation, visualization and videos of events. The Portal provides access to data and Information. A web-based Learning Centre provides educational tools and facilitates learning through interactivity, self-paced study, easy access and distance learning.

Component	Title	Key Position	Primary Responsibility
1	Programme Management	<ul style="list-style-type: none"> - Programme Coordinator - Chief Technical Advisor⁵ 	<ul style="list-style-type: none"> - Overall programme management - Technical Assistance to components
2	River Monitoring	<ul style="list-style-type: none"> - Head of Hydro Team cum Hydrologist - Senior Hydrological Advisor - Operational Hydrologist - Sediment monitoring Specialist 	Maintenance and upgrades of river monitoring network; provision of hydro-met and related data; Coordination with other monitoring system
3	MRC Information System	<ul style="list-style-type: none"> - Head of Information System cum Database Manager - GIS and Remote Sensing Specialist 	Maintenance and updates of information system, provision of spatial and time series data/services
4	Modelling and Assessment	<ul style="list-style-type: none"> - Head of Modelling Team - Senior Modelling Advisor - 04 Modellers 	Improvement of MRC toolbox; provision of services on modelling and impact assessment; capacity building on modelling
5	Learning Centre and Knowledge Hub for TWRM ⁶	<ul style="list-style-type: none"> - Component cum Knowledge Hub Manager - Communication Assistant⁷ 	Knowledge sharing on TWRM; information exchange and dissemination

Positions⁸ of each component with management structure of IKMP 2011-2015 are proposed and described in more detail in figure 3.

⁵ CTA has the roles in providing advisory and technical supports to the programme management

⁶ The Knowledge Hub was established under MRCS level. However, it is directly managed by IKMP

⁷ Communication Assistant tasks are focusing on knowledge and information sharing on TWRM. This position will work closely with Communication Officer under ICCS.

⁸ Some key positions will be continuously transferred from phase 1. Funding for key positions in the next phase will come from several sources including the Operational Expense Budget (OEB) and donor funding budget etc.

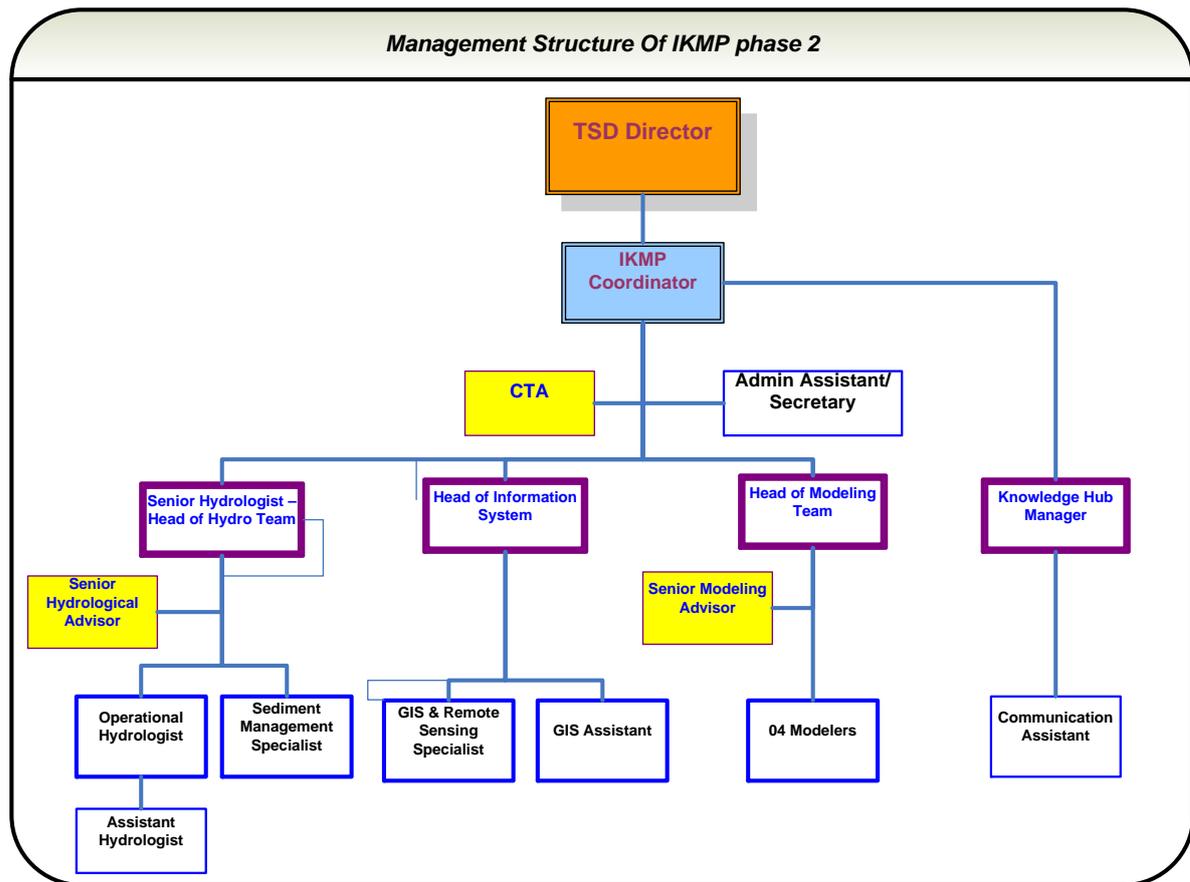


Figure 3: Management Structure of IKMP 2011-2015

4.2. Implementation Arrangements

The IKMP 2011-2015 as described is intended to run over a five year period. However, as the programme specifically addresses longer-term goals such as capacity development, sustainability and institution building it will continue for a longer period.

A number of activities and projects which are ongoing from IKMP phase 1, will continue and will be integrated into the second phase of IKMP; these include the GIS and database systems, discharge and sediment monitoring networks, modelling toolbox and its services and MRC portal etc.

4.2.1. Coordination and Engagement

IKMP 2011-2015 will be implemented under coordination support and supervision from the following mechanism (bodies):

- **Steering Committee (SC):** The functions of the Steering Committee are to monitor IKMP activities, guide IKMP development, give advice, link IKMP to the political level and facilitate information exchange between the IKMP, NMCs, line agencies and donors. Committee members include the donor representatives, country representatives including the Director General or Secretary General Level of NMCSs and the IKMP National Coordinators, IKMP Programme Coordinator and CTA. The Committee will meet twice each year. Involvement of line agencies in the SC will be strengthened as part of the process of closer linkages with line agencies in the delivery of MRC core functions

- **MRC Information and Knowledge Management Technical Assistance and Coordination Team (TACT):** The IKM TACT, a MRC-level technical advisory body, will act as the regional management committee and will provide coordination on all matters relevant to the implementation of the IKM which need regional consensus and require conversion to national action. The IKM TACT will be composed of NMC and MRCS members. The MRCS members include the Director of TSD, the IKMP Programme Coordinator, and the Chief Technical Advisor of the IKMP. NMC members include the IKMP National Coordinators and relevant line agency representatives.
- **Programme Coordination Committee (PCC):** The PCC provides guidance to ensure smooth implementation of IKMP activities with a focus on management issues. The IKMP PCC includes the IKMP Programme Coordinator, CTA, and Representatives from national IKMP units including National IKMP Coordinators. The IKMP PCC meetings shall be convened biannually (every six months) in between Steering Committee meeting; preferably at MRCS.
- **National IKMP Unit:** The National Unit will be responsible for the national implementation of IKMP. The National IKMP Unit is headed by the national IKMP coordinator and consists of staff of the NMCS and line agencies working on IKMP related activities.
- **External Linkages:** The relationship between the IKMP and the NMCs and line agencies is necessarily very close as all activities will involve working with the national counterparts so that capacity is built throughout the programme and they are able to gain advantage from the investment in IKMP.

An overview of implementation arrangements of IKMP 2011-2015 is shown in figure 4

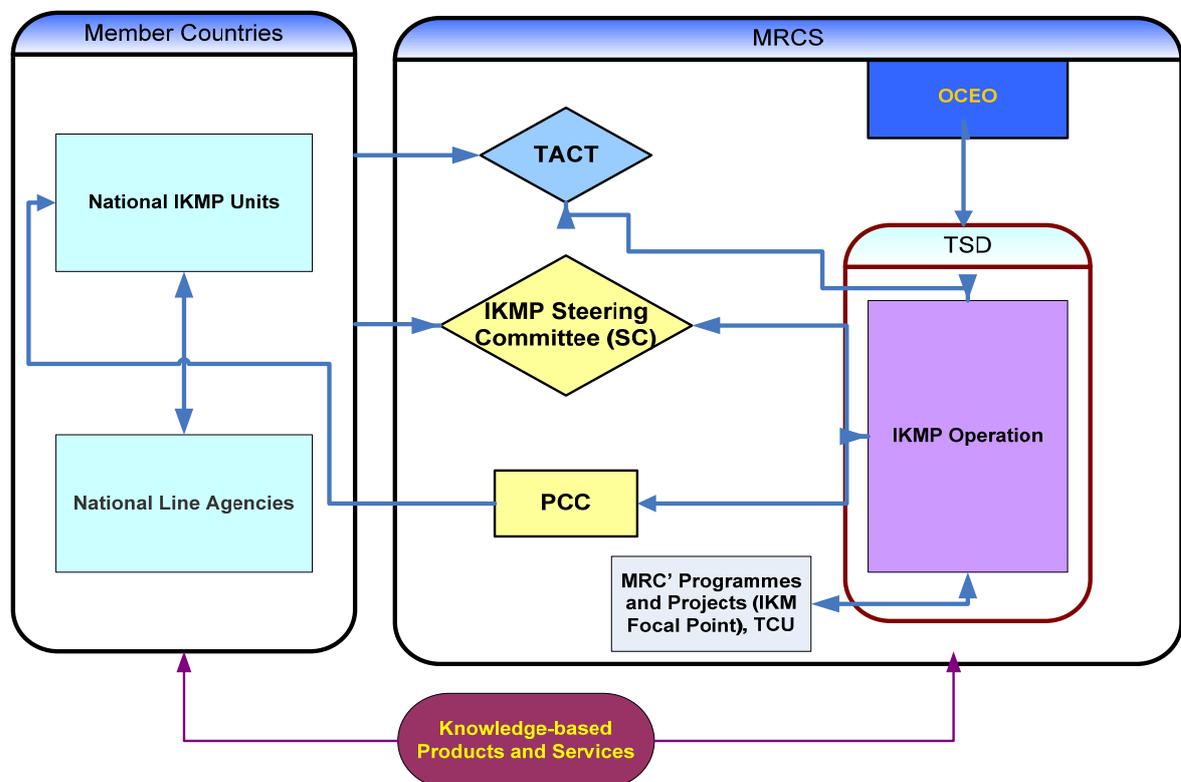


Figure 4: Implementation arrangements of IKMP 2011-2015

Terms of Reference (TORs) for each coordination and supervision mechanism are developed and are presented in annex 4 of this document.

4.2.2. Planning, Monitoring and Reporting

IKMP will produce the following planning documents:

- Inception report with Programme Implementation Plan; and
- Annual Work Plans

Result-based monitoring and Performance Management System (PMS) currently developed and adopted by the MRC will be applied to monitor the progress and impact of the implementation of IKMP 2011-2015. Findings from monitoring work will be documented in IKMP progress reports including:

- Quarterly progress reports: at component level
- Bi-annual progress reports: at programme level
- Annual progress reports: at programme level
- Technical and situation reports: at the MRC level

Basically, the performance monitoring of IKMP 2011-2015 will be conducted through the following mechanisms:

- (i) **Performance management data collection and analysis process:** a set of all result indicators and monitoring questions will be developed and recorded in the Data Monitoring and Management Plan (DMMP). The programme will regularly conduct the data collection for monitoring purpose every six months through the selection of an appropriate method for data and information collection.
- (ii) **Six monthly performance management reviews:** for every six month, base on the results from data and information collection, the programme will conduct a performance management review in order to assess the relevance, results achieved, efficiency of implementation management, and lessons learnt or recommendations for improving the performance and evidence of the implementation of those recommendations. The performance management review is conducted with respect to the principles of transparency, stakeholder participation and contestability with subsequent sharing of the resulting reports with those involved. In addition, the results of the performance management review will be communicated via the use of a common MRC-wide reporting format and all performance information will be recorded on the MRC PMS database.
- (iii) **Mid-term Independent Review:** After three years of operation, IKMP will conduct a Mid-term Review (MTR) that involves a greater degree of independence of the review team (it is expected to be recruited by IKMP Development Partners). The MTR will look deeper into evidence of results and impacts and through it, draw out broader lessons learnt for strategy, policy, and future programme development and implementation.
- (iv) **Final Independent Evaluation:** This independent evaluation is expected to be conducted at close to completion of the IKMP phase 2. This evaluation will seek to find evidence of not only the relevance, effectiveness, sustainability and efficiency

of the programme, but also evidence of impacts and advocacy. Lessons learnt and recommendations from this evaluation will be essential inputs for improvement or development of the programme in the future. All significant results arising from the final independent evaluation will be recorded in the MRC PMS database. The executive summary of this document will be made publicly available through the MRC website.

- (v) **Six monthly performance management reporting:** IKMP will periodically produce bi-annual performance management reports (at mid-year and year-end) based on the results of the performance management review and MTR (if available). These reports will address relevance, effectiveness, sustainability and efficiency of programme management and recommendation for performance improvement. Such report will be separate from progress reports on activity implementation and budget expenditure. The performance management reports will be produced for internal MRC use only and will comply with the system's principles of transparency, contestability, stakeholder participation, external accountability and enabling of organizational learning. An Executive Summary version will be produced for communicating to external stakeholders and a public report will be produced annually explaining the contribution of programmes to the achievement of the goals of the MRC's Strategic Plan.

- (vi) **Performance management database:** one centralized performance management database will be established to ensure the systematic storing, managing and retrieval of performance management information of the programme. It is supposed to be designed as a simple system with adjustment from time to time based on the needs of the programme. All performance management documents will be made available to internal users or publics through MRC website and MRC intranet.

5. Annexes

Annex 1: Budget estimation for IKMP 2011-2015

Inputs	Budget Estimates (Euro)					Budget Allocation (Euro)		
	2011	2012	2013	2014	2015	Finland	France	Others
I. Programme Management						1,141,000		
Riparian Staff	43,000	43,000	43,000	43,000	43,000	215,000		
CTA ⁹	74,000	74,000	-	-	-	148,000		
General Support Staff (2)	12,000	12,000	12,000	12,000	12,000	60,000		
Consultants	31,000	31,000	31,000	25,000	25,000	143,000		
National IKMP Unit Staff	75,000	75,000	75,000	75,000	75,000	375,000		
Meeting/Workshop	30,000	30,000	30,000	30,000	30,000	150,000		
Travel	10,000	10,000	10,000	10,000	10,000	50,000		
II. River Monitoring Network	-	-	-	-	-	1,273,000		
Riparian Staff	43,000	43,000	43,000	43,000	43,000	215,000		
Senior Hydrological Advisor	123,000	123,000	-	-	-		246,000	

⁹ To be riparian from January 2013

Inputs	Budget Estimates (Euro)					Budget Allocation (Euro)		
	2011	2012	2013	2014	2015	Finland	France	Others
Hydro-met Monitoring Network	154,000	154,000	154,000	154,000	154,000	300,000	470,000	
Sediment Monitoring Network	77,000	77,000	77,000	38,000	38,000	153,000	154,000	
Ground Water Monitoring	154,000	154,000	77,000	77,000	38,000	180,000		320,000
National Activities/Projects	38,000	38,000	38,000	38,000	38,000	190,000		
Meeting/Workshop/Training	31,000	31,000	31,000	31,000	31,000	155,000		
Travel	16,000	16,000	16,000	16,000	16,000	80,000		
III. MRC-IS						1,186,000		
Riparian Staff	25,000	25,000	32,000	25,000	25,000	132,000		
Consultants	31,000	31,000	19,000	12,000		93,000		
Project Expenses (contract, equipment, software etc)	77,000	77,000	62,000	62,000	38,000	316,000		
Generation of Digital Terrain Model (DTM) ¹⁰	310,000	620,000	620,000	620,000				2,170,000
National Activities	92,000	92,000	92,000	92,000	92,000	460,000		
Meeting/Workshop	31,000	31,000	31,000	31,000	31,000	155,000		

¹⁰ Summary of benefit from generating DTM for the floodplain areas can be found in annex 6 of this document.

Inputs	Budget Estimates (Euro)					Budget Allocation (Euro)		
	2011	2012	2013	2014	2015	Finland	France	Others
Travel	6,000	6,000	6,000	6,000	6,000	30,000		
IV. MRC Toolbox						2,921,000		
Riparian Staff	115,000	115,000	115,000	115,000	115,000	575,000		
Senior Modelling Advisor	Ongoing support from Finland							
Finalization and Updates of Toolbox	250,000	185,000	62,000	62,000	62,000	621,000		
Development of new 2D Models	60,000	60,000	60,000			180,000		
On the job training for the modellers	60,000	60,000	60,000	60,000	60,000	300,000		
National Activities/Projects	124,000	124,000	124,000	124,000	124,000	620,000		
Capacity Building Programme	100,000	100,000	70,000	70,000	60,000	400,000		
Meeting/Workshop	30,000	30,000	30,000	30,000	30,000	150,000		
Travel	15,000	15,000	15,000	15,000	15,000	75,000		
V. Learning Centre and Knowledge Hub						585,000		
Riparian Staff	45,000	45,000	45,000	45,000	45,000	225,000		
Consultants		30,000	30,000	30,000		100,000		

Inputs	Budget Estimates (Euro)					Budget Allocation (Euro)		
	2011	2012	2013	2014	2015	Finland	France	Others
	30,000				30,000			50,000
MRC Portal and Mekong Info maintenance and Upgrades	62,000	62,000	31,000	31,000	31,000			217,000
Upgrades of Virtual Mekong Basin	12,000	12,000	12,000	12,000	12,000	60,000		
Operation of Learning Centre and Knowledge Hub	120,000	60,000	60,000	60,000	60,000			360,000
Meeting/Workshop/Training	40,000	30,000	30,000	30,000	30,000	160,000		
Travel	8,000	8,000	8,000	8,000	8,000	40,000		
Total	2,554,000	2,729,000	2,448,000	2,169,000	1,464,000	7,106,000	870,000	3,117,000
Total Budget Needed for IKMP 2011-2015	11,093,000							

Total budget needed for IKMP 2011-2015: Euro 11,093,000, in which:

Finland expected funding: Euro 7,106,000

France committed and expected funding: Euro 870,000

Funding gap (expected to be mobilized from other sources): Euro 3,117,000

Annex 2: Logical Framework for IKMP 2011-2015

Result	Indicator	Source of Data	Risk
Development Objective			
<i>Effectively support MRC programmes, NMCS and relevant line agencies on the development and management of water and related resources in Mekong Basin by providing accurate and timely data, information and knowledge for planning and programme implementation work</i>	Quantity, quality and timeliness of data and information used by national institutions and MRC programmes	Master Catalogue monitoring. Results of quality control monitoring of material supplied.	
Expected Outcomes			
1. IKMP is efficiently and effectively managed and communicated, and technical components are effectively supported.	1.1) Percentage of planned outputs produced to expected standard.	1.1.1 Programme Progress Reports.	
		1.1.2 Programme annual reviews	
	1.2) Annual work-plan implementation rates.	1.2.1 Programme Progress Reports	
	1.3) Percentage of staff positions occupied	1.3.1 Programme Progress Reports	
	1.4) Average level of satisfaction of staff with programme management.	1.4.1 MRC staff survey	
	1.5) Percentage of sampled MRC stakeholders aware of programme approach, progress and results.	1.5.1 MRC Stakeholder Survey	
2. A basin-wide river monitoring network is well functioning and linked with other MRC monitoring systems to provide accurate and reliable timely hydro-meteorological and related data at basin level while strengthening relevant national and regional capacity.	2.1) Extent to which relevant agencies use monitoring data on a) water-use, b) hydrometeorology, and c) sedimentation	2.1.1 MRC Portal Monitoring Reports	
		2.1.2 Assessment of target/client agencies' responses to IKMP products and services.	
	2.2) Extent to which relevant agencies contribute to sustainability of the monitoring systems for a) water-use, b) hydrometeorology, and c) sedimentation.	2.2.1 Master Catalogue Monitoring	
	2.3) Percentage of annual operating costs of monitoring systems financed by MRC (for a) water-use, b)	2.3.1 Data monitoring system status reports	

Result	Indicator	Source of Data	Risk
	hydrometeorology, and c) sedimentation).		
3. An Information System of the MRC (MRC-IS) which comprehensively integrates MRC data and information, is consolidated, regularly updated and made available for internal and external uses	3.1) Number of agencies using MRC (IKMP) developed/facilitated data and information.	3.1.1 Master Catalogue	
		3.1.2 Assessment of target/client agencies' responses to IKMP products and services.	
	3.2) Target agencies perceived adequacy (Qty, timeliness, accessibility and utility) of MRC-developed databases and GIS maps/datasets.	3.2.1 Master Catalogue	
		3.2.2 Assessment of target/client agencies' responses to IKMP products and services.	
	3.3) Number of requests from national agencies for MRC (IKMP) data and information.	3.3.1 Monitoring of MRC partner/client product and services demand.	
3.3.2 Master Catalogue			
3.4) Level of contribution of agencies to the further development and dissemination of MRC (IKMP) facilitated data and information.	3.4.1 Assessment of target/client agencies' responses to IKMP products and services.		
4. MRC provided tools and related modelling services extensively used by target regional and national agencies for planning, forecasting and impact assessment	4.1) Number of agencies using MRC developed/facilitated tools and modelling services (by type of use – planning, forecasting, impact assessment).	4.1.1 Master Catalogue	
		4.1.2 Assessment of target/client agencies' responses to IKMP products and services.	
	4.2) Target agencies perceived adequacy (quality, timeliness, accessibility and utility) of MRC-facilitated tools and modelling services.	4.2.1 Master Catalogue	
		4.2.2 Assessment of target/client agencies' responses to IKMP products and services.	
5. Appropriate knowledge management systems and processes developed and applied, and shared to MRC partner agencies via sustainable knowledge networks	5.1 Number and percentage of partner agencies involving in Knowledge Management systems, mechanisms or processes.	5.1.1 Partner agency Knowledge Management self-assessment.	
	5.2) Number of active members (individuals and organizations) of supported networks.	5.2.1 and 5.2.2 Networks Monitoring Report	
	5.3) Perceptions of network members of utility and sustainability of networks.		

Result	Indicator	Source of Data	Risk
	5.4) Quantity of significant knowledge products generated by networks.	5.4.1 Networks on-line survey.	
		5.4.2 Group interviews with network members	
Outputs			
1. IKMP is efficiently and effectively managed and communicated, and technical components are effectively supported.			
1.1 Programme implementation plans and annual work-plans are achieved.	<ul style="list-style-type: none"> Number and percentage of targeted outputs and sub-outputs achieved. Annual budget execution rate 	<ul style="list-style-type: none"> Annual Programme Activity Report Annual Programme Performance Review 	
1.2 Programme is fully staffed and staff development plans achieved.	<ul style="list-style-type: none"> Percentage of established programme positions which are filled. Percentage of programme staff indicating satisfaction with programme management and working environment. 	<ul style="list-style-type: none"> Annual Programme Results Report. Annual Programme Performance Review MRC staff survey 	
1.3 Programme approach, plans and results are effectively communicated to stakeholders	<ul style="list-style-type: none"> Percentage of sampled programme stakeholders aware of programme approach, progress and results. 	<ul style="list-style-type: none"> MRC Stakeholder Survey 	
1.4 The perceptions and needs of programme clients - in relation to the programme - are regularly assessed.	<ul style="list-style-type: none"> No. of client perceptions and needs assessments conducted. 	<ul style="list-style-type: none"> Annual Programme Activity Report 	
2. A basin-wide river monitoring network is well functioning and linked with other MRC monitoring systems to provide accurate and reliable timely hydro-meteorological and related data at basin level while strengthening national and regional capacity relevantly.			
2.1. An appropriate and effective hydro-meteorological network covering mainstream and tributary boundaries upgraded and strengthened.	<ul style="list-style-type: none"> Number of monitoring stations which are operational. Percentage of total annual operating costs of system covered by MRC. Average station data output rate (number of data updates received as percentage of number expected) 	<ul style="list-style-type: none"> Component progress reports Annual Programme Performance Review 	
2.2. A system for acquiring real-time hydro-meteorological data (discharge/water level, rainfall) for flood monitoring and forecast in place and	<ul style="list-style-type: none"> Percentage of archived data updated and quality assured Number of data used by FMMP and other programmes 	<ul style="list-style-type: none"> Network management record Other programme reports FMMP bulletins Annual Programme 	

Result	Indicator	Source of Data	Risk
regularly upgraded		Performance Review	
2.3. A network and database for sediment monitoring developed and implemented	<ul style="list-style-type: none"> Number of station covering sediment measurement Number of programmes and LA used sediment data and analysis results 	<ul style="list-style-type: none"> Bi-annual Sediment Monitoring report List of data request on sediment 	
2.4. Ground water monitoring in place to provide data and information for monitoring and forecast of water use	<ul style="list-style-type: none"> Number of product published on Ground Water analysis Ground water database available 	<ul style="list-style-type: none"> IKMP technical reports Statistical report of users on ground water database 	
2.5. The MRC's programmes and national project adequately and time supported with the required hydro-meteorological and related data	<ul style="list-style-type: none"> Number of services and products made available to clients. Percentage of sampled targeted client agency staff reporting having used hydro-meteorological data services and products in previous year. Percentage of sampled services and product-using clients assessing services and products as satisfactory or better. 	<ul style="list-style-type: none"> Component progress reports Assessment of target/client agencies' responses to IKMP products and services. 	
2.6. Critical hydrological situations monitored and explained	<ul style="list-style-type: none"> Number of technical report on hydrological situation Number of technical seminar on extreme events organized 	<ul style="list-style-type: none"> JC record MRC Website Progress report MRT 	
2.7. Procedures on Water Use Monitoring effectively implemented in cooperation with NMCS and national line agencies	<ul style="list-style-type: none"> Procedures implemented 	<ul style="list-style-type: none"> Report 	
2.8. Capacity related to operating and maintenance of the system in a long run effectively built up	<ul style="list-style-type: none"> Number of training, workshop including national staff involved SOP manuals available 	<ul style="list-style-type: none"> Capacity building report Annual programme performance review 	
3. An Information System of the MRC (MRC-IS) which comprehensively integrates MRC data and information is consolidated, regularly updated and made available for internal and external uses			
3.1. Data storage system and IT infrastructure at MRCS and NMCS improved	<ul style="list-style-type: none"> Number and type of datasets accessible using GIS Percentage of sampled targeted client agency staff 	<ul style="list-style-type: none"> Component progress reports Annual Programme Performance Review 	

Result	Indicator	Source of Data	Risk
	reporting having used MRC geospatial data and information in previous year.	<ul style="list-style-type: none"> Assessment of target/client agencies' responses to IKMP products and services. 	
3.2. Manuals of standards and guidelines for data and information management and systems developed and made available for uses	<ul style="list-style-type: none"> Number of Manuals accepted by TACT Number of Manuals available in the MRC-IS Number of users download the manuals 	<ul style="list-style-type: none"> Annual review of Master Catalogue Statistical report of the MRC Portal 	
3.3. Quality control and correction of all datasets at MRCS and NMCS in place	<ul style="list-style-type: none"> Number of datasets which have been quality-controlled and corrected, and stored in the Master Catalogue (by type). Datasets searchable in the Master catalogue 	<ul style="list-style-type: none"> Statistical report of the MRC Portal Component technical report 	
3.4. Data integration, content management and Metadata management system further developed in the Master Catalogue	<ul style="list-style-type: none"> Number of service functions available in the portal Metadata exchange takes place with internet search engines 	<ul style="list-style-type: none"> Annual review of Master Catalogue Component technical report 	
3.5. An up-to-date MRC database maintained and made available to other MRC programmes, NMCS and national line agencies	<ul style="list-style-type: none"> Number of Programmes and line agencies supply data regularly List of new data updated List of downloadable datasets 	<ul style="list-style-type: none"> Component technical report Annual programme performance review Statistical report of the MRC Portal 	
3.6. National Information Systems (NIS) at NMCS and Line Agencies implemented	<ul style="list-style-type: none"> Number of systems implemented 	<ul style="list-style-type: none"> National Websites and Portal National technical report 	
3.7. The operation and maintenance of the National Information System successfully transferred to Line Agencies.	<ul style="list-style-type: none"> Number of Line Agencies operation and maintenance of National IS 	<ul style="list-style-type: none"> National Website and Portal National technical report 	
3.7. The Procedures on Data, Information Exchange and Sharing successfully implemented	<ul style="list-style-type: none"> Procedures implemented 	<ul style="list-style-type: none"> Report 	
4. MRC-provided tools and related modelling services extensively used by target regional and national agencies for planning, forecasting and impact assessment			
4.1. The MRC Toolbox continuously developed, improved and widely used by other MRC programmes, NMCS and national line agencies.	<ul style="list-style-type: none"> Number of Line Agencies using the Toolbox and the usage made of different tools by all MRC and external users. Citations for the MRC toolbox and feedback on acceptance 	<ul style="list-style-type: none"> Component progress reports Annual Programme Performance Review Records of Toolbox Installation, user 	

Result	Indicator	Source of Data	Risk
	as reference tools	group feedback and annual gap analysis reporting for IWRM.	
4.2. Strategic studies at basin, national and transboundary levels supported with effective modelling services	<ul style="list-style-type: none"> Number of strategic studies supported with modelling services. Number of strategic study teams assessing model as satisfactory or better. 	<ul style="list-style-type: none"> Component progress reports Annual Programme Performance Review Assessment of target/client agencies' responses to IKMP products and services. 	
4.3. Capacity building for MRC and national line agencies in analysis, modelling and assessment, designed, implemented under Integrated Water Resources Management (IWRM) principles	<ul style="list-style-type: none"> Number of new users successfully using the MRC Toolbox system. 	<ul style="list-style-type: none"> Review of system use and user capacities achieved in each country and in MRC programmes 	
5. Appropriate knowledge management systems and processes developed and applied, and shared with MRC partner agencies via sustainable knowledge networks			
5.1. The MRC portal successfully operated, regularly maintained and updated, acted as an access point for information and data exchange and sharing	<ul style="list-style-type: none"> Average monthly access rate of Portal via intranet. Average monthly access rate of Portal via internet. Average monthly document download rate (a) From IS b) from Mekong-Info) 	<ul style="list-style-type: none"> Monthly summary reports on use of Portal. 	
5.2: Mekong Info upgraded, operated and maintained to be a focal point for information about the Mekong River	<ul style="list-style-type: none"> Number of thematic areas covered by Mekong-Info. Number of documents stored on Mekong-Info. Percentage of sampled Mekong-Info users assessing the service as satisfactory or better. 	<ul style="list-style-type: none"> Component progress reports Annual Programme Performance Review Assessment of target/client agencies' responses to IKMP products and services. 	
5.3. Virtual Mekong Basin developed and maintained for understanding the main balances of river parameters of flow, sediment, nutrition etc	<ul style="list-style-type: none"> Number of key partners Number of tools and best practices shared Number of virtual tools regularly used by active network members 	<ul style="list-style-type: none"> Component progress reports Annual Programme Performance Review Network member survey 	
5.4. A Learning Centre established for having learning tools covering areas of the MRC operation	<ul style="list-style-type: none"> Number of services provided via the Learning Centre. Percentage of sampled stakeholder agency staff (MRCS, NMCSs, line agencies, donors, NGOs) reporting having used the Centre in previous year. 	<ul style="list-style-type: none"> Component progress reports Annual Programme Performance Review Assessment of target/client agencies' responses to IKMP products and 	

Result	Indicator	Source of Data	Risk
	<ul style="list-style-type: none"> Percentage of those reporting use of Centre expressing satisfaction with Centre's services. 	services.	
5.5. Knowledge Hub for Transboundary Water Resources Management established for sharing tools, best practices and other knowledge on TWRM with partners and clients	<ul style="list-style-type: none"> Number of members of the knowledge hub Level of data, information and knowledge-sharing activity of the hub. Percentage of sampled network members expressing satisfaction with the hub. 	<ul style="list-style-type: none"> Component progress reports Annual Programme Performance Review Hub member survey. 	
5.6. Partnership with relevant institutions established and strengthened	<ul style="list-style-type: none"> Number of partnership agreements 	<ul style="list-style-type: none"> List of agreements 	

Annex 3: Outline of programme activities

Component 1

Output 1.1: IKM programme implementation plans and annual work-plan achieved

Activity 1.1.1: Prepare the Programme Implementation Plan (PIP) for five year operation of IKMP

Purpose: To set a framework that is designed to assist the programme to manage and monitor implementation effectively

Approach: The PIP will be developed in a way that:

- Incorporates the needs and concerns of all stakeholders through a consultative process.
- Ensures that the indicators for each task are measurable and achievable
- Applies the principles of the MRC Performance Management System

Result: An indicative five-year Programme Implementation Plan that provides basic foundation for operation of IKMP 2011-2015.

Activity 1.1.2: Timely prepare annual work-plan and monitor the progress

Purpose: To provide detailed activities planning and set out what will be accomplished during one year for each output.

Approach: Production of annual work-plan, financial plan, regional workshop on annual work-plan and approval of work-plan by Steering Committee of IKMP.

Result: A work-plan that describes all activities to be implemented during one year with indicators and set timeframe for monitoring.

Output 1.2: Programme fully staffed and staff development plans achieved

Activity 1.2.1: Consolidate IKMP management structure within TSD and to coordinate IKMP activities

Purpose: To strengthen the management structure for day to day operation and coordination of IKMP with an orientation to a demand driven and client oriented approach.

Approach: IKMP will need to be consolidated in order to maintain on day to day basis a clear direction for the programme by:

- Developing clear and transparent Terms of Reference for each position
- Recruiting new personnel.
- Applying performance monitoring to measure progress towards the achievements of objectives and planned results; and reporting to schedule.

Result: A well organized and functioning IKMP team that effectively meets the client needs in a measurable manner.

Activity 1.2.2: Develop long-term capacity building strategy for IKMP

Purpose: To strengthen competencies of IKMP staff and relevant national line agencies in information and knowledge management that effectively supports the decision support process.

Approach: The strategy will be developed and implemented in collaboration with ICBP and Mekong-IWRM project. It will focus on four areas:

- Legal, regulatory and procedural development
- Institutional development
- Human resources development, and
- Technology development

Result: A comprehensive capacity plan developed and implemented effectively and efficiently that strengthens competencies of IKMP and relevant line agencies.

Output 1.3: Programme approach, plans and results effectively communicated to stakeholders

Activity 1.3.1: Maintain and consolidate the activities of IKM TACT

Purpose: To provide regional advisory coordination and approval to all technically related matters of IKMP.

Approach: Current mechanism of IKM TACT will be maintained by updating the Terms of Reference to include enough technical specialists into this advisory body.

Result: IKM TACT maintained its regular operation to facilitate regional technical coordination of IKMP which needs regional consensus and conversion into national actions.

Activity 1.3.2: Communicate with and transfer knowledge to riparian countries

Purpose: To provide knowledge and organizational basis for implementing IKM activities within riparian country institutions.

Approach: Through IKMP national unit, data and information are exchanged between MRC and relevant line agencies. Implementation of MRC procedures and guidelines is a channel where tools and knowledge are transferred to riparian countries.

Result: IKMP National units played a key role in promoting communication and transfer of tools and knowledge from MRC to riparian countries and vice versa.

Activity 1.3.3: Organize and participate in relevant IKM workshops and trainings

Purpose: To communicate and promote IKMP work, products and services within the riparian country institutions and with other stakeholders

Approach: Current network of partnership of IKMP is expanded with new members in four member countries and in other regions. IKMP coordinates with NMCs, line agencies and regional and international organizations to organize national or regional workshop on IKM issues together as appropriate. Moreover, IKMP may participate in workshops, conferences and other forums that are in alignment with IKMP needs. If necessary, IKMP co-organize those events or contribute to some agenda items of some events.

Relevant issues may include promoting, communicating and raising awareness of best practices of IKM, procedures, MRC-IS, river monitoring, modelling and assessment tools, training materials and knowledge sharing on Transboundary Water Resources Management etc.

Result: National and regional workshops, conference and forums to promote IKMP work, products and services.

Activity 1.3.4: Provide technical support and implement MRC procedures and guidelines

Purpose: To put the MRC signed procedures into practices under the framework of 1995 Mekong Agreement.

Approach: In collaboration with other MRC programmes and NMCs, IKMP may facilitate the process of implementing the signed procedures of the MRC. IKMP is involved directly with implementing two procedures of PDIES and PWUM, and provides technical assistance (database development, assessment tools and analysis etc) for the implementation of other procedures (PMFM, PNPCA etc) and their guidelines. National and regional consultations may need to be conducted during the implementation phase to update country perspectives into the process and results.

Result: Signed procedures of the MRC and their guidelines implemented supporting the decision making process and Mekong Cooperation.

Output 1.4: The perceptions and needs of programme clients, in relation to the programme, regularly assessed

Activity 1.4.1: Regularly updated assessment of client needs

Purpose: To better understand user requirements, so that IKMP products and services are demand-driven and client-oriented.

Approach: Understanding and delivering client needs effectively and efficiently is a primary factor for ensuring business success. Data, information and tool needs assessment is periodically conducted by IKMP to update the needs of clients for IKMP products and services. Means of transferring and exchange of knowledge may be regularly re-assessed.

Result: A sound basis for the design and delivery of IKM products and services to address the needs of clients.

Activity 1.4.2: Redesign knowledge based products and services of IKMP

Purpose: To better support other MRC programmes and member countries in planning and implementation work.

Approach: Based on the needs assessment conducted by IKMP, some key products and services of IKMP may be redesigned in order to meet requirements of other programmes and countries in the new context of Mekong development and programme/project implementation. Capacity building and MRC tools for modelling and assessment may be considered as key products/services which IKMP is trying to focus on in this second phase.

Result: A number of key products and services redefined to be delivered by IKMP, supporting the needs of other MRC programmes, NMCs and relevant line agencies.

Activity 1.4.3: Consolidate and implement the cost recovery system

Purpose: To ensure the sustainability of IKMP products and services

Approach: A cost recovery system will be consolidated by launching the Master Catalogue and MRC Web Portal which defines actual costs incurred for different products and services to be provided. A pricing structure for internal, external, non-commercial and commercial clients is also applied which allows clients to submit their applications through the MRC portal.

Result: A cost recovery system is consolidated that allows online application and payment from clients.

Component 2

Output 2.1: An appropriate and effective hydro-meteorological network covering mainstream and tributary boundaries upgraded and strengthened.

Activity 2.1.1: Finalize the implementation of the Mekong Hydrological Cycling Observation System project (Mekong HYCOS)

Purpose: To complete installation and setting up of the integrated river monitoring network in both the mainstream and tributaries of the Mekong

Approach: Continuation of HYCOS implementation from IKMP phase1. More attention is paid to real time data transmission and data management.

Result: 17 hydrological stations on the mainstream and 32 stations on tributaries functioning and delivering reliable and timely data to MRCS and line agencies.

Activity 2.1.2: Provide coordination and technical assistance to the operation and maintenance of the integrated river monitoring network

Purpose: To ensure the operation of the river monitoring network is run smoothly and to strengthen the capacity of relevant line agencies in the management of the network.

Approach: Conduct periodical coordination meetings for operators following the model currently implemented by the Mekong HYCOS project. Provide technical assistance to countries in solving the technical problems occurring. Continuously build capacity of operators to sustain the network operation and maintenance.

Result: All 49 stations of the network operating properly with reliable data provided

Activity 2.1.3: Gradually transfer the operation and maintenance of the river monitoring network.

Purpose: To transfer the ownership of network operation to member countries for sustainability of the network.

Approach: MOU needs to be developed and shared with member countries on gradually transferring the network to national operating agencies. Guidelines with a road map may be developed to guide the transition process.

Result: All MOU signed between MRC and member countries on transferring ownership of the network to operating agencies by 2015.

Activity 2.1.4: Conduct capacity building for line agencies to implement the river monitoring network.

Purpose: To strengthen capacity of line agencies for the purpose of network sustainability.

Approach: Yearly technical training for operators and technical staff of relevant line agencies. Associate hydrologist positions at MRCS may be considered for capacity building purposes.

Result: All relevant line agencies of the integrated river monitoring network are able to independently operate the network without any technical assistance from MRCS.

Output 2.2: A system for providing real-time hydro-meteorological data (discharge/water level, rainfall) for monitoring and flood forecast in place and regularly upgraded

Activity 2.2.1: Develop the strategy/policy for data management within MRCS and in member countries.

Purpose: To identify strengths that can be built on and weaknesses to be addressed in these practices and to develop the strategy and policy for improvement.

Approach: Needs and SWOT analysis. This will build on the established real time monitoring and quality assurance of HYCOS data

Result: A strategy/policy is developed and consolidated to improve data management and quality assurance practices.

Activity 2.2.2: Adopt or develop appropriate software for hydro-meteorological data management in MRC.

Purpose: To have suitable and consensus software that can be used for hydro-met data management in MRCS and relevant in-country institutions

Approach: Review the current use of software for data management in both MRCS and member countries. Comparative analysis is applied for available software for hydro-met data management in the world. Build up capacity for using the recommended software. This will be done in line with the MRCS Information strategy and recommendations for HM software upgrade initiated in TACT.

Result: User-friendly software for hydro-met data management adopted and used by MRC and relevant line agencies in member countries.

Activity 2.2.3: Consolidate a system for quality assurance and correction for data acquired from the river monitoring network.

Purpose: To finalize the current developed tools and system for hydro-met data correction and quality assurance.

Approach: Improvement of current system developed by IKMP and introduced to member countries and relevant Programmes.

Result: All prioritized historical and real time hydro-met data are quality assured before being accessible for analytical use.

Activity 2.2.4: Finalize a relational database for storing and managing all quality assured hydro-meteorological data.

Purpose: To allow for data storage, searches and requests as required and connecting to MRC-IS

Result: A relational database is developed with GIS and web-based supported

Output 2.3: A network and database for sediment monitoring developed and implemented

Activity 2.3.1: Provide coordination and technical support to the implementation of Discharge and Sediment Monitoring and Geomorphology Tools Project

Purpose: To start establishing a network and tools for monitoring sediment transportation and geomorphology change in the LMB. To generate outputs that can be used for other programmes and member countries in understanding the river.

Approach: It is under ongoing activities of the discharge and sediment monitoring and geomorphology tools project. IKMP will assign more coordination support and staffing to the implementation of this project and ensure the alignment of the project implementation with IKMP objective.

Result: The project is successfully implemented with expected results

Activity 2.3.2: Develop a database for storing and managing sediment and related data acquired from a sediment monitoring system.

Purpose: To store and manage the sediment and related data from ongoing activities under a sediment monitoring network.

Result: A sediment database is created with reliable data used for modelling and other analysis in MRCS and member countries.

Activity 2.3.3: Develop and adopt tools for sediment and geomorphology analysis

Purpose: To support the analysis of acquired sediment data

Approach: Tools may be developed under the MRC toolbox or adopted from other sources based on needs assessment.

Result: A number of tools available for sediment and geomorphology analysis and study.

Output 2.4: Ground water monitoring in place to provide data and information for monitoring and forecast of water use

Activity 2.4.1: Develop and regularly include ground water data in the Master Catalogue and update a relational database for the Lower Mekong Basin.

Purpose: To provide the foundation for understanding ground water in the LMB

Approach: Through the existing ground water database, the ground water data are collected from member countries and made available in the Master catalogue. Some field survey may be conducted in Cambodia and Laos PDR where ground water data is not yet available.

Result: Ground water data of the LMB available at MRC and used for water use monitoring purposes.

Activity 2.4.2: Develop and adopt tools for ground water management and analysis.

Purpose: To support the analysis of ground water data for technical purposes

Approach: Tools may be developed or adopted under the framework of MRC toolbox development.

Result: A number of tools available at MRC for ground water analysis and study.

Output 2.5: The MRC's programmes and national project adequately and timely supported with the required hydro-meteorological and related data

Activity 2.5.1: Deliver properly processed and quality assured historical and real-time hydro-met data to the users via the Master Catalogue

Purpose: To make reliable hydro-met data available to the public under the framework of procedures for Data and Information Exchange and Sharing (PDIES)

Approach: All historical and near real-time hydro-met data are quality assured and imported into the MRC Master Catalogue. These data will be categorized and made available to users via MRC web portal.

Result: Implementation of PDIES on hydro-met data via the MRC Master Catalogue and web portal.

Activity 2.5.2: Process and deliver quality assured near real time hydro-met data directly to real time data users

Purpose: To support data users on having most updated near real-time hydro-met data for flood and other river parameter forecasts

Result: Quality assured hydro-met data made available to data users within one week

Activity 2.5.3: Provide data analysis and special services as required

Purpose: To fulfill the needs of other programmes and member countries in hydro-met data analysis and other related services

Approach: IKMP technical staffs make analysis and provide special services to other MRC programmes and line agencies as needed.

Result: Satisfactory of IKMP clients on hydro-met data services

Output 2.6: Critical hydrological situations monitored and explained

Activity 2.6.1: Near real time monitoring of hydrological conditions of the river and give advice in critical situations.

Purpose: To timely respond to critical situations of the river

Approach: Timely and precisely monitor the situation of the river, especially for flood extreme events and critical drought situations.

Result: All critical hydrological situations are monitored and actions responded

Activity 2.6.2: Collect necessary data to provide scientific analysis of any critical hydrological conditions and issue technical reports on each event.

Purpose: To timely respond to public needs in understanding the critical hydrological situations and follow up actions

Result: All critical hydrological situations (flood, drought and other possible hazards) are explained and reported.

Activity 2.6.3: Cooperate with relevant agencies/institute for better monitoring and forecasting critical situations of the river

Purpose: To have common methods and understanding of river monitoring and forecasting in the region

Approach: Training/workshop and technical paper exchange/MOU

Result: Consensus and common explanation of all critical hydrological situations/events in the river basin

Output 2.7: Procedures on Water Use Monitoring (PWUM) effectively implemented in cooperation with NMCS and national line agencies

Activity 2.7.1: Set up a working group for water use monitoring within MRCS and in each member country (in corporation with M-IWRMP)

Purpose: To effectively and timely support IKMP on implementation of PWUM in both MRC and national levels.

Approach: At MRC level, each relevant programme that has a database on water use may need to assign a staff to be a member of the working group. Meanwhile, at the national level, NMCs may coordinate to establish a working group in each country.

Result: A working group at MRCS and in each member country established and functioning.

Activity 2.7.2: Conduct national and regional consultations on the implementation of PWUM in regional context.

Purpose: To promote understanding of the procedure and identify needs from countries in implementing this procedure.

Result: All needs/concerns of member countries are taken into consideration in the implementation of the procedure.

Activity 2.7.3: Set up criteria for water use monitoring in each country and in the region.

Purpose: To have a complete set of criteria/parameters for water use monitoring in the LMB

Approach: Based on international guidelines for water sharing and use

Result: A list of criteria/parameter is set up and agreed by all member states.

Activity 2.7.4: Set up a database for managing data acquiring from water use monitoring network.

Purpose: To support better managing the water use and to strengthen the MRC-IS

Result: Another database for water use is developed and integrated into the MRC-IS

Activity 2.7.5: Collect water use data from each country and regularly update the monitoring network.

Purpose: The database of water use is regularly updated and available to users for river management

Approach: Through working groups in member countries and at MRC level.

Result: The database for water use is updated and reported

Output 2.8: Capacity related to operating and maintenance of the river monitoring network effectively built up

Activity 2.8.1: Frequently conduct needs assessment on operation and maintenance of the river monitoring network in line agencies and develop capacity building plan.

Purpose: To strengthen capacity of line agencies in monitoring the river and forecasting on extreme events.

Approach: Through participatory needs assessment and SWOT analysis

Result: A full capacity building plan is developed and adopted by member countries.

Activity 2.8.2: Set up a programme of on the job training for network operators.

Purpose: To deliver the capacity building to the network operators

Approach: The model of Hydrology Associates may be considered

Result: A small project is developed and implemented for on the job training in IKMP

Activity: Regularly provide training to refresh knowledge and acquire new skills to line agency staff.

Purpose: To regularly update knowledge and skills on river monitoring for relevant line agencies

Result: Capacity of line agency staff is up to date

Component 3

Output 3.1: Data storage system and IT infrastructure at MRCS and NMCS improved

Activity 3.1.1: Upgrade both hardware and software for data storage and IT infrastructure especially servers at both offices of MRCS.

Purpose: To enable MRCS to store, share and exchange large datasets and information

Approach: The approach will be two-fold. Data and information can be stored, shared and exchanged via MRCS server or via services on the Internet if more applicable. Needed software must be available to facilitate the storing, sharing, exchange and for quality assurance.

Result: An Information system that can fulfill the requirements of storing, sharing and exchange

Activity 3.1.2: Support MRCS in improving data and information management systems

Purpose: To ensure that data and information is handled in a timely manner and is of acceptable quality

Approach: The approach includes the involvement of MRCS, NMC's and National Line Agencies. The data exchange and sharing of quality assured data and information must gradually be moved from MRCS to National Line Agencies. This requires capacity building and buildup of a professional Information section in Line Agencies to take over the data and information handling process from data capture / acquisition, storage, Quality Assurance / Quality Control (QA/QC), for exchanges and sharing.

Result: Management of data and information is done by responsible agencies.

Output 3.2: Manuals of standards and guidelines for data, information and systems management developed and made available for uses

Activity 3.2.1: Conduct needs assessment on data and information management in MRCS and NMCs.

Purpose: To set a baseline upon which needed capacity building can be planned.

Approach: In line with the IT and Information strategy an assessment of current status at MRCS and in relevant National Line Agencies is undertaken. The assessment must include a proposal for realistically achievable set goals in the institutions.

Result: An overview of the actual needs

Activity 3.2.2: Develop manuals and guidelines used for data and information management systems in MRCS and member countries.

Purpose: To ensure operation and data and information handling process sustainability.

Approach: IT infrastructure, Information strategy, use of standards and procedures and implemented solutions are documented in manuals and as integrated parts of the systems. Documentation is available in electronic form to relevant user groups. For non technical users easily accessible summaries should be produced, see Activity 3.2.2.

Result: A sustainable MRCS-IS where transfer of Management Information is ensured

Activity 3.2.3: Provide capacity building in managing and maintaining the data and information system to national line agencies.

Purpose: To ensure transfer of operation and data and information handling processes to relevant national line agencies.

Approach: Capacity building will be based on the IKMP capacity building plan. Its major principle is to build on real world project implementation where IKMP and partners can facilitate the change in operation and data and information handling processes in the relevant line agencies. Training can be a limited but always integrated part of the capacity building process. National line agency data custodian's capacity building is important.

Result: Capacity of national line agencies to handle operation and data and information handling processes in areas of their responsibilities.

Output 3.3: Quality control and correction of all datasets at MRCS and NMCS in place

Activity 3.3.1: Finalize manuals and guidelines for data quality assurance in MRC and its member countries.

Purpose: To ensure coherent handling of data Quality Assurance

Approach: International standards and procedures for orderly, logical, and consistent Quality Assurance must be followed. This is set out in the MRCS-IS strategy and implementation. Further development is needed and it is important to ensure that the standards and procedures are followed although they may not always be in the same practical way

Result: Coherent handling of data Quality Assurance can be implemented

Activity 3.3.2: Provide quality control and quality assurance to all historical and near real time data available in MRCS.

Purpose: To ensure the integrity and consistency of data

Approach: Internationally accepted and peer reviewed algorithms must be used. Quality Assurance is very diverse from time series to spatial and non spatial data. As part of capacity building (See Activity 3.2.3), the national line agencies should undertake the QA in all areas of their responsibilities. The selection of algorithms and software can be handled by TACT. All Quality Assured datasets must have relevant metadata attached according to the ISO19138 standard.

Result: Datasets can be reliably used for assessments.

Activity 3.3.3: Transfer knowledge of data quality control and quality assurance to national agencies.

Purpose: To implement coherent handling of data Quality Assurance

Approach: The transfer will be an integrated part of capacity building based on real world implementation projects (See Activity 3.2.3 and the IKMP capacity building plan).

Result: Capacity building of national line agencies and implementation of Quality Assurance.

Output 3.4: Data integration, content management and Metadata management system further developed in the Master Catalogue

Activity 3.4.1: Permanently upgrade the MRC master catalogue in both functionality and interface.

Purpose: Make data and information available to users

Approach: The present process where MRCS receives raw data and information from national line agencies is to be changed to receiving QA datasets with metadata. The upgrade of the Master Catalogue can also be gradually transferred to the national Line agencies provided they build up the capacity and infrastructure. IKMP will then mainly ensure the integration of national datasets to form MRB. Orderly, logical, and consistent sets are available to users.

Result: Timely access to consistent data and information

Output 3.5: MRC relational databases maintained and made available to other MRC programs, NMCs and national line agencies

Activity 3.5.1: Establish and upgrade relational databases for relevant data in MRC and make available to users.

Purpose: To provide user access to relational structured data

Approach: For relevant quality assured datasets in the Master Catalogue, relational databases are constructed with ensured integrity and consistency. Middleware for MC import is produced and standard queries are setup, especially in relation to export of data to relevant MRCS Toolbox applications. The relational databases are datasets themselves and included in the Master Catalogue.

Result: Easy user access to consistent relational data.

Activity 3.5.2: Work with other programmes and line agencies to regularly update the databases.

Purpose: To ensure timely and reliable update of relational databases.

Approach: For national line agencies the activity will be included under 3.4.2. For MRCS programmes work agreements will be setup to ensure that programmes regularly maintain and update datasets under their responsibility.

Result: Agreed workload distribution for maintenance

Output 3.6: National Information Systems (NIS) at NMCS and Line Agencies implemented

Activity 3.6.1: Support on development of National Information System at NMCS and line agencies.

Purpose: To enable the agencies to undertake informatics work under their responsibility.

Approach: In line with the findings under Activity 3.2.1, a development plan for relevant agencies is produced and discussed in TACT to ensure consistency with the MRCS-IS strategy and standards for metadata, data exchange and the cooperation between agencies and IKMP. The implementation of the development plan is scheduled according to the capacity building Activity 3.2.3.

Result: Sustainable NIS implemented

Output 3.7: The operation and maintenance of the National Information Systems in Line Agencies

Activity 3.7.1: Gradually handover the task of operation and maintenance of the NIS to national line agencies.

Purpose: To ensure that MRC-IS activities are gradually taken over by relevant line agencies

Approach: In line with the NIS implementation and capacity building plan (Activity 3.2.3), it is decided in the development plan (Activity 3.6.1) how the transfer of activities is planned and scheduled.

Result: A gradual transfer of activities.

Output 3.8: The Procedures on Data, Information Exchange and Sharing (PDIES) successfully implemented

Activity 3.8.1: Conduct re-assessment of custodians for data provision in each member country.

Purpose: To ensure timely and reliable data provision

Approach: For datasets to be exchanged regularly new MoUs should replace previous ones. For one type of dataset only one MoU should cover all uses for the MRCS-IS. Once MoU's are setup no further data requests from MRCS to the agencies are needed. The frequency of exchange is decided by TACT. For ad hoc datasets formal data requests are issued by MRCS following the guidelines. The national custodian network has to be reestablished by appointment in national line agencies and by building cooperative relations with IKMP. Capacity building of the custodians is a part of the IKMP capacity building Activity 3.2.3

Result: Timely and reliable data exchange

Activity 3.8.2: Organize national consultations to identify the best mechanism for data exchange and sharing.

Purpose: To integrate the data exchange and sharing in the national line agencies workflow

Approach: Relevant line agencies are engaged to discuss standardization of national processes for data exchange and sharing. It is important to use the same standards and procedures while details should be adapted to individual line agency needs and capability, see Activity 3.3.1.

Result: National agreement on data exchange mechanisms.

Activity 3.8.3: Set up detailed manuals for data exchange and sharing within MRC and member states.

Purpose: To monitor the data exchange and sharing

Approach: The sharing of dataset will be monitored via the Master catalogue. The exchange of regularly and ad hoc exchanged sets will be monitored separately and may be available in the MRCS-IS for users to be notified automatically via feeds.

Result: Transparent exchange and sharing process.

Activity 3.8.4: Regularly report and update information on PDIES to TACT and JC meetings.

Purpose: To formally assess the status of data exchange and sharing

Result: Progress reports of IKMP and technical notes for TACT

Component 4

Output 4.1: The MRC Toolbox continuously developed, improved and widely used by other MRC programmes, NMCS and national line agencies.

Activity 4.1.1: Finalize the development of MRC toolbox including its interface and number of tools for modelling, quality assurance and analysis.

Purpose: To provide modelling, assessment and analysis for delivering core river basin management functions of the MRC in the SP2011-2015.

Approach: Tools will be developed based on the existing MRC Decision Support Framework (DSF), Detailed Modelling Support models and other tools recommended and adopted from external sources. Work will be a part of ongoing activities of IKMP phase 1 on the MRC toolbox.

Result: A full MRC toolbox is finalized and available to MRC programmes and national line agencies.

Activity 4.1.2: Promote use of the MRC toolbox by IKMP and other MRC programme

Purpose: To encourage use to the MRC tools by MRC programmes for water resources management

Approach: IKMP will encourage the use of the MRC tools by other MRC programmes by providing technical assistance, capacity building and application of new tools in the implementation of the programmes, especially modelling and assessment.

Result: The MRC tools are recognized and widely used by other MRC programmes

Activity 4.1.3: Capacity building for the application of the new MRC toolbox.

Purpose: To ensure that all relevant MRC staff and line agencies have enough capacity and resources to use the new tools.

Approach: In line with IKMP Capacity Building plan

Result: The MRC tools are effectively and efficiently used by MRCS and NMCs and line agencies

Activity 4.1.4: Support the use of new tools in the MRC toolbox by national line agencies

Purpose: To encourage the use of MRC tools by member countries for water resources management

Approach: IKMP will encourage the use of the MRC tools by member countries by providing technical assistance, capacity building and application of new tools in the implementation of the pilot projects, national case studies on modelling and assessment.

Result: The MRC tools are recognized and widely used by the MRC member countries.

Output 4.2: Strategic studies at basin, national and transboundary levels supported by effective modelling services

Activity 4.2.1: Continuously implement the modelling activities in coordination with the MRC programmes.

Purpose: To support other MRC programmes on modelling activities and assessment

Approach: IKMP modelling team is responsible for conducting modelling activities or providing technical assistance to other programmes in modelling, assessment and analysis.

Result: Modelling activities under MRC are fully supported by IKMP

Activity 4.2.2: Basin-wide scenario work.

Purpose: To provide requested information and support for sustainable development. To support the decision making process at regional level.

Approach: This is a part of ongoing activities under IKMP phase 1. In addition to BDP and FMMP, IKMP will also conduct basin wide scenario work with other MRC programmes such as CCAI, ISH, AIP to support the decision making process under the framework of these programmes.

Result: Development works are fully justified based on results of basin-wide scenario works conducted by IKMP.

Activity 4.2.3: Provide modelling services on national and transboundary issues upon request

Purpose: To support the member countries' needs for problem solving and provision of required information for planning and decision making.

Approach: As it is similar to the MRC basin-wide scenario work, the national team will be supported by IKMP by riparian and international expertise.

Activity 4.2.4: Support national real world activities especially for Cambodia and Lao PDR.

Purpose: To give priority in modelling capacity building for Cambodia and Lao PDR

Approach: As it was identified in the assessment report of IKMP phase 1, Cambodia and Lao PDR may need more special support on modelling in order to build up their knowledge in this area. Financial and technical assistance to Cambodia to establish a national centre for modelling under the management of a central water management agency should be considered.

Result: Gaps in modelling competencies of the MRC member countries are getting closer.

Output 4.3: Capacity building for MRC and national line agencies in analysis, modelling and assessment, designed and implemented under the Integrated Water Resources Management (IWRM) principles

Activity 4.3.1: On the job training for national modellers

Purpose: To strengthen the capacity for national modellers

Approach: In line with the IKMP capacity building plan that was developed and partly implemented by IKMP phase 1. The modality of Junior Riparian Professional under ICBP may be applied by IKMP for this activity. National modellers may need to spend some time to work day to day together with the IKMP modelling team or they may be sent to work in national line agencies with technical support from IKMP.

Activity 4.3.2: Implement national and transboundary studies

Purpose: To strengthen the capacity of national line agencies in modelling by promoting learning by doing principles

Approach: In line with the IKMP capacity building plan

Result: Progress and annual reported submitted by countries

Activity 4.3.3: Conduct local and transboundary scenario work

Purpose: To support countries' independent capacity for problem solving and to provide required information for planning and decision making.

Approach: In line with the IKMP capacity building plan

Activity 4.3.4: Set up a network of modelling trainers in the region for the application of the MRC toolbox

Purpose: To provide training of trainers for key modellers in the region on MRC recommended tools.

Approach: Some key modellers who have strong background and knowledge in modelling are selected among relevant national line agencies. A course of Training of Trainers (TOT) on the application of the MRC toolbox will be provided and would be repeated as refresher and updating courses. These trainers (modellers) will be mobilized as key facilitators who help promote the use of the MRC toolbox to other modellers and within their institutes.

Result: A group of riparian modellers who have advance knowledge and skills in the application of the MRC toolbox.

Activity 4.3.5: Provide training as needed to national modellers

Purpose: To build capacity on modelling, assessment and analysis to national modellers as required.

Approach: IKMP through its modelling team may organize a number of trainings based on:

- Needs and requests of national modellers on MRC and other related tools
- New/updates on MRC toolbox that needs to be reported to member countries
- Support the implementation of certain projects/case studies in member countries or in the region.

IKMP through its network of modelling trainers may consider organizing follow up trainings to reach more national modellers on the MRC toolbox.

Result: Most of key IKMP line agencies in member countries have modelling staff who are capable to use and handle the MRC toolbox.

Component 5

Output 5.1: the MRC portal operated, regularly maintained and updated and functioning access point for data and information

Activity 5.1.1: Develop and operate the MRC web portal

Purpose: To ensure access to the Portal data and information

Approach: The development was largely done in phase I of IKMP. Continuous development can be done via the dynamic administrator interface by IKMP staff. Operation is to be monitored in unity with the website, both for direct access and use and for indirect access via search engines and other services.

Operation is to be split between technical issues handled by the MRCS IT functions and administrative functions to be administered by other MRCS staff. Administrative

functions include licenses, payment terms, handling of physical datasets, portal users maintenance etc.

Result: A web portal utilizing Internet services for the benefit of the users.

Activity 5.1.2: Regularly update and maintain the MRC web portal.

Purpose: To ensure continuous relevance of the Portal

Approach: The most important activities are to constantly update and maintain the datasets and provide access to users and to regularly add new services and functionalities. The maintenance and updating of datasets is ensured via component 2, 3 and 4 activities. The decision whether or not to add new services and functionalities has to be viewed as a combination of user needs and availability, especially the availability of the Internet for storage services, map servers, translation tools, visualization tools etc, to minimize and avoid duplication at MRCS.

Result: A web portal largely utilizing Internet services for user benefits.

Output 5.2: Mekong Info upgraded, operated and maintained to be a focal point for information about the Mekong River

Activity 5.2.1: Integrate MekongInfo into the MRC website and via the MRC portal

Purpose: To ensure combined access to general information about the MRB

Approach: The present MekonInfo is updated and integrated into the present portal upgrade. Associated services of user maintenance and user groups are transferred to free Internet services. The information of MekongInfo is mainly of non-MRCS origin and therefore not part of the Master Catalogue.

Result: A focal point for access of relevant MRB information from many sources.

Activity 5.2.2: Permanently update and maintain the MekongInfo.

Purpose: To ensure the relevance of MekongInfo

Approach: The update activities will be handled in combination between IKMP and other programmes and agencies by their provision of relevant articles, news etc. RSS feeds can keep users informed about the updates.

Result: A link to relevant MRB information is provided.

Activity 5.2.3: Create a forum on Integrated Water Resources Management for users of the MekongInfo.

Purpose: To facilitate the contact between IWRM users

Approach: IKMP to provide assistance to setup the forum by using free Internet services. This can be linked to the Knowledge Hub, See Output 5.5

Result: Enhanced understanding of IWRM.

Output 5.3: Virtual Mekong Basin developed and maintained for understanding the main balances of river parameters of flow, sediment, nutrition etc

Activity 5.3.1: Develop the web-based Virtual Mekong Basin (VMB)

Purpose: To provide a learning tool for the Mekong River Basin

Approach: The work is ongoing with the portal upgrade but will have limited contents finished in phase I of IKMP. The VMB is to provide learning and understanding of the MRB by providing scientifically based information via visualization, animation and

interaction. It intends to link the layers of information from physical assets like geomorphology, weather systems, water, sediment, nutrient and carbon balances and the Social, Economic and Environment layers. This includes especially links between ecological balances like nutrient and primary production to fisheries and agriculture production etc.

Result: An easily accessible learning tool to enhance the understanding of the MRB.

Activity 5.3.2: Integrate the Virtual Mekong Basin into the MRC portal

Purpose: To provide easy access and ensure search engine listing.

Approach: The VMB will be accessible from the portal. Hosting may be by Internet services. The learning tool can be downloaded for local use provided technical assets are present.

Result: A wide potential use of the learning tool and potential for learning

Activity 5.3.3: Update the VMB regularly

Purpose: To ensure the VMB is also showing contemporary issues and new relevant areas for learning and understanding.

Approach: IKMP and partners will maintain the VMB by regularly updating the information and adding new relevant information. For the first version five basic areas are included, but another 15 are planned. This list can be enhanced based on needs and requirements.

Result: An updated and therefore relevant learning tool.

Output 5.4: A Learning Centre established for having learning tools covering areas of the MRC operation

Activity 5.4.1: Redesign the learning centre based in MRCS

Purpose: To establish an entity responsible for the Learning Centre

Approach: The LC was attached to the Library in IKMP phase I, but will be separated from 2011 onwards. IKMP will therefore setup a specific force to ensure the continuation of the LC. Besides the VMB (See Output 5.3) MRCS holds numerous learning kits and other relevant information for specific learning. The LC will produce a service agreement describing its organizational structure and operation.

Result: A functioning LC with clear and transparent activities.

Activity 5.4.2: Collect and update materials for the learning centre

Purpose: To provide relevant learning material and services.

Approach: The first step will be to arrange existing learning material and tools held by MRCS. This is in close corporation with Master Catalogue, data exchange, Knowledge hub and portal activities. Next phase will be to enhance the LC's holding of learning materials and tools.

Result: Easy overview and access to learning materials and tools for users.

Activity 5.4.3: Install and operate the learning centre at MRCS

Purpose: To ensure timely and reliable access to learning materials and tools for users.

Approach: The main access channel is the Portal where learning material and tools will be made available. The administrative operation will be handled by the LC staff while the technical operation is handled by the portal operators.

Result: Reliable access to relevant learning tools and material.

Output 5.5: Knowledge Hub for Transboundary Water Resources Management (TWRM) established for sharing tools, best practices and knowledge on TWRM with partners and clients

(See the KH for TWRM business plan for details)

Activity 5.5.1: Establish a core management team and an interim steering committee for the knowledge hub on TWRM

Purpose: To establish the organization for the KH

Approach: In accordance with the approved Knowledge Hub business plan to establish the organization for the KH:

- Steering Committee of network partners (initially selected key partners), chaired by MRC
- Staff at MRC
- An experienced riparian Knowledge Hub Manager (with specific TWRM background and extensive international network of contacts)
- Focal points designated in existing programmes with a maximum time allocation of 5-10% and gradual recruitment of 1-3 additional regional professionals depending on the demand and required expertise and including a mixture of full time and part time positions in different disciplines
- Secretarial services for the Core Team at MRCS, including a dedicated Web Manager
- Regional/international Advisory Panel (3-5 part time senior experts) which could be drawn from other international advisory panels being established at MRC such as for the Basin Development Plan.
- Focal point arrangements associated with, and working from, key partner organizations, in particular IUCN.

Result: The Knowledge Hub is established.

Activity 5.5.2: Develop guidelines and introductory materials for operation of the knowledge hub

Purpose: To provide a work plan for 2011

Approach: To make a work plan for 2011 including the production of guidelines and introductory material for 2011. The work plan will be LFA-based and include monitoring and evaluation in line with the MRCS Performance Monitoring system

Result: The base for activities of the KH described

Activity 5.5.3: Consolidate the business plan for fund raising and extend the partnership with other members of the Asia Pacific Water Forum Knowledge hubs.

Purpose: To establish a sound financial basis for the KH.

Approach: Various phases of financing could be considered including:

- Start up financing from ADB or other development partners in parallel with in-kind support from related programmes and sections of the MRC based on the synergies with their existing work programmes (mid 2010)
- Start-up financing 2010-2013 to be sought from development organizations, including foundations, with an interest in knowledge management and capacity building and ultimately including a broader range, including possible support from private sources
- Building up cost recovery mechanisms by sale of products and charging for services, with a view to gradually reduce reliance on donor core funding, aiming for a 50-50% share by 2018 to ultimately self-financing by 2020
- Securing agreement from partners to provide a reasonable level of in-kind contributions (in addition, membership fees are suggested in the guidelines etc)
- With reference to the section on “Clients” above: target some services to other regions, mainly trans-boundary river basins in Africa (Southern, Western and Eastern), to attract donor financing and income

Result: A financially soundly based KH

Activity 5.5.4: Conduct training to national line agencies on knowledge and information management with a focus on tools and materials for TWRM

Purpose: To ensure TWRM processes are used by national line agencies

Approach: information on training programmes, workshops and seminars in the region

- Courses and mentoring in TWRM and related issues, hosted by MRCS, NMCs, partner organizations or clients, and targeting a variety of stakeholder groups per demand
- Workshops and seminars at regional, sub-regional, national and sub-national levels
- Collaboration with universities in the region on curriculum development, development and provision of teaching materials and support to teaching
- Capacity building through small concrete pilot/demonstration activities or projects.
- Media awareness raising.

Result: Dissemination of TWRM processes.

Output 5.6: Partnership with relevant institutions established and strengthened

Activity 5.6.1: Support regular meetings with line agencies and staff through the model of IKM TACT and other forums.

Purpose: To ensure consistency of TWRM processes and support decisions

Approach: As a regional inter-governmental organization of the Lower Mekong Basin, MRC also considers it important to develop partnership relations with key knowledge centers in each of the its four member countries (Cambodia, Lao PDR, Thailand and Viet Nam) as well as upstream dialogue partner countries (China and Myanmar). These partner centers will be identified in discussion with riparian countries during the start up phase of the Knowledge Hub. In addition, key partners will include other closely related Knowledge Hubs and international organizations and MRCS has been discussing the possibility of a partnership arrangement with IUCN-Regional Office for Asia in Bangkok which would broaden the outreach beyond the Mekong basin to a wider network in Asia and take advantage of the contacts in IUCN’s various water initiatives.

Result: A coherent and solidly based partnership network established.

Activity 5.6.2: Update and promote the use of virtual collaboration tools.

Purpose: To ease the collaboration between Knowledge Hub partners.

Approach: By provision of knowledge, experiences, good practices and tools for TWRM, with a view to promote and support coordinated, sustainable and pro-poor development, and enhance effective regional cooperation. A partial list of issues – to be addressed from a TWRM perspective - could include the following:

- Tools for water resources management, especially on trans-boundary related issues.
- New communication tools and management system that would complement the Asia-Pacific Water Forum initiative to create 'knowledge hubs' that will share solutions to the region's many pressing water challenges.
- Guidelines, manuals, good practice papers
- Models and other software
- Decision support systems - starting with the MRC knowledge base and Decision Support Framework, DSF, and drawing on the MRC Integrated Knowledge Management Programme, IKMP, and its related national agencies

Result: Improved collaboration capability

Annex 4: Terms of References for Programme Coordination and Supervision Mechanisms

**TERMS OF REFERENCE for
Information and Knowledge Management Programme
Steering Committee (IKMP, SC), updated in July 2010**

1 Background

The Information and Knowledge Management programme (IKMP) was designed as a cross cutting programme of the Mekong River Commission (MRC) which provides information and knowledge services to other programmes as well as to National Mekong Committee and line agencies. As it was formulated in December 2006 through the approval of the MRC Council, IKMP's objective is to build a solid foundation of data, information and knowledge products, systems and services that supports the goal of the Mekong River Commission.

Phase 1 of IKMP was actually operated from January 2007 to December 2010 under the framework of 1995 Mekong Agreement and was in line with the MRC Strategic Plan 2006-2010. In order to consolidate outputs/achievements of IKMP and continue providing knowledge based products and services to other MRC programmes and member countries as needed, the second phase of IKMP is formulated covering the period of 2011-2015 which is designed to be very much in line with new Strategic Plan 2011-2015 of the MRC.

The development objective of IKMP 2011-2015 is to ***“effectively support MRC programmes, NMCS and relevant line agencies on the development and management of water and related resources in the Mekong Basin by providing basin-wide monitoring, impact assessment, modelling, forecasting, and knowledge management system for planning and programme implementation work”***

The implementation of the IKMP 2011-2015 requires regional coordination on several management issues. This Terms of Reference (ToR) is therefore updated to guide IKMP implementation.

The aims of IKMP 2011-2015 are as follows:

- (i) IKMP is efficiently and effectively managed and communicated, and technical components are effectively supported
- (ii) A basin-wide river monitoring network is well functioning and linked with other MRC monitoring systems to provide accurate, reliable and timely hydro-meteorological and related data at basin level while strengthening relevant national and regional capacity
- (iii) An Information System of the MRC (MRC-IS) which comprehensively integrates MRC data and information, is consolidated, regularly updated and made available for internal and external uses
- (iv) MRC provided tools and related modelling services extensively used by target regional and national agencies for planning, forecasting and impact assessment

- (v) Appropriate knowledge management systems and processes developed and applied, and shared with MRC partner agencies via sustainable knowledge networks

2 Objectives

The objectives of the IKMP SC are to ensure effective programme management and appropriate coordination with National Mekong Committees (NMCs), donors, and concerned partners in implementation, monitoring and delivery in terms of contractual obligations between MRC and the Donors.

3 Functions and Responsibilities of the IKMP SC are:

- 3.1 To review the submitted reports concerning IKMP work plan, progress, technical performance and budgets; and to monitor the performance of the overall Programme.
- 3.2 To approve the Programme implementation plan (PIP) and annual work plans;
- 3.3 To consider any proposed modifications to the PIP in terms of programme structure, organization, scope, content, timing, budgets for which the consent of the donors would be required;
- 3.4 To provide strategic guidance and coherence to the IKMP implementation to increase its effectiveness.
- 3.5 To be a forum dealing with strategic and policy issues of high level, and to recommend to JC for consideration and advice if so required.

4 Composition and Meetings

The IKMP SC shall be composed of two members from each NMC and three members from the MRCS including the Director of TSD, the IKMP coordinator, assisted by the Chief Technical Adviser, will serve as Secretary and Donor representatives from the Donor agencies. The level of the NMC representation on the SC will be at the Deputy Director General / Deputy Secretary General level, other member of the NMC is the IKMP National Coordinator. The chairmanship of the IKMP SC meeting will be rotated in alphabetic name order of the MRC Member Countries. As one of the IKMP SC members from the host country will serve as chairperson for the meeting, the host NMC may assign one additional member to fill the vacant seat in its delegation at that time.

The IKMP SC meetings shall be convened at least 02 times per year. The IKMP SC may invite participation of other ad hoc members from time-to-time in accordance with the requirements of specific subjects under discussion.

Financial support will be provided for IKM SC meetings from the IKMP, or other MRC programmes.

5 Decisions and Reporting

The IKMP SC will make decisions by consensus. Any pending issue shall be submitted to the JC for instruction and decision.

The IKMP SC shall prepare minutes after each meeting, review its activities, conclusions and recommendations and distribute them to all members.

6 Modification of the Terms of Reference for IKMP SC

IKMP SC and NMCs may recommend modifications to this ToR to the JC.

Any modifications of this ToR shall be approved by the JC.

TERMS OF REFERENCE for Information and Knowledge Management Technical Assistance and Coordination Team (IKM TACT), updated in July 2010

1 Background

In order to strive for the vision, namely, “an economically prosperous, socially just and environmentally sound Mekong River Basin”, the Mekong River Commission (MRC) aims to serve the Mekong riparian countries on the sustainable development of the Mekong River Basin water and related resources. One of the important means to achieve this Vision is to provide meaningful information and knowledge to relevant partners.

In July 2000, the MRC Secretariat started with the preparation for the development of the MRC Information System (MRC-IS). The System is intended to provide data and information services to the MRC, its member countries, and projects and programs. Hence, through the development of the MRC-IS, the MRC Secretariat plays a key role as a regional information hub, which will link partners through information networks, and which will provide them information and knowledge services and products. The Procedures for Data and information Exchange and Sharing (PDIES) and the Procedures for Water Use Monitoring (PWUM), approved by the MRC Council in 2001, 2003 respectively, provide a comprehensive and adaptive framework for data and information exchange, and water use monitoring, to support the implementation of the 1995 Mekong Agreement. Due to the close relationship between the requirements of the PDIES and PWUM and the support provided by the MRC-IS, a regional coordination forum for technical issues to serve both procedures, was established known as the Information System Design and implementation Team (ISDIT) in 2002 and then the “Technical Assistance and Coordination Team (TACT)” in 2003.

Following the request of the MRC Joint Committee in 2003 to take action to ensure on the sustainability of the MRC-IS, phase 1 of the Information and Knowledge Management Programme (IKMP) was formulated in 2006 and was actually operated for 2007 to 2010. The IKMP was established with the ongoing activities and experiences in the development of the MRC-IS. However, the programme more strongly embeds the original objectives of the MRC-IS in the framework of Integrated Water Resource Management (IWRM), which results in transparent links between the IKMP and the MRC Strategic Plan 2006-2010, and between the IKMP and all other MRC programmes. In order to ensure the sustainability of the programme and to continue providing knowledge based products and services supporting decision making process in the MRC, the second phase IKMP is formulated covering the period of 2011-2015 and is designed to be very much in line with new Strategic Plan 2011-2015 of the MRC.

The implementation of the IKMP requires regional coordination on several technical issues which are in line with those handled by the TACT. This IKM TACT ToR is therefore an expansion and modification of the original MRC TACT ToR.

2 Objectives

The IKM TACT is a permanent body of the MRC serving as a forum for the MRC Secretariat and the National Mekong Committees (NMCs) to coordinate and agree at the regional level on all matters relevant to the IKM Function which is defined as “*the establishment and operation of all data, information and knowledge management, sharing and exchange activities within the MRC.*” The IKM TACT also initiates the conversion of regional agreements into national actions with regard to the IKM Function.

The scope of work:

- 2.1 The implementation of the procedures under the 1995 Mekong Agreement related to information and data exchange and sharing, and water use monitoring, namely: 1) Procedures for Data and Information Exchange and Sharing; and, 2) Procedures for Water Use Monitoring;
- 2.2 The implementation or technical assistance to the implementation of new procedures, guidelines and standards established under the IKMP.
- 2.3 Development and operation of MRC-IS and MRC toolbox.

3 Functions and Responsibilities of the IKM TACT

The establishment, maintenance and improvement of the operation of the IKM Function will be institutionalized through the IKM Guidelines, and the implementation of the IKMP. As mentioned earlier, the IKMP more strongly embeds the original objectives of the MRC-IS more firmly in the framework of Integrated Water Resource Management (IWRM), which results in transparent links between the IKMP and the MRC Strategic Plan, and between the IKMP and all other MRC programmes. The programme also expands and accentuates the original objectives of the MRC-IS towards catalyzing dialogue based on sound knowledge.

The IKM TACT shall:

- 2.4 Serve as the forum for coordination between the MRCS and the NMCs for all matters relevant to the establishment, maintenance and improvement of the operation of the IKM Function as implemented by the IKMP, and the development and implementation of the MRC-Water Use Monitoring System (WUMS).
- 2.5 Serve as the forum for the preparation, consultation and agreement on the IKM guidelines, to be submitted to and approved by the MRC Joint Committee
- 2.6 Serve as a mechanism to assist the MRC in the implementation of the PDIES, PWUM, and the IKM Function through the IKM guidelines and the IKM Programme including:
 - 2.6.1 designing, developing/establishing, implementing and improving the MRC-IS, the DSF, MRC toolbox, and the MRC-WUMS;
 - 2.6.2 prioritizing, formulating and recommending data, information and knowledge needs and updates;
 - 2.6.3 prioritizing, drafting and recommending standards on, among other matters, format, classifications and data, information and knowledge quality;
 - 2.6.4 prioritizing, drafting and recommending relevant technical guidelines;
 - 2.6.5 planning and drafting delivery schedules;
 - 2.6.6 preparing for approval by the Joint Committee (JC) modalities and verification guidelines for data, information and knowledge exchange and sharing, and for water use monitoring;
 - 2.6.7 drafting data license agreements including obligations and responsibilities of users;
 - 2.6.8 implementing monitoring activities; and
 - 2.6.9 Undertaking other tasks as instructed by the JC.

MRC WUMS

The Mekong River Commission Water Use Monitoring System (MRC-WUMS) consists of three components:

- 1 The physical equipment and related structures (i.e., relevant water measuring devices such as: stream flow/level and reservoir gauges, water quality monitoring stations, meteorological and hydro-meteorological facilities, data transmission means by telephone, telemetry and satellite, and data gathered through remote sensing technologies). The physical equipment and related structures are normally located in and managed/owned by respective country;
- 2 Various procedures (i.e. relevant monitoring methodologies, operation and maintenance requirements and processes, calibration standards and verification protocols, and data collection and communication procedures); and
- 3 Related personnel/institutions/organizations (i.e., those directly involved in the operation and maintenance of the physical equipment and related structures through the various procedures).

4 Composition and Meetings

The IKM TACT shall be composed of four members from each NMC and relevant line agencies and three members from the MRC Secretariat representing the Technical Support Division (TSD): the Director of TSD will serve as Convener while the IKMP coordinator, assisted by the Chief Technical Adviser, will serve as Secretary. The NMC's members should be led by an officer at decision-making level. One of the members of the NMC should be the IKMP National Coordinator while two other members should come from relevant line agencies.

Each NMC shall designate its representatives to the IKM TACT for a minimum period of two years and inform the MRC Secretariat. The members should have the following qualification:

- 1 A broad knowledge on data management, information technology, knowledge management and, preferably, on general concepts regarding databases and Geographic Information Systems and Remote Sensing application;
- 2 A good knowledge on data and information availability and related monitoring systems within the MRC programs, NMCs, and line agencies; and
- 3 A basic understanding of the application of computer modelling relevant to the MRC programmes.

Each NMC shall inform the MRC Secretariat on the change of its representatives in the IKM TACT.

The IKM TACT meetings shall convene regularly as decided by its members or as directed by the JC. The IKM TACT may invite participation of other ad hoc members from time-to-time in accordance with the requirements of specific subjects under discussion.

Financial support will be provided for IKM TACT meetings from the IKMP, or other MRC programmes.

5 Decisions and Reporting

The IKM TACT will make decisions by consensus. Any pending issue shall be submitted to the JC for instruction and decision.

The IKM TACT shall prepare minutes after each meeting, review its activities, conclusions and recommendations and distribute them to all members.

The IKM TACT shall prepare an annual report to the JC regarding its activities and reviews of the appropriateness and applicability of the approved procedures and relevant IKM documents with recommendations for amendments if necessary.

6 Modification of the Terms of Reference for IKM TACT

IKM TACT and NMCs may recommend modifications to this ToR to the JC.

Any modifications of these ToR shall be approved by the JC.

TERMS OF REFERENCE for Information and Knowledge Management Programme Programme Coordination Committee (PCC), updated in July 2010

1 Background

The Information and Knowledge Management programme (IKMP) was designed as a cross cutting programme of the Mekong River Commission (MRC) which provides information and knowledge services to other programmes as well as to National Mekong Committee and line agencies. As it was formulated in December 2006 through the approval of the MRC Council, IKMP's objective is to build a solid foundation of data, information and knowledge products, systems and services that supports the goal of the Mekong River Commission.

Phase 1 of IKMP was actually operated from January 2007 to December 2010 under the framework of 1995 Mekong Agreement and was in line with the MRC Strategic Plan 2006-2010. In order to consolidate outputs/achievements of IKMP and continue providing knowledge based products and services to other MRC programmes and member countries as needed, the second phase of IKMP is formulated to cover the period of 2011-2015 which is designed to be very much in line with new Strategic Plan 2011-2015 of the MRC.

The development objective of IKMP 2011-2015 is to ***“effectively support MRC programmes, NMCS and relevant line agencies on the development and management of water and related resources in the Mekong Basin by providing basin-wide monitoring, impact assessment, modelling, forecasting, and knowledge management system for planning and programme implementation work”***

The implementation of the IKMP 2011-2015 requires regional coordination on several management issues. This Terms of Reference (ToR) is therefore updated to guide IKMP coordination and information exchange.

The aims of IKMP are to achieve:

- (vi) IKMP is efficiently and effectively managed and communicated, and technical components are effectively supported
- (vii) A basin-wide river monitoring network is well functioning and linked with other MRC monitoring systems to provide accurate, reliable and timely hydro-meteorological and related data at basin level while strengthening relevant national and regional capacity
- (viii) An Information System of the MRC (MRC-IS) which comprehensively integrates MRC data and information, is consolidated, regularly updated and made available for internal and external uses
- (ix) MRC provided tools and related modelling services extensively used by target regional and national agencies for planning, forecasting and impact assessment
- (x) Appropriate knowledge management systems and processes developed and applied, and shared with MRC partner agencies via sustainable knowledge networks

2 Objectives

The objectives of the IKMP PCC is to ensure effective management and proper coordination of activities between the IKMP components and projects with National Mekong Committees (NMCs), donors, and concerned partners in implementation, monitoring and delivery in terms of contractual obligations between MRC and the Donors.

3 Functions and Responsibilities of the IKMP PCC are:

- 3.6 Advise on coordination of activities between the IKMP components, projects, NMCs and other MRC Programmes to arrive at optimal synergy and to avoid overlaps and unnecessary costs;
- 3.7 Discuss and agree on the annual workplan and the state of progress.
- 3.8 Agree on modifications in the schedule of activities of the projects and submit to the Steering Committee any modifications to the projects, budgets or plans, including intermediate results and activities;

4 Composition and meetings

The IKMP PCC consists of two members from each NMC and its line agencies, including the national IKMP coordinator, and two members from the MRCS including the IKMP Coordinator.

The members of the MRCS PMU and others may be invited to meetings.

The IKMP PCC meetings are chaired by the IKMP Coordinator.

The IKMP PCC meetings shall be convened biannually (every six months) in between Steering Committee meeting; preferably at MRCS.

The IKMP PCC chairman can call for specific meeting(s) if necessary or upon request from members.

Financial support will be provided for IKMP PCC meetings from the IKMP, or other MRC programmes.

5 Decisions and Reporting

The IKMP PCC meetings will make decisions by consensus. Any pending issue shall be submitted to the IKMP Steering Committee for instruction and decision.

Meeting record will be prepared after each meeting, including review of activities, conclusions and recommendations and distributed to all participants.

6 Modification of the Terms of Reference for IKMP PCC

IKMP PCC and NMCs may recommend modifications to this ToR to the IKMP Steering Committee.

Any modifications of this ToR shall be approved by the IKMP Steering Committee.

**Annex 5: Summary of key issues from IKMP Mid-term Review,
conducted by independent consultants (Niras Finland)**

**IKMP Mid-term Review; October - November 2009
Recommendations and Current Actions Taken by IKMP**

General:

1. *It is important that in general, and certainly for technical positions, exemption from*

Article 33 constraint on employment should be sought. Amendment of the agreement in this regard should be considered.

2. *A more systematic assessment of all factors restraining recruitment and retention of specialist staff is required which should include:*

a. *Review and revision of contractual terms (eg. one year rolling contracts, lack of access to employer superannuation, conditions of long term staff consultants) and other disincentives for working at MRCS to comply with more standard international employment conditions.*

b. *Consideration of a professional HR recruitment firm in order to consider approaches (marketing, head hunting) services to assist successful recruitment.*

3. *Capacity building and maintenance of a high quality IKMP team should be an explicit component of the next Strategic Plan's IKMP Work-plan with specific objectives and targets. This should be prepared with reference to the recent final report of the former Senior Modelling Advisor as well as consideration of the needs of a future distributed model for river basin management (if adopted in the next Strategic Plan).*

4. *In devising an organizational structure for the next Strategic Plan, consideration be given to an arrangement which integrates IKMP services more directly with the end using Programmes as a mechanism for improving Programme efficiencies and effectiveness. This should follow a review of the strengths and weaknesses of the various options including consultation with key staff.*

5. *The MRC and development partners consider the feasibility of options of moving from*

a DP-single Programme/project funding model, to a model whereby DP funding is for implementation of the MRC Strategic Plan with the MRC and development partners agreeing Plan priorities and overall balance. This approach could be based on a matching formula with country contributions so that countries have a greater influence and interest in funding priorities.

6. *As part of preparing the next Strategic Plan, the IKMP develop a model and strategy for moving from the current, largely centralized approach for IKM to a more distributed model which can be moved to over the next 2 strategic planning periods.*

1. Programme Management

1. The IKMP strengthen its approach as a service provider so that end user Programmes are actively involved on project steering committees and, secondly, that IKMP designate a Programme Account manager to build programme involvement and relations.

- *Invite MRCS programmes to SC meeting for relevant points*

Consideration should be given to end user programmes chairing Project/programme committees. Project committees would agree terms of reference for IKMP involvement, monitor and supervise progress.

- *Continue to make written agreements on services provision to other programs*

The steering committees should also overview provision of data from countries to programmes so that it is linked to and identified in the IKMP database.

- *Provide overview of data requested and data received pr. SC meeting*

2. The IKMP develop a M&E Log Frame approach with SMART indicators and which is then used to underpin Programme reporting as well as provide the basis for developing the Programme Plan for the next Strategic Plan period.

- *Present IKMP: Continue the activity M&E*
- *Next Phase II: make LFA in Programme document and include RM&E linked to SP11-15 and MDG (Use present draft)*

3. Programme reporting to the Steering Committee, in particular, be revised so that there is a focus on Programme and MRC level outputs and less emphasis on individual activities.

- *Change progress reports in line with RM&E*

4. IKMP should re-instate its excel based shadow financial monitoring system so that more accurate and appropriate reports are provided to the Steering Committee and which meets the Committee's needs.

- *A new edition of Solomon to be introduced with the co-hosting. Recommend to use this for Financial monitoring*

5. The MRC should be encouraged to update its Financial Management system and document management system so that it can meet the management needs of Programmes and reporting needs of Programmes and Development Partners.

- *Decision is made, see point 11.*

6. The IKMP with the MRCS management more critically analyze requests for additional services in terms of the benefits, costs and risks of the additional activities to its agreed Programme.

- *Financial and human resources to be assessed. Potentially user payment.*

7. Consideration be given to combining the Programme Coordination Committee and TACT in order to increase Programme management efficiency.

- *To be proposed on IKMP SC after discussion on TACT and PCC meetings*

2. Hydro-Meteorological Data

1) AHNIP and Mekong HYCOS

(i) It is recommended that a clear deadline is set for completing the AHNIP and HYCOS networks (beginning of 2010) in order to allow for adequate testing period before the next flood season begins in May 2010. This should lead to improved flood forecasting by the RFMMC. At the same time the AHNIP rainfall and water level data need to be quality assured and inventoried into the MRCS HYMOS database for the optimum uses of available data among MRCS and riparian countries.

- *Agreement with FMMP on testing. When operation is stable the testing starts.*

(ii) Access to ANHIP and Mekong HYCOS near real-time data has to be ensured for NMCs and line agencies, and it is recommended to disseminate simplified instructions of how to access the data for these stakeholders in order to market the

products when they are fully available and correct any misunderstandings on data access and sharing.

- *Is part of the MRCS-IS strategy.*

(iii) Although majority of the riparian country NMCs indicated their willingness and capacity to take ownership and responsibility of the IKMP hydro-met data collection related activities, the long term sustainability of the networks is a major risk due to higher level budget decision making and local capacity to maintain and operate networks and ensure provision of quality assured data. Plans should be developed to support Cambodia and Lao PDR post-2011 in operating and maintaining the ANHIP/HYCOS network.

- *Gradual handover to countries planned. Full country responsibility in SP11-15*

(iv) Acceptable flood forecasting beyond a couple of days can be expected provided there are a reasonable number of near real time rainfall stations and hydro-met stations spatially distributed over the LMB, and that this is supported by good meteorological services predicting future rainfall events. A technical study is recommended to assess the IKM needs, alternatives, cost benefit, feasibility and sustainability of increased stations for improving the accuracy of flood forecasting and for extending the forecasting period.

- *FMMP job, IKMP can assist. Also Drought assessment and Ground water issues are presently being included by IKMP.*

2) Historical hydro-met data

(i) It is recommended for IKMP to cooperate more directly with the line agencies (including upper basin countries of China and Myanmar) responsible for data collection, processing and quality assurance in terms of providing detailed explanations of the data usage and benefits of data sharing, and regularly to inform the line agencies about updated and QA datasets available at IKMP database. Mutual understanding and recognition of benefits of sharing the data both directions can also facilitate IKMP to obtain full set of hydro-met data post-2001. This will allow the models and scenarios now based on hydro-met data up to year 2001 to be updated.

- *At MRCS level dialog has started with China and Myanmar*
- *IKMP has to work via NMC's to Line Agencies. QA capacity building for LA's is planned.*

(ii) IKMP should take concentrated capacity building efforts to ensure all countries are using IKMP consistent guidelines for data collection, processing and quality assurance. Additional assistance should be directed especially to Cambodia and Lao PDR. This activity is essential not only for long term sustainability of the monitoring programs, but for the entire IKMP database to remain up-to-date through changes brought in by riparianisation, to expand the monitoring programs to fill in data gaps and to become internationally recognized.

- *Planned for modelling and Sediment Monitoring. For HM data, see point 2)(i).*

3) Sediment and discharge monitoring project

(i) Data collection and monitoring efforts of different programs (especially EP and FP) should be harmonized and integrated (location, time, personnel and budget) when sediment and discharge monitoring project begins implementation as a coordinated monitoring programme. It is highly recommended that IKMP revisits the plans developed in 2008 and firmly integrates EP and FP into Sediment and discharge monitoring project. The harmonization would provide direct benefits in terms of value

for money, ease of relating monitoring results and enhancing cooperation between MRCS programmes.

- *The firm temporal integration is described in the plan. Location integration is only possible for stations at same place. Has been planned in details with EP.*

4) Major hydro-met data gaps

(i) The scientific basis for additional base data such as groundwater levels is well known, but any new data collection, measuring and monitoring campaign should be based on an identified need of the MRC Programme outcomes so that riparian countries understand the need, see benefit and are encouraged to participate.

- *Drought and Ground water, see 1)(iv). Both issues are recognized by the countries as important. Also Water Use Monitoring (WUM) is being planned by IKMP*

(ii) New major data collection and generation campaigns should only be initiated after it is certain that line agencies are capable of providing IKMP with good quality data (and metadata) in order to reduce MRCS costs and enable concentration on core activities. This will necessitate guidelines, instructions QA and capacity building to be included and coasted in any new initiative. The costs and benefits need to be fully quantified before funding agreement.

3. GIS and Databases

1. IKMP invests more in IT infrastructure at the headquarters in order to maintain a scalable and centralized database and to make sure that the system is stable, secured and fully backed up. IKMP should also invest more on the data digitizing system (scanner) in order to speed up the process of converting and importing the hardcopies in the archive into the Master Catalogue so that it become available for practical use.

- *Is planned, but funding not available for full purchase*

2. IKMP should install license for GIS software at NMC and line agency offices so that it can be used legally. Regarding the high cost of GIS software such as ArcGIS, it is recommended that MRC negotiate with ESRI to arrange a special arrangement as the MRC is a non-profit organization. Also IKMP could explore the possibility of using a floating license or concurrent license to reduce the license cost.

- *In purchase*

3. The tools and middleware for quality assurance and catalogue should be improved in term of user interface, stability and batch processing.

- *Under development*

4. In order to successfully deploy database management and quality assurance across all MRC programmes, IKMP requires strong support from management to streamline and enforce a consistent data management policy across Programmes.

- *MRCS level*

5. IKMP will need to deliver more capacity building for quality assurance and metadata management at MRCS Programme, NMCs and line agencies levels.

- *Planned, see 2(i)*

6. IKMP should consider a package to produce updated land cover of the region using satellite imagery. Given the large size of DSF\ WUP-FIN model's grid a land cover map generated from Landsat ETM+, ASTER or even MODIS should be sufficient.

- *Corporation with FAO is established, work ongoing*

7. Development of a good DEM is a high priority in order to increase the accuracy of flood forecasts, flood risk assessment and mapping as well as to support hydrological modelling.

- *Draft strategy produced. Regional workshop planned. Funding may restrict.*

4. Modelling

1. Database update should be done as soon as possible to enable update of the modelling tools, particularly that of DSF. Calibration and model verification, sensitivity study of each model parameter affecting flow and flood characteristics should be carried out by the modelling team as well.

- *Is being implemented*

2. Additional DSF/ISIS licenses should be distributed into riparian countries to support capacity building. In addition, there should be building of the capacity of universities by providing DSF/ISIS licenses.

- *Part of the software upgrade*

3. There would be benefit from a review of the Associate Modeller Programme in order to assess its past effectiveness and the manner in which it should operate in future so that it leads to a cadre of effective hydrological modellers in the riparian countries. This should be conducted in parallel with bilateral donor support which is to be provided to Laos and possibly Cambodia. Extending participation to the staff, and postgraduates of regional is needed. Universities would also be beneficial in building a larger network of regional modellers in the medium term.

- *Associate modellers can only get some experience, not become competent modellers by joining IKMP.*

4. The IKMP should focus on maintaining and providing high quality baseline-data and basic modelling services which are of common interest of majority of the programmes. The programme-specific 'extra' services such as development of new thematic maps, development of new models and modelling services would be better self-developed by each programme or outsourced in consultation with IKMP. The IKMP task is then to coordinate with programs to provide technical support, IT infrastructure.

- *This is part of SP11-15. IKMP Phase II will support this.*

The scope to use simpler and less data demanding models should also be considered a priority.

- *The extended toolbox is created based on many criteria like usability, data needed and of course ability to provide requested results.*

5. IKMP should establish a core long term modelling team with expertise not only in hydrological modelling but also hydropower, irrigation, etc, sectoral knowledge and expertise. There needs to be an overall recognition that modelling cannot do everything, and can potentially be inaccurate and thereby provide misleading results and interpretations (such as with hydropower). The core team should be composed of 4 permanent experts selected through open (non country specific) competition (including former MRCS staff) assisted by 2 riparian modelling experts (emphasize on selection from Lao and Cambodia) and 4 associate modellers. Any replacement should be accompanied with considerable overlapping. The core modelling team has to be headed by a modeller with management experience and background (training in model development management to be provided by IKMP if necessary). IKMP should concentrate on providing VNMC and TNMC training-of-trainers programme,

which also could be linked with financial support from IKMP to the bi-lateral mutual modelling cooperation already implemented by VNMC. In addition, as training of 5 days per time is not enough for Lao PDR and Cambodia the sessions should be at least two weeks at a time and preferably longer term. Coordination of IKMP provided training must be closely planned with the bi-lateral training being provided to Laos and Cambodia by donors.

- *To cover the extensive modelling requests requires much larger staff. This is evidenced by other modelling institutions. IKMP should therefore only have core competencies in limited areas and cooperate with other modelling centers in other areas.*

6. WUP_FIN modelling tools should be incorporated into the modelling toolbox as soon as feasible and possible. These should be made available to the NMCs and line agencies with capacity building based on real life problem solving and calibration of the modelling tools as required by and within the capacity of the riparian countries. At the same time, development of further tools should be limited to finalizing the toolbox and transferrable detailed models, and model updates. The main emphasize should be aimed at capacity building at the IKMP core modelling team. Any projects undertaken in countries should be undertaken closely with the responsible line agencies and include a strong dissemination component so that decision makers are aware to the project's findings and implications.

- *There is only one toolbox, including the DSF. The toolbox will not be finalized, but continuously developed base on requirements for modelling.*

5. Communications and Knowledge Management

As part of the 2010 work plan,

1. IKMP should plan for and produce basic communications materials which will assist NMCs and line agencies in communicating with their most important stakeholders.

- *Communication tool are available on the Internet. All material at MRCS will be available via the Portal. Additional translation to riparian languages will be part of Phase II.*

2. NMCs should establish and improve their countries website and communication material.

- *See point 11*

In the period of the next Strategic Plan;

3. IKMP should collaborate more closely with universities in the riparian countries so that the knowledge and information of MRCS is transferred, incubated and in the long run accumulated to help the member countries to build overall capacity.

- *IKMP Setup Corporation with any institution that can agree to data and information sharing and knowledge transfer on a nonprofit basis.*

4. IKMP to review and plan for the further development of MekongInfo in the light of new IT based social networking features.

- *Upgrade of MekongInfo is planned and included in the Portal upgrade*

5. IKMP should improve capacity and infrastructure of NMCs to build and maintain high quality website.

- *Development should be done by professionals. Updating by the NMC's*

6. Communications and Coordination Expert (CCE) position could be considered for IKMP. The CCE would be responsible for regular communications with all stakeholders and clients act as a focal point for data requests, and coordination with service requests from other MRCS programmes and riparian countries. CCE would also be responsible for coordinating the timely production of simplified presentations and publications on research and modelling results.

- *The functions are included in the Account Manager function and other functions. That kind of position requires substantial competence.*

The Next Strategic Plan Period

1. It is important that in general, and certainly for technical positions, exemption from Article 33 constraint on employment should be sought. Amendment of the agreement in this regard should be considered.

2. A more systematic assessment of all factors restraining recruitment and retention of specialist staff is required which should include:

a. Review and revision of contractual terms (eg. one year rolling contracts, lack of access to employer superannuation, conditions of long term staff consultants) and other disincentives for working at MRCS to comply with more standard international employment conditions.

b. Consideration of a professional HR recruitment firm in order to consider approaches (marketing, head hunting) services to assist successful recruitment.

3. Capacity building and maintenance of a high quality IKMP team should be an explicit component of the next Strategic Plan's IKMP Work-plan with specific objectives and targets. This should be prepared with reference to the recent final report of the former Senior Modelling Advisor as well as consideration of the needs of a future distributed model for river basin management (if adopted in the next Strategic Plan).

4. In devising an organizational structure for the next Strategic Plan, consideration be given to an arrangement which integrates IKMP services more directly with the end using Programmes as a mechanism for improving Programme efficiencies and effectiveness. This should follow a review of the strengths and weaknesses of the various options including consultation with key staff.

5. The MRC and development partners consider the feasibility of options of moving from a DP-single Programme/project funding model, to a model whereby DP funding is for implementation of the Strategic Plan with the MRC and development partners agreeing Plan priorities and overall balance.

This approach could be based on a matching formula with country contributions so that countries have a greater influence and interest in funding priorities.

6. As part of preparing the next Strategic Plan, the IKMP develop a model and strategy for moving from the current, largely centralized approach for IKM to a more distributed model which can be moved to over the next 2 strategic planning periods.

Annex 6: Summary of benefit from generating the Digital Terrain Model (DTM) for the floodplain area

DTMs are used in many parts of the world for various purposes. The major reported uses of DTMs were in terrain modelling, map visualization, and hydrologic modelling, which in turn is the foundation for Socio Economic and environmental analyses. Land use and water resource utilization planning are basic products derived from DTM and are critical for decision-making if they are accepted to be valid and reliable representations of reality.

The following benefits are derived from accurate DTM:

1. Benefits of DTM and Floodplain Maps

A high-resolution digital terrain model (DTM) would provide basic information to create current and accurate flood maps that would benefit each member state of the MRC both for governments and the private sector.

The MRC member countries have suffered from flooding, mostly due to flash flood and river overflow. Better floodplain maps could help reducing damages by helping communities manage the situation and mitigate the effects before the floods. Such decisions could save lives and money by reducing the damage by planning projects that include levees, bypass channels, and upstream divisions based on reliable DTM data.

Soil maps are critical for farmers, developers and natural resource managers. Many Ministries of Agriculture have older soil maps that can be upgraded by utilizing DTMs to correct spatial displacement of soil boundaries. High-resolution DTMs could improve and help Ministries get the soil maps they need.

A high-resolution DTM also benefits other users such as developers, surveyors, engineers, government agencies, and the general public. The elevation data can be used on a regular basis for the purposes of reviewing mining operations, Cell phone tower sitting, Wetland delineations, Flood management control, River basin studies and Land use zoning etc.

The following are the benefits of using high-resolution DTM for activities were proposed to be conducted according to the MRC Strategy on Flood Management and Mitigation in 2000.

2. Benefit of DTM for modelling and flood relate to the MRC Strategy on Flood Management and Mitigation

According to the strategy, four major groups of management measures to reduce flood risk and flood hazard across the floodplain are (a) Land-use planning, (b) Structural measures, (c) Flood preparedness, and (d) Emergency management. The accurate DTM plays a unique role to increased efficiency and quality outputs of those measures. The following are some examples of using the DTM:

- a. Land-use Planning measures on the floodplain aim to ensure that the vulnerability of a particular land-use activity is consistent with the flood hazard on that area of land, ie the objective is to keep people and vulnerable activities out of the most hazardous areas of the floodplain. To define the flood hazard on that area of land, the use of accurate DTM data as base data input would lead to increased efficiency and quality of modelling works for flood hazard and flood risk analysis.

According to the 7th Annual Mekong Flood Forum statement, the Land use zoning related to flood risk management may be a very effective contribution to the reduction of flood risk and mitigation. (7th Annual Mekong Flood Forum (AMFF-7), forum statement, page 2)

- b. The accurate DTM is the crucial data input for fulfil support the Role No1 of FMM Strategic Roles and Elements of Floodplain Management such as structural measures that aimed at 'keeping floodwaters away from the people' based on typical structural measures include flood mitigation dams, embankments and flood detention basins. For Development and Building Controls, it can be seen as a particular kind of structural measures for urban and settlement areas, aimed at reducing flood damage to buildings. Typical building controls include minimum floor levels to eliminate nuisance flooding, and the use of building materials and building designs that enable rapid and effective cleanup after a flood.

Regarding, The 7th Annual Mekong Flood Forum, 13 and 14 May 2009, Bangkok, Thailand, the participants expressed their strong wish to continue with their efforts to improve structural measures, flood proofing and the preparedness for floods by improved flood forecasting and early warning, as well as to increase their cooperation based on the overarching objective to reduce flood risk and flood damage in the Mekong River Basin. (7th Annual Mekong Flood Forum (AMFF-7), forum statement, page 1)

- c. To support the FMM Strategic Role namely Flood Preparedness and Emergency Management, the flood risk maps, flood extent, flood depth, flood duration and scenarios' simulation of flooding by incorporation up to date information on land use, structure development, etc should be produced by using the accurate DTM and present them in form that is easy to understandable and easily retrieved by field worker in emergency operations. (MRC Strategy on Flood Management and Mitigation 2000, page 13)

Some of the other activities that would benefit from a high-resolution DTM are as follows:

- a. Transportation Infrastructure. Planning, design, construction and maintenance of transportation infrastructure benefit greatly by the availability of accurate and comprehensive high-resolution terrain data. This data would lead to increased efficiency and quality in hydrologic and hydraulic analysis and design work important for dealing with water flowing off or under roadways. DTM data would support transportation project streamlining because preliminary drainage design could begin without waiting for drainage area mapping to be completed. The DTM data will also support better communication about drainage issues, both within other government units and the public, because of the ability to create clearly understood graphics.
- b. Land Use Management. Availability and use of an accurate DTM would expedite planning and development of land use for precision agriculture, drainage systems, land subdivision, utilities, commercial and industrial districts, etc., and improve the quality of soils mapping.
- c. For Surface and Groundwater Models the availability of a DTM would make it possible to build and run mathematical models representing rivers, lakes, and groundwater flow systems on a regional basis. Regional models are essential tools in timely response and coordination between government agencies and the communities.
- d. Related to Natural Resources Management, the quality of life and sustainability of its water and land resources (forestry, fish and wildlife, minerals, etc.) depend on wise management of these resources. One of the data inputs in planning and implementing sound management ideas is high-resolution elevation data. A DTM would significantly enhance the ability to manage natural resources efficiently and effectively.

MRC has already developed a series of flood models and flood probability maps in the past years. Using the detail and accurate topographic data (DTM), they can provide the level of detail needed for land use or infrastructure planning as well as flood risk assessment.

DTM or Elevation data for many parts of the Mekong basin, particularly the Cambodian floodplain, are inadequate for modelling flood extent, depth and duration and associated flood hazard and risk, and other fundamental data. Sub-metre accuracy for the Cambodia floodplain and other areas are required to support IKMP flood modelling, flood forecasting (FMMP Component 1) and flood risk assessment (FMMP Component 5).