# Basin Development Strategy

# for the

# Mekong River Basin

## 2021 - 2030

*Complete Second Draft of Part I and First Draft of Part II*

4 March 2020

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## Abbreviations and acronyms

| | |
|---|---|
| **ACMECS** | Ayeyarwady-Chao Phraya Mekong Economic Cooperation Strategy |
| **ADB** | Asian Development Bank |
| **ASEAN** | Association of South-East Asian Nations |
| **BDS** | Basin Development Strategy |
| **CRBMF** | Core River Basin Management Functions |
| **CSO** | Civil Society Organisations |
| **DSS** | Decision Support System |
| **ESIA** | Environmental and Social Impact Assessment |
| **FAO** | Food and Agriculture Organisation |
| **GDP** | Gross Domestic Product |
| **GIS** | Geographic Information System |
| **GMS** | Greater Mekong Sub-region |
| **GW** | Gigawatt, 1000 MW |
| **GWh** | Gigawatt hours, 1 million kilowatt hours |
| **HYCOS** | Hydrological Cycle Observing System |
| **IWRM** | Integrated Water Resources Management |
| **JCCCN** | Joint Committee on Coordination of Commercial Navigation on Lancang-Mekong River |
| **LMRB** | Lower Mekong River Basin |
| **LMC / MLC** | Lancang-Mekong Cooperation / Mekong-Lancang Cooperation |
| **MLC Water** | Mekong-Lancang Cooperation on water resources |
| **LMI** | Lower Mekong Initiative |
| **M&E** | Monitoring and Evaluation |
| **MRB-IF** | Mekong River Basin Indicator Framework |
| **MoU** | Memorandum of Understanding |
| **MRC** | Mekong River Commission |
| **MRC SP** | Mekong River Commission Strategic Plan |
| **MRCS** | Mekong River Commission Secretariat |
| **MTR** | Mid-Term Review of the MRC Strategic Plan |
| **MW** | Megawatt |
| **NIP** | National Indicative Plan |
| **NPV** | Net Present Value |
| **NMCS** | National Mekong Committee Secretariat |
| **PDIES** | Procedures for Data and Information Exchange and Sharing |
| **PMFM** | Procedures for the Maintenance of Flows on the Mainstream |
| **PNPCA** | Procedures for Notification, Prior Consultation and Agreement |
| **PWQ** | Procedures for Water Quality |
| **PWUM** | Procedures for Water Use Monitoring |
| **RFDMC** | Regional Flood and Drought Management Centre |
| **SDG** | Sustainable Development Goal |
| **SOBR** | State of Basin Report |
| **UN** | United Nations |
| **USD** | United States Dollar |
| **WB** | World Bank |

# PART I: BASIN DEVELOPMENT STRATEGY

## 1.0 INTRODUCTION

### 1.1 Purpose and scope of the Strategy

This Integrated Water Resources Management (IWRM)-based Basin Development Strategy (BDS) sets out how water and related resources of the Mekong River Basin[1] should be utilised, managed and conserved over the period 2021-2030 from the perspectives of the Lower Mekong River Basin countries of Cambodia, Lao PDR, Thailand and Viet Nam, in-line with their commitment to the *Agreement on the Cooperation for the Sustainable Development of the Mekong River Basin* (the *1995 Mekong Agreement*).

The *1995 Mekong Agreement* establishes the goals, objectives and underlying principles by which the four Member Countries intend to cooperate, and to which this Strategy responds. These may be summarised as:

- To cooperate in all fields of sustainable development, utilisation, management and conservation of the water and related resources of the Mekong River Basin, in a manner to optimise multiple uses and mutual benefits … including, but not limited to irrigation, hydro-power, navigation, flood control, fisheries, timber floating, recreation and tourism (Article 1);
- To promote the development of the full potential of sustainable benefits and to prevent wasteful use with an emphasis and preference on joint and/or basin-wide development projects and basin programs through the formulation of a *basin development plan* (Article 2);
- To protect the environment, natural resources, aquatic life and conditions, and ecological balance (Articles 3 and 7-10); and
- To utilize the waters of the Mekong River system in a reasonable and equitable manner (Articles 4-6).

**The BDS is a basin-wide strategy** whose main purpose is to guide all actors involved in Mekong water-related issues towards achieving improvements in the environmental, social and economic state of the Mekong River Basin, which is periodically recorded in the State of Basin Report (SOBR). The BDS uses the SOBR to identify the key issues faced by basin countries in developing and managing the water and related resources and sets out the way in which the countries agree to cooperatively address these issues in order to promote the sustainable development of the basin in-line with the aims and intent of the *1995 Mekong Agreement*.

The Strategy contributes to a wider adaptive planning process linking regional and national plans towards realising the common vision of an *economically prosperous, socially just, environmentally sound, and [climate resilient]* Mekong River Basin. The Strategy provides an integrated basin perspective for enhancing national plans and projects to ensure an

[1] In the MRC context, Mekong River Basin refers to the whole river basin from source to sea and is divided into Upper Mekong, called Lancang in China, and Lower Mekong. In the context of cooperation with China, the whole river is often referred to as "Lancang-Mekong River".

acceptable balance between economic, social and environment outcomes, with benefits to all basin countries and peoples.

Unlike previous editions with a timeframe of five years, the BDS 2021-2030 is prepared and agreed for a ten-year period. In addition to articulating the vision toward 2040, the Strategy:

- aligns cooperative basin management and development to contribute to the achievement of the United Nations **Sustainable Development Goals** by 2030;
- outlines **opportunities** to promote sustainable development and strengthen management in the basin, and thereby increase regional and national benefits;
- sets medium term **strategic priorities** for all relevant actors in the basin to strengthen basin management and ensure implementation of the opportunities will contribute to optimal and sustainable development pathways;
- defines **outcomes** and **outputs** towards 2030 to address the basin-wide strategic priorities.

The BDS 2021-2030 is prepared under the framework of MRC cooperation, with engagement of all basin countries and relevant regional organisations. Unlike previous editions, greater emphasis of the strategy is on the actions needed for the entire Mekong River Basin, since the current water security issues can be addressed effectively only at the basin scale through cooperation between all six basin countries and their cooperative bodies. The strategy covers all water and related sectors. The priorities include outcomes and outputs that other key regional organisations will contribute to through the implementation of their own strategies and action plans. It highlights the cooperation that is needed with the Mekong-Lancang Cooperation (MLC)[2] water priority area. Unlike other Mekong related regional cooperation mechanisms, the MLC Water platform facilitates cooperation among all six riparian countries (including China and Myanmar, which are longstanding MRC Dialogue Partners) on water resources management and development, including but not limited to the Mekong river basin.

The BDS 2021-2030 is designed for implementation by all national and regional level stakeholders, including government agencies, private developers, regional organisations and programmes, development partners, scientific and advisory institutes, civil society organisations and others. The MRC will implement a substantial part of the Strategy's strategic priorities itself through its Strategic Plan and, consistent with its coordination role, promote and track implementation of the remainder by the other actors as described in Chapter 6.

## 1.2 Need for Strategy updating

By global standards, the Mekong River is both of great importance and challenging to manage due to its highly variable inter- and intra-annual flow and its transboundary nature. This challenging context creates both risks and opportunities, and the risks are growing as populations and economies grow and as the climate changes. Assessing and mitigating the risks requires early and joint action, as solutions will become much more difficult and costly over time with uncoordinated development that does not optimise regional benefits and minimise regional costs.

[2] Mekong Lancang Cooperation (MLC) is used here and is interchangeable with the Lancang Mekong Cooperation (LMC).

The previous BDS for 2016-2020 set strategic priorities to capture water resources development opportunities and manage the risks of national ongoing and planned developments. These cross-cutting priorities are still largely relevant, but the Strategy is updated herein considering major changes in the basin over recent years as described in the State of Basin Report and Mid-Term Review of the previous MRC Strategic Plan:

- **Hydropower dams constructed on the mainstream** in the Upper Mekong River Basin and on tributaries in the Lower Mekong River Basin have changed the natural flow regime of the river, yielding both opportunities and risks. The construction of the first two dams on the mainstream in the Lower Mekong River Basin is also now complete and others are progressing through the planning process;

- **Floodplains are being developed** and flood protection and river training are being taken up at many locations along the mainstream and especially in the delta. Industrial activities such as sand mining from river channels are increasing;

- **The potential for water-related emergency situations is increasing**, including from dam breaks, sudden water level changes, and water quality incidents from increased navigation, development pressures and climate change. Natural disasters, such as flood and droughts, could become more frequent and severe in future;

- **Developments outside the water sector** are impacting water related resources. These include the construction of (international) roads, railways and power transmission infrastructure, the development of non-irrigated agriculture and mining activities, as well as deforestation and urbanisation;

- **There are new regional actors**, including the Mekong-Lancang Cooperation, with a mandate for water resources development and management, and an ASEAN increasingly focused on water-related disasters (see Table 6.1), leading to new relationships for managing the Mekong;

- **Broader societal and economic developments**, including decreasing poverty, increasing regional integration, technological advances (e.g. in earth observation and new energy options), and a common focus on the 17 United Nations Sustainable Development Goals are bringing new opportunities and challenges for all countries.

Recent assessments of future development scenarios have confirmed that nationally planned development is sub-optimal from a basin-wide perspective. The plans create large national economic benefits, but they also pose impacts and risks at the basin level, including falling short in protecting key environmental assets and millions of people against major floods and droughts. Furthermore, the benefits, impacts and risks from basin development may not be viewed as equitably distributed. The siting and design of some of the projects that are progressing could prevent implementation of the joint projects needed to increase water security and help achieve the mutually beneficial basin vision.

**A sense of urgency is growing** among stakeholders on the need to move basin development towards more "optimal" and sustainable outcomes that address long-term needs, including water, food, and energy security. This requires increased levels of regional cooperation and integration. Experience from other regions suggests that joint management and development, with cost and benefit sharing agreements will be necessary if the people of the Mekong region are to transition to middle/high income status in a manner that is in long-term balance with the basin's ecosystems. The significant investment in data and knowledge under the Mekong cooperation of the past sixty years makes the Mekong River Basin more prepared than most basins that have reached such agreements.

The updated Strategy for 2021-2030 addresses these pressing issues and takes regional cooperation a step further towards more optimal and sustainable development by emphasising:

- **Proactive regional planning,** which involves moving beyond the set of infrastructure projects that the basin countries are currently planning to identify new projects for consideration by countries in future updates to national plans that could increase synergies and reduce trade-offs at both the basin and national levels, and provide a comprehensive response to climate change and related water security challenges;

- **Coordination of basin operational management** where there may be transboundary effects, including for river flow management, sediment management, management of emergencies, and coordination of the design and management of hydropower cascades;

- **Modernisation of data and information acquisition and sharing** by consolidating and upgrading monitoring, information, decision-support and communication systems to a level and disaggregation that is fit-for-purpose for proactive regional planning and operational basin management, and getting information to key stakeholders and the public;

- **More integrated Mekong-Lancang management arrangements** including by setting up joint basin expert groups to oversee and direct the work streams in the above areas, and by increasing data sharing and cooperation between the two regional water platforms: MRC and MLC Water.

Accordingly, the implementation of this Strategy during 2021-2030 is intended to move all parties beyond reactive regional planning towards proactive regional planning and to coordinate basin operational management, supported by modern monitoring and decision support systems. By 2030, which coincides with the objective for self-financing of the MRC and the targets for achievement of the SDGs, the management of the Mekong River Basin will need to match the needs of a fast-developing Mekong region.

## 1.3 Approach to Strategy updating

This BDS for 2021-2030 is based on the findings of a range of basin-wide assessments, reviews and studies. The resulting strategy aligns with the Siem Reap Declaration of the Third MRC Summit held on 5 April 2018 (see Box), as well as the Phnom Penh Declaration of the Second Mekong-Lancang Cooperation Leaders' Meeting "Our River of Peace and Sustainable Development" on 10 January 2018 and the Five-Year Action Plan on Lancang-Mekong Water Resources Cooperation (2018-2022).

**Declaration of the Third MRC Summit - priority areas for action**

- Optimize development opportunities and address challenges through a basin-wide, integrated and inclusive multi-disciplinary process
- Consider the key findings of the Council Study to capture development opportunities and address trade-offs, benefit sharing and risks
- Continue to improve the dissemination, uptake, and use of MRC products by relevant line agencies and organizations
- Continue the momentum in implementing MRC Procedures
- Strengthen basin-wide monitoring networks and forecasting systems for floods and droughts, and the related data and information management systems
- Implement the BDS, SP and NIPs with greater efforts focussing on joint projects and the implementation of the decentralization roadmap
- Identify and implement opportunities for further cooperation with Dialogue Partners, Development Partners and other partners
- Concrete cooperation should be pursued with ASEAN, Mekong-Lancang Cooperation, and Greater Mekong Sub-region towards a shared future

This BDS recognizes that sustainable development in the basin depends on social equity and the resilience of the basin population, and that economic development as well as targeted policies and actions will be necessary to address inequity. The strategy therefore recognizes a "gender and vulnerability" approach to account for intersectional inequity and the different dimensions of vulnerability.

The Strategy updating forms a key step in the implementation of the strategic planning cycle facilitated by the MRC (Figure 1.1). The updated Strategy builds on the experience gained during the preparation and implementation of the BDS 2016-2020, and further considers:

- The progress made in implementing the strategic priorities of BDS 2016-2020 and lessons learned (see Section 1.4);
- The 2018 State of Basin Report (SOBR), which identifies the key issues the BDS should address and measures the effectiveness of its implementation (Chapter 3);
- The national perspectives of basin countries and regional perspectives of relevant regional organisations (see Chapters 4 and 5);
- Changes in national plans for the development and management of water related resources (Section 2.4);
- Recent scenario assessments, including the Council Study, which provides an outlook to future benefits, impacts and risks of current national plans (Chapter 3);
- Regional or basin-wide sector strategies for hydropower, navigation, environment, fisheries, climate change adaptation, drought mitigation and management, and studies on flood risk reduction in the delta;
- A review of water-related strategies and plans of regional organizations, initiatives and programmes, and the mapping of priority areas relevant to achieving the Outcomes of the BDS (Section 2.5 and 6.2).

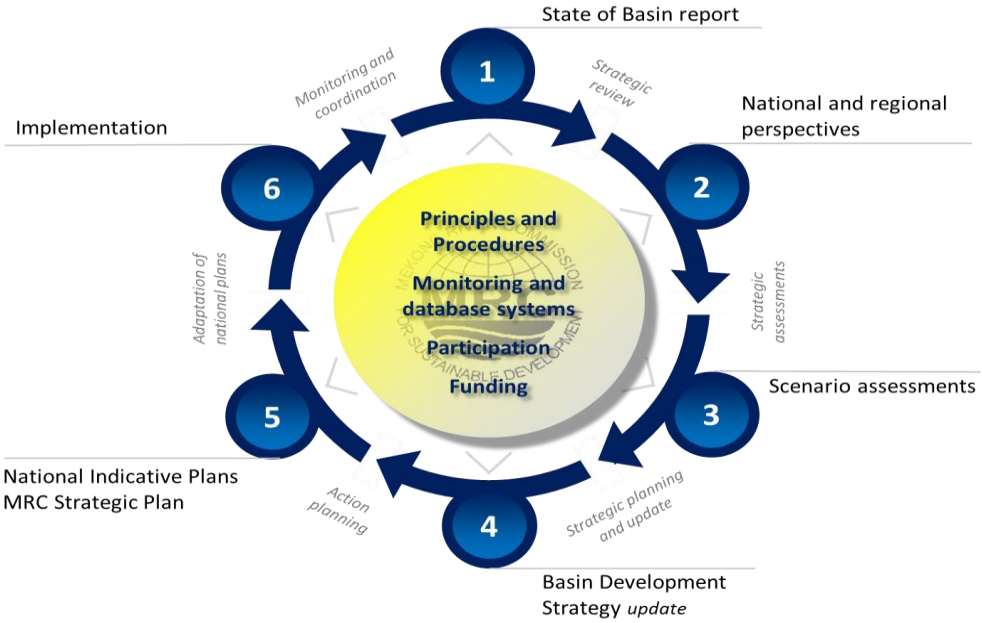



**Figure 1.1:** Mekong Basin strategic planning cycle

This Strategy has been prepared with contributions from each MRC Member Country's National Mekong Committee Secretariat (NMCS) and national line/implementing agencies;

and engagement of MRC Dialogue Partners (China and Myanmar); MLC Water; relevant regional organizations, initiatives and programmes such as ASEAN, GMS and others; private sector and development partners; and broader stakeholders. The final version of the updated BDS has been negotiated by senior government officials from the Member Countries prior to consideration and approval by the Ministers in the MRC Council on behalf of their respective Governments.

## 1.4 Implementation of the Strategy 2016-2020 and lessons learnt

The BDS 2016-2020 comprised development opportunities, 7 strategic priorities (see Box), and 37 strategic actions. The development opportunities are being implemented by the basin countries through their national sector plans. Since 2016, several opportunities have moved from the planning to the implementation stage (see Section 2.2).

**The 2016-2020 strategic priorities**

1. Reduce remaining knowledge gaps to minimise risks
2. Optimise basin-wide sustainable development and cost and benefit sharing
3. Strengthen the protection of mutually agreed environmental assets
4. Strengthen basin-wide procedures and national implementation capacity
5. Improve national water resources development
6. Enhance information management, communication and tools
7. Increase cooperation with partners and stakeholders

The strategic actions under each of the 7 strategic priorities were to be implemented at both regional and national levels through the MRC's Strategic Plan (SP) 2016-2020 and the National Indicative Plans (NIPs) of the four Member Countries. Due to the restructuring, downsizing and decentralisation of MRC core river basin management functions, a considerable part of the strategic actions will not be substantially completed by 2020. There are also gaps where neither the SP nor NIPs fully address key aspects of the BDS and some of the completed actions still have to be taken up by relevant agencies (government, non-government and development partners) in order that they contribute to the achievement of the strategic priorities.

Strategic actions that had not started, or will remain substantially incomplete, or might not be taken up at national or regional levels by the end of 2020, as well as actions that have ongoing relevance, are included in the results chain of this BDS 2021-2030. The implementation of the BDS 2016-2020 resulted in a number of important lessons. They have been used to prepare this BDS for 2021-2030.

**A focus on traditional basin planning is not sufficient.** During 2016-2020, communities in various parts of the Mekong River Basin were confronted with unusual or rapidly changing flow conditions and water-related emergencies (including a dam breach). In most cases, it took too long for the national and regional water management agencies to clearly communicate to the public what was happening, how they were responding to the situation, and what the implications would be. With increasing development and erratic climate events, the number of water-related incidents is likely to rise. Since many incidents may have transboundary impacts, river basin coordinators (such as the MRC) will need to focus increasingly on coordination of management and operational issues, supplementing their conventional role in basin planning processes.

**Reactive regional planning is likely to lead to sub-optimal outcomes**. There can be large positive impacts associated with basin development decisions, but large costs and trade-offs as well. Regional planning that only assesses the impact of existing national plans and recommends not implementing certain projects, rather than offering a broader range of

possible projects, is unlikely to be accepted by national governments. While the MRC has succeeded in working with countries to change the design of some infrastructure projects to minimize negative impacts, current national plans themselves have not been changed over several MRC planning cycles, even with increasing knowledge and awareness of their cumulative impacts. This is largely due to a failure to identify a regional plan capable of producing higher benefits and lower costs based on a comprehensive assessment of options. Breaking this cycle of only reacting to established plans, to proactively identify alternative pathways that achieve higher benefits across sectors and between countries, is critical to the Mekong River Basin vision.

**The scope of issues and challenges faced by basin countries is basin-wide**. The development of basin water resources is having increasingly evident transboundary effects. This is illustrated in rapid water level fluctuations, diminished sediment flows, and a change in the annual hydrograph. Future developments, including for flood and drought risk reduction, will further augment these changes. Managing these changes in the most effective way possible can only be done through cooperation between all six riparian countries, requiring a strategy applicable to the entire basin and to guide the actions of all relevant actors towards common goals.

**Better use could be made of existing data.** A substantial amount of data has been collected over many years by the Member Countries and the MRCS. However, the value of this data is limited without effective data management systems and tools in place. A lack of integration and harmonisation between regional and national systems introduces inefficiencies and difficulty accessing information and data when it is needed. The application of new technology is part of the solution.

**An alternative approach to decentralised monitoring is necessary**. The approach to the decentralisation of core river basin function monitoring activities over 2016-2020 focused on the handover of both the operational aspects of water-related data collection, processing and analysis, along with the financial responsibility for those activities to individual implementing agency budgets within Member Countries. This approach has been found to be unsustainable and requires a re-think. A better approach would involve the complete decentralisation of water-related data collection functions, while maintaining a regional approach to the management of a core monitoring network with financial support provided by Member Country contributions to the MRC budget.

**The strategies and action plans of all relevant actors need to be aligned to achieve the Basin Development Strategy Outcomes**. To achieve the basin vision and goals, all water resource management actors need to be working towards common objectives. Without this alignment, the BDS outcomes can only ever be partially achieved. The MRC Strategic Plan 2021-2025 is therefore fully integrated through its results chain with the BDS and the impact pathway from output to outcome more fully described. The contribution to BDS outcomes by other regional organizations and initiatives would also be more explicitly identified.

**Need to inform the public in a timely manner.** Unbalanced, biased and incorrect statements and journalism on water-related issues in social and other media are an increasing concern for the basin countries and the MRC. Misinformation is contributing to conflicting perceptions across stakeholder groups, feeding mistrust and affecting regional relations. To mitigate this situation, MRCS, in collaboration with key actors such as LMC Water Center, and countries need to provide timely factual and even-handed information in traditional and social media, newspapers and other avenues on the actual situation in the basin, the causes of changes, and how they are responding to unusual water-related issues.

**Country-to-country capacity building could be improved.** The capacity of some countries to effectively oversee the large-scale water infrastructure being developed and operated in their territories is limited. This capacity needs to be urgently developed to ensure effective oversight of operations so that infrastructure is in good condition when concession agreements come to an end (and loans are repaid) and greater economic benefits to the countries can be realised. There is also a need for increased capacity in planning and management of many water-related sectors. Different human and technical capacity among basin countries provides an opportunity for greater use of country-to-country knowledge sharing and capacity building.

**Rethink the formulation and implementation of the NIPs**. In 2011 and 2016, National Indicative Plans (NIPs) were formulated to support BDS implementation at the national level. The NIPs were seen as the primary channel by which basin perspectives, river basin management functions, sustainable development opportunities, and regional guidance and tools would be promoted and mainstreamed into the five-year national socio-economic and sector planning and annual work planning of relevant national agencies. The formulated NIPs varied widely in terms of scope, budget, funding approaches, and ownership by national line agencies. Although there have been some implementation successes in bringing regional and national planning closer together, this Strategy recommends a rethink of the NIPs. The NIPs need to have a stronger focus on increasing regional benefits and reducing regional costs through follow-up actions from regional processes and outputs, including guidelines, sector strategies, and identified (joint) infrastructure projects to build climate resilience and reduce flood and drought risks. All planned major infrastructure projects need to feature in the NIPs to facilitate more proactive regional planning and coordinated basin management operations. In addition, the NIPs need to be 'rolling' plans to better align with national planning and budgetary cycles and accommodate new regional and joint initiatives.

# 2.0 WATER RESOURCES MANAGEMENT AND DEVELOPMENT

This chapter describes the current situation with water resources management and development in the Mekong River Basin. It illustrates that although consumptive use of the basin's water resources has so far been limited, water resources development is transforming the basin in many ways. Water resources management lags development but is improving.

## 2.1 The Mekong River Basin

The Mekong River rises in the Himalayas at an elevation of about 5,000 m. It is the world's 12th longest river, flowing for almost 4,763 km through the People's Republic of China, where it is known as the Lancang River, Myanmar, Lao PDR, Thailand, Cambodia and into the sea from Viet Nam (Figure 2.1). The Mekong has the world's 8th largest flow, with a mean annual discharge of approximately 446 km$^3$, and its basin is the world's 21st largest by area, draining 810,000 km$^2$.

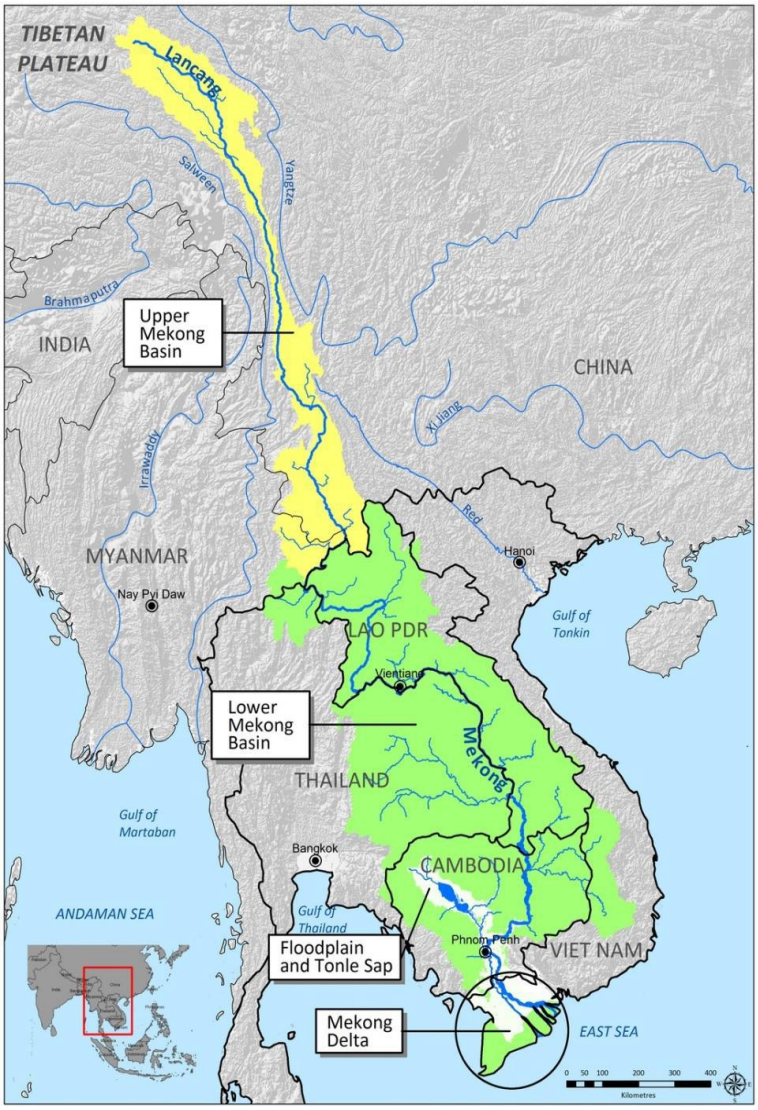



**Figure 2.1:** The Mekong River Basin

The hydrology of the Basin is characterised by very high inter-annual variability, with discharge over the wet season on average 5-10 times greater than over the dry season (Figure 2.2). Snowmelt off the Tibetan Plateau dominates dry season discharge north of Vientiane, Lao PDR. Between June and October, the Southwest Monsoon delivers a discharge pulse from the Mekong tributaries when the monsoonal winds meet the Annamite range along Lao PDR, Cambodia and Viet Nam. Along with tropical storms moving in from the sea, this can contribute to extensive flooding in parts of Lao PDR and in the Mekong Delta in Cambodia and Viet Nam. These wet season peak flows also cause the large flow reversal up the Tonle Sap River to the Great Lake in Cambodia, triggering fish movement and delivering a pulse of sediment and nutrients to the floodplain, which supports fish and other biodiversity, and enables recession rice agriculture around the lake.

This annual cycle of flooding is the basis of water resources productivity within the basin, benefiting the local inhabitants for centuries through abundant fisheries and fertile floodplains. The magnitude of the annual flood has led to the concept of 'living with floods' which recognises the valuable role flooding plays in the economy and society of the region, and the need to work in harmony with that cycle, while seeking to mitigate the destructive nature of the most extreme events.

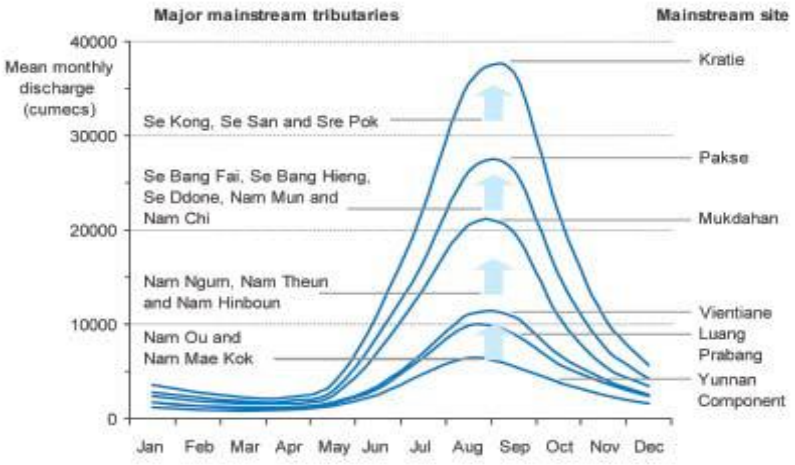



**Figure 2.2:** Mean monthly discharges at various sites on the mainstream and the major tributary sources in each reach

## 2.2 Water resources development

Around 12% of the average annual runoff of the Mekong River Basin is consumptively used before it reaches the sea, through water resources development including agricultural and urban uses. By 2040, this proportional use is projected to increase to around 15%.

While this proportion of consumptive use is relatively low compared to many other river basins around the world, the disparity in flow between the wet and dry seasons raises challenges for water resource development, particularly in terms of water security for agriculture and other human uses throughout the year and in different parts of the basin. Although there have been plans for capturing flows during the wet season and redistributing during the dry season for more than half a century, it is only relatively recently that countries in the region have invested in significant storage capacity in parts of the basin – in China through the development of the Lancang Hydropower cascade, notably Nuozhadu and Xiaowan dams on the mainstream, and with numerous lower storage capacity reservoirs on the tributaries and more recently on the mainstream, albeit with run-of-river operations.

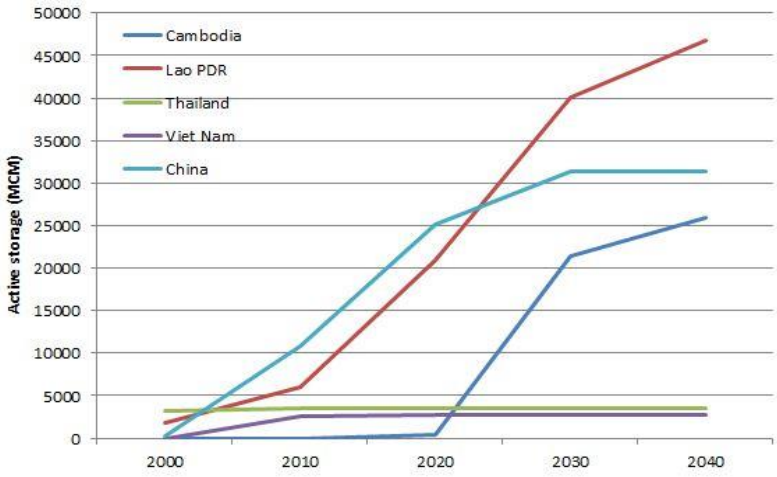



**Figure 2.3:** Trends and outlook for total active storage

The current level of active storage in the basin (Figure 2.3), at about 14% of mean annual runoff, is relatively low compared to many major rivers around the world. Based on current national plans it is forecast to increase to around 22%, offering the potential to support

national irrigation and hydropower development plans and to help mitigate floods and droughts. Almost half of the current regulating capacity has been developed in China.

The water resources of the Mekong River Basin are on a rapid development trajectory. While development in some parts of the basin commenced more than a century ago, in other parts the exploitation of the water and related resources is more recent. As with many river basins around the world, development started from downstream (Figure 2.4).

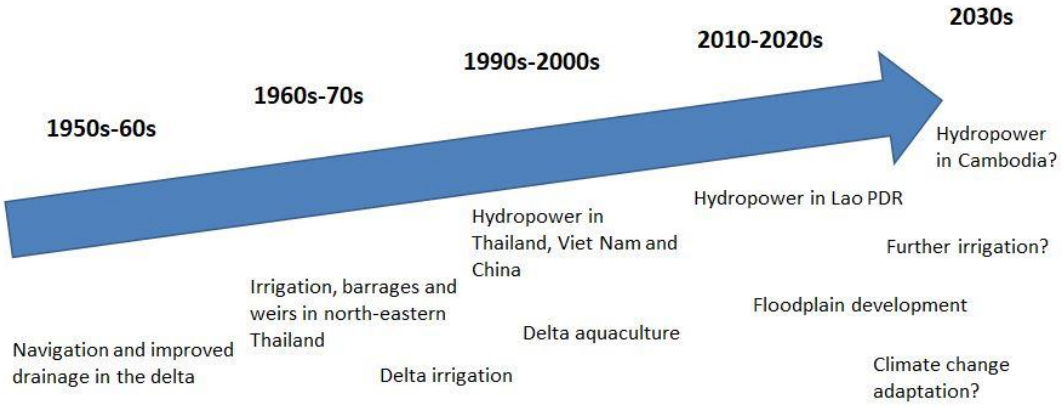



**Figure 2.4:** Illustration of basin development trajectory since the 1950s-60s to 2030 and beyond

Viet Nam first invested in navigation and improved drainage in the fertile Mekong Delta and by the 1960s began to construct intensive canal systems, pumps and other means of irrigating the floodplain. Its approach to agricultural development has been extraordinarily successful with the delta these days supporting three rice crops a year. The last 20 years or so have also seen substantial development of aquaculture ponds and the construction of 14 hydropower dams on tributaries in the Central Highlands, upstream of Cambodia.

Thailand has long had a focus on improving water security in its north-eastern provinces with the construction of barrages and weirs and a number of irrigation dams and schemes within the Chi-Mun River basin and areas draining directly to the Mekong. In addition to rice, the paddy fields and connected canals and streams support a productive capture fisheries sector which helps to diversify income for much of the population. Thailand constructed seven hydropower projects on Mekong tributaries from the mid-1960s onwards, although only two with installed capacity of more than 100 MW. Thailand is currently focused on modernising and improving the efficiency of much of its existing water resources infrastructure. For example, by installing pump-back systems at Lam Takong and Chulaporn dams and floating solar panels at Sirindhorn reservoir.

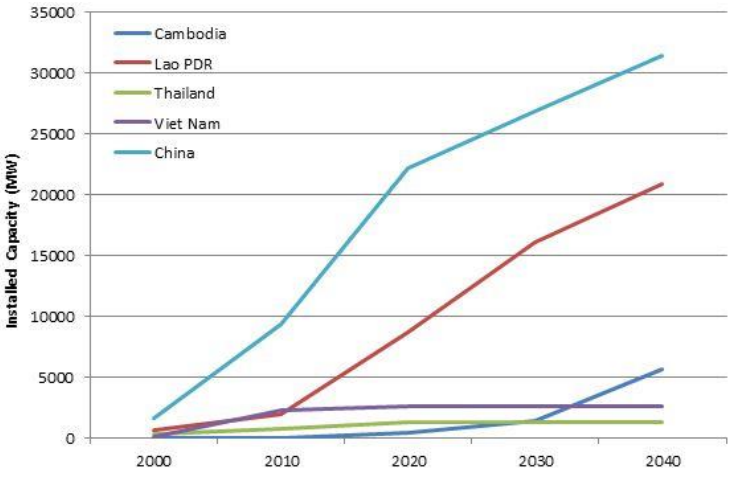



**Figure 2.5:** Trends and outlook for hydropower installed capacity

Wars and political instability in the latter part of the 20th century meant that development in Cambodia and Lao PDR was delayed for several decades and is only now coming to fruition. Lao PDR has commenced construction of the lower Mekong hydropower cascade that was in the last basin plan of Mekong Committee, the MRC's predecessor, including the recently built run-of-river Xayaburi and Don Sahong. These dams are among more than 100 projects either built or planned on the tributaries and mainstream within Lao PDR which aim to help meet regional energy demand including through the regional transmission grid being progressed under the Greater Mekong Sub-region cooperation initiative.

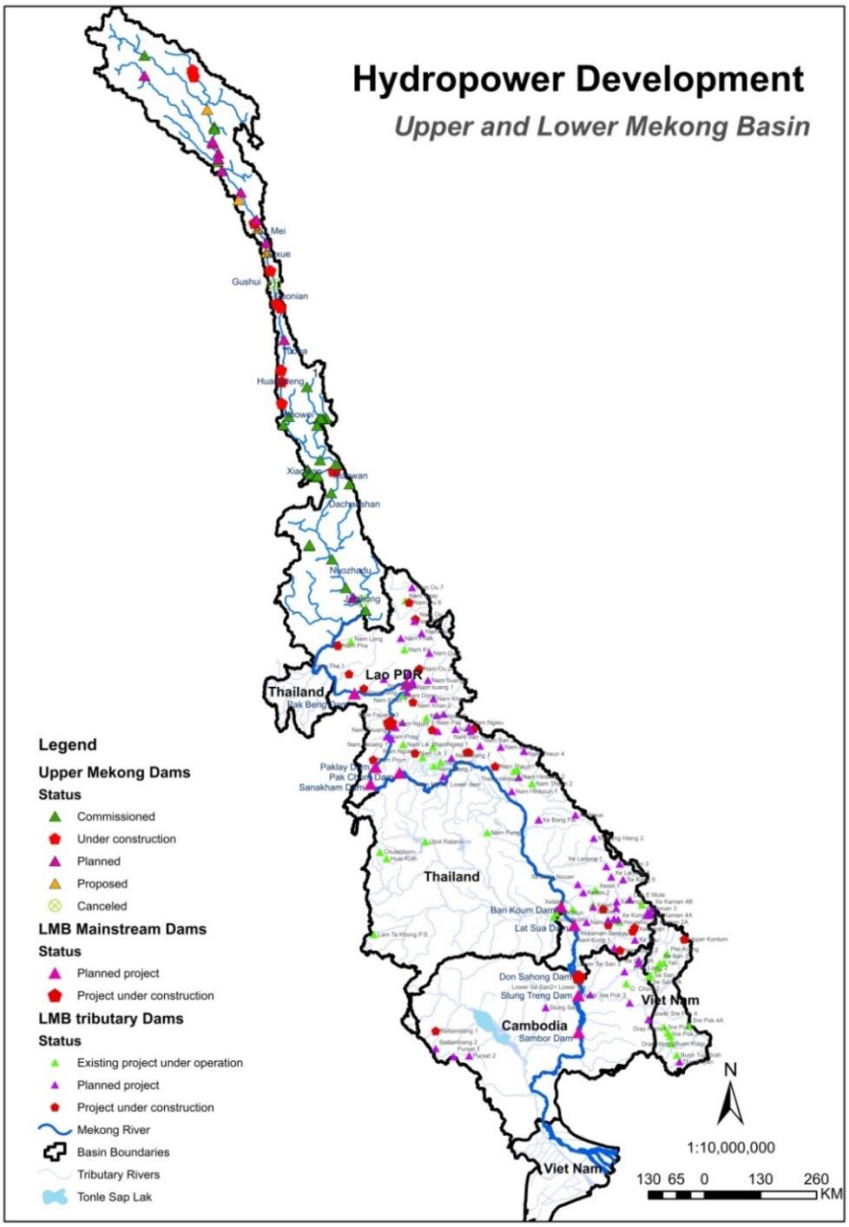



**Figure 2.6:** Current and planned hydropower development in the Mekong River Basin

Cambodia is also intensifying development of its water resources. This includes irrigation development, drainage works and flood management around Tonle Sap and between Phnom Penh and the border with Viet Nam. Hydropower investments are planned on the mainstream and in the tributaries including the 3S basin, where Lower Sesan II has been constructed.

China has constructed more than 8 hydropower dams (of which 2 are storage dams) along the mainstream in the Upper Mekong with another 14, each greater than 100 MW, either constructed or planned. The installed hydropower capacity on the Upper Mekong is 19,285 MW with the planned total rising to 31,300 MW. Only a small proportion of China's part of the Mekong River Basin is irrigated due to the narrow, steep sided gorges that dominate there.

The Myanmar portion of the Mekong River Basin is relatively undeveloped compared to the other countries. The first dam on its Mekong tributaries was commissioned in 2017 and there are plans for at least six more small storage dams. Less than 1,000 km$^2$ of Myanmar's basin area is currently irrigated.

In addition to hydropower, irrigation expansion is identified as a priority for a number of basin countries, and this will increase the demand for the basin's water resources. Despite this, there is potential for overall water security to improve as a result of higher dry season flows due to hydropower operations. There is likely to be surplus water even accounting for further irrigation development which is projected to increase substantially in Cambodia, Lao PDR and Thailand up to 2040. The situation in critical dry years, however, requires further analysis.

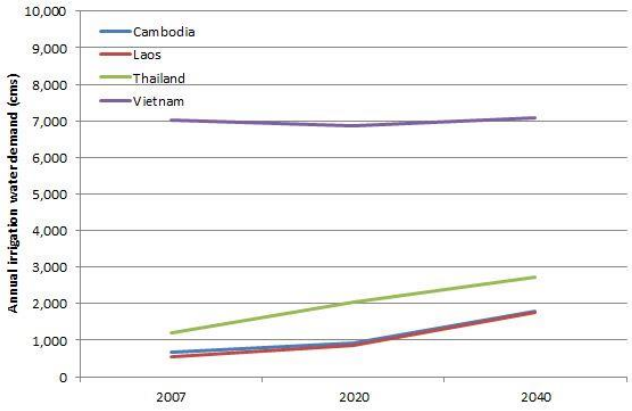



**Figure 2.7:** Projected change in annual irrigation demand

Groundwater use has been relatively modest in most parts of the Mekong River Basin. Thailand and Viet Nam both use groundwater to irrigate crops, yet the lack of extensive transboundary aquifers outside the Mekong delta has meant limited need for regional engagement on transboundary issues.

Domestic water demand is projected to increase across the LMRB by around 76% by 2040 and industrial demand to increase by around 192% in line with population growth and further industrialisation of national economies. Nevertheless, domestic and industrial demand for water in the Mekong River Basin will remain relatively small compared to other sectors.

## 2.3 Water resources development implications

The construction of tributary and mainstream dams is changing the flow regime of the basin and this presents both challenges and opportunities. Further construction of in-stream barriers will exacerbate these impacts and contribute to others. The location and design of dams can, however, have an important bearing on the overall costs and benefits

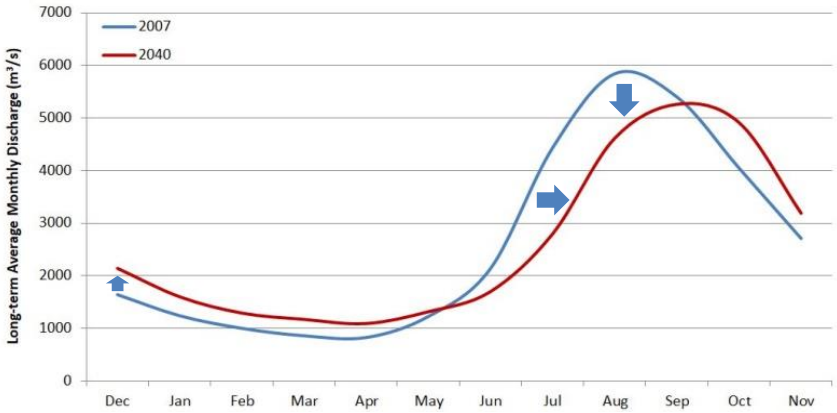



**Figure 2.8:** Projected change in monthly average discharge by 2040 at Chiang Saen due to water resources development and climate change

including for people in vulnerable situations experiencing poverty and at risk of food insecurity. This raises questions about whether national plans can be further adapted to optimise regional benefits and ensure adequate consideration of trade-offs between sectors, particularly between fisheries and power generation.

The impacts of dams have had a significant impact on the transport of sediment from the Upper Mekong River Basin to the Lower Mekong River Basin and further instream barriers are expected to make this problem worse. The implications of this reduction in sediments are increased erosion, potentially less productive fisheries and floodplains, and reduced replenishment of the delta which is affected by subsidence and sea-level rise. In-stream barriers also significantly reduce fish migration having detrimental impacts on spawning and recruitment of fish to subsequent generations. Different fish species will be affected to a greater or lesser extent depending on their ecological requirements.

The challenges faced in the Mekong Delta due to development activities are particularly acute. Reduced replenishment of sediment from upstream, subsidence due to groundwater extraction, sand mining deepening channels and exacerbating the impacts of tides on erosion, and increased salinity intrusion are just some of the significant issues requiring urgent attention.

Hydropower operations are increasingly playing a role in rapid river level fluctuations as projects are commissioned and respond to electricity demands and grid stabilisation requirements. These fluctuations can have negative impacts on downstream communities including in relation to the viability of traditional riverbank agriculture. Reservoirs will need to be managed during flood and to enable periodic sediment management releases. This increased regulation of the basin and the opportunities and challenges it brings requires greater operational coordination, improved water release protocols, data and information sharing, and enhanced early warning systems.

The change in flow regime also means potentially more water available during the dry season. This surplus water could be used to expand irrigation, help manage the risks to agriculture of more frequent or extreme droughts due to climate change, and/or for additional flows to the delta to help combat salinity intrusion. Determining the equitable and sustainable use of these additional flows will be an important consideration for regional cooperation over the next ten years.

Water availability is strongly influenced by the condition of the catchment, which is being affected by deforestation and other land use change including urbanisation and conversion of wetlands and floodplain. More forested areas will slow the rate of run-off into rivers and streams, mitigating flash floods and providing extended groundwater discharge through the dry season. The influence of catchment development on the Mekong's hydrology is evident in Cambodia, Thailand and Lao PDR. Protecting watersheds upstream of reservoirs and settlements in particular is likely to be increasingly important as the population and value of infrastructure on the floodplain increases and as sedimentation of dams risks their power generating capacity.

## 2.4 Water resources management

National sovereignty, customs and administrative systems are the foundation of planning, decision-making and the management of water resources within the Mekong River Basin. Due to transboundary concerns, these national systems are overlaid with a regional cooperation framework consisting of the *1995 Mekong Agreement* between the four Lower Mekong River Basin countries and more recently the *Mekong-Lancang Cooperation* mechanism between all six riparian nations.

At a national level, each country seeks to implement water resources management appropriate to its national needs and all countries have national water laws and dedicated national agencies responsible for water resources management. The basin countries are increasing efforts to manage and regulate developments. Lao PDR has recently adopted a new water law and is in the process of finalizing its new National Water and Water Resources Management Strategy. The new law governs water use throughout the country and includes provision for environmental flows and new standards on pollution control. A national coordinating and monitoring center in relation to hydropower operations is being established. The amended Electricity Law 2017 and updated Policy on Sustainable Hydropower Development 2018 strengthened the planning, assessment and monitoring of major projects.

Cambodia's national water law focuses on the sustainable utilisation and conservation of water resources and determines the rights and obligations of water users. It provides for the establishment of water-user groups to facilitate participation of local communities in the sustainable development and management of water resources.

Thailand introduced a new water resources law in 2018 and established a new Office of National Water Resources, which also hosts the Thai National Mekong Committee secretariat, under the Office of the Prime Minister to improve coordination across sectors and engagement on Mekong issues. A key feature of the arrangements is the further development of river basin organisations to support planning and implementation of Integrated Water Resources Management and climate adaptation at a sub-basin scale.

Viet Nam's Decree 120 on *Sustainable and Climate Resilient Development of the Mekong Delta* introduces a shift in emphasis for agriculture and seeks to further boost aquaculture. A key driver of Decree 120 is an effort to coordinate Ministerial and provincial actions to achieve more sustainable and higher value development in the face of expected climate change impacts including rising sea levels, increased salinity intrusion and the risk of severe flooding.

China is implementing integrated water resources management plans to address serious water shortages that are constraining and limiting social and economic development. These plans will seek to limit future demand, increase water use efficiency and improve water quality. Moreover, China is building multilateral engagement with South East Asia in all sectors of the economy including water. Myanmar is preparing a new water law based on integrated water resources management principles and is developing IWRM plans for major river basins.

In relation to international water law, the *1997 UN Watercourses Convention* has now come into force and although the *1995 Mekong Agreement* has primacy among Lower Mekong River Basin countries, the future development of projects with transboundary impacts could be influenced by the provisions of the Convention. From the basin countries, only Viet Nam has ratified the Convention so far.

As the Mekong countries undertake reforms to improve the investment environment, and clarify the rules for resource utilisation, there are increasing opportunities for the private sector (and state-owned companies) in the development of water and related resources. In areas including hydropower, navigation, large-scale irrigation, and industry, investment from the private sector now outweighs that from traditional public sources.

Compared to conventional public sector driven developments, the emerging private sector developments are more opportunity-driven with relatively short planning cycles and assessment processes designed to meet minimum requirements. Moreover, private project

developers do not have to comply with safeguard policies of the multilateral banks, which previously dominated the hydropower and irrigation sectors. Strong government regulatory systems and enforcement capacity and the readiness to interpret national policies to include emerging good practice and guidelines from regional organizations are therefore needed.

## 2.5 Regional cooperation and integration

**Cooperation between the Mekong countries is accelerating**

Cooperation between countries throughout the Mekong and wider region is becoming deeper and more comprehensive, especially through ASEAN, the primary regional cooperation body for Southeast Asian countries, including all Lower Mekong River Basin states. In 2015 the ASEAN Economic Community was established, eliminating tariffs between Member Countries in a market of USD 2.6 trillion and a region of 622 million people. China is ASEAN's number one trading partner, and trade and foreign direct investment between all countries is growing strongly.

Substantial cross-border infrastructure improvements are taking place in electricity, communications, and transport. In 2018 the region's first multi-lateral electricity trade took place involving Lao PDR, Malaysia and Thailand. Trade barriers continue to come down and there is a focused effort to improve connectivity and harmonise the regulatory environment.

Compared to the pace and scope of this increased integration across the broader regional economy, cooperation in water resources planning and development has been relatively modest. National water-related sector plans are prepared and implemented largely independently from those of the other basin countries. Regional water cooperation focuses primarily on data and information sharing and knowledge acquisition, while joint investment projects by two or more countries have been developed only for hydropower, driven by energy sector planning.

**Regional platforms for water cooperation**

In Mekong water resources development and management, the four Lower Mekong riparian states have been cooperating through the Mekong River Commission, based on the 1995 Mekong Agreement, for 25 years, building on a long history of cooperation since 1957 with the Mekong Committee. The Upper Mekong states of China and Myanmar have been dialogue partners of the MRC since 1996, cooperating in data and information sharing, technical exchanges, joint studies, and policy dialogue.

The MRC remains the only treaty-based intergovernmental river basin organisation with a clear mandate and core functions, focusing on principles of integrated water resources management, common procedures, strategies, guidelines and tools to support the sustainable and equitable use of water and related resources, and joint actions to address transboundary issues. As a regional knowledge hub and water diplomacy platform, its core functions have been defined to include: data acquisition, exchange and monitoring; analysis, modelling and assessment; basin planning support; forecasting, warning and emergency response; implementation of the five MRC procedures; and dialogue and facilitation.

The MLC, recently established through the Sanya Declaration in 2016, has a broader scope with water resource management being one of five priority areas, which also include connectivity, production capacity, cross-border economic cooperation, and agriculture and poverty reduction through project-based initiatives. MLC water cooperation does not solely focus on the Mekong river basin but on cooperation on regional, national and local water issues in the six countries. The MLC's work in these areas is expected to support ASEAN

community building, promote the implementation of SDGs and advance South-South cooperation. Projects are financed through a Special Fund which provides a vehicle for investment and technology transfer in water resources management broadly under China's Belt and Road Initiative. National data centres are being established to support cooperation between members.

The water resources cooperation area of MLC (MLC Water) is managed through a Joint Working Group (JWG) of water and related line agencies in the six countries supported by the Lancang-Mekong Water Resources Cooperation Center (LMC Water Center) in Beijing. The Center is a platform for technical exchanges, research, information sharing and capacity building. A Lancang-Mekong Environmental Cooperation Center has also been established in Beijing.

The JWG is an important new avenue for whole-of-basin cooperation. The Mekong River Commission Secretariat being granted observer status at JWG meetings and the agreement to a Memorandum of Understanding between MRCS and LMC Water Center is evidence of the willingness of both cooperation platforms to work more closely together.

Increasing engagement between MRC and the MLC Water builds on the strong positive trajectory of cooperation between the MRC and China highlighted above.

**Other Mekong-related platforms**

Beyond the principle water resources cooperation platforms of the MRC and MLC, other key cooperation mechanisms involved in Mekong water resources related issues in the region include ASEAN, the Greater Mekong Sub-region (GMS) initiative, the Lower Mekong Initiative (LMI), the Ayeyarwady-Chao Phraya-Mekong Economic Cooperation Strategy (ACMECS) and the Mekong Initiatives of Japan and the Republic of Korea. The key water-related areas of focus of each of these mechanisms are identified in Table 2.1.

**Table 2.1:** Water-related focus areas of other key cooperation mechanisms in the Mekong River Basin

| | ASEAN | ACMECS | GMS | LMI | Mekong-Japan | Mekong-Korea |
|---|---|---|---|---|---|---|
| **Related Focus Areas** | - Water supply, demand and management<br>- Water quality and sanitation<br>- Environment<br>- Climate change, extreme events<br>- Energy | - Environment<br>- Climate change and disasters<br>- Renewable energy<br>- Natural resource management<br>- Agriculture<br>- Tourism | - Energy<br>- Environment<br>- Climate change<br>- Tourism<br>- Transport | - Environment and water<br>- Agriculture, food and energy security<br>- Data collection, modelling tools, and data and information management | - Water resources<br>- Climate Change<br>- Disasters | - Green Growth<br>- Water resource development<br>- Agriculture and rural development |
| **Modes of cooperation** | - Governance and policy making<br>- Technical exchanges<br>- Capacity building | - Investment<br>- Human development and capacity building<br>- Application of modern technology | - Investment<br>- Capacity building | - Policy and technical exchanges<br>- Capacity building | - Investment<br>- Technical exchanges and capacity building | - Investment<br>- Policy and technical exchanges<br>- Capacity building |
| **Members** | Brunei, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, Philippines, Singapore, Thailand, Viet Nam.<br><br>China is a Dialogue Partner | Cambodia, Lao PDR, Myanmar, Thailand, Viet Nam<br><br>China is one of the "Development Partners" | Cambodia, Lao PDR, Myanmar, Thailand, Viet Nam, China (Yunnan Province and Guangxi Zhuang Autonomous Region) | United States with Cambodia, Lao PDR, Myanmar, Thailand, Viet Nam | Japan with Cambodia, Lao PDR, Myanmar, Thailand, Viet Nam | Republic of Korea with Cambodia, Lao PDR, Myanmar, Thailand, Viet Nam |

The ASEAN community is becoming more and more prominent in reflecting regional socio-economic development and trends in joint visions that intersect with basin water resource management issues such as gender- and child-centred disaster risk reduction, and strengthened social protection to reduce vulnerabilities. These include the ASEAN Socio-Cultural Community Blueprint 2025, and the growing number of active committees in social matters, such as the ASEAN Committee on Women, and the ASEAN Commission on the Promotion and Protection of the Rights of Women and Children. In the water related areas, ASEAN have active committees and working groups devoted to water resources management, energy, environment, fisheries, and disaster management, among others.

In addition to the above, the World Bank and other Development Partners continue to provide strong support to integrated water resources management in the region both through cooperation with the regional platforms and the other mechanisms and bilaterally with basin countries. The Joint Committee on the Coordination of Commercial Navigation (JCCCN) involving China, Lao PDR, Myanmar and Thailand continues to play an important role in helping facilitate the expansion of navigation in the upper parts of the basin.

Consistent with its role to *coordinate the work on water and related resources development and management of relevant actors* in the Mekong in order to ensure synergies and minimize duplication of efforts and resources, the MRC is strengthening relationships with these other regional bodies and through key bilateral arrangements.

**Towards a deeper and more strategic regional cooperation**

The increasing regulation of the basin and the uncertainties and opportunities presented by hydropower operations in the management of floods and droughts, and in rapid water level fluctuations highlights the importance of enhanced cooperation between upstream and downstream states. Enhanced regional cooperation will need to go beyond identifying and sharing information to avoid duplication in areas of 'common interest' and focus on strategic win-win outcomes in areas of 'complementary interest', where the relative strengths of different bodies can be maximised in support of integrated policy approaches at the water-food-energy nexus. Areas of complementary interest between different bodies include water resources and energy planning, land use and infrastructure planning on the floodplain, environmental and social protection, and benefit sharing, data management and infrastructure operations, and early warning and disaster response amongst others.

Deeper cooperation will require each organisation to clearly articulate its role and comparative advantage and to participate in and help shape areas of complementary interest in the strategies and action plans of the other regional organisations, initiatives and programmes. Cooperation is not an end in itself and so selective engagement on a small number of high priority areas focused on achieving the outcomes of this Basin Development Strategy may be more effective than broad overlapping efforts through multiple avenues.

Continued improvements in prior notification and consultation arrangements for development projects, including earlier engagement in project design will be beneficial. The recent State of Basin Report has highlighted the need to enhance data and information exchange, improve water use monitoring and to elevate cooperation to a level that not only includes joint environmental monitoring, but also joint overall planning of future strategic development to optimise sustainable development and management of the basin's resources.

To achieve the desired outcomes of this Basin Development Strategy the two regional cooperation platforms will need to work together to facilitate more proactive regional planning and operational management between upper and lower basin countries. Over the

period to 2030 a deeper institutionalisation or evolution of the relationship between MRC and MLC should usefully be explored.

# 3.0 TRENDS AND LONG-TERM OUTLOOK

This Chapter provides an overview of current trends in conditions and an Outlook to 2040 based on the 2018 State of Basin Report and recent scenario assessment work completed by MRC. It forms the basis for considering strategic responses in Chapter 4.

The Mekong River Basin is a highly dynamic region, with a vast endowment of natural resources, young and increasingly well-educated and connected population, and multiple avenues of growth and opportunity ahead. Large inflows of foreign direct investment, particularly in agriculture, energy, and tourism are transforming the landscape and offer the promise of substantial improvements in productivity and incomes. Investment in multimodal transport, communications and electricity infrastructure is connecting people and economic activity within the basin and beyond.

## 3.1 Environment trends and outlook

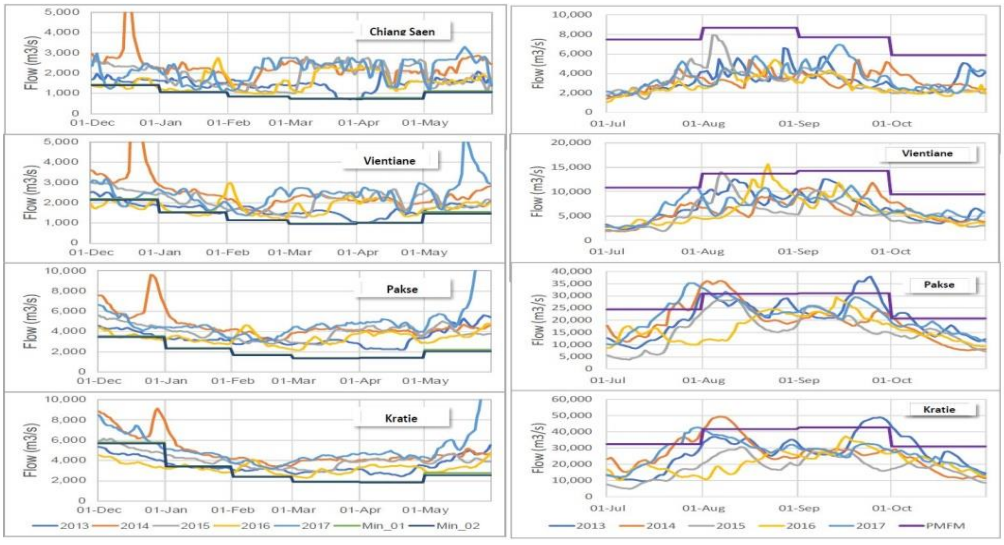
***Water flow conditions***

Conditions and Trends

Flows in the Mekong mainstream are generally within agreed limits[3], with only occasional exceptions. Nevertheless, monitoring at Chiang Saen indicates annual and flood season flows are substantially lower and dry season flows higher than long-term averages since the construction of large reservoirs in China. Flows at Kratie show a similar but less marked increase in dry season flows, with no discernible difference yet at the delta.

In addition to changes in monthly discharge, recent years have seen significant flow variability, particularly in Lao PDR and Thailand, with hydropower operations and heavy rainfall events contributing to rapid changes in water levels of up to 2 metres in a day. These changes are causing much concern for riparian communities, including due to the impacts on riverbank agriculture.

**Recent (a) dry season and (b) flood season flows in relation to the Procedures for the Maintenance Flow in the Mainstream (PMFM)**




[3] Maximum and minimum flow limits have been agreed in the Lower Mekong Basin under the Procedures for Maintenance of Flow in the Mainstream

Outlook

The modification of the flow in the mainstream is expected to continue with further development of hydropower. This will likely result in the continued shift in flows from the wet season to the dry season and a delay in the onset and offset of the annual flood in the upper part of the Lower Mekong River Basin. Lower flood season flows may reduce connectivity with wetlands and the productivity of the floodplain, particularly in Thailand and Lao PDR, but may also mean lower flood damages, if the changes are not reversed by climate change.

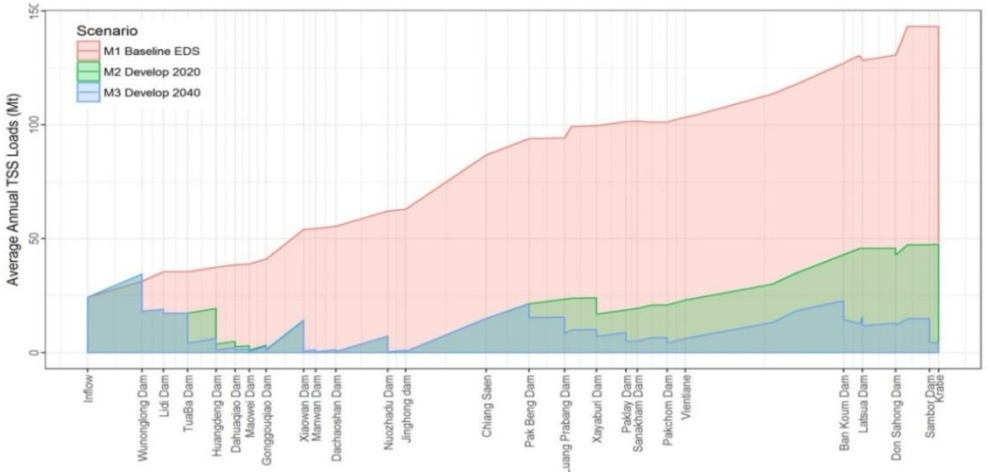
***Water quality and sediment conditions***

Conditions and Trends

Water quality in the basin as it relates to human health, aquatic ecology and agriculture is generally good. Samples from the MRC's routine water quality monitoring rarely exceed target values. Where target values are exceeded this is often for phosphorous and nitrogen in the Tonle Sap and delta area, likely due to fertiliser use in surrounding catchments.

Sediment transport along the mainstream has been significantly curtailed by the development of large storages in the upper part of the basin. The average annual suspended sediment load at Chiang Saen decreased from about 85 MT/year to 10.8 MT/year from 1994 to 2013. Given the importance of sediments to nutrient transport, erosion and deposition processes, maintenance of the delta, and fisheries and agricultural productivity, this decline is alarming.

**Projected suspended sediment loads along the mainstream under different scenarios**




Outlook

The loss of sediments in the river is only likely to increase with further construction of dams. One worst case scenario suggests the sediment load by the time the flow reaches Kratie could almost disappear by 2040, and bank protection costs to combat increased erosion are estimated at up to USD 6 billion. Some of the planned dams will have bigger negative impacts on sediment transport than others.

Further urban and industrial development and intensification of agriculture may put increasing pressure on water quality. The use of fertiliser and pesticides is increasing and is an area to watch due to the risk of pollutant runoff causing impacts on receiving waters. The lower flow environment created by dams and climate change may also present new risks from algal blooms and low dissolved oxygen, threatening fish and dependent livelihoods.

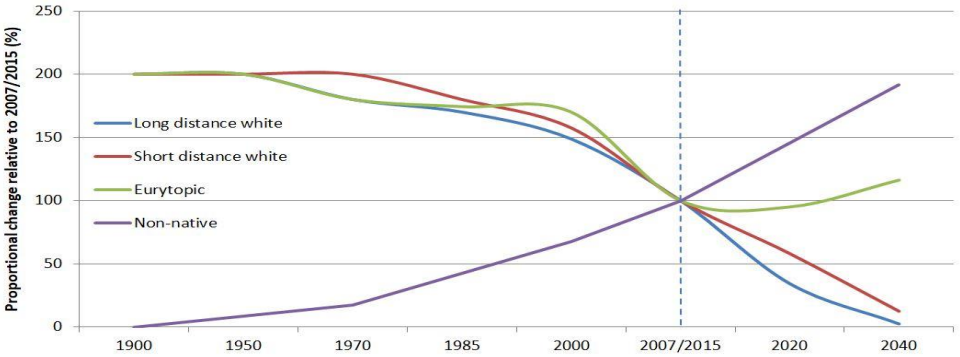
***Environmental assets***

Wetlands of the Mekong River Basin are important hotspots of biodiversity and play an important role in the economy, society and culture of the region. These are severely threatened and gradually being degraded or lost completely. Between 2003 and 2010 the area of mangroves declined by 30%. With a little over 100,000 km$^2$ of wetlands left in the Lower Mekong River Basin in 2010, MRC has estimated less than two per cent of the original wetland area in the Mekong Delta remains.

Conditions and Trends

The Mekong River Basin supports one of the world's most diverse freshwater environments with around 1,200 fish species recorded. Total biomass is estimated to have declined considerably over the past 100 years due to agricultural land development including massive expansion of rice farming and deforestation, intensive fishing pressure, hydropower development, sand mining, urbanization and industrial development and associated pollution.

**Estimated past and projected change in fish biomass relative to 2007/15 for select types**




Outlook

The outlook for native fish in the Lower Mekong River Basin is poor with total biomass projected to decline substantially by 2040. This is largely due to the effect of planned infrastructure developments in the mainstream and tributaries, with in-stream barriers having a particularly negative impact on valuable migratory species, some of which are likely to become extinct.

The change in the river environment is likely to favour generalist and non-native species over others. The effects of development on fish populations raise important concerns about food security and the livelihoods of people in vulnerable situations. Wetlands are likely to continue to face pressures.

## 3.2 Social trends and outlook

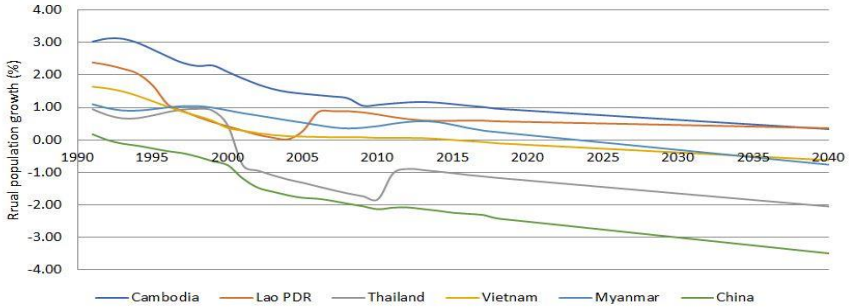
***Overall social conditions***

Population is growing strongly across the basin although at a declining rate due to dramatic falls in fertility rates in the 1980s and 90s. The total basin population is now estimated at 72.1 million, of which 25.4 million are in Thailand, 19.8 million in Viet Nam, 13.4 million in Cambodia, 6.3 million in China, 6.2 million in Lao PDR, and 0.8 million in Myanmar. The expansion of employment opportunities in and around urban areas is driving significant rural-urban migration. While the basin population is still predominately rural, large and growing urban centres (such as Vientiane, Phnom Penh and Can Tho) form an increasing share of the population.

Conditions and Trends

Poverty rates have fallen sharply in all basin countries, including in rural areas. Rural poverty levels in Lower Mekong River Basin countries are between 15% and 30% of the population with the highest rate in Cambodia and the lowest in Thailand. Between 2011 and 2015, China's Yunnan province saw a reduction of more than 50% in the proportion of the population below the national poverty line. Notwithstanding these reductions, inequalities between urban and rural areas and between different groups within society remain.

**Rural population growth in Mekong River Basin countries**




**Outlook**

At current growth rates the population of the basin is projected to be around 100 million by 2040. The UN projects that by 2050 between 50% and 70% of the population in Lao PDR, Viet Nam and Thailand will live in cities. The population in rural areas is likely to fall in all countries, although with a relatively large proportion remaining in rural areas in Cambodia.

A continued reduction in poverty is likely. However, relatively large numbers of poor, natural resource dependent communities are likely to persist for some time alongside improving but still present gender inequalities in paid and unpaid work.

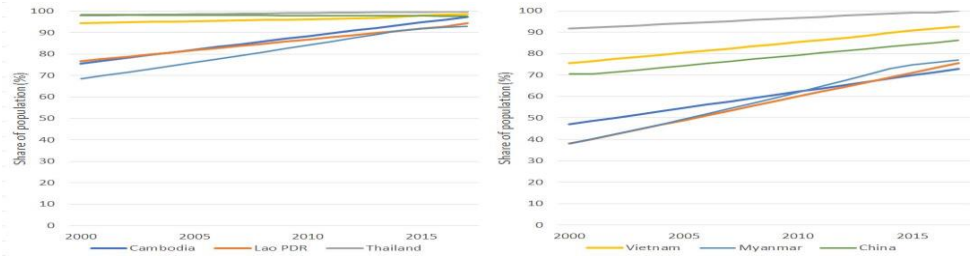
***Living conditions and wellbeing***

Food security in the basin has improved considerably over the last 20 years. The adequacy of dietary energy supply increased by between 5% and 20% from 1999 to 2016 such that nationally all Lower Mekong River Basin countries produce enough food to meet more than 100% of their dietary energy needs. The prevalence of undernourishment has also declined, although parts of the basin still have large populations experiencing undernourishment and relatively high rates of infant malnutrition, indicating inequality of access to food.

Access to improved water sources, sanitation facilities and electricity has increased substantially since 2000, yet significant variations exist both within and between countries, reflecting different stages of development. Thailand is close to 100% of the population having access to at least basic drinking water services and Viet Nam is not far behind. China, Thailand and Viet Nam are at full electrification, with Lao PDR and Cambodia rapidly gaining ground. Rural populations lag their urban counterparts in access to sanitation and electricity.

**Conditions and Trends**

**Share of (a) urban and (b) rural populations with access to at least basic drinking water**




**Outlook**

The outlook for food security in the basin is generally positive, although may be at risk in future due to the impacts of climate change on crop production and fish yields, particularly during extreme dry years. Access to safe water, sanitation and rural electrification is expected to continue improving, consistent with historical trends.

***Livelihoods and employment***

**Conditions and Trends**

Agriculture, fisheries and forestry are an important source of employment for the people of the Mekong River Basin yet the share of overall employment in these sectors is in gradual decline. In 2017 Cambodia was estimated to have had 66% of its total employment in these sectors, Lao PDR 61%, Thailand 33%, Viet Nam 41% and China's Yunnan province 55%. The decline in the share of employment in these sectors is due to strong growth in manufacturing and services industries, particularly in and around urban areas.

Only small differences exist between the proportion of men and women employed in primary industries. However, data suggests a large gender wage gap throughout all industries, additional to women´s often limited access, control and ownership of land and assets. The proportion of girls to boys in primary education illustrates continuing gender disparities, especially in Cambodia, Lao PDR and Myanmar.

**Gender Parity Index for primary school enrolment in Mekong River Basin countries**


**Outlook**

An expansion of agriculture in the Mekong River Basin is likely to increase demand for agricultural workers. Recent assessments indicate this demand has the potential to compete with higher value manufacturing and services industries leading to negative pressure on overall economic growth from labour deficits and underutilised infrastructure. Consistent with the projected growth in navigation, employment in that sector is likely to more than double by 2040.

Gender parity in employment and economic security is likely to improve gradually over time, consistent with development trajectories and national goals. However, while the number of women employed may increase, this will not necessarily translate into gender equality which is also dependent on the type of work and wages earned. A lack of gender disaggregated data for key statistics to inform planning will hamper progress.

## 3.3 Economic trends and outlook

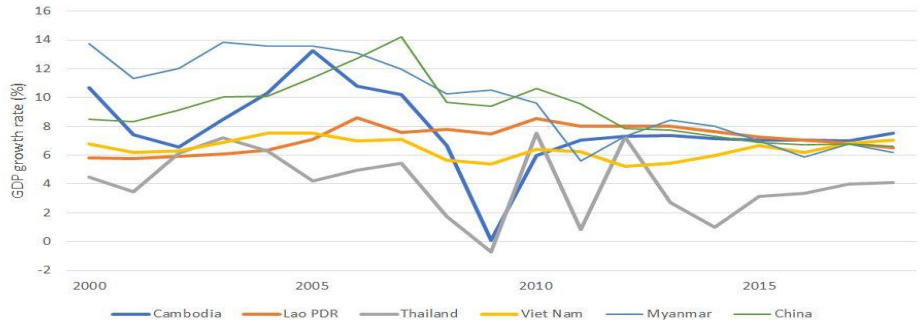
***Overall Economic Performance***

Conditions and Trends

Mekong River Basin economies are growing rapidly. Average national GDP growth was between 3.2% and 8.1% per annum between 2008 and 2018. Growth was primarily in manufacturing and service sectors, with agriculture's average share of GDP declining from 23% to 15% over the same period. Thailand's GDP per capita is more than USD 6,000, approximately five times that of Cambodia and three times Viet Nam and Lao PDR. Per capita GDP in China's Yunnan province tripled from 2007 to 2016, reaching USD 4,839.

The economy of the basin continues to grow despite weaker export growth in response to softening global conditions. This is due largely to solid inflows of foreign direct investment and continued strength in domestic demand. Imports are now outpacing exports in Cambodia, China and Thailand, with the contribution of net exports to growth currently positive only in Viet Nam.

**GDP Growth Rate in Mekong River Basin Countries**




Outlook

Future economic growth across the basin is likely to be lower than in the past. Across the Lower Mekong River Basin, the average growth rate to 2040 is projected to be between 2.5% and 3.5% per annum. Cambodia and Lao PDR are expected to reach middle income country status by the middle of the decade, maintaining higher growth than Thailand and Viet Nam, with rates closer to 5%.

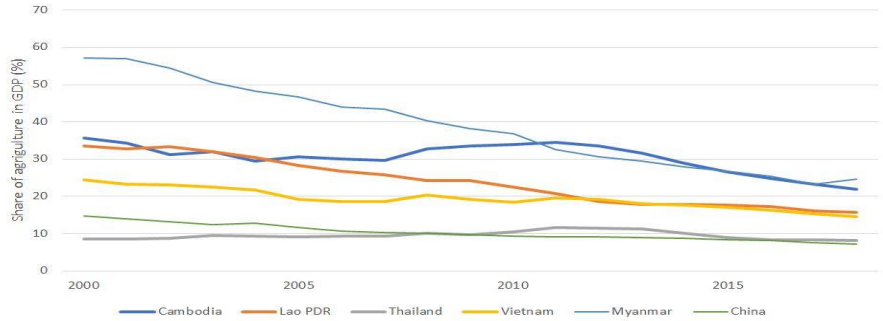
Slower global growth in the short-term is expected to continue to hit exports from basin countries. Trade surpluses are narrowing in China, Thailand and Viet Nam. Prospects for growth in exports over the medium to longer term are nevertheless strong if global growth returns to trend.

***Economic Performance of Agriculture***

Conditions and Trends

Although agriculture's share of GDP is declining, it remains an important source of economic value and food security and is a major employer in the basin. Nationally, agriculture exports in 2017 were valued at USD 42 billion in Thailand and USD 8.6 billion in Viet Nam. In 2013, irrigated rice production in the LMRB was worth more than USD 7.7 billion, of which 83% was from the Viet Nam delta. Rice from the LMRB represents around 50% of the total produced from the four countries. In China's Yunnan province, agricultural production is now valued at over USD 30 billion, having grown rapidly over the last decade.

### Agriculture's share of GDP in Mekong River Basin countries




**Outlook**

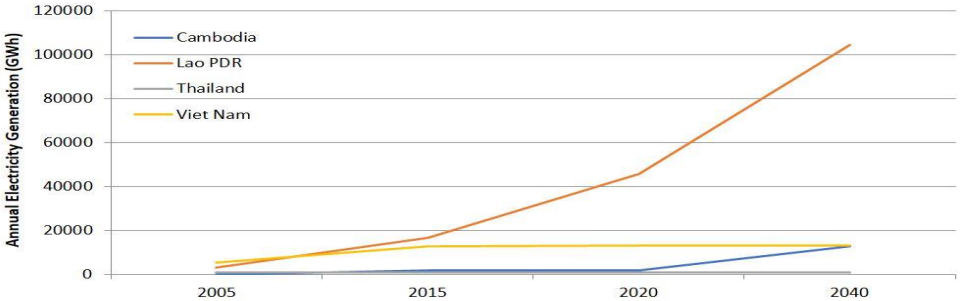
Agricultural value in the LMRB is projected to continue growing strongly. Thailand is likely to retain the highest value agriculture sector although substantial gains are expected in both Cambodia and Viet Nam, with Cambodia more than doubling the value of its agricultural output. Global food demand and rising prices will continue to attract foreign investment in the development of agriculture, including in the large relatively undeveloped floodplains in Cambodia that are also important for flood storage, capture fisheries, and biodiversity.

***Economic Performance of Hydropower***

**Conditions and Trends**

Energy demand across Southeast Asia grew 60% over the past 15 years and hydropower in the Mekong River Basin is expanding rapidly to help meet some of it. Electricity generation from Lower Mekong River Basin hydropower increased from 9.3 GWh to 32.4 GWh between 2005 and 2015. The gross value of the energy produced in 2015 was estimated at more than USD 2 billion, up from around half a billion a decade earlier. Lao PDR is the largest producer, with more than 50% of the Lower Mekong River Basin total. The estimated value of hydropower in the Upper Mekong River Basin in China is more than USD 4 billion per annum, from the production of around 80 GW of electricity. Myanmar currently has only one sizeable hydropower operation, with an estimated annual economic value of USD 15 million.

### Past and projected electricity generation from hydropower in LMRB countries




**Outlook**

The International Energy Agency is projecting Southeast Asian energy demand to grow by two-thirds to 2040. In-line with this growth, there are plans for electricity generation from hydropower to increase to 131 GWh per annum. The value of the hydropower sector is expected to increase across Lower Mekong River Basin countries in-line with this growth. Further planned dam construction in the Upper Mekong in Xizang/Tibet in China, with a total installed capacity of more than 12,000 MW, means additional economic gains are likely there too.

While the outlook for hydropower is positive, there are also risks that generation capacity runs ahead of demand and that too much hydropower without adequate storage exposes the sector to additional climate risks, especially under drier future conditions. Cost reductions in other renewable sources, particular solar, are expanding the development options available to countries, and globally the International Energy Agency is projecting installed capacity from solar to exceed hydropower by 2030. Cambodia and Lao PDR are considering solar energy projects, including on reservoirs.

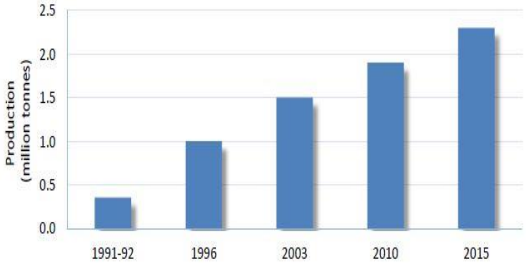
***Economic Performance of Fisheries and Aquaculture***

**Conditions and Trends**

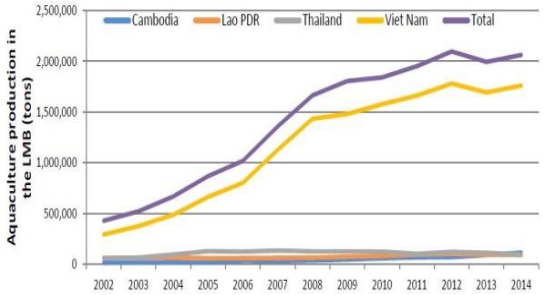
Fisheries in the Mekong River Basin are an important source of food security and livelihoods (see production figures below). While the amount of fish caught is increasing, fishing effort has also increased and smaller, less valuable species now make up an increasing proportion of the catch. In 2015, annual capture fisheries production in the LMRB was valued at USD 11.15 billion with more than 50% of this value coming from fish harvested in Thailand's paddy rice fields.

In 2015, annual aquaculture production was valued at USD 5.8 billion, of which 86% was from Viet Nam. Over the last 10 years the industry has experienced average annual growth of more than 11%. Per capita output in Yunnan province increased by more than 180% over a similar period.

**Capture fisheries production in the LMRB**




**Aquaculture production in the LMB**




**Outlook**

In-line with a decline in fish biomass, the value of capture fisheries in the LMRB is projected to decline over the next 20 years. This is largely due to the further construction of barriers to fish movement both in the mainstream and tributaries, but land-use change, and signs of overfishing indicate the pressures are multiple and varied. Marine fisheries off the coast of the delta may also suffer due to a reduced sediment and nutrient plume.

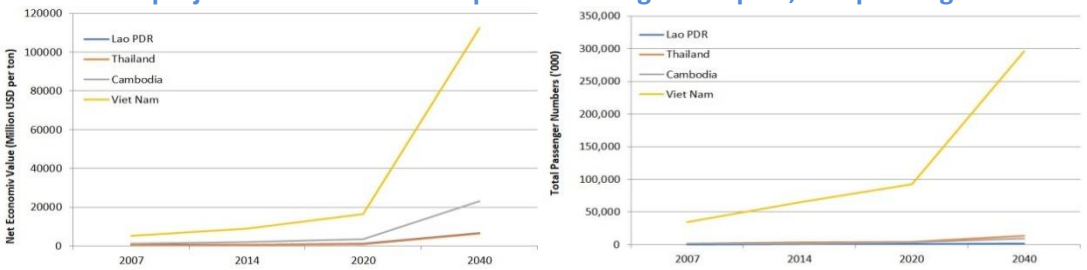
Aquaculture production is forecast to continue growing strongly, particularly in the delta where it will continue to displace agriculture due to higher economic returns and the effect of salinity intrusion on agricultural yields. Despite considerable challenges, opportunities for further aquaculture development in upstream areas including reservoirs, taking into account the different needs and roles of both men and women, may need to be explored.

### *Economic Performance of Navigation*

Conditions and Trends

The Mekong River is an important inland waterway for both cargo and passenger transport. An estimated 800,000 tons of cargo are shipped annually between China, Thailand, Myanmar and Lao PDR. Cargo volumes in all Lower Mekong River Basin countries grew by more than 6.4% per year between 2007 and 2014. The annual economic value of cargo transport in 2007 was estimated at USD 6.8 billion, of which Cambodia's share was USD 1.1 billion, that of Lao PDR, USD 0.4 billion, Thailand USD 0.2 billion, and Viet Nam USD 5.1 billion.

**Current and projected economic value per ton of cargo transport; and passenger numbers**




Outlook

Navigation is expected to expand considerably to 2040 as a result of further hydropower development on the mainstream, as well as dredging and clearing of rocky areas within the channel. The Navigation Master Plan foresees an increase in cargo transport capacity in both the upper parts of the Mekong River between China, Thailand and Lao PDR, and in the lower reaches between Cambodia and Viet Nam. The value of the navigation sector is projected to increase substantially across the Lower Mekong River Basin with Cambodia and Viet Nam the major beneficiaries. However, development of navigation is highly dependent on the capacity and links with other transport modes and corridors.

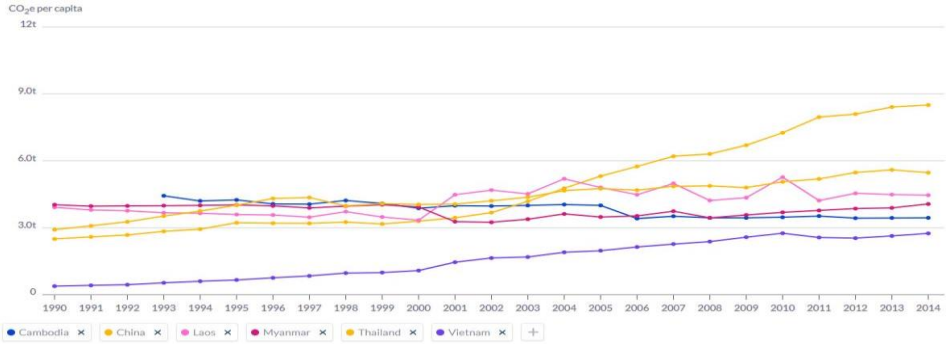
## 3.4 Climate Change trends and outlook

### *Greenhouse gas emissions*

Conditions and Trends

Greenhouse gas emissions relative to GDP of Mekong River Basin economies have fallen dramatically since 1990, particularly in Cambodia, Lao PDR and Myanmar. However, total greenhouse gas emissions are rising by about 1.3% to 3.6% per annum, due to both population growth and economic development. Emissions in Cambodia, Lao PDR and Myanmar are only a fraction of those from the other basin countries, and are dominated by agriculture and land use, land use change and forestry.

**Greenhouse gas emissions per capita in Mekong River Basin countries**



Outlook

Greenhouse gas emissions are projected to increase in all countries to 2030 under business-as-usual (BAU) scenarios. Under the Paris Agreement on Climate Change LMRB countries have made commitments to reduce emissions by between 8% and 27% from BAU. In some cases this is expressed as an absolute reduction in emissions and in some cases a reduction in emissions intensity with the specific approach reflecting national priorities. Access to international financing is identified as necessary to meet the higher levels of emissions reduction ambition. China has a commitment to reaching peak $CO_2$ emissions by 2030 and for reductions in emissions intensity of 60-65% below 2005 levels.

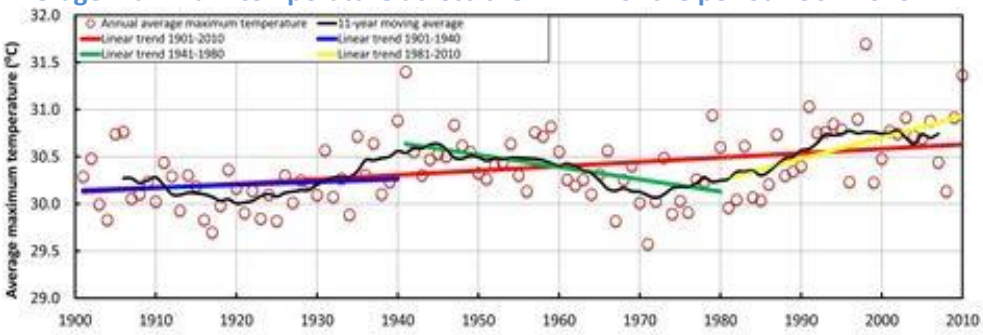
***Climate change trends and extremes***

Conditions and Trends

Average annual basin-wide temperatures and precipitation have increased over the historical record. Sea-level around the delta is rising. However, there is no evidence to-date of more intense rainfall events or more frequent or intense tropical storm activity. Indeed, there is evidence storm intensity may be decreasing.

Trends in the extent and severity of floods and droughts are difficult to perceive due to high variability from year to year. There may have been a slight increase in flood peaks and flooded areas and a slight overall decrease in drought conditions over recent decades, but further monitoring over longer time periods is necessary.

**Average maximum temperature across the LMRB for the period 1901-2010**




Outlook

Temperatures are projected to continue increasing across the basin and across seasons. By 2060 under the worst-case projections, the average annual basin-wide temperature could be up to 3.3˚C higher depending on the global emissions trajectory. Rainfall could increase or decrease with large variation in the magnitude and location of change.

Overall basin water yield, annual river flow and water level, wet season duration, peak flow and level, and dry season minimum flow and level, could all either increase or decrease. The range in possible outcomes is enormous with annual river flow varying by between -59% and +27%, and dry-season minimum one-day flow changing by between -65% and +35% at Chiang Saen. Basin development will interact with climate change, in some cases exacerbating the change and in some cases mitigating it.

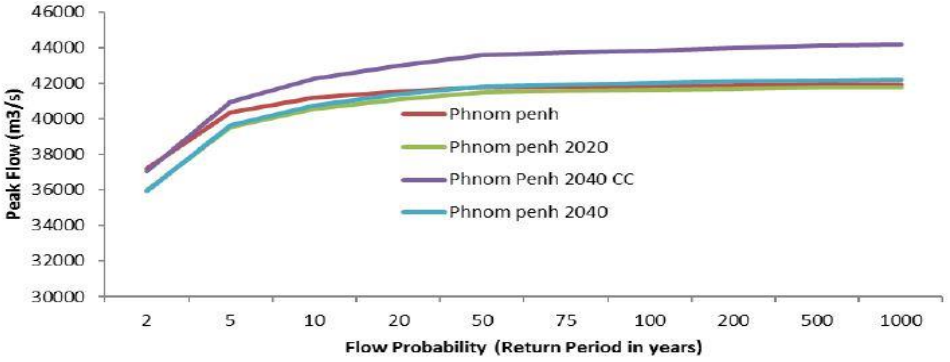
***Adaptation to climate change***

Climate change adaptation efforts are in their early stages in each country. All countries have policies, strategies and/or plans to respond to climate change and have established both operational and oversight bodies to coordinate actions. While many studies and projects have been completed, further work is necessary to fully mainstream climate change concerns into spatial and development planning within and across sectors.

The proportion of rice and maize that is irrigated increased from about 27% to 36% between 2000 and 2015 across the LMB, and total live storage increased from 1% to approximately 14% of the Mean Annual Runoff over the same period. The average annual cost of flood damages for 2010-2014 was USD 0.2 billion per year although with substantial variation from year-to-year. Flood protection measures including levees and flood ways continue to be constructed around built-up areas.



**Current and projected peak flows for different flow probabilities at Phnom Penh**






Flood damages are projected to be 5 to 10 times higher by 2040. Smaller floods at Phnom Penh may be similar to what they are today as the impacts of upstream development on reducing flood season flows is reversed by a wetter climate. However, at higher return intervals, above one in ten years, wetter climate conditions will cause much bigger and extremely damaging events, especially when combined with the continued reduction of the delta floodplains due to urban, industrial and agricultural expansion (land-use changes in the basin are currently being mapped). If half of the delta floodplain area that currently has limited flood protection (mainly located in Cambodia) gets full year flood protection (dykes and embankments), a 1:100-year flood will overtop existing flood protection of the large cities in the delta.

Climate change could also increase demand for irrigation water by up to 6.6% over the year, or 13% in the wet season under a drier climate. Current plans for upstream reservoir development have insufficient storage to offset the losses in floodplain storage and to meet potential increased irrigation demand. Cooperative spatial and development planning to preserve important parts of the basin's floodplains and develop flood ways in the delta is lacking, and so is the identification of vulnerabilities, including by gender.

# 4.0 STRATEGIC NEEDS, RESPONSES AND RISKS

Recognizing the trends and long-term outlook described in Chapter 3, this chapter examines the implications for planning and management of the Mekong River Basin. Regional planning and management in the basin will need to change from reactive to proactive to increase regional benefits and reduce costs.

## 4.1 Implications of recent regional assessments and studies

The Mekong River has always faced challenges because of natural drivers (climate, erosion and sedimentation) and human-made drivers (water resources development and use) of change. During the last decades, water resources development has accelerated to support economic growth and water, food and energy security, but has also had large impacts on the environment. The aim of water management in the Mekong region is to strike a balance between economic, social and environmental outcomes to which most stakeholders can agree. An acceptable balance is being sought by implementing the strategic planning cycle described in Section 1.3 in which the State of Basin Report identifies the key issues that the Basin Development Strategy should address.

The summary of the 2018 State of Basin Report demonstrates that the Mekong River Basin continues to be a highly dynamic region, driven by economic growth and an increasing population. The development of the Mekong's waters contributes considerably to economic growth but also threatens the level and distribution of growth through increasing impacts and risks that large-scale water resources development brings. All water-related sectors contribute but the hydropower sector contributes most to the benefits, impacts and risks. The key findings and implications for basin planning and management are as follows:

**Environment**: Reservoir developments in the basin have caused a significant change in the flow regime of the Mekong and are contributing to the observed drastic decrease in sediment concentrations, leading to extensive riverbank erosion and risks to riverine communities. The long-term consequences of these changes need to be managed to minimise environmental harm whilst leveraging the benefits of more secure dry season flows. The risks to fish populations are substantial and the loss of wetlands and riverine habitats require urgent action to protect remaining assets before they are lost.

**Social**: The poverty rate is declining and living conditions improving in all basin countries. Future food supplies will likely be sufficient to meet long-term dietary needs. Nevertheless, most basin countries still have considerable populations experiencing poverty and undernourishment. Despite overall improvements in social conditions, many households and communities along the Mekong corridor remain vulnerable to shocks, particularly droughts and floods. With the exception of some sectors, inequity and gender inequality are still a hindrance for sustainable development and resilience. Much better information such as spatially and gender disaggregated data is needed to identify poor water-related resource users and specific water sector impacts, to determine where vulnerabilities lie, and what the opportunities are to improve resilience.

**Economic**: High economic benefits are being derived in hydropower development while significant benefits are made in irrigated agriculture, capture and reservoir fisheries, sand-mining and navigation. Current national plans for water-related development will make an adequate contribution to long-term food and energy security but less so to water security: the assessed risks of floods and droughts, due to climate change and reduction of the delta

floodplains, need to be addressed soon as solutions will become much more difficult and costly with continuing uncoordinated development.

**Climate change**: Both temperature and sea level are rising, but other predicted aspects of climate change are not yet evident. The regional countries are all engaged in managing climate change and this should be reinforced through basin-wide planning efforts. Future climate change may exacerbate the losses from extreme events with greater numbers of people affected by larger flooding events. This requires capacity to respond to increased variability, infrastructure to offset potentially damaging effects, coordinated spatial land use planning on the delta floodplains, building in buffers, and coordinating reservoir operations.

**Cooperation**: Addressing the above opportunities, risks and challenges require higher levels of regional cooperation between all riparian countries, supported by regional organizations, initiatives and programmes, including the MRC, MLC, ASEAN, GMS, ACMECS, LMI, Mekong-Japan Cooperation, and Mekong-Korea Cooperation. There is scope for more focused and effective cooperation among these mechanisms, reducing overlap and duplication, by contributing to each other's strategic and action plans based on a clearer articulation of role, strength, and comparative advantage *viz-a-viz* other organizations. The evolving relationship between the MRC and MLC Water will be particularly important for the implementation of this strategy.

**The trade-offs between the economic and environmental dimensions[4] of water resources development – in the order of NPV tens of billions – are much larger than needed**. They are the result of regional planning reacting to independent national planning based on the same set of development projects that the countries are planning. Thus, so far regional planning has been generally limited to assessing the acceptability of the transboundary impacts of national plans, formulated largely in isolation from the other riparian countries. Although major observed impacts, such as the reductions in sediment flow and wetlands, are generally irreversible, there is still a lot to be gained from a more proactive regional planning approach that also addresses climate change and related water security challenges, as described in Section 4.2.

With increased basin development and river regulation, the proactive regional planning approach needs to be supplemented by a greater focus on coordination of operational basin management to reduce transboundary risks of sudden changes in river water levels, sediment loads and water quality, as described in Section 4.3. All of this requires smarter water-related monitoring and modern information and decision support systems, as described in Section 4.4. The risks and challenges that need to be managed and overcome in order to move towards proactive regional planning and coordinated operational basin management are described in Section 4.5.

## 4.2 Need for a more proactive approach to basin planning and joint action

Recent regional (cumulative) impact assessments and strategic studies, reacting to independent national plans, confirm that national water resources development plans are sub-optimal from a basin perspective as they: (i) cannot individually address the long-term water security and environmental needs of the Mekong River Basin; (ii) lead to an uneven distribution of benefits, impacts and risks; and (iii) miss significant opportunities for coordinated and joint development that could increase economic benefits and reduce impacts and costs.

[4] These trade-offs are also likely to have social implications which are less well known.

So far, these assessments and studies have not led to significant changes in nationally planned water resources development as they are sometimes perceived as constraining development rather than enabling it to occur in a more sustainable manner. This concern will be addressed by a more proactive regional planning approach that goes beyond the development projects that the countries are currently planning to address the shortcomings of the national plans, increase economic benefits and reduce costs.

**A more proactive regional planning approach does not only consider postponing or modifying environmentally damaging projects but proposes also new projects for economic and social development and environmental protection**, with a view to increasing synergies and reducing trade-offs at the basin level. New project proposals will include:

- **National projects of basin-wide significance**, which create benefits within the country as well as development opportunities elsewhere in the basin, such as: watershed projects (for flow maintenance, enhancing the lifetime of storage reservoirs and contributing to reducing greenhouse gases); the preservation of wetlands including riverine habitats (for enhancing ecosystem services, biodiversity, capture fisheries, and tourism); the creation of inter-seasonal storage for hydropower generation (which increases dry season flows which can be shared); and projects based on new technology (such as floating solar on hydropower reservoirs); and the relocation of unattractive projects (e.g. a hydropower project from a valuable untouched stream to (storage-backed) hydropower cascades);

- **Joint projects** (involving two or more countries), which address issues and opportunities that one country alone could not do as effectively, such as the preservation of parts of the transboundary floodplain in the Mekong Delta (for the protection of urban areas against large floods); the development of multi-purpose hydropower projects (for flood, drought, navigation) for adaptation to increased floods and droughts in a transboundary context; the development of transnational parks (for environmental protection and tourism); and navigation (for enhancing commercial navigation and safety). Most joint projects will be based on a cost and benefit sharing deal or agreement and lead inevitably to higher levels of transboundary cooperation and regional integration (and thus would advance ASEAN community building objectives);

**To operationalize proactive regional planning**, this strategy builds on the existing regional assessments and strategic studies and provides directions for the assessment of a few new basin-wide development scenarios that represent proposed adapted national plans (with added joint and nationally significant projects) to set the countries on a path to more optimal and sustainable development. The basin countries will then compare the assessment results with those of the "Planned development scenario" which is based on the current national plans (as assessed by the Council Study and others) in terms of national economic benefits, transboundary impacts, and providing long-term water security and environmental and social needs. This will provide the rationale for each country to consider whether to modify their national plans to greater mutual benefit as part of the regular review and updating of those plans.

While this could have been done years ago, it is not too late. Given the basin countries' commitment to optimal and sustainable development, such a proactive planning approach will provide incentives to discuss benefit sharing and trade-offs between national development plans and thereby to determine the best ways by which to develop the basin given the current circumstances and the legitimate aims and concerns of each country. The results of this new approach will enable the "Development Opportunities" section of the next BDS to provide strategic guidance to national planning for the basin across all water-

related sectors for economic development (irrigation, hydropower, navigation, flood protection) and environmental management (wetlands, riverine habitats, forestry, floodplains, fisheries)[5].

This approach will create confidence that water can be allocated and used without unforeseen impacts. This should lead to early engagement of the responsible regional organizations (i.e. MRC, MLC Water, or both in partnership) in the preparation of large development projects that are agreed in the "Development Opportunities" section of this strategy. These organizations are able to mobilize the expertise and deploy tools that can add value to Terms of References, feasibility studies, ESIAs etc. in consultation with the governments and relevant parties, with a view to enhancing project benefits and sustainable development outcomes. This earlier engagement will facilitate project consultation and approval processes, such as the PNPCA process.

Such a proactive regional planning approach needs to be implemented by all six countries through their appropriate regional cooperation arrangements. At the technical level, MRCS and the LMC Water Center can support and facilitate joint multi-sectoral expert groups that oversee and steer the assessment of the new scenarios and the preparation of technical papers by a mobilized expert/consultant team. The latter will also prepare the required information for basin-wide discussions among broader stakeholders, as well as a high-level policy paper for initiating the trade-off and benefit sharing discussions between countries at the senior policy levels. Other regional cooperation arrangements will be engaged in various sectors such as navigation (JCCCN) and energy (GMS Regional Power Trade Coordination Committee) and political/diplomatic support (ASEAN, World Bank and other partners).

## 4.3 Need for coordinated operational basin management

Some transboundary operational basin management services are already in place in the Mekong River Basin, including flood forecasting and the implementation of the Procedures for the Maintenance of Flows on the Mainstream (PMFM) by the MRC, using hydro-meteorological data provided by the LMRB countries and China. As the Mekong River Basin becomes more developed and regulated by dams, and susceptible to more extreme weather events due to climate change, there is increasing need for more data and information sharing and coordination of the following operational basin management needs that may have transboundary aspects:

- **River flow management**. The development of storage capacity in the upper and lower parts of the basin provides an opportunity to manage a substantial and increasing part of the overall Mekong flow volume for socio-economic development, environmental flow needs and mitigation of floods and droughts. To ensure sustainability of all benefits of the river, the water supply-demand balance and sudden water level changes need to be managed within acceptable bounds and communicated to affected countries and people. This requires information sharing on irrigation abstractions and unusual hydropower reservoir inflows and operations, and in some cases adjustment of reservoir releases;

- **Sediment management**. The consequences of diminished sediment concentrations on the river's morphology, riverbank erosion, delta building processes, and the productivity

[5] Where appropriate, these discussions may lead to concluding deal structures (agreements) between countries on joint project level to capture potential gains to mutual benefit, as in other large international river basins including Senegal, Columbia, Aral Sea and La Plata.

of coastal waters and the impacts of these changes on the livelihoods of women and men in the basin need to be fully understood so that agreement can be reached on how best to manage sediments within the system and to mitigate the transboundary impacts of reduced concentrations. In the near term, monitoring and information sharing should be improved regarding sediment trapping and flushing by dams, sediment extraction (sand mining) and riverbank erosion;

- **Management of emergencies**, which include incidents related to water quality (e.g. resulting from accidental spills from a ship or port) and water quantity (e.g. an extreme flood wave caused by improper spillway gate operation or an equipment or structural failure of a dam). With increasing development and erratic climate events, the number of water-related incidents is likely to rise. The management of such emergencies requires information sharing based communication protocols followed by coordination of the response action plan for such incidents. Protocols and action plans need to be developed based on national practices and available regional guidelines. A gender- and vulnerability-responsive approach as envisioned by the ASEAN community needs to be central to all prevention, emergency and post-emergency measures;

- **Design and management of hydropower cascades**. A coordinated design and operation of the increasing number of cascading hydropower dams will improve the benefits and lower the cost of the full utilization of the water resource in the basin and the safe passing of flood waves and flushed sediments through the cascades. Transboundary coordination should support the implementation of existing design guidelines (which relate also to fish passages, navigation facilities, dam quality and safety, and others) and ensure that accurate and timely information sharing among the cascading plants is in place for smooth cascade operations as well as transboundary emergency situations.

The responsibility for the above operational basin management needs rests with the designated agencies in the individual basin countries. But as the Mekong River is an international river governed by treaty, the basin countries have agreed to cooperate not just in the development but also in the *management* of water and related resources. Coordination between the countries is needed to realize benefits for other countries (for example through coordination of sediment management) or reduce costs to other countries by early communication of extreme water situations or emergencies, what the impacts could be, and how agencies and the public should respond. Therefore, the MRC will need to focus increasingly on coordination of management and operational issues, supplementing their conventional role in basin planning processes.

The broadening of transboundary coordination of these basin management operations will be jointly explored and undertaken by the MRC and MLC Water, with technical support from the MRCS and LMC Water Center under the recently agreed MoU. Both organizations consider the management of flood and droughts and information sharing as their core activities. They will build on ongoing activities between the MRC and China on data and information sharing, technical exchanges, and joint research on unusual and extreme flow conditions. Other regional organizations will need to contribute, such as GMS/ADB on energy related aspects and ASEAN with respect to emergency management and vulnerability reduction.

Within the MRC, the coordination of operational basin management activities could be housed in the Regional Flood and Drought Management Center (RFDMC) which is established for real time operations and communications. The strengthening of the Center can be considered as an integral part of the recommended upgrading of the RFDMC for more accurate and timelier flood and drought forecasting services, which covers

modernization of communication and modelling capability, and the improvement of service delivery to clients in the countries.

## 4.4 Need for enhanced data collection, management, analysis and communication

With increasing development in the basin and the onset of climate change impacts, the need for water-related monitoring and information systems is of ever greater importance. Recent inventories show significant overlaps and gaps in the basin's monitoring systems and incompatible information systems at national and regional levels. Basin-wide cooperative action is needed to consolidate and upgrade the monitoring and information systems to a level that is fit-for-purpose for proactive regional planning and operational basin management needs.

The consolidation and upgrading of the basin's monitoring and information systems should be undertaken in a collaborative fashion by the MRC and MLC Water. These organizations could upgrade existing expert groups into basin-wide and joint basin expert groups with representatives of the six basin countries to direct and oversee the work, which may last throughout this strategy period. The joint basin expert group will build on and enhance ongoing activities and arrangements for data collection and information management and sharing among the basin countries.

To increase synergies and reduce costs, the consolidation, upgrading and reinvigoration of the basin's monitoring, information, modelling, forecasting and communication systems, which recently began in the MRC, will be further enhanced with a coherent, basin-wide conceptual plan that all basin countries can agree to. The plan will consider all existing and planned water-related monitoring, data management and modelling systems and facilities, as well as procedures and protocols for sharing of data and information. In all these areas, modern technology and methods, such as high-resolution satellite imagery products and decision support systems, will simplify monitoring requirements with an increasing focus on those key issues that directly affect choices in strategic and operational management of the basin.

**For more proactive regional planning**. Most economic, social, and environmental data for regional water resources development planning are being collected and maintained by the basin countries (as they need the same data for national planning purposes). There is a need, however, for a more systematic compilation and transmission of relevant socio-economic data for regional planning purposes, and regular monitoring of the basin's environmental assets, including wetlands and fisheries, and for consistent and spatially disaggregated social and economic data across the whole basin to better identify and support vulnerable communities. Satellite data will help address current data gaps related to land and water use. Field surveys will be needed to support the identification of joint projects and projects of basin-wide significance for moving towards optimal and sustainable development (see Section 4.2). The periodic sharing of the required national data will be further improved, based on adapted procedures and modern and compatible information and communication systems (see below).

**For transboundary operational management**. There is considerable scope for prioritization, re-alignment, and enhancement, as well as removal, of redundant hydro-meteorological stations and sediment and water quality sampling locations to enable a more cost-effective overall monitoring effort in the Mekong River Basin. As before, the basin countries, with their partners as appropriate, will finance and manage the resulting redesigned network of

monitoring and sampling locations, and collect the data according to agreed protocols and methodologies and share those with regional water actors for regional flood/drought forecasting and coordination of transboundary flow management, sediment management, management of hydropower cascades, and emergency situations in accordance with agreed procedures.

To improve management of the mainstream, a core monitoring network of stations and sampling locations on the Mekong mainstream and main tributaries will be managed by the MRC with operational decentralisation of data collection functions to the basin countries. MRC would finance this core monitoring network in the LMRB, using the HYCOS telemetry network with aligned discharge measurements and water quality and sediment sampling in an integrated monitoring and assessment methodology. The emerging joint environmental monitoring (JEM) will be integrated in the core monitoring network. The core network will also enhance emergency management and flood forecasting. This approach may lead to a more cost-effective monitoring effort overall. It also would strengthen MRC and its RFDMC as a regional knowledge hub and center of excellence.

In addition to a core monitoring network, the MRC will cooperate with MLC Water to establish a central monitoring coordination function to promote harmonization across the basin and support the six countries in the collection and storage of various types of data: hydro-meteorological, discharge and sediments, water quality, fish catch and effort, riverine health (plankton, invertebrates etc.), and on wetland and forest habitats. This function will link the collection, storage and accessibility of data with the integrated regional assessment, planning and operational management work done centrally by the MRC in collaboration with MLC Water. It will also help minimize any duplication of effort and ensure all data is collected only once but then used for multiple purposes at the national and regional level.

**For information analysis and communication**. There is a need at the national and regional level for compatible and modern decision support systems (DSS) that are connected to monitoring stations, earth observation data providers, and other data centres to support water management across time and spatial scales. These compatible systems would enable the implementation of all core river basin functions including online monitoring, emergency management and communications, flood forecasting and early warning, drought forecasting and management, reservoir operations, water allocation, seasonal forecasting, reservoir sedimentation management and longer-term planning of infrastructure development, and climate change adaptation and vulnerability reduction.

Some basin countries are leading the way and have already installed a modern DSS in large tributary basins systems, while the MRC is upgrading its data and modelling systems towards the highest international standards. They will promote and support the development of similar systems in the other countries, which will dramatically improve data and information analysis and sharing capabilities among the countries. Having a modern DSS will also create the opportunity for each country to verify regional modelling and assessment results and test new proposals for water resources development and management. The latter will increase trust and confidence among the countries to discuss and negotiate joint and significant projects at the regional level.

**The Mekong River Basin Indicator Framework (MRB-IF)**[6] will be rolled out in the entire basin. The MRB-IF with strategic indicators, assessment indicators and supporting

[6] Formerly known as the MRC Indicator Framework. It is more appropriately called MRB-IF as the indicators applied for the whole basin and not just MRC.

monitoring parameters offers a systematic and consistent approach to data collection and analysis for regional and national planning. The MRB-IF will be periodically updated to balance the data needs for basin planning and management, on the one hand, and the practicalities and costs, on the other. The agreed MRB-IF is supported by a data acquisition and generation action plan which provides clarity on what should be provided by whom and when. The MRB-IF will also drive a more comprehensive implementation of the MRC Procedures.

**Towards one river basin information management system**. The process of cooperation on regional planning, operational basin management and supporting monitoring and information systems will inevitably lead to improved implementation of the MRC procedures and further data and information sharing between upper and lower part of the Mekong River Basin. Ultimately, with increasing regional economic integration, there should be one river basin information management system for the Upper and Lower Mekong River Basin by 2030.

## 4.5 Strategic risks and challenges

**Strategic risks**

**The overarching risk** that could diminish the effectiveness of the implementation of this strategy is related to cooperation between the countries and their regional water cooperation platforms, the MRC and MLC. The higher level of cooperation that is required may not be achieved in the near term because sufficient trust and confidence may yet not materialize among all parties to move towards basin-wide proactive planning and transboundary cooperation on basin operations. People in downstream countries have concerns that increasing upstream water storage could be used against them by holding dry season flows, while upstream countries are concerned over constraints on sovereign actions.

**There is no easy remedy for insufficient trust**. In other international river basins, common understanding and trust comes with increasing regional integration. While this is never easy to achieve, taking steps along this pathway will provide positive feedback that creates new opportunities, including through ASEAN community building. Much depends on the political commitment of the basin countries and the technical and diplomatic skills of the leadership within the MRC and MLC to drive a practical process towards achieving this strategy's aims. Important will be also a systematic multi-stakeholder engagement that builds towards consensus and agreements on water resources development and management in the basin, as well as more openness from countries and developers, and addressing unbalanced and incorrect journalism and advocacy (which can feed mistrust and affect regional relations) by providing factual and even-handed information and advice (see lessons learnt in Section 1.4).

**If the level of regional water cooperation is not stepped up,** opportunities will be missed to increase regional benefits and reduce costs by coordinated national planning and joint investments in water resources development and management. Furthermore, the following economic, environmental and social risks may become reality:

- **Loss of lives and infrastructure** in urban and industrial areas of the Mekong Delta due to the continuous reduction of floodplain storage and lack of coordinated investment in flood protection leading to higher overall costs to everyone (needs cooperative socio-economic and spatial planning to reserve part of the delta floodplains for flood storage and discharge);

- **Insufficient increase in inter-seasonal water storage** to keep up with increasing water uses in a future climate with dryer dry seasons (planning for inter-dependent development of storage and further consumptive uses in the basin, and the sharing of the resulting dry season flows);

- **Loss of livelihoods and food security in poor resource-dependent communities** before economic development gradually lifts them out of poverty and accommodates change in livelihoods (needs planning for postponing or relocation of projects with large negative impacts as often such projects are also economically unattractive);

- **Stranded hydropower projects** because electricity supply runs ahead of demand, or lower than anticipated dry season flows, or expansion of new technology, leading to unreliable, loss making hydropower projects with higher electricity costs for consumers (needs harmonization between water and energy sector planning and the development of hydropower in storage-backed cascades);

- **Critical loss of remaining wetland and floodplain habitat** reducing ecosystem services, such as flood absorption and fish habitat (needs regional planning and a whole-of-landscape approach, which is urgent in a rapidly changing basin due to developments within and outside the water sector);

- **Higher future cost of water security projects** due to ongoing and planned (water) infrastructure developments in areas and locations that may be needed in future for (joint) joint projects to build climate resilience and manage flood and drought risks (needs planning to identify these areas as well as the scope of such future projects, followed by spatial planning reservation);

- **Higher cost of riverbank and coastal protection** and other costly measures to address the impact of sediment starvation (requires regional agreement on the implementation of a basin-wide sediment management strategy);

- **Larger impacts of water-related accidents and operations** due to accidental spills of toxic substances, dam breaks, and uncoordinated hydropower operations, (requires coordination of basin management operations, communication and data sharing protocols, and gender- and vulnerability-responsive action plans for prevention and response).

**Main challenges**

**The main challenges identified** in addressing the needs and risks described in this strategy are related to the implementation process and based on experiences and lessons from previous planning cycles. There are no major technical challenges. Because of significant investment in data acquisition and knowledge over many years, the Mekong region is more prepared than most other developing basins to implement the proposed proactive regional planning and operational basin management. There is a need, however, for further institutional alignment at the basin level for the sustainable management of the basin's water resources, to address the uneven distribution of knowledge and capacity between

countries, and continue to build trust and confidence in the added-value of basin-wide cooperative action for each country.

**Institutionalising mechanisms for all six basin countries to cooperate effectively.** Establishment of joint basin expert groups are an important and practical mechanism to guide and oversee pro-active regional planning, coordinated basin management operations, and the consolidation and upgrading of the basin's monitoring and information systems. The challenge will be to extend MRC's current regional expert groups consisting of LMRB representatives of key line/implementing agencies to joint basin expert groups (one for planning, one for monitoring/information systems, and one for coordination of basin operations) with technical leaders from all six basin countries through cooperation with MLC Water. A further challenge will be to develop the institutional mechanisms, capacity and consistent membership within the key line/implementing agencies so that the joint basin expert groups (and their agencies) will gradually take over many actvities that are currently dependent on consultants and the financial support of donors.

**Levelling the implementation capacity between Member Countries. I**mplementation of this strategy requires new approaches and technologies related to data collection and information systems, modelling and planning at different time scales, development of joint and significant national projects, information sharing and communication, and supervising infrastructure development and operations companies. This is a challenge as training in these areas cannot be simply outsourced. It must be tailored to the specific conditions of the Mekong River Basin and directly relevant to achieving the outcomes sought by this BDS.

Different capacity among basin countries provides an opportunity for greater use of country-to-country knowledge sharing and capacity building. Each significant activity and project related to the BDS should have a capacity building component which uses a mix of mechanisms such as (i) targeted training and workshops for immediate use and timed to the operations of the joint expert groups (see above), (ii) on-the-job learning by national experts, coached by other riparian experts on the actual implementation of the regional planning and information management activities (which could be contracted out), (iii) secondments and temporary transfers of experts, (iv) exchange visits, once ideas and proposals are developed for the Mekong, to see first-hand how pro-active regional planning and operational basin management is practiced in other large river basins.

**Addressing inequities associated with gender and vulnerability.** All basin countries have made significant progress in social development and gender equality during the last decade. Nevertheless, there are still substantial gaps and inequities that require focused action. The latter is a challenge since gender disaggregated data is scarce and existing data are often not linked effectively and timely with decision-making processes and budget allocations. This multi-dimensional data gap needs urgent addressing by the basin community. In this BDS, gender has been mainstreamed in the BDS results chain according to gender equality and vulnerability considerations. The defined Outcomes and Outputs under Strategic Priority 2 address the considerable gender and vulnerability related data gaps and aspects of basin water, food and energy security (see Sections 5.3 to 5.5). The BDS also calls for specific measures that directly aim at the reduction of inequity and vulnerability, such as gender and vulnerability expertise in the proposed Joint Basin Expert Groups. ASEAN is also actively supporting member states in addressing gender issues that will contribute to the achievement of BDS Outcomes and Outputs.

**Enhancing the capacity to manage floods and droughts effectively.** The current capacity to manage floods and droughts effectively is limited in the Mekong River Basin. Storage on floodplains has been reducing due to development and inter-seasonal storage behind dams

is less than 15% of mean annual runoff. This strategy promotes the spatial planning of floodways in the Mekong delta and the creation of additional storage in wetlands and behind dams to build climate resilience and manage flood and drought risks. This is a challenge as suitable storage areas have been disappearing due to wetland reclamation, population growth in potential reservoir areas, and the construction of dams and other infrastructure that are now in the way of more optimal infrastructure. The remaining options for increasing natural and constructed water storage (using GIS/EO technology) need to be identified and assessed through the proposed regional proactive planning before they are gone. Additional flow thresholds may be needed to protect the flow reversal to the Tonle Sap Lake and other benefits of the Mekong's high inter-seasonal variability will be preserved.

**Demonstrating regional plans and discussions on trade-offs as opportunities for win-win outcomes rather than as a threat to national sovereignty.** A regional planning and management approach should add value to national plans by presenting opportunities to increase the overall benefits and decrease the overall costs (i.e. make the pie bigger). Demonstrating this value in a rigorous and transparent way while supporting discussions around cost and benefit sharing between countries and/or sectors can be challenging, particularly where there are uncertainties in the science and models underpinning the analysis, and where there is a lack of trust between parties. Finding new ways to present information and receive input, avoiding 'black box' models and tools, being open about assumptions and uncertainties, using trusted third parties, and involving key personnel throughout the process in a truly collaborative way are just some of the tactics that will be important to overcome this challenge.

**Coordinating multiple actors at several levels and across different sectors.** Integrated water resources management is by definition multi-sector and multi-stakeholder. Increasingly, development in the basin requires the involvement of more than one ministry at a national level (e.g. water and energy) and at more than one level of government (e.g. national, provincial and local). At a regional level there are more actors involved (e.g. now including MLC) and a much bigger role for the private sector. Questions about overlapping mandates, regional versus national versus sub-national prerogative, which organisation(s) is best placed to lead, contribute, or rather focus its efforts elsewhere need to be resolved quickly and with all parties focused on outcomes for the basin as a whole and the people that live there. Coordination needs to be strengthened, informed by a strong understanding of existing institutional and governance systems throughout each basin country, the strengths, weaknesses and priorities of different parties, and the political context and drivers of change.

**Strengthening national implementation.** Achieving outcomes from almost all regional activity in relation to water resources management and development is ultimately dependent on implementation at a national level where there is much outside the water sector which ultimately impacts on what can be achieved in the water sector. The effectiveness of national implementation depends on an alignment of interests and priorities, human and technical capacity, available resources, good governance, strong institutions and a sound regulatory environment, compliance assurance and enforcement, and international, national and local politics. Often engaging in these areas is beyond the scope of water resources management and development and so requires the strong support of development partners and countries working closely together to strengthen national systems and institutions more broadly.

# 5.0 BASIN DEVELOPMENT PATHWAYS

Considering the strategic needs, risks and challenges described in Chapter 4, the Basin Development Pathways set out sustainable development opportunities and a results chain directed at achieving the Sustainable Development Goals most directly relevant to regional water resources management and development in the Mekong River Basin.

## 5.1 Shared Mekong River Basin Vision towards 2040

The Mekong River Basin Vision identifies among the countries of the basin a shared long-term aspiration for the future. The Vision itself is an enduring one. It represents an ongoing ambition to achieving progress in the lives of the people of the basin in support of peace, security and societal harmony. The Mekong River Basin Vision is of:

> ***An Economically Prosperous, Socially Just, Environmentally Sound and [Climate Resilient] Mekong River Basin***

The Mekong River Basin Vision embodies ***a balance*** between economic development, social justice and environmental integrity, with climate resilience a cross-cutting focus. All dimensions are ***equally important*** to achieving the sustainable development, utilisation, and conservation of the basin's water and water-related resources.

Towards 2040 the [three/four] dimensions of the Vision are described below, as informed by national inputs and the Sustainable Development Goals most relevant to water resources management and development.

**Economically Prosperous**

The Basin of 2040 is one with substantially higher GDP and higher incomes for the people that live there. Inclusive economic growth is driven by the continued shift to industrial and service sector led economies, creating opportunities for all groups and helping eradicate poverty. Agriculture is more productive and globally competitive with an emphasis on higher value and green produce, using improved technology. Navigation enables people and bulk goods to move long distances cheaply, safely and environmentally friendly. Energy generation from hydropower and other renewable sources provides reliable and affordable electricity for all. New economic potential is realised in nature-based tourism, leveraging the basin's unique environment and culture.

**Socially Just**

The Basin of 2040 is one where the benefits of water resource development are shared with the people impacted by those developments, in order that sustainable livelihoods for all people are possible. There is less direct dependence on water-related resources as people previously in vulnerable situations have opportunities to earn higher incomes in other sectors and increase their standard of living. The Basin is food, water and energy secure and economic growth is inclusive. Men and women have equal opportunity to realise their full potential through access to and control of economic resources.

**Environmentally Sound**

The Basin of 2040 is one where people live in harmony with nature, where the remaining environmental assets, especially the important wetlands and natural forests, are protected from further decline. Natural resources are managed sustainably within ecological limits so that ecosystem services including flood and drought protection are maintained for the benefit of the countries' economies and people. The basin remains one of the world's most biodiverse places with sufficient habitat and regulatory controls to arrest the decline in species. Watersheds serve an important role as refuge for plants and animals, regulating runoff and groundwater recharge and reducing soil erosion.

**[Climate Resilient]**

[The Basin of 2040 has enough water during the dry season to minimise the effect of droughts while salinity intrusion in the delta is not materially worse, even as sea-level rises. Water is of good quantity and quality to enable sustainable development while minimising water-related disasters. Flood impacts are less severe through a combination of upstream reservoirs, protected floodplain areas, and by coordinating the design, location, construction and operation of flood protection infrastructure. Transboundary flood management effectively operates as a single integrated system between countries.]

The above dimensions of the Mekong River Basin Vision towards 2040 – all based on national inputs and SDGs – guide the development of the results chain defined in Section 5.3 to 5.5.

## 5.2 Sustainable development opportunities

The sustainable development opportunities below represent a substantial broadening of the opportunities in the previous editions of the BDS, which were negotiated by the Member Countries in 2010. Since then, the Mekong River Basin conditions and outlook has changed significantly, as described in Chapter 3. New information has become available on development opportunities and associated risks. The perceptions of national and regional stakeholders on water-related needs and priorities are changing.

As a result, development opportunities have been added for the restoration and management of riverine and wetland habitats and watersheds. The provision of water security to protect societies from water risks, especially floods and droughts, now figures prominently among the development opportunities, both as part of other sector investments and as a development opportunity in its own right. In all development sectors below, this strategy promotes the development of joint projects between two or more countries and significant national projects that create benefits within the country as well as opportunities elsewhere in the basin.

**Hydropower development**

There is potential for further development of hydropower to promote energy security and cross-border trade and contribute to flood and drought management. There are also opportunities for operational improvements to existing hydropower facilities to moderate downstream flood peaks, water level fluctuations and sediment risks.

This strategy promotes the concentration of hydropower development in storage-backed cascades to: (i) increase dry season flows and power generation, (ii) provide reliable flows to downstream run-of-river hydropower facilities and improve their performance, (iii) reduce downstream flood and drought risks and enhance dry season navigation, and (iv) create

opportunities to forego hydropower development in still undeveloped watersheds with high ecological value. Regional proactive planning will identify storage-backed and joint (multi-purpose) hydropower projects.

Further utilising this opportunity requires a focus on sustainability and addressing risks and uncertainties both at project and transboundary levels. Potential transboundary impacts will need to be identified and mitigated collaboratively through national regulatory frameworks and guidelines, as well as applicable regional procedures and guidelines. To enhance sustainable development, any new power generation plans should consider the full range of viable generation sources, including complementary use of wind and solar, and ensure that supply does not run too far ahead of demand.

**Expansion of irrigated agriculture**

There is an opportunity for increased dry season flows resulting from hydropower developments to be used to expand irrigation without affecting the historical baseline flow. A possible diversion from the mainstream into Northeast Thailand is one option that has been identified. Modernising and expanding irrigated areas, and changing cropping patterns, to improve efficiency and increase agricultural production will help achieve drought protection and improve household food and water security needs. There are opportunities also for expansion of groundwater-based irrigation powered by the expanding electricity grid or local solar generation.

To further capitalize on this opportunity and mitigate the risks to flow and sediment regimes requires proactive regional planning for inter-dependent development of storage and further consumptive uses in the basin, and the sharing of the resulting dry season flows. Determining how to share any additional dry season flows, including in relation to expanding irrigated agriculture or mitigating the effects of increased salinity intrusion on existing agriculture, should be informed by analysis of the potential impacts of climate change in different parts of the basin and the overall regional costs and benefits from different uses.

**Navigation development**

There is considerable potential throughout the mainstream for the further development of inland water transport (IWT) as an integrated, effective, safe and environmentally friendly way to move people and goods. This opportunity can be realised by taking advantage of greater water depth in the dry season and continuing to implement the existing IWT plans for the upper, middle and lower parts of the river. Elevated water levels due to hydropower dams may assist development of navigation in Lao PDR and Cambodia, but only if dams are sited to also suit IWT.

The investment opportunities for the navigation sector occur in many areas, ranging from waterway improvements to navigation aids and port development. Capitalizing on the opportunities requires the implementation of a Strategic Environmental Assessment (SEA) of the IWT plans, which steers environmental and social impact assessments for specific port and terminal constructions and waterway improvement projects. Major risks need to be fully addressed while basin countries consider and address jointly the transboundary impacts through national regulatory frameworks and guidelines, as well as applicable regional procedures and guidelines.

**Leveraging the value from regionally significant environmental assets**

There are opportunities to rehabilitate and improve the management of forested areas in watersheds to enhance the lifetime of storage reservoirs, protect biodiversity and contribute

to reducing greenhouse gases in the atmosphere. There are also opportunities for preservation, restoration and leveraging of the remaining wetlands and other riverine habitats for ecological (biodiversity), economic (nature-based tourism, fisheries), social (ecosystem services, social wellbeing), and climate change adaptation (flood and drought mitigation) purposes.

This strategy supports the identification, selection and preparation of investment opportunities in these environmental assets through proactive regional planning as informed by asset and ecosystem services valuation and the determination of the limits of acceptable change to ecological conditions. There are also opportunities for joint transboundary projects including to support biodiversity corridors and to regulate dry season flows and groundwater recharge. This strategy also supports regional cooperation to improve the capacity of countries to take advantage of innovative financing arrangements, such as attracting foreign carbon offsetting funds for reforestation of watersheds.

**Flood and drought mitigation**

There is a need for further flood risk reduction of urbanized and industrialized areas through a combination of upstream storage reservoirs (in combination with hydropower development), protecting certain floodplain areas against urban and industrial development (for storage and conveyance of floods), and infrastructure such as embankments and flood ways. The increase in upstream storage will also contribute to mitigating droughts in a future climate with dryer dry seasons. Joint projects will likely be needed to mitigate flood and drought risks to acceptable levels in various parts of the basin.

Early planning is required as solutions will become much more difficult and costly with time due to ongoing developments in areas that might be needed in future for projects to build climate resilience and manage flood and drought risks. This strategy supports a basin-wide, integrated approach to flood and drought management through proactive regional planning and flood risk management activities in the Mekong Delta. Such an approach requires detailed modelling and analysis of the movement of water across the floodplain and the assessment and prioritization of options and measures for flood protection, considering climate change (including sea level rise), the ecological benefits of floods, socio-economic development and spatial plans, and the rising cost of flood damage in expanding urban and industrial centres.

**Alternative livelihood development**

Water resources development impacts some poor, resource dependent communities more than others. Some groups within communities, particularly women, are also often in more vulnerable situations. There is therefore an opportunity to reduce inequities and achieve greater social inclusion by facilitating the transition of these people to situations where they are less directly dependent on natural resources for their income and sustenance. The investment in sectors with high potential to decrease gender inequality will be important to reduce vulnerabilities and inequity. Many of these opportunities will exist outside water-related sectors. Targeted investment in key areas will be needed to ensure the people most affected by water resource development will benefit from gains in employment and economic growth resulting from the above development opportunities and the broader transition to an industry and service-led economy. The identification, selection and preparation of investment opportunities in conjunction with joint projects and national projects of basin-wide significance will have a multiplier effect on the benefits of water resources development.

**Other opportunities**

Other water-related opportunities, such as public water supply, industrial water supply, fisheries, environment, and tourism, as well as opportunities beyond the water sector (e.g. alternative power generation options), also have considerable potential.

## 5.3 Sustainable Development Goals

The Strategic Priorities and outcomes for basin development and management in the next sections are directed at contributing to the achievement of relevant Sustainable Development Goals (Table 5.1). Water resources development and management can contribute to *No Poverty* (Goal 1), *Zero Hunger* (Goal 2), *Good Health and Well Being* (Goal 3), *Gender Equality* (Goal 5), access to *Clean Water and Sanitation* (Goal 6) and *Affordable and Clean Energy* (Goal 7). At the same time, the following Goals are supported by actions taken in water and water-related sectors: *Decent Work and Economic Growth* (Goal 8), *Industry, Innovation and Infrastructure* (Goal 9), *Climate Action* (Goal 13), *Live Below Water* (Goal 14), and *Life on Land* (Goal 15). *Partnerships for the Goals* (Goal 17) are essential to achieving the other goals, including through regional cooperation in the basin.


Although all the above Sustainable Development Goals are relevant to the Mekong River Basin Vision, the targets and indicators specified for each Goal can be used to identify those most impacted by regional cooperation on water resources through the Basin Development Strategy (Table 5.2). Goals not indicated below, are addressed indirectly based on the extent to which they are mainstreamed into the other goals or result from progress made towards those goals with more direct links to water resources management.

**Table 5.1:** Sustainable Development Goals (SDGs) with Targets most directly relevant to regional water resources development and management in the Mekong River Basin

| MRB-IF Dimension | SDGs | Targets |
|---|---|---|
| **Environment** |  | **6.5** By 2030, implement integrated water resources management at all levels, including through transboundary cooperation as appropriate<br>**6.6** Protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes<br>**13.1** Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries<br>**13.2** Integrate climate change measures into national policies, strategies and planning<br>**15.1** Ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains and drylands, in line with obligations under international agreements<br>**15.9** Integrate ecosystem and biodiversity values into national and local planning, development processes, poverty reduction strategies and accounts |
| **Social** |  | **1.5** By 2030, build the resilience of the poor and those in vulnerable situations and reduce their exposure and vulnerability to climate-related extreme events and other economic, social and environmental shocks and disasters<br>**2.4** By 2030, ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters and that progressively improve land and soil quality<br>**5.c** Adopt and strengthen sound policies and enforceable legislation for the promotion of gender equality and the empowerment of all women and girls at all levels<br>**6.5** By 2030, implement integrated water resources management at all levels, including through transboundary cooperation as appropriate<br>**6.6** Protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes |
| **Economic** |  | **2.4** By 2030, ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters and that progressively improve land and soil quality<br>**7.2** By 2030, increase substantially the share of renewable energy in the global energy mix<br>**9.1** Develop quality, reliable, sustainable and resilient infrastructure, including regional and trans-border infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all |
| **Climate Change** |  | **1.5** By 2030, build the resilience of the poor and those in vulnerable situations and reduce their exposure and vulnerability to climate-related extreme events and other economic, social and environmental shocks and disasters<br>**9.1** Develop quality, reliable, sustainable and resilient infrastructure, including regional and trans-border infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all |
| **Cooperation** |  | **6.5** By 2030, implement integrated water resources management at all levels, including through transboundary cooperation as appropriate<br>**17.9** Enhance international support for implementing effective and targeted capacity-building in developing countries to support national plans to implement all the Sustainable Development Goals, including through North-South, South-South and triangular cooperation<br>**17.14** Enhance policy coherence for sustainable development<br>**17.18** By 2020, enhance capacity-building to developing countries … to increase significantly the availability of high-quality, timely and reliable data disaggregated by income, gender, age, race, ethnicity, migratory status, disability, geographic location and other characteristics relevant in national contexts |

## 5.4 Basin Development Strategy priorities and results chain

Five Strategic Priorities for Mekong River Basin development and management to 2030 are identified to direct the BDS Outcomes and Outputs towards improving the Mekong State of Basin and contribute to the SDGs above. The five Strategic Priorities, one for each dimension of the Mekong River Basin Indicator Framework, are as follows:

1. **Environment:** Maintain the ecological function of the Mekong River Basin
2. **Social:** Enable inclusive utilisation of the basin's water and water-related resources
3. **Economic:** Enhance optimal and sustainable development by increasing regional benefits and decreasing regional costs
4. **Climate change:** Ensure water security by mitigating floods and droughts
5. **Cooperation:** Strengthen cooperation among all basin countries and stakeholders

The BDS Outcomes seek to describe the resulting end state that basin countries would like to see by 2030. They are aligned with the Strategic and Assessment Indicators of the State of Basin Report and MRB-IF and their achievement will be evaluated using the MRB-IF indicators. The Outputs are the immediate results necessary for producing one of the Outcomes through an identified impact pathway. Each Output will be produced by one or more actors implementing one or more activities. The activities will be defined and identified in the strategic plans or action plans of each relevant actor, such as the MRC.

This section describes the Strategic Priorities and outlines the Outcomes and Outputs for each Strategic Priority in each dimension.

### Environment Dimension Results Chain

#### Strategic Priority: Maintain the ecological function of the Mekong River Basin

The Mekong River Basin's environment is being heavily modified, placing the ongoing viability of some important ecosystems and dependent biota such as fish, at risk. These ecosystems include river and wetland habitats and forested watersheds, all of which provide valuable provisioning, regulating, supporting and cultural services to the countries and people of the basin, contributing to sustainable economic development. The most critical issues to be addressed over the period to 2030 are changes in water flow conditions, reduced sediment transport due to dams and sand mining, and the loss of remaining wetlands and unsustainable management of watersheds.

To address these issues requires action at both regional and national levels. It will be important to identify the limits of acceptable water-related change for priority environmental assets to avoid the potential negative impacts of water resource development, and to work together to mitigate the transboundary impacts from development that are already evident. A focus on sediment transport is necessary to help minimise regional costs from riverbank erosion and land subsidence in the delta. More sustainable watershed management will help protect biodiversity, while supporting dry season flows and power generation. Healthy wetlands provide flood protection, improved water quality and important fish habitats. Sustainable fish populations are essential to the food security and livelihoods of people in vulnerable situations.

**The Outcomes and Outputs** focus on water flow conditions, sediment and environmental assets (wetlands and watersheds). They seek to ensure that by 2030, the environment continues to provide important ecosystem services, supporting food security and livelihoods, especially of people in vulnerable situations.

| Strategic Priority 1: Maintain the ecological function of the Mekong River Basin | | |
|---|---|---|
| **Outcomes** | **Outputs** | **Contribution to other Outcomes** |
| 1.1 River flows support a healthy environment and productive riparian communities | 1.1.1 Water flow and quality in the mainstream managed in accordance with agreed guidelines<br>1.1.2 Guidance and measures for sustainable hydropower implemented | Outcome 1.2, 1.3<br>Outcome 2.1, 2.2<br>Outcome 3.1, 3.2 |
| 1.2 Sediment transport helps mitigate bank erosion and land subsidence | 1.2.1 Basin-wide sediment management plan developed and implemented | Outcome 2.1, 2.2<br>Outcome 3.1, 3.2 |
| 1.3 River and wetland habitats and watersheds provide important ecosystem services | 1.3.1 Limits of acceptable change for key river and connected wetland habitats identified and implemented<br>1.3.2 A regional planning and management framework for watersheds agreed and implemented | Outcome 3.1, 3.2<br>Outcome 3.1, 3.2 |

## Social Dimension Results Chain

### Strategic Priority: Enable inclusive utilisation of the basin's water and water-related resources

Water resources development tends to exacerbate inequality. Poor, resource dependent people in vulnerable situations bear the most risk due to a lack of alternative livelihoods and adaptive capacity. Gender differences in access to water and water-related resources, as well as related to impacts and opportunities from water resources development need to be better understood so that measures can be put in place to promote equity and achieve food, water and energy security for all. This will require a concerted effort to enhance information and knowledge, supported by the collection, sharing and analysis of spatially distributed and gender disaggregated data. As policy makers better understand the needs and opportunities of people in vulnerable situations who are impacted by water resource development, strategies for alternative livelihood development can be designed and implemented, including through joint projects and national projects of basin-wide significance.

**The Outcomes and Outputs** focus on food, water and energy security for women and men while helping transition poor, resource dependent communities to more secure livelihoods with higher incomes. They seek to ensure that people, especially those in vulnerable situations, can meet their basic needs while sharing in the benefits of basin water resource development. Food security is addressed, in particular, through improving management of fisheries and addressing risks to capture fisheries from water resources development.

| Strategic Priority 2: Enable inclusive utilisation of the basin's water and water-related resources | | |
|---|---|---|
| **Outcomes** | **Outputs** | **Contribution to other Outcomes** |
| 2.1 Basin communities are food, water and energy secure, thus strengthening climate resilience | 2.1.1 Access and supply of safe water to people in vulnerable situations improved<br>2.1.2 Capture fisheries regulatory frameworks improved and implemented<br>2.1.3 Risks to capture fisheries productivity and | Outcome 2.3, 3.2 |

| | | |
|---|---|---|
| | diversity minimised<br>2.1.4 The gender and vulnerability aspects of basin water, food and energy security are identified and addressed by policy makers | |
| 2.3 Employment and livelihoods reduce poverty and inequality through less direct dependence of vulnerable people on river and wetland resources | 2.2.1 Alternative livelihood strategies for poor, resource dependent communities impacted by water resources development are developed and mainstreamed at national levels | Outcome 2.1 |

## Economic Dimension Results Chain

### Strategic Priority: Enhance optimal and sustainable development by increasing regional benefits and decreasing regional costs

Separate national development plans, designed and implemented in an uncoordinated way, are unlikely to optimise the benefits and minimise the costs for basin countries. Sustainable development for all basin countries could be enhanced by identifying and implementing opportunities not yet considered in national plans, including significant joint infrastructure projects and projects of basin-wide significance, with a view to achieving a better overall outcome across sectors and between communities. Projects across all dimensions need to be identified, alternative scenarios assessed, and information made available for consideration by national decision-makers in updating national plans. This information can also support discussions between basin countries about trade-offs and benefit sharing.

Such a proactive approach to regional planning, if implemented effectively and integrated within national development planning processes, will achieve higher economic growth in each country than would otherwise be the case from implementing separate and uncoordinated national plans. As the economy of the region is increasingly integrated, cooperation in water-related sector planning and management through the implementation of regional sector strategies can also help enhance the economic value and sustainability of individual sectors.

**The Outcomes and Outputs** focus on enhancing national plans through proactive regional planning and helping improve the economic value of water-related sectors through regional cooperation. They seek to ensure economic growth is higher across the region than it otherwise would be based only on uncoordinated national plans, and promote cooperation to increase regional benefits and decrease regional costs.

| **Strategic Priority 3: Enhance optimal and sustainable development by increasing regional benefits and decreasing regional costs** | | |
|---|---|---|
| **Outcomes** | **Outputs** | **Contribution to other Outcomes** |
| 3.1 The economic growth of each country and the region is higher as a result of more proactive regional planning | 3.1.1 The Basin Development Plan and associated national plans are informed by the findings of a more proactive regional planning approach | Outcome 1.2, 1.3<br>Outcome 2.1, 2.2<br>Outcome 3.2<br>Outcome 4.1<br>Outcome 5.1 |

| | | |
|---|---|---|
| 3.2 Enhanced value from key economic sectors including irrigated agriculture, hydropower, navigation, environment and fisheries, through implementation of regional strategies | 3.2.1 Investment and associated measures in irrigated agriculture implemented<br>3.2.2 Sustainable hydropower development strategy and related regional energy plans implemented in synergy<br>3.2.3 Investment and associated measures in basin navigation plans implemented in synergy<br>3.2.4 Investment and associated measures in regional environmental strategies and programmes implemented in synergy<br>3.2.5 Investment and associated measures to adapt to changes in fish populations and catch composition identified and implemented | Outcome 1.1, 1.3<br>Outcome 2.1, 2.2<br>Outcome 3.1 |

## Climate Change Dimension Results Chain

### Strategic Priority: Ensure water security by mitigating mainstream floods and droughts

Floods and droughts cause severe economic and social hardship, particularly on poor and marginalised communities. Climate change has the potential to exacerbate the frequency and severity of both floods and droughts with more people and assets at risk due to population growth and floodplain development. Basin countries need to take steps to increase water security – mitigating the impacts of too much water at certain times of year, while not having enough at other times. Opportunities for upstream and floodplain storage should be considered along with the coordination of floodplain planning and coordinated operation of instream and flood protection infrastructure.

As with efforts to enhance sustainable development, joint projects and national projects of basin-wide significance will be an important mechanism to ensure the regional costs from floods and droughts are minimised. These projects need to be identified and assessed and where appropriate, integrated into national plans and linked to other planned sector developments (such as storage-backed hydropower or wetland restoration) or as stand-alone developments (such as alignment of land-use planning to support transboundary flood-ways and floodplain storage) that enable the most cost effective overall response.

While water security needs to be improved, adaptation to floods and droughts so that basin communities are better prepared will need to continue, including through enhanced monitoring, forecasting and warning systems and the mainstreaming of climate change adaptation at the national level.

**The Outcomes and Outputs** focus on identifying and preparing options to improve water security throughout the year using both structural and non-structural measures. By 2030, it is expected that national plans will incorporate options for making increased dry season flows available to support agriculture and mitigate salinity intrusion, and for mitigating flooding using both in-stream and floodplain storage.

| Strategic Priority 4: Ensure water security by mitigating floods and droughts | | |
|---|---|---|
| **Outcomes** | **Outputs** | **Contribution to other Outcomes** |
| 4.1 There is sufficient flow in the dry season to support livelihood | 4.1.1 Transboundary projects to facilitate regional cooperation implemented<br>4.1.2 Coordinated dam operations and use of flood | Outcome 1.3<br>Outcome 2.1, 2.2<br>Outcome 3.1, 3.2 |

| | | |
|---|---|---|
| activities and mitigate salinity intrusion; and reduced flood peaks in the wet season | protection infrastructure for flood and drought mitigation<br>4.1.3 Cooperative socio-economic and spatial planning on the floodplain | Outcome 4.2 |
| 4.2 Basin communities are better prepared for more frequent and severe floods and droughts as a result of climate change | 4.2.1 Integrated basin-wide forecasting and early warning<br>4.2.2 Climate change adaptation, including measures to adapt to flood and drought, mainstreamed at national levels | Outcome 1.1, 1.3<br>Outcome 2.1<br>Outcome 4.1 |

## Cooperation Dimension Results Chain

### Strategic Priority: Strengthen cooperation among all basin countries and stakeholders

The increasing regulation of flows in the basin requires cooperation among all six basin countries to address issues of water security, fluctuating water levels from hydropower operations, and coordinating operations to mitigate floods, droughts and sediment loss. Building on good foundations, three areas of cooperation will need to be strengthened over the next decade: (i) cooperation on potential future institutional arrangements for managing the whole basin; (ii) cooperation between countries to further strengthen the established river basin organization (i.e. MRC); and (iii) coordination among all regional mechanisms and relevant partners that work in water resource management.

Between basin countries, a focus should be on strengthening country-to-country capacity building, enhancing implementation of the MRC procedures, and ensuring a financially secure Mekong River Commission that can continue to support the needs of basin countries. Between the two main water cooperation platforms, progress on harmonisation of disaggregated data collection and sharing, notification of water releases and sharing operating protocols, combining expertise and integrated decision support systems will all be beneficial to achieving one overall basin planning and management system. All Mekong and regional water, energy and environment related cooperation mechanisms will need to focus on areas of complimentary strength and comparative advantage to minimize duplication and ensure a cost-effective response to achieving the outcomes articulated in this strategy.

**The Outcomes and Outputs** focus on working towards the integrated whole-of-basin management of the river system. This will need to be coordinated by the two regional cooperation platforms, MRC and MLC Water, with each focusing on its core strengths and putting in place compatible systems that enable enhanced data and information sharing all year round, protocols on coordinated operations, joint knowledge products and bringing a wider pool of expertise from all basin countries to bear in resolving basin-scale challenges and managing risks, and consolidated monitoring networks across the whole basin.

| **Strategic Priority 5: Strengthen cooperation among all basin countries and stakeholders** | | |
|---|---|---|
| **Outcomes** | **Outputs** | **Contribution to other Outcomes** |
| 5.1 Higher benefits and lower costs from the integrated management of the entire river system | 5.1.1 Common understanding on the potential future institutional arrangements for basin management<br>5.1.2 Significant joint infrastructure projects and national projects of basin-wide significance and associated measures (BDP) agreed, and project preparation in progress | Outcome 5.2, 5.3<br>Outcome 3.1, 4.1 |

| | | |
|---|---|---|
| 5.2 A Strengthened Mekong River Commission supports the achievement of higher regional benefits, lower regional costs, and increased water security | 5.2.1 Implementation of the 1995 Mekong Agreement Procedures enhanced<br>5.2.2 A core river monitoring network for the mainstream and remaining national river monitoring networks consolidated<br>5.2.3 Compatible Decision Support Systems with reinvigorated data and information management and sharing, modelling, forecasting, and communication<br>5.2.4 Organisational development of the Mekong River Commission | Outcome 1.1, 1.2, 1.3<br>Outcome 2.1, 2.2<br>Outcome 3.1, 3.2<br>Outcome 4.1, 4.2<br>Outcome 5.1, 5.3 |
| 5.3 Cooperation among all relevant regional water-related mechanisms and relevant partners based on need and complementary strengths | 5.3.1 Mekong-related cooperation mechanisms and relevant partnerships implemented in synergies<br>5.3.2 Joint State of Basin Report and Basin Development Strategy<br>5.3.3 Joint Basin Expert Groups<br>5.3.4 Harmonised basin-wide stakeholder platform | Outcome 1.1, 1.2, 1.3, 1.4<br>Outcome 2.1, 2.2<br>Outcome 3.1, 3.2<br>Outcome 4.1, 4.2<br>Outcome 5.1, 5.2 |

## 5.5 Description of Outcomes and Outputs

Each Outcome and Output in the results chain above is described below together with the assessment indicators and impact pathways to facilitate the uptake of the resulting Outputs by line or implementing agencies and others. The key organisations that need to be involved in the delivery of each Output are also provided based on their mandate (national agencies), interests (private sector, development partners), or strategic and action plans (regional organizations, initiatives, and programmes).

The impact pathways describe enabling actions which will help ensure the Outputs can contribute effectively to the Outcomes. Enabling actions could include: involving the responsible line agencies at the requisite levels of seniority in the design of the activities and the development of Outputs; allocating resources to support capacity building during the Output development process; awareness raising on issues and options for senior government officials; 'translation' of recommendations, guidance and options into national systems; and supporting the use of the regional products and services in national and regional decision-making. Building these impact pathways into the activity and task planning for each Output will help support the uptake of regional outputs at the national level.

## Environment Dimension Description of Outcomes and Outputs

<table>
<tr><th colspan="2">Environment Dimension</th></tr>
<tr><td colspan="2">Outcome 1.1 River flows support a healthy environment and productive riparian communities</td></tr>
<tr><td>Description of Outcome<br><br>The hydrology of the Mekong River is changing with lower flood season flows, higher dry season flows and rapid fluctuations in water levels due to reservoir operations and extreme events. More severe droughts and floods may occur more frequently due to the impacts of climate change. With increasing navigation and industrialisation there is also increasing risk of water quality related incidents. By 2030, healthy riverine environment comprises flows that are within agreed ecological bounds, ensures rivers and wetlands are connected at frequencies and for durations to support ecosystem services and enables riverbank agriculture to support livelihoods including of people in vulnerable situations. Water quality in the Mekong remains good.</td><td>State of Basin and MRB-IF Indicators<br><br>- Compliance of dry season flows with the PMFM<br><br>- Compliance of flood season peak flows with the PMFM<br><br>- Compliance with Tonle Sap reverse flows with the PMFM<br><br>- Ecological health, and compliance of water quality with the PWQ</td></tr>
<tr><td>Output 1.1.1 Water flow and quality in the mainstream managed in accordance with agreed guidelines (related to Outputs 1.3.1, 2.2.1, 3.1.1, 4.1.2, 4.2.2, 5.2.1)</td><td>Output 1.1.2 Guidance and measures for sustainable hydropower implemented (related to Outputs 1.2.1, 2.1.3. 3.1.2, 4.1.1)</td></tr>
<tr><td>Description of Output<br><br>Water resources development is causing changes in hydrology both over the long-term and through short-term fluctuations in water levels. Building on the limits for minimum dry season and maximum flood season flows under the PMFM, thresholds for maximum dry season and minimum wet season flows, as well as acceptable rates of change for short-term fluctuations due to reservoir operations and extreme events, will be evaluated for feasibility, recognising multiple objectives from infrastructure operations including for power generation. Where feasible, further thresholds that relate to the protection of the environment will be incorporated into operational decision-making, and routine monitoring, notification and reporting. Implementation of the Procedures for Water Quality will be enhanced to encompass water quality related to incidents from the transport of hazardous goods and other emergencies. Enhanced monitoring, notification and reporting arrangements will be implemented where necessary.</td><td>Description of Output<br><br>Several guidelines and tools have been developed in recent years to guide planning and decision-making on sustainable hydropower, including on designing and retrofitting sediment passage systems and sediment flushing operations, incorporating fish passage systems and addressing water quality, aquatic ecology and dam quality and safety issues. Systematically implementing this guidance in the planning, design, construction and operation of hydropower will include awareness-raising, incorporation of guidelines into national decision-making processes and regulatory frameworks, capacity building and knowledge sharing between national agencies and developers, and review and reporting on the consistency of projects and decision-making processes with the guidelines. Evaluating the effectiveness of the guidelines and updating them based on lessons learned and experience implementing mitigation measures in the Mekong River Basin may also be necessary.</td></tr>
<tr><td>Impact Pathway<br><br>1. Implementing agencies sign-off on concept and scope of potential new thresholds and methods<br>2. Implementing agencies, hydropower operators and navigation sector engaged in development of options<br>3. New thresholds incorporated into operational monitoring, notification and decision-making processes<br>4. Monitoring, analysis and corrective actions undertaken where necessary</td><td>Impact Pathway<br><br>1. Guidelines signed-off by implementing agencies<br>2. Raise awareness, build capacity and promote guidelines among implementing agency staff and developers<br>3. Plans developed and avenues identified to incorporate into national decision-making processes<br>4. Guidelines and measures implemented through national planning and decision-making processes</td></tr>
<tr><td>Key Organisations<br><br>MRC, MLC Water, national energy, environment and water agencies, private sector operators, ASEAN</td><td>Key Organisations<br><br>MRC, MLC Water, national energy, environment and water agencies, private sector developers and operators</td></tr>
</table>

**Environment Dimension**

**Outcome 1.2** Sediment transport helps mitigate bank erosion and land subsidence

**Description of Outcome**

The loss of sediment in the river since the construction of mainstream and tributary dams is damaging to the river and floodplain environment. Much of this loss will be permanent as the sediments are trapped behind dam walls and in low-flow reservoir environments. Facilitating sediment transport will help mitigate land subsidence in the delta, maintain floodplain productivity, reduce costs for riverbank protection along the length of the river, and help optimise the long-term economic potential of hydropower operations. By 2030, as much as possible of the remaining suspended and bedload sediment transport is protected through improved siting, design and construction of any further instream barriers, more effective management of sand mining to ensure sustainability, and coordinated mitigation measures such as sediment flushing.

**State of Basin and MRB-IF Indicators**

- Changes in sediment transport
- Condition of riverine, estuarine and coastal habitats

**Output 1.2.1** Basin-wide sediment management plan developed and implemented (related to Outputs 1.1.2, 3.1.1)

**Description of Output**

A plan to protect ongoing sediment transport throughout the basin developed, agreed and implemented by basin countries. This plan will include mechanisms to minimise further sediment loss in proactive regional and national planning and develop protocols for the coordination of sediment flushing operations in the mainstream and tributaries. Objectives will relate to minimising the future costs of riverbank protection and loss of floodplain productivity, and optimising the economic potential of hydropower over the long-term. The plan will also identify measures to ensure the regional costs of sand mining operations are adequately factored into national and industry development plans. It will clearly identify roles and responsibilities, cost sharing mechanisms and adaptive planning based on systematic monitoring and evaluation of sediment transport and riverbank and coastal erosion, including through enhanced monitoring techniques with the use of remote sensing and earth observation technologies.

**Impact Pathway**

1. Implementing agencies sign-off on concept and scope of proposed basin-wide sediment management plan
2. Engagement and consultation with implementing agencies and hydropower and sand mining industries on issues and mechanisms to resolve them
3. Incorporation of sediment transport considerations in assessment methodologies for proactive regional planning
4. Incorporation of sediment management guidelines and protocols in dam design and operational decisions
5. Monitor, evaluate and adaptively manage

**Key Organisations**

MRC, MLC Water, national environment, industry and water agencies, private sector developers and operators

**Environment Dimension**

**Outcome 1.3** River and wetland habitats and watersheds provide important ecosystem services

**Description of Outcome**

The key environmental assets of the basin provide a range of ecosystem services including provisioning (e.g. food, fuel, timber), regulating (e.g. flood control, water quality), supporting (e.g. habitat, carbon sequestration), and cultural (e.g. traditional and aesthetic values) services. These services contribute social and economic benefits to basin communities, particularly for poor, resource dependent people in vulnerable situations. The remaining riverine and wetland habitats and watersheds, including important fish habitats, need protection through national policies and management and by modifying development plans to minimise the potential negative impacts and leverage the value these ecosystems provide. By 2030, regional and national development plans are informed by asset and ecosystem services valuation and limits of acceptable change to ecological conditions. Forested areas of watersheds are increasing.

**State of Basin and MRB-IF Indicators**

- Extent of wetland area
- Condition of riverine, estuarine and coastal habitats
- Condition and status of ecologically significant areas
- Condition and status of fisheries and other aquatic resources

| **Output 1.3.1** Limits of acceptable change for key river and connected wetland habitats identified and implemented (related to Outputs 1.1.1, 3.1.1) | **Output 1.3.2** A regional planning and management framework for watersheds agreed and implemented (related to Output 3.1.1, 3.2.4) |
|---|---|
| **Description of Output**<br><br>Limits will be identified beyond which the ecological character of priority regional river or wetland assets will be changed and the functions and services they provide compromised. These limits will most usefully be expressed for hydrological parameters but could also relate to the extent of vegetation communities, water quality parameters, habitat fragmentation and so on. The limits will be based on expert scientific advice and gender responsive local community engagement, and then incorporated through an iterative approach into the assessment methodologies for proactive regional and national planning, so that trade-offs can be properly considered by national decision-makers. They will also inform the development and implementation of management plans for priority regional environmental assets and work to identify further monitoring and management thresholds for mainstream flows. | **Description of Output**<br><br>Sustainable watershed management is based on effective land-use planning and sound regulatory management and institutions. A regional planning and management framework for watersheds based initially on the network of upper catchment priority regional environmental assets and other key areas identified by Member Countries will facilitate implementation of improved land-use planning, institutional development and governance, effective policy, laws or regulations and enforcement mechanisms. This framework will support regulation of dry season flows, mitigating flash floods, biodiversity, and adaptation to climate change. It could also support the attraction of carbon offset projects including for reforestation, which can earn carbon credits to be sold on international markets. Guidance and capacity building for countries to improve watershed management would support implementation of the framework. |
| **Impact Pathway**<br><br>1. Implementing agencies sign-off on scope and concept<br>2. Implementing agencies and local communities engaged in identification and assessment<br>3. Awareness raising, support and facilitation for uptake and integration<br>4. Regional and national development plans modified to adequately protect priority regional environmental assets | **Impact Pathway**<br><br>1. Implementing agencies sign-off on scope and concept<br>2. Implementing agencies engaged in development of regional framework<br>3. Awareness raising, support and facilitation for uptake and integration<br>4. Implementing agencies improve planning, regulatory and institutional arrangements<br>5. Implementing agencies and third parties take action to develop and implement projects |
| **Key Organisations**<br><br>MRC, national environment and water agencies, GMS, ASEAN | **Key Organisations**<br><br>National environment, agriculture and forestry agencies, GMS, MRC |

## Social Dimension Description of Outcomes and Outputs

| **Social Dimension** | |
|---|---|
| **Outcome 2.1** Basin communities are food, water and energy secure, thus strengthening climate resilience | |
| **Description of Outcome**<br><br>The living conditions and wellbeing of basin communities is reflected in part by the extent to which households have food, water and energy security. Effective management and development of the basin's water and water-related resources, including fisheries, should help conditions improve over time. However, inequities, including in relation to gender, are likely to persist without targeted intervention focused on people in vulnerable situations. By 2030, households have sufficient access to food, water and energy to meet their basic needs and improve their climate resilience. Regional and national planning has been informed by strategies that can be implemented to improve equity and on the extent to which water resource development is affecting food security for all. People dependent on fish for their food security and livelihoods, have sufficient fish of value to catch, eat and sell, supporting their nutritional requirements and overall wellbeing. | **State of Basin and MRB-IF Indicators**<br><br>- Food Security<br>- Water Security<br>- Access to electricity |

| **Output 2.1.1** Access and supply of safe water to people in vulnerable situations improved (related to Output 2.1.4) | **Output 2.1.2** Capture fisheries regulatory frameworks improved and implemented (related to Outputs 1.3.1, 1.3.2) | **Output 2.1.3** Risks to capture fisheries productivity and diversity minimised (related to Outputs 1.1.2, 1.3.1) | **Output 2.1.4** The gender and vulnerability aspects of basin water, food and energy security are understood and addressed by policy makers (related to Outputs 2.1.1, 3.1.1) |
|---|---|---|---|
| **Description of Output**<br>Access to safe water supply lags access to improved water sources by some distance, especially in many rural areas of the basin. Improving the capacity of national and local authorities to address these issues in the most challenging areas is an important step to achieving SDG 6. Country-to-country knowledge sharing and best-practice international expertise will be brought to bear in developing an investment plan for targeted intervention, including pilot projects to improve safe water supplies and sanitation for people in vulnerable situations. | **Description of Output**<br>Fish in the basin are under pressure and management of fisheries needs to improve. Guidelines available to basin countries on identifying important habitats and designing measures to protect them from both *in-situ* and *ex-situ* threats, on designing and implementing appropriate regulatory mechanisms (incl. legal requirements and compliance) and institutional arrangements (incl. co-management), will help ensure fishing is sustainable and in the best possible position to withstand future shocks including changes from water resources development. Mechanisms to share lessons learned between countries on success and failure will be implemented to help build regional capacity. | **Description of Output**<br>The construction and operation of dams will have an impact on capture fisheries productivity, especially for migratory species. Other basin developments including in agriculture and mining also threaten fish. Measures will be identified to mitigate the risks to fish including through the use of environmental flows, operational guidance for structures that affect the immediate hydraulic and water quality environment around dams and in impoundments, and by studying the effectiveness of fish passages in relation to the unique fish ecology of the basin. Guidance for dam operators and national agencies overseeing the coordination of dam operations will support measures to mitigate the risks to fish. | **Description of Output**<br>Improving the understanding by decision-makers of Mekong specific needs, challenges and opportunities in water, food and energy security of both women and men in vulnerable situations will help identify measures to improve equity for vulnerable groups in different parts of the basin. National data collection and processing mechanisms will be modified to enable the assembly and analysis of sub-national, national and regional datasets on gender and other dimensions of vulnerability. Improved datasets will be used to identify and evaluate policies, programs and measures to improve equity for vulnerable groups in conjunction with water resources development. |
| **Impact Pathway**<br>1. Build capacity of national and local authorities<br>2. Develop investment plan and mobilise resources<br>3. National agencies and private sector implement plan with support of development partners | **Impact Pathway**<br>1. Implementing agencies sign-off on scope and concept<br>2. Ownership and buy-in built by involving national and local bodies<br>3. National and local policies, regulations and governance changed<br>4. New arrangements implemented by fisheries organisations and local fishers | **Impact Pathway**<br>1. Implementing agencies sign-off on scope and concept<br>2. Knowledge improved through monitoring, studies and documenting best practice including on costs and benefits<br>3. Guidelines tested and incorporated into operational decision-making and future designs | **Impact Pathway**<br>1. Implementing agencies sign-off on scope and concept<br>2. Spatially distributed and gender disaggregated data collected, analysed and reported<br>3. Information incorporated into scenario assessments |
| **Key Organisations**<br>MLC Water, national agencies, Development Partners, ASEAN | **Key Organisations**<br>MRC, national agencies | **Key Organisations**<br>MRC, national agencies | **Key Organisations**<br>MRC, MLC Water, national agencies, Development Partners, ASEAN, CSOs |

| Social Dimension | |
|---|---|
| **Outcome 2.2** Employment and livelihoods reduce poverty and inequality through less direct dependence of vulnerable people on river and wetland resources | |
| **Description of Outcome**<br>The means for people to sustain themselves and their families has an important bearing on their vulnerability to water-related disasters and other shocks. By 2030, knowledge gaps on the needs, risks, and opportunities and the strategies that can be put in place to support people in vulnerable situations have been closed: we know where they live, how they are impacted by water-related development and operations, what kind of national or local strategies and support programmes can improve their resilience, and how these programmes can be delivered. Less people will be directly dependent on natural resources for their income and sustenance, with greater involvement in the growing industry and service sectors of the economy. Higher participation in employment with decent wages and diversified livelihoods for both men and women has helped reduce vulnerability and improved economic prosperity. | **State of Basin and MRB-IF Indicators**<br>- Employment in LMRB water-related sectors<br>- Economic security<br>- Gender equality in employment and economic engagement |
| **Output 2.2.1** Alternative livelihood strategies for poor, resource dependent communities impacted by water resources development are developed and mainstreamed at national levels (related to Outputs 2.1.4, 3.1.1, 5.1.2) | |
| **Description of Output**<br>The assembly and analysis of sub-national, national and regional datasets on gender and other dimensions of vulnerability will be used to identify the needs, risks and opportunities for poor, resource dependent communities impacted by water resource development. Strategies to facilitate the transition of poor, resource dependent people to alternative livelihoods that enable higher incomes and better living standards for both women and men will be identified and implemented through national development plans. Strategies will be informed by improved spatially distributed and gender disaggregated data on people and communities in vulnerable situations, and implemented in conjunction with both joint projects and national projects of basin-wide significance. | |
| **Impact Pathway**<br>1. Implementing agencies sign-off on scope and concept<br>2. Data collection and processing mechanisms modified<br>3. Spatially distributed and gender disaggregated data collected, analysed and reported<br>4. Alternative livelihood strategies identified, evaluated and mainstreamed into national plans including for joint projects and national projects of basin-wide significance<br>5. Resources mobilised and plans implemented | |
| **Key Organisations**<br>National agencies, Development Partners, ASEAN, CSOs, MRC | |

## Economic Dimension Description of Outcomes and Outputs

| Economic Dimension | |
|---|---|
| **Outcome 3.1** The economic growth of each country and the region is higher as a result of more proactive regional planning | |
| **Description of Outcome**<br>Optimising the regional economic benefits from water resource management and development means that national plans that are implemented have higher overall benefits and lower overall costs than earlier versions. By 2030, changes to national plans will be considered through sovereign processes taking into account the basin-wide alternative development scenarios prepared and assessed through a more proactive regional planning approach. Economic growth and the contribution of the basin's strategic resources (food, water, energy) to national and regional demands should be higher in individual countries and for the region as a whole, as projects take into account synergies and trade-offs between basin-wide sectoral development to increase benefits, | **State of Basin and MRB-IF Indicators**<br>- Contribution of LMRB water-related sectors to basin, national and regional GDP<br>- Contribution of LMRB water-related sectors to food and energy supply |

reduce costs (including for mitigating adverse impacts), and provide long-term water security. Projects include those for instream and floodplain storage to reduce flood peaks, with natural floodplain storage also protected to provide benefits to biodiversity and fisheries. Benefits and costs are more evenly distributed in the basin ('making the pie bigger in order for the countries to share the pie fairly').

**Output 3.1.1** The Basin Development Plan and associated national plans are informed by the findings of a more proactive regional planning approach (related to Outputs 1.1.1, 1.2.1, 1.3.1, 1.3.2, 3.2.1, 3.2.2, 3,2.3, 3.2.4, 3.2.5, 4.1.1, 4.1.2, 4.1.3, 5.1.2, 5.2.3)

**Description of Output**

Updates to the BDP and national plans will be considered through normal periodic reviews that include options for increasing benefits, reducing costs and providing long-term water security. An assessment of alternative basin-wide development scenarios includes an identification of options to increase in-stream and floodplain storage within the whole basin for flood, drought and environmental management purposes. The recommendations for updating national plans (including mainstreaming climate change adaptation in sector development plans) may include adding joint projects and projects of basin-wide significance, changes to the location or design of existing projects, or not proceeding with others. Alternative dam operating rules will also be considered to help coordinate flood and drought mitigation, and manage sediment transport while maximising power generation. The new information will inform discussion of trade-offs and benefit sharing opportunities (through significant joint projects and projects of basin-wide significance) and acceptable transboundary impacts between the countries to determine the best ways by which to develop the basin given the current circumstances and the legitimate aims and concerns of each country.

**Impact Pathway**

1. Implementing agencies sign-off on scope and concept
2. Implementing agencies steer and oversee scenario assessments and related studies
3. Implementing agencies engage in regional discussions on trade-offs and benefit sharing
4. Implementing agencies include projects in national planning processes

Plans implemented leading to higher benefits and lower costs

**Key Organisations**

MRC, MLC Water, national agencies, Development partners

## Economic Dimension

**Outcome 3.2** Enhanced value from key economic sectors including irrigated agriculture, hydropower, navigation, environment and fisheries through implementation of regional strategies

**Description of Outcome**

The economic value obtained from key water-related sectors including irrigated agriculture, hydropower, navigation, ecosystem services, and fisheries will be substantially higher in 2030 than it is today. This value will be realised with regard to inter-sectoral linkages and the opportunity to achieve multiple benefits, with the long-term sustainability of industries as a key driver, based on more proactive regional planning under Outcome 3.1 and the implementation of priority investments and associated measures. Each sector will add value to the economy rather the detracting from it and draining resources including labour and capital from other more valuable sectors.

**State of Basin and MRB-IF Indicators**

- Economic value of LMRB water-related sectors

| **Output 3.2.1** | **Output 3.2.2** | **Output 3.2.3** | **Output 3.2.4** | **Output 3.2.5** |
|---|---|---|---|---|
| Investment and associated measures in irrigated agriculture implemented (related to Outputs 3.1.1, 5.1.2) | Sustainable hydropower development strategy and related regional energy plans implemented in synergy (related to Outputs 1.2.1, | Investment and associated measures in basin navigation plans implemented in synergy (related to Output 3.1.1) | Investment and associated measures in regional environmental strategies and programmes implemented in synergy (related to | Investment and associated measures to adapt to changes in fish populations and catch composition identified and implemented |

| | | | | |
|---|---|---|---|---|
| | 1.4.2, 3.1.1, 5.1.2) | | Outputs 1.3.1, 1.3.2, 3.1.1, 5.1.2) | (related to Outputs 2.1.2, 2.1.3) |
| **Description of Output** | **Description of Output** | **Description of Output** | **Description of Output** | **Description of Output** |
| Investment opportunities and associated measures will be identified and implemented in the (i) rehabilitation of existing irrigated agricultural areas; (ii) new irrigation on existing agricultural land; and (iii) development of new agricultural land. | The sustainable hydropower strategy will be implemented in synergy with related regional energy plans and based on input from proactive regional planning, including the assessment of alternative basin-wide development scenarios. Implementation will include identifying how to adapt national plans so that regional benefits are higher and regional costs lower and to enable planning, design and operations to have regard to multiple benefits and potential benefit and cost sharing mechanisms. | A comprehensive programme of work has been identified in navigation master plans for the upper and lower Mekong River Basins[7]. This includes infrastructure investments and supporting measures. Work will be prioritised and implemented according to an agreed schedule. Priorities and schedule will consider progress with complementary hydropower development plans and projected growth in navigation demand in both upper and lower parts of the basin. | A comprehensive programme of work has been identified in basin environmental management strategies, ranging from use of economic instruments, developing legal frameworks, assessing ecosystem services and engaging local communities. Work will be prioritised and implemented according to an agreed schedule, with a focus on mainstreaming protection of priority regional assets into national sector plans and identifying new financing mechanisms. | As fish populations may change over time due to development impacts, consideration will be given to optimising the benefits of the changes for local communities with consideration of existing inequities. Investments and associated measures will be identified to support regulatory improvements (e.g. changes in allowable fishing areas, use of different types of gear), implement enhancement methods (incl. use of reservoirs) such as stocking and sustainable aquaculture, and facilitating market development for different species. |
| **Impact Pathway for all Outputs**<br>1. Implementing agencies prioritise investments and associated measures<br>2. Implementing agencies agree on work schedule<br>3. Implementing agencies prepare the prioritised investments and associated measures for implementation<br>4. Water cooperation platforms facilitate and support | | | | |
| **Key Organisations** | **Key Organisations** | **Key Organisations** | **Key Organisations** | **Key Organisations** |
| MLC Water, national agencies, ADB, FAO, private sector | MRC, MLC Water, national agencies, GMS, private sector | MRC, JCCCN, MLC Water, GMS, national agencies | MRC, MLC Water, national agencies, GMS | MRC, national agencies, FAO |

## Climate Change Dimension Description of Outcomes and Outputs

| Climate Change Dimension | |
|---|---|
| **Outcome 4.1** There is sufficient flow in the dry season to support livelihood activities and mitigate salinity intrusion; and reduced flood peaks in the wet season | |
| **Description of Outcome** | **State of Basin and MRB-IF Indicators** |
| Climate change may exacerbate floods and droughts throughout the basin, while changes to flows and sea-level rise could make salinity intrusion in the | - Flood protection measures |

[7] JCCCN's Development plan on International Navigation on the Lancang-Mekong River (2015-2025) and MRC's Master Plan for Regional Waterborne Transport in the Mekong River Basin

| | | |
|---|---|---|
| delta worse. In response, by 2030 national development plans are being implemented which include (joint) projects that can increase dry season flows to support agriculture during drought and to mitigate salinity intrusion during low flows and in response to sea-level rise. Transboundary cooperation projects on climate change adaptation facilitate the identification of these significant joint and national projects by building trust and enhancing joint planning and problem solving. The use of infrastructure for flood and drought control is coordinated, including through transboundary cooperation. Floodplain planning and development is coordinated across borders to enable storage and conveyance of floodwaters in an efficient and cost-effective way. | | - Drought protection measures<br>- Extent of salinity intrusion in the delta<br>- Compliance of dry season flows with the PMFM<br>- Compliance of flood season peak flows with the PMFM |
| **Output 4.1.1** Transboundary projects to facilitate regional cooperation implemented (related to Outputs 3.1.1, 4.2.1, 5.1.2) | **Output 4.1.2** Coordinated dam operations and use of flood protection infrastructure for flood and drought mitigation (related to Outputs 1.2.1, 1.2.2, 3.1.1, 4.1.1, 4.2.1, 5.2.2, 5.2.3) | **Output 4.1.3** Cooperative socio-economic and spatial planning on the floodplain (related to Outputs 3.1.1, 5.1.2) |
| **Description of Output**<br>Transboundary climate change adaptation projects to mitigate floods and/or droughts are identified and implemented, building trust through integrated water resources management, and helping inform the identification of the significant joint and national projects through proactive regional planning. The identified projects will be conceptualized and implemented by the directly involved countries to improve knowledge, management, systems and cooperation in response to floods and droughts. Significant joint and national infrastructure projects will be identified and integrated into national plans under Output 5.1.2 based on more proactive regional planning and the assessment of alternative basin-wide development scenarios under Output 3.1.1. | **Description of Output**<br>The operation of storage reservoirs and hydropower cascades to help mitigate floods, droughts and other emergencies will be coordinated through agreed operating protocols to manage transboundary risks, ensure predictable responses to extreme events, and facilitate clear communication between parties including advance notification. Where relevant, the operation of flood protection infrastructure such as gates/sluices, floodways and pumping stations will also be coordinated through agreed protocols to minimise the potential damage to each country. | **Description of Output**<br>Transboundary coordination of spatial floodplain planning is critical to address flood risks and enable cost effective mitigation measures. A long-term vision for the delta floodplains and associated guidance will be prepared to steer socio-economic, spatial and sector planning. This will be based on national plans, the Initial Studies work, and further activities under this Strategy, including: (i) field surveys and detailed modelling and analysis of the movement of water across the floodplain; (ii) the assessment and prioritization of options for flood protection in various parts of the delta under different levels of transboundary cooperation and under consideration of social priority needs and vulnerabilities; and (iii) discussions on trade-offs and benefit sharing. |
| **Impact Pathway**<br>1. Implementing agencies steer and oversee project identification<br>2. Implementing agencies prepare projects<br>3. Implementing agencies negotiate joint projects<br>4. Plans implemented leading to higher benefits and lower costs | **Impact Pathway**<br>1. Engagement of implementing agencies, developers and operators in opportunities, risks and challenges<br>2. Identification of solutions and protocols developed<br>3. Protocols incorporated into hydropower operations | **Impact Pathway**<br>1. Further studies and assessments provide information to planners<br>2. Options for transboundary flood management for the delta are discussed by the countries<br>3. Vision and associated guidance for management of delta floodplains mainstreamed into national planning and decision systems |
| **Key Organisations**<br>MRC, MLC Water, national agencies, Development partners, GMS | **Key Organisations**<br>MRC, MLC Water, national agencies, hydropower and reservoir operators | **Key Organisations**<br>MRC, national agencies, Development Partners |

| Climate Change Dimension | |
|---|---|
| **Outcome 4.2** Basin communities are better prepared for more frequent and severe floods and droughts as a result of climate change | |
| **Description of Outcome**<br>Even with substantial investment in further regulating the flow of the Mekong River, floods and droughts will continue to occur and could be more frequent and severe due to climate change. By 2030, better prepared communities will be those where floodplain planning and development and the operation of flood protection infrastructure is coordinated across borders to enable storage and conveyance of floodwaters in an efficient and cost-effective way. Monitoring and early warning systems for flood and drought operate seamlessly between countries through improved data and information sharing, accurate forecasting, and timely notification. Knowledge is shared and capacity built for disaster response. Measures to adapt to flood and drought are mainstreamed at a national level in sector strategies, plans and projects. | **State of Basin and MRB-IF Indicators**<br>- Vulnerability to floods, droughts and storms<br>- Institutional response to the effects of climate change |
| **Output 4.2.1** Integrated basin-wide forecasting and early warning (related to Outputs 4.1.2, 5.2.1, 5.2.2, 5.2.3) | **Output 4.2.2** Climate change adaptation, including measures to adapt to flood and drought, mainstreamed at national levels (related to Outputs 1.3.2, 3.1.1, 4.1.1, 4.1.2, 5.1.2, 5.2.2, 5.2.3) |
| **Description of Output**<br>A regional forecasting and early warning system for flood and drought based on an integrated monitoring network, improved data acquisition and forecasting tools and processes, and agreed communication protocols between regional cooperation platforms and national agencies. All parties will operate from the same set of data and information through integrated regional, national and local systems. Additional data collection and transmission may be necessary, including through greater use of remote sensing technology. Notification of critical information and warnings will be communicated to affected people through multiple channels including new media and mobile technology. | **Description of Output**<br>Strengthening flood and drought management capacity at the national level including through implementation of integrated regional strategies for flood, drought and climate adaptation with planned and newly identified investments in all relevant water-related sectors to enhance resilience (such as storage-backed hydropower, socio-economic floodplain development, and wetland and watershed protection). Associated measures may include integrated regional monitoring and infrastructure operating protocols to help mitigate impacts; addressing knowledge gaps in the conjunctive, sustainable use of groundwater; and capacity building for national agencies on assessing climate change risks and impacts. |
| **Impact Pathway**<br>1. Implementing agencies and MLC Water sign-off on scope and concept<br>2. Engagement with affected communities on needs and challenges<br>3. Cooperation on data collection and sharing between countries<br>4. Systems in place at regional and national levels, providing accurate and timely information to potentially affected communities | **Impact Pathway**<br>1. Implementing agencies sign-off on scope and concept of regional flood and drought activities<br>2. Flood and drought management agencies engage all water-related sectors for identification of multi-purpose and climate proofing investments and associated measures<br>3. Implementing agencies steer and lead the preparation and implementation of the agreed regional flood and drought activities<br>4. Implementing agencies incorporate regionally identified investments and associated measures in national governance, decision-making and planning systems of the various sectors |
| **Key Organisations**<br>MRC, MLC Water, national agencies | **Key Organisations**<br>MRC, MLC Water, national agencies, ASEAN |

## Cooperation Dimension Description of Outcomes and Outputs

<table>
<tr><th colspan="2">Cooperation Dimension</th></tr>
<tr><td colspan="2">Outcome 5.1 Higher benefits and lower costs from the integrated management of the entire river system</td></tr>
<tr><td>Description of Outcome<br><br>There are now two key regional platforms for cooperation on water resources management among basin countries (MRC and MLC Water) which are similarly structured and aimed at common objectives. Cooperation between these two platforms has commenced and will be strengthened through the implementation of this BDS. By 2030, the basin countries and water cooperation platforms will have been working collaboratively together for the integrated management of the whole Mekong River Basin, ensuring compatibility of systems, the sharing of data, information and knowledge, joint studies, assessments and reports and an integrated whole-of-basin monitoring network. The benefit/cost ratio of managing the entire river system is optimised.</td><td>State of Basin and MRB-IF Indicators<br><br>- Overall environment, social and economic benefits derived in each country’s part of the basin<br><br>- Proportion of benefits derived from cooperation relative to total net economic value (Cost of cooperation relative to value created and delivered)<br><br>- Joint efforts on projects of basin-wide significance and with potential trans-boundary impacts</td></tr>
<tr><td>Output 5.1.1 Common understanding on the potential future institutional arrangements for basin management (related to Output 5.2.4)</td><td>Output 5.1.2 Significant joint infrastructure projects and national projects of basin-wide significance and associated measures (BDP) agreed, and project preparation in progress (related to Outputs 2.2.1, 3.1.1, 4.1.1)</td></tr>
<tr><td>Description of Output<br><br>To provide direction to further cooperation between the two key regional water platforms, basin countries need to achieve a common understanding on the potential future institutional arrangements for managing the entire Mekong-Lancang river system with a view to optimising the value created, delivered and captured relative to the costs of cooperation. To achieve this, the various options need to be explored, articulated and discussed so that all parties have a clear understanding of the nature of future cooperation arrangements and can strengthen the relevant organisations to support the implementation of those arrangements.</td><td>Description of Output<br><br>The significant joint infrastructure projects and national projects of basin-wide significance (which are the main mechanisms for regional benefit sharing) identified in Output 3.1.1 will be further conceptualized for subsequent incorporation in the national planning and decision-making systems. The joint preparation of the concept document (with the detail of a WB Project Concept Note for investment financing) will underpin a deal structure (or agreement) between the participating countries and the subsequent incorporation of the project in the national plan(s). The feasibility and associated ESIA studies for the further preparation of the joint projects will be implemented by the involved countries with regional facilitation and technical support as needed and requested. The whole process will be supported by capacity building, including study tours, on the identification, negotiation, decision-making and preparation of joint projects, including the development of a toolkit of policy mechanisms and guidelines.</td></tr>
<tr><td>Impact Pathway<br><br>1. Basin countries engaged in the preparation of a joint concept note<br>2. Basin countries have an opportunity to engage in discussions and negotiations on the options for future institutional arrangements<br>3. Basin countries sign-off on selected option for implementation</td><td>Impact Pathway<br><br>1. Implementing agencies steer and oversee project identification<br>2. Implementing agencies prepare projects<br>3. Implementing agencies discuss and negotiate joint projects<br>4. Implementing agencies include projects in national planning processes</td></tr>
<tr><td>Key Organisations<br><br>National Governments, MRC, MLC Water, ASEAN, and</td><td>Key Organisations<br><br>MRC, MLC Water, national agencies, Development</td></tr>
</table>

| | |
|---|---|
| others | partners, ASEAN |

| Cooperation Dimension | | | |
|---|---|---|---|
| **Outcome 5.2** A Strengthened Mekong River Commission supports the achievement of higher regional benefits, lower regional costs and increased water security | | | |
| **Description of Outcome**<br>By 2030, there is a strengthened Mekong River Commission in terms of structure, organisational capacity, and relevance and importance of the Outputs it produces for regional and national water resources development and management. In its cooperation arrangements and operations, the MRC focuses on its strengths and comparative advantage to avoid duplication and complements other cooperation mechanisms towards common basin objectives. Implementation has further shifted to national line and implementing agencies including through the operation of joint basin expert groups and is supported and facilitated by small regional and national secretariats. | | | **State of Basin and MRB-IF Indicators**<br>- Proportion of MRC budget funded by national contributions<br>- Extent of knowledge sharing activities |
| **Output 5.2.1** Implementation of the 1995 Mekong Agreement Procedures enhanced (related to Outputs 1.1.1, 1.2.1, 3.1.1, 4.1.2) | **Output 5.2.2** A core river monitoring network for the mainstream and remaining national river monitoring networks consolidated (related to Outputs 1.1.1, 1.2.1, 4.1.2, 4.2.1, 5.2.1) | **Output 5.2.3** Compatible Decision Support Systems with reinvigorated data and information management and sharing, modelling, forecasting and communication (related to Outputs 3.1.1) | **Output 5.2.4** Organisational development of the Mekong River Commission (related to Outputs 5.1.1, 5.2.2, 5.3.3) |
| **Description of Output**<br>Implementation of the 1995 Mekong Agreement procedures is enhanced including by earlier engagement in planning and design under PNPCA, a review and update of PDIES to support improved data sharing and management arrangements. Lessons learned from implementation to-date and previous reviews inform the development of an action plan and agreed procedural arrangements with updated technical guidelines, where appropriate. | **Description of Output**<br>Comprehensive data and information are available for the development and management of basin water resources through a core monitoring network for the mainstream, managed and operated by the MRC, and complemented by consolidated, more cost-effective national networks for national and regional purposes. Consolidation is supported by a rigorous network analysis that identifies the most cost effective whole-of-basin monitoring network to meet current and future needs supporting both planning and operational decisions. | **Description of Output**<br>Reinvigorated and compatible decision support systems (DSS) available at regional and national levels for the whole Mekong River Basin. Systems will be linked together to share data and information, support joint studies and assessments, and enable consistent evaluation of alternative scenarios and plans throughout the basin. Systems provide support to both integrated planning and coordination of operations, including online monitoring, flood and drought forecasting, improved data analysis, strategic planning, implementation of procedures and others. | **Description of Output**<br>A financially secure river basin organisation in the MRC including its Regional Flood and Drought Management Center that meets the needs of the countries as a knowledge hub, facilitator of joint efforts and platform for water diplomacy. Organisational development provides a basis for effective cooperation that creates and delivers value for the countries. Contributions from Member Countries to the MRC rise in-line with commitments to 2030, and MRC work is supported by strong engagement from national line/ implementing agencies by integration into national work plans and budgets. |
| **Impact Pathway**<br>1. Concept signed-off by implementing agencies | **Impact Pathway**<br>1. Regional audit of existing stations and | **Impact Pathway**<br>1. Implementing agencies sign-off on scope and | **Impact Pathway**<br>1. Countries and MRC jointly prepare an |

| | | | |
|---|---|---|---|
| 2. Improved procedures/guidelines discussed and negotiated by implementing agencies<br>3. Enhanced procedures/guidelines agreed by Member Countries | current and future needs<br>2. Implementing agencies oversee network analysis and design<br>3. Redesigned core and national monitoring networks integrated into regional and national budgets and work plans | concept<br>2. Implementing agencies oversee the design and development of the DSS's at regional and national levels<br>3. Countries agree communication and data analysis and sharing protocols | organisational development plan covering all parts of the MRC<br>2. Countries and MRC jointly lead the implementation of the organisational development plan |
| **Key Organisations** | **Key Organisations** | **Key Organisations** | **Key Organisations** |
| MRC, national agencies | MRC, MLC Water, national agencies | MRC, MLC Water, national agencies, Development partners | MRC, national agencies, Development partners |

| **Cooperation Dimension** | | | |
|---|---|---|---|
| **Outcome 5.3** Cooperation among all relevant regional water-related mechanisms and relevant partners based on need and complementary strengths | | | |
| **Description of Outcome**<br>There are a number of regional cooperation mechanisms or organisations that work on water or water-related issues, among other priority areas. To achieve the outcomes of this BDS by 2030, all mechanisms will need to contribute to relevant outputs. As resources are limited cooperation occurs where it is focused on the Strategic Priorities and necessary to achieve the Outcomes of this Strategy. Different mechanisms have different strengths and areas of comparative advantage, including complementary strengths outside the water sectors. Identifying these relative strengths and designing processes to leverage them efficiently and effectively, and engage with all relevant stakeholders in a harmonised way provides a basis for the implementation of this Strategy. | | | **State of Basin and MRB-IF Indicators**<br>- Joint efforts on projects of basin-wide significance and with potential transboundary impacts<br>- Extent of knowledge sharing activities<br>- Partnerships between the MRC and other parties |
| **Output 5.3.1 Mekong-related cooperation mechanisms and relevant partnerships implemented in synergies** | **Output 5.3.2** Joint State of Basin Report and Basin Development Strategy (related to Outputs 5.2.2, 5.2.3) | **Output 5.3.3** Joint Basin Expert Groups (related to Outputs 5.1.1, 5.2.4) | **Output 5.3.4** Harmonised basin-wide stakeholder platform |
| **Description of Output** | **Description of Output** | **Description of Output** | **Description of Output** |
| Each regional cooperation mechanism identifies and communicates its areas of relative strength and comparative advantage under Output 5.1.1, and identifies complementary strengths in other mechanisms. Priorities for engagement and cooperation are identified and input is provided into the strategies and plans of other cooperation mechanisms, where appropriate. Cooperation on options for a Mekong Fund to support social and | All six basin countries contribute data and information to the preparation and drafting of the next State of Basin report in 2023. By 2028, the report is a joint product of the MRC and MLC Water, reflecting the conditions and trends across the five dimensions and in accordance with the MRB-IF throughout the basin. This builds on further joint studies and research between the two platforms on priority and informs the development | National and regional expertise in water resources management and development is pooled in expert groups established with members from all six basin countries. These groups operate to ensure consistent information, analysis and advice, including where there are differences of view, through the governance structures of both MRC and MLC Water. These groups enable learning about basin-wide | A basin-wide stakeholder platform will be operational to promote common understanding of the evidence base relating to the basin; to promote greater understanding of the role and benefits of procedures and products; and to provide a forum for substantive involvement of broader stakeholders in regional water resources planning and operational management. This harmonised platform consolidates the current fragmentation and |

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| environmental measures including in relation to disasters, is explored. | of a joint Basin Development Strategy. | opportunities and risks and bring national perspectives into regional work. | duplication in stakeholder engagement and helps combat stakeholder fatigue. |
| **Impact Pathway**<br>1. Cooperation mechanisms engage in the prioritisation of strengths and comparative advantage<br>2. Cooperation mechanisms focus their strategic and work plans on their comparative advantages<br>3. Cooperation mechanisms provide input to the strategies and work plans of other mechanisms where appropriate | **Impact Pathway**<br>1. Concept prepared and agreed between MRC and MLC Water<br>2. Sharing of data and information and joint preparation of SOBR<br>3. SOBR written and published by MRC and MLC Water<br>4. Both parties jointly update the BDS based on agreed concept | **Impact Pathway**<br>1. Membership of Expert Groups includes permanent, senior technical officials of all key water-related ministries of all six basin countries<br>2. Expert Groups have agreed ToR to steer, supervise and increasingly implement the regional work<br>3. Members have assigned responsibilities in their home ministries that include contributing to the work of the Expert Group | **Impact Pathway**<br>1. All relevant stakeholders agree with the proposed concept<br>2. All stakeholder groups are represented in the platform activities to ensure balance and diversity of views<br>3. Consistent recording, reporting, and impact tracking procedures |
| **Key Organisations**<br>MRC, MLC Water, LMI, GMS, ACMECS, Mekong-Japan, Mekong-Korea | **Key Organisations**<br>MRC, MLC Water, National agencies, ASEAN | **Key Organisations**<br>MRC, MLC Water, National agencies | **Key Organisations**<br>CSOs, MRC, MLC Water, LMI, ASEAN, private sector actors, development partners |

# 6.0 IMPLEMENTATION OF THE STRATEGY

This chapter shows that higher levels of regional cooperation between the basin countries and their regional cooperation mechanisms are needed to produce the Outputs and achieve the Outcomes that are defined in this BDS. MRC will coordinate BDS implementation and needs extensive involvement of all relevant actors in the basin.

## 6.1 Implementing sustainable development opportunities

Identified and agreed development opportunities will be implemented at national and sub-national levels through national and local agencies and organisations, and also through the private sector, based on national regulatory frameworks and guidelines, as well as applicable regional procedures and guidelines. Joint projects between two or more countries will be implemented through coordinated national development or regional cost and benefit sharing agreements.

The basin countries' water cooperation platforms (MRC and MLC Water), as well as ASEAN, GMS and other relevant actors, will continue to promote and help coordinate sustainable development opportunities, in particular joint projects and national projects of basin-wide significance. In this context, the MRCS will perform its core river basin advisory service function for technical queries and requests for support from national agencies, developers and others related to implementation of the BDS and the use of best practice guidelines.

The implementation of this strategy will identify significant joint projects and national projects of basin-wide significance through the assessment of a few alternative basin-wide development scenarios, building on the earlier assessments of national water resources development plans. The new scenario assessments will be used to build further trust and confidence among the basin countries by exploring whether modifications and additions to national plans (by adding joint and national significant projects) will lead to better social, economic, environmental and water security outcomes.

This assessment of alternative scenarios will set the stage for the countries to discuss the results, make initial decisions on trade-offs, and develop a shared understanding of the path to meeting the longer-term sustainable development needs of basin communities. If the results demonstrate significant added national benefits arising from working collaboratively, each country subject to its own sovereign decisions will have the rationale to adapt its national plans for greater mutual benefit as part of the regular review and updating of those plans.

New joint and national significant project opportunities will be named in the "Sustainable development opportunities" section of the next BDS. As requested, the water cooperation platforms will assist the countries in the adaptation of national plans and the preparation of the newly agreed joint projects.

## 6.2 Implementing strategic priorities

The BDS Outcomes in the five strategic priority areas will be addressed by the countries' regional organizations, initiatives and programmes (see Section 2.5) in collaboration with relevant counterpart organizations, such a national line and implementing agencies, scientific and advisory institutes, civil society organisations and others. The MRC will coordinate BDS implementation and deliver many of the BDS Outputs in the BDS results chain. The other regional cooperation mechanisms will contribute to BDS Outcomes through activities in their water-related priority areas.

**MRC Strategic Plan**. Given its mandate, MRC is responsible for the overall coordination of implementation of the BDS 2021-2030, with support of the MRCS at the regional level and the NMC Secretariats at the national level. To undertake these responsibilities, the MRC has prepared a 5-year Strategic Plan (2021-2025) which supplements this BDS to contain:

- Objectives for the MRC in terms of (i) promoting and coordinating basin development and management and (ii) strengthening its institutional structure and operations;
- Five-year activity plan for implementation of the BDS results chain with timelines, implementation arrangements, collaborative partnerships, budget lines, and allocation of responsibilities to operational and governance units;
- The integrated planning, M&E and reporting framework for the entire BDS.
- Institutional and operational development perspectives of the MRC.

**National Indicative Plan (NIP)**. The basin countries are encouraged to prepare a NIP to implement the BDS at the national level, capturing the benefits from regional cooperation. The NIP is the primary channel by which basin perspectives, basin management functions, development opportunities, and regional guidance and tools are promoted and mainstreamed into the five-year national socio-economic and sector planning and annual work planning of relevant national agencies. Since the NIP has to align with national planning and budgetary cycles, a rolling NIP will be prepared, with different timeframes for different NIP components, and with a flexible formulation process. The NIPs will include:

- Significant planned projects in water, energy and related sectors, which provide an opportunity for early engagement of the countries' water cooperation platforms (MRC, MLC Water) in the preparation of such projects with a view to enhancing project benefits and sustainable development outcomes, which will facilitate project consultation and approval processes;
- Identified new or updated joint projects and national projects of basin-wide significance, which are the primary means for increasing and sharing the benefits from developing the Mekong's water resources. These projects are significant infrastructure investments and associated measures in water resources development and management. The regional water cooperation platforms will support the identification and further preparation of such projects, as described in Section 6.1;
- Bilateral or multilateral transboundary pilot projects to improve knowledge, management, systems and cooperation;
- Follow-up actions for facilitating uptake at the national level of basin perspectives, regional sector strategies, and water resources management and sector guidelines and methods in the national planning and decision-systems, with a view to increasing the benefits of national plans and projects and reducing the regional costs;
- Activities associated with the water-related activities of the regional cooperation mechanisms (MLC, ASEAN, GMS etc.), national activities that contribute to BDS Outcomes supported by Development Partners and International Financing Institutions, and decentralized activities under MRC's core river basin management functions;
- An implementation plan and funding mobilisation strategy, which identifies funding sources and the necessary steps to access those sources.

**Alignment between regional water cooperation platforms**. Higher levels of regional cooperation between all six basin countries are required to produce the Outputs and achieve the Outcomes that are defined in this BDS. Therefore, this strategy promotes a process of increasing cooperation between the two water cooperation platforms of the basin countries: the MRC and MLC Water. Many activities in the List of Proposed Projects on Lancang-Mekong Water Resources Cooperation (which builds on the Five-Year Plan of Action on Lancang-Mekong Cooperation 2018-2022) will contribute to the Outcomes and Outputs defined in this BDS (see Annex 1)

The two frameworks should begin exploring **the establishment of joint basin expert groups** and aiming at establishment of one integrated river management system for flood and drought management, water utilization and environmental conservation. The expert groups will promote basin-wide coherence in approaches and technology, ensure results and services respond to national and regional needs, and assist in the uptake and use of the results in the national planning and management systems. To fill capacity gaps in technical discussions, non-governmental experts could be invited to expert group meetings, as appropriate.

**Plans of other regional cooperation mechanisms.** The water-related activities of other relevant regional organizations, initiatives and programmes generally have a broader scope than this BDS (which predominantly focuses on transboundary Mekong water resources management), but their implementation could contribute to BDS Outcomes and some of the Outputs that have a broader scope (see Table 6.1 and Annex 1 for details). Some of these regional cooperation mechanisms will be targeted at the achievement of BDS Outputs through cooperation arrangements with the MRC and MLC Water, ASEAN and GMS. The outputs (and key deliverables) of the water-related activities of regional cooperation mechanisms will be tracked through MRC's organisational M&E system to support the evaluation of BDS Outcomes.

**Table 6.1:** Alignment of Priority Areas of Key Regional Cooperation Mechanisms with BDS Outcomes

| Regional Cooperation Mechanism | BDS Outcome(s) | Priority Areas relevant to the BDS |
|---|---|---|
| **Greater Mekong Sub-region (GMS)** | 1.3 | Natural resources and ecosystem services (advisory, technical and project services) |
| | 3.1, 3.2 | Power market integration (transmission links; market development; grid-to-grid trading; cross-border connections) |
| | 2.2 | Agriculture (climate-smart, inclusive value chains; safe and environment friendly products) |
| | 4.1 | Climate resilience and disaster risk management (advisory, technical and project services; project investment) |
| **MLC Water** | 3.1 | Water resources and green development |
| | 4.1, 4.2 | IWRM and climate change adaptation |
| | 3.1, 3.2 | Water sector production capacity |
| | 2.1, 2.2 | Rural areas, water conservancy and livelihood improvement |
| | 3.1, 3.2 | Sustainable hydropower development and energy security |
| | 3.1, 5.1, 5.2 | Transboundary river cooperation and information sharing |
| | 5.3 | Coordination with other areas |
| **ASEAN (Water Resources Management)** | 3.1 | IWRM Country strategy guideline and indicator framework implementation |
| | 5.3 | Public awareness and cross-sectoral coordination |
| | 2.1 | Water conservation |
| | 1.3, 2.1 | Water quality and sanitation |
| | 4.1, 4.2 | Water-related disasters |
| **ASEAN (Nature** | 1.3 | Key terrestrial biodiversity area conservation including protected |

| | | |
|---|---|---|
| **Conservation and Biodiversity)** | | areas |
| | 1.3 | Access and benefit sharing |
| **ASEAN (Energy cooperation)** | 1.1, 3.1, 3.2 | ASEAN power grid |
| | 1.1, 3.1, 3.2 | Renewable energy |
| | 1.1, 3.1, 3.2 | Regional energy policy & planning |
| **ASEAN (Climate change)** | 4.2 | Adaptation and resilience |
| | 4.1 | Mitigation, technology transfer |
| | 3.1, 3.2, 4.1 | Climate finance |
| | 3.1, 4.1 | Cross-sectoral coordination and global partnership |
| **ASEAN (Disaster management and emergency response)** | 1.1, 1.2, 4.2 | Risk assessment and awareness |
| | 1.1, 1.2, 4.2 | Prevention and mitigation |
| | 1.1, 1.2, 4.2 | Preparedness and response |
| **ACMECS** | 5.3 | Environmental cooperation (water resource management, climate change, renewable energy, disaster risk management) |
| **LMI** | 5.2 | Satellite-based data systems |
| | 5.2 | Data management and sharing |
| | 5.2 | Decision support tools |
| **Mekong-Japan Cooperation** | 1.3, 5.2 | Data collection for basin management and environment Conservation |
| | 4.1, 4.2 | Flood and drought management |
| | 4.2 | Disaster risk reduction |
| **Mekong-Korea Cooperation** | 4.1, 4.2 | Water security, flood and drought Management |
| | 3.2 | Hydropower management |

## 6.3 Engagement of broader stakeholders

**Extensive participation**. During the preparation of this strategy, wide and meaningful consultations were held at the national and regional level with broader stakeholders, including regional organizations and initiatives, development partners, universities, private sector, civil society organisations, and others. Their views are considered in this BDS, which will be implemented by the basin countries and their regional cooperation mechanisms with direct involvement and engagement of broader stakeholders.

**Direct involvement in BDS implementation**. Non-governmental stakeholders (including academia, private sector entities, CSOs), can provide inputs to specific activities that will be implemented to produce the BDS Outputs, either as a member of the implementing team or as a participant in activity-related workshops and consultation meetings. There will be also opportunities for broader stakeholders to participate in meetings of the above joint basin expert groups and associated temporary task forces. The TORs of the existing expert groups provide opportunity for the participation of broader stakeholders, but the mechanisms need to be further elaborated.

**Regular stakeholder forums**. While the MRC Regional Stakeholder Forum will continue, efforts are needed to further streamline, synergize and synchronize other Mekong related stakeholder forums in order to maximize stakeholder inputs, reduce stakeholder engagement fatigue, and achieve common objectives of sustainable development of the Mekong. This strategy promotes the 'institutionalization' of a Multiple Stakeholder Platform with the mandate to undertake regular stakeholder reviews of the implementation of the strategy at the regional and national levels. A balanced representation of the many stakeholders in these forums will be important, as well as consistent recording, reporting, and impact tracking procedures. There will be a need also to raise awareness and provide understandable information in the local language to some society groups for them to have an equal voice during the forums.

**Targeted stakeholder meetings on key issues of concern.** This strategy promotes the proactive organization by the water cooperation platforms of targeted meetings with specific stakeholder groups (e.g. CSOs, private sector, media) whenever needed on major issues of concern, with a view to sharing information, discussing perspectives and viewpoints, and working towards consensus. To support such meetings, the web portals of the water cooperation platforms need to be modernized to function as a web-based decision support system (DSS) where stakeholders can follow changes in land and water conditions in the basin, integrate and visualize a wide range of data, and make changes in development scenarios and assess the impact of these changes on selected indicators. Also these meetings could be brought under the proposed Multiple Stakeholder Platform which would streamline, synergize and synchronize Mekong related stakeholder forums.

**Proactive unbiased information providers**. All of the above will strengthen role of the countries' water cooperation platforms as honest basin managers on which people can rely on to provide even-handed information and advice on technical aspects and the conditions in the basin, and to pro-actively inform the people through web portals, social media, newspapers, and other media.

**Only by the active, open and transparent involvement of all Mekong stakeholders can the Outcomes of the Strategy be realized, leading towards sustainable development, poverty alleviation and livelihood improvements.**

## 6.4 Funding of BDS implementation

**Financing development opportunities**. Most of the development opportunities in the hydropower, navigation, irrigation, and industry (mining, forestry, tourism, aquaculture) sectors will be largely financed by the private sector (and 'state-owned companies') through debt and equity financing. In all of these areas, investment from the private sector now outweighs that from traditional public sources. In these sectors, governments have an important regulating and resource planning and management role to ensure development is sustainable and beneficial for the country and its people. There will be opportunities for creating added value for water resource management (such as monitoring and data sharing) by improving private sector concessions and contracts.

Most of the development opportunities in the environmental and social sectors will need to be financed through national public budgets and international and regional loans and grants. There will be opportunities to benefit from innovative financing arrangements, such as attracting foreign carbon offsetting funds for reforestation of watersheds. The large needs for flood and drought protection will need to be integrated to the extent possible in already planned sectoral development together with the newly identified (joint) multi-purpose storage projects (for flood protection, hydropower, irrigation, navigation, etc.). The remainder will need to be financed through national public budgets with limited opportunities for Public-Private Partnerships (PPP) for financing infrastructure in the above sectors.

**Funding of strategic priorities.** The total estimated costs of the enabling outputs and activities (studies, assessments, planning) and non-structural investments (equipment, monitoring facilities) is in the order of USD XXX million or about XX million USD/year. It is expected that these costs can be funded through international and regional grants, supplemented by national public budgets and private sector funding. Since, MRC will coordinate BDS implementation and implement most of the results chain, the above funding will contribute to the implementation of the MRC SP, either as unallocated, earmarked or associated funding. The other regional water cooperation mechanisms will manage their

own budgets for the implementation of the water-related activities that could contribute to BDS Outcomes.

**A Mekong Fund**. The development of a regional Mekong Fund could be considered to attract funding from multiple sources to finance identified (joint) social and environmental investment opportunities of transboundary significance, as well as water-related disaster recovery. Potential sources, subject to further investigation, discussion and national regulations, could be a region-wide levy on the purchase of hydroelectricity, contributions from the private sector, development partners, and new sources such as carbon financing. Experience from other regions indicates the institutional and legal underpinnings for a Mekong Fund are possible with sufficient political commitment in the basin countries. An operational Mekong Fund will enhance trust between the countries and unlock new opportunities for cooperative and joint water resources development. It would also help address ongoing social and environmental concerns about the potential transboundary impacts of development projects, and the need to help communities adapt to these changes.

## 6.5 Monitoring, evaluation and reporting

**An integrated planning, monitoring, evaluation and reporting system** (MRC's basin monitoring system) has been established by the MRC to track the implementation of the BDS 2021-2030. The system has a practical dashboard to provide planners, decision makers, funders and other stakeholders with: (a) the information necessary to determine whether the plans and processes in the strategy are being implemented effectively; (b) whether BDS Outcomes are being achieved; and (c) what contributions are being made to the relevant SDG targets (Figure 6.1).

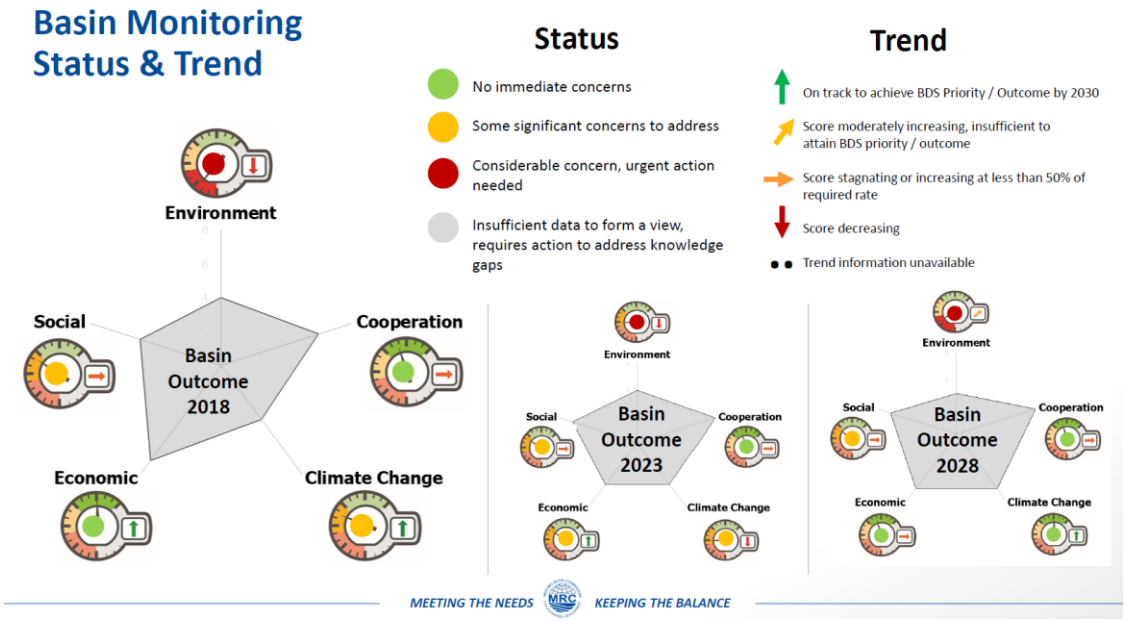


**Figure 6.1:** Sample representation of the MRC's dashboard for monitoring the status and trends in conditions across the basin

The dashboard tracks progress towards Outcomes through a traffic light display aligned to the strategic and assessment indicators across the Mekong River Basin Indicator Framework (MRB-IF). These indicators will be evaluated and quantified every 5 years for the preparation of the State of Basin Report (SOBR)**.** The SOBR records and evaluates the development impacts, positive and negative, within the Mekong River Basin as a measure of the effectiveness of the implementation of the BDS. The SOBR also provides decision-makers

with answers to strategic questions related to the Strategic Indicators of the Mekong River Basin, such as the ones listed below.

| **Key strategic questions evaluated through 5-yearly State of Basin reporting** | |
|---|---|
| ***Environment*** | Are the conditions of water flow and water quality in the Mekong mainstream acceptable?<br>Are key environmental assets in the Mekong River Basin being adequately preserved and protected? |
| ***Social*** | What social benefits, direct and indirect, are being derived from water resource developments in the Mekong River Basin?<br>How are the river-related livelihoods in each country being affected by land and water management decisions? |
| ***Economic*** | What economic value does each Member Country derive from the use of the Mekong river system within the water-related sectors?<br>How well does the Mekong river system contribute to water, food and energy security, and navigation for people and goods? |
| ***Climate Change*** | Do the current water-related development plans provide sufficient protection against mainstream and tributary floods and droughts?<br>How resilient are people, wetlands and water infrastructure to climate change? |
| ***Cooperation*** | What is the added value of cooperation under the 1995 Mekong Agreement facilitated by MRC?<br>How well is Mekong River Basin development moving towards optimal and sustainable development? |

**Towards Mekong River Basin management objectives**. Thus, the 5-year SOBR, based on the MRB-IF, will assess achievement of the BDS Outcomes and progress towards the Mekong River Basin Vision, as well as the adjustments that need to be made in the next update of the Basin Development Strategy. The rollout of the MRB-IF and its set of strategic and assessment indicators in the entire Mekong River Basin, is the first step towards defining longer term basin management objectives and targets, and the means to achieve them through 10-year updates of a Basin Development Strategy.

# PART II: MRC STRATEGIC PLAN

## 7.0 INTRODUCTION

### 7.1 Purpose and scope of the Strategic Plan

**This Mekong River Commission Strategic Plan (SP) for 2021-2025 is a unified corporate plan** that is fully integrated with the Basin Development Strategy (BDS) 2021-2030 through the implementation of the strategic basin planning cycle (Figure 7.1). A key characteristic of the cycle is the linkage between the five-yearly State of the Basin Report (SOBR) and the BDS, with the former recording and evaluating the development and management impacts (positive and negative) within the Mekong River Basin, and the latter aimed at the improvement of the conditions in the basin in the 5 dimensions of the Mekong River Basin Indicator Framework (MRB-IF): environment, social, economic, climate change, and cooperation.

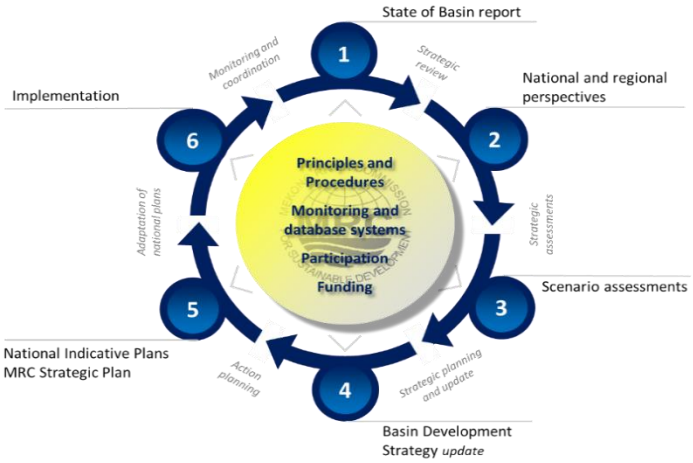


**Figure 7.1:** Mekong Basin strategic planning cycle

**This SP sets out how the MRC will contribute to the implementation of the BDS** and strengthen the organization over the next five years:

1. The MRC will coordinate the implementation of the BDS and deliver many of its Outputs, some in cooperation with other regional cooperation mechanisms. The latter will also contribute to BDS Outcomes and Outputs through activities in their water-related priority areas (see Section 6.2);

2. The MRC will implement an organisational development plan to support national implementation of core river basin management functions and the transition towards regional planning and management processes that are embedded in the national planning, decision-making and governance systems, and funded by the basin countries (see Chapter 9).

**The role of the MRC is changing**. In parallel with the development trajectory of the Mekong River Basin, the role of the MRC is changing from cooperation primarily on knowledge acquisition and sharing towards comprehensive cooperation on water resources development and management across the entire Mekong River Basin. This SP will support this shift in the focus of cooperation by guiding the implementation of:

1. **Proactive regional planning** which builds on the national plans to create synergies at the basin level within and between planned and new sectoral developments, including significant joint and national projects, to increase regional benefits, reduce regional costs, and provide a higher level of water security during dry and wet seasons;

2. **Coordinated basin management operations** to prevent and manage water-related emergencies and support coordinated operations of infrastructure (such as hydropower cascades) in an increasingly developed basin susceptible to more extreme weather events. Although operations and oversight of operations are mainly a national responsibility, regional coordination is needed to realize the potential benefits and reduce costs for other countries.

**Regional cooperation is intensifying**. Proactive regional planning and coordination of basin management operations will shift transboundary cooperation to a level that emphasizes the adaptation of national plans to capture regional gains and mitigate regional costs through a continuum from unilateral action to coordination and collaboration and ultimately joint action, as illustrated in Figure 7.2. The Heads of State of the basin countries provided direction to the intensification of regional cooperation on regional water resources development and management at the Third MRC Summit in 2018 and at the Second Mekong-Lancang Cooperation Meeting in 2019.

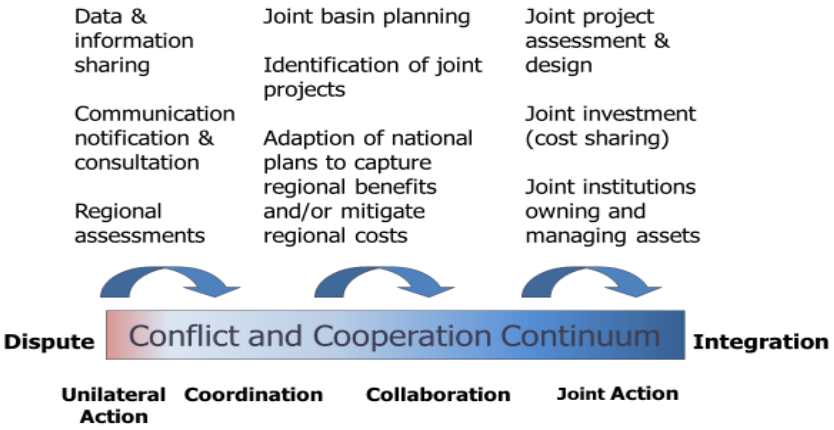


**Figure 7.2:** Conflict and cooperation continuum

**The arrangements for the implementation of the SP** in Chapter 9 build on those of the previous SP 2016-2020, with enhancements designed to benefit from the changing institutional landscape (through cooperation with MLC Water) and the need to engage the national sector agencies more in the implementation of SP activities (to improve uptake of regional outputs and achieve the BDS Outcomes). A key mechanism for the implementation of this SP is the enhancement of the existing LMRB expert groups to joint basin expert groups with technical leaders from all 6 basin countries.

**Approach to SP preparation**. This SP is formulated based on the BDS 2021-2030, the recommendations from the mid-term review of the SP 2016-2020, and the institutional direction established by the MRC Decentralization Roadmap, which have all benefitted from contributions from MRC Member Countries (NMCS and line/implementing agencies), MRC Dialogue Partners (China and Myanmar), other regional cooperation mechanisms, the private sector, development partners, and broader stakeholders. Most of these stakeholders have also reviewed draft versions of this SP and provided input. The final version of the SP has been negotiated by senior government officials from the Member Countries prior to consideration and approval by the Ministers in the MRC Council on behalf of their respective Governments.

## 7.2 Foundations of the MRC Strategic Plan

The foundations of the MRC SP are the 1995 Mekong Agreement, the Third MRC Summit, the BDS 2021-2030, and the Regional Roadmap for Decentralisation.

**The 1995 Mekong Agreement**

Cooperation in the coordinated planning of the Mekong countries has a long history, dating back to the establishment of the Mekong Committee under the auspices of the United Nations in 1957. The 1995 Mekong Agreement with its commitment to coordinated planning and joint management of the Mekong River Basin for its sustainable development raised this cooperation to a new level.

The 1995 Mekong Agreement establishes the goals, objectives and underlying principles by which the four Member Countries have committed to cooperate (see Section 1.1). The Agreement establishes the MRC as the inter-governmental organisation with the mandate to implement the Agreement and the projects, programmes and activities taken thereunder in cooperation and coordination with each member and the international community, and to address and solve related issues and problems.

Under the Agreement, the MRC has three principal organs: the MRC Council, Joint Committee, and the Secretariat. To manage Mekong affairs internally and to facilitate Mekong cooperation, each Member Country has established a National Mekong Committee (NMC), comprising representatives of the relevant major line/implementing agencies in each country and supported by a secretariat (NMCS).

The Agreement charges the MRC with promoting and coordinating sustainable development, utilisation management and conservation of the Mekong's water and related resources. It also mandates the MRC to formulate a basin development plan to identify, categorise and prioritise the projects and programmes to seek assistance for and to implement at the basin level. The planning mechanism adopted by the MRC is the Basin Development Strategy (BDS), which will now be updated every ten years.

**Third MRC Summit 2018**

At the Third MRC Summit, the Heads of the MRC Member Countries reaffirmed their commitment to the effective implementation of the 1995 Mekong Agreement. They provided key directions for basin development and management that have shaped the BDS 2021-2030 in terms of sustainable development opportunities and the results chain towards achievement of the SDGs for the Mekong River Basin. They also reiterated their support to the organizational development of the MRC and for pursuing concrete cooperation with MLC, ASEAN and GMS towards a shared future. The priority areas for action are summarized in Section 2.4.

**The Basin Development Strategy 2021-2030**

The BDS 2021-2030 as Part I of this document forms an integral part of this SP. The BDS sets out how water and related resources of the Mekong River Basin will be sustainably developed, utilised, managed and conserved over the period 2021-2030. For the Lower Mekong River Basin countries (Cambodia, Lao PDR, Thailand and Viet Nam) the BDS is in-line with their commitment to the 1995 Mekong Agreement. The BDS is also consistent with the objectives of the Mekong-Lancang Cooperation (MLC) in the area of water cooperation, involving all six basin countries (including China and Myanmar). This SP describes how the MRC will contribute to the implementation of the BDS.

**Regional Roadmap for Reform and Decentralisation**

The Roadmap for reform and decentralisation (MRC Roadmap) with its 14 Overarching Recommendations (approved by the MRC Council in June 2014), sets out how the MRC as an

organisation will develop over the period to 2030 to become a leaner, 'expert' organization funded by the member countries. This is to be achieved with increasing implementation of the core river basin management functions by national line or implementing agencies in each member country in order to achieve regional objectives consistent with the 1995 Mekong Agreement. The MRC has completed several of the recommendations in the MRC Roadmap and made good progress in others. The recommendation to reduce MRCS staff to 90-100 by 2020 was surpassed with about 64 staff in 2020. A further reduction to 40-50 staff is envisaged by 2030.

This SP builds on this progress to guide implementation of the remaining decentralization agenda. It addresses issues with the capacity and funding of decentralized monitoring activities identified in the Mid-Term Review of the SP 2016-2020 and outlines requirements for the development and implementation of a major organizational development plan to strengthen the MRC. A strengthened MRC is required to enable increased cooperation with MLC Water for the purposes of integrated management of the whole Mekong River system by 2030, ensuring compatibility of systems, the sharing of data, information and knowledge, joint studies, assessments and reports and an integrated whole-of-basin monitoring network, as described in the BDS.

# 8.0 MRC RESULTS CHAIN

## 8.1 General

**MRC's work areas**. For the next five years, the MRC will focus its work on coordinating the implementation of the BDS 2021-2030 by all relevant actors, while implementing many of the Outputs itself. In this regard, MRC's priority areas of work are:

1. **Promotion and advice on identification, preparation and implementation of the BDS sustainable development opportunities** by national agencies and the private sector, in particular joint projects and national projects of basin-wide significance (see Section 6.1);

2. **Coordination of implementation of the five BDS strategic priorities** among relevant national implementing agencies, regional cooperation mechanisms and others. This includes advising how their broader water-related priority areas can contribute to BDS Outcomes (see Section 6.2);

3. **Contribution in whole or part to 28 BDS Outputs** by MRCS, NMCs and national line/implementing agencies. Some of the Outputs will be delivered under existing and new cooperation agreements with regional cooperation mechanisms such as MLC Water, ASEAN and GMS (Section 6.2);

4. **Monitoring and evaluation of the implementation of the BDS**. MRC's monitoring system covers the entire BDS results chain, including BDS Outcomes and Outputs that the water-related activities of other regional cooperation mechanisms will contribute to (see Section 9.6).

In Sections 8.2 to 8.6 of this SP the key activities that need to be implemented to deliver each BDS Output are identified along with milestones and the relationships with other Outputs. The key activities provide direction to MRC's multi-year work plans on the nature and scope of the tasks that need to be implemented and the resources that are required to implement these tasks.

**Enabling tasks**. There are a few essential 'enabling tasks' that are common to the delivery of most Outputs and are not shown in the tables with key activities in Section 8.2 to 8.6. These common enabling activities are aimed at knowledge sharing for decentralization of CRBMFs and at the uptake of MRC deliverables in national governance, decision-making and planning systems:

- Preparation of a tailor-made **consultation and capacity building plan** for the delivery of each Output, from the initial identification of the work plan with activities and tasks, to the uptake and use of the resulting Output by the 'client' (e.g. national implementing agency);

- Incorporation of the **impact pathway** that has been defined for each BDS Output (see Section 5.5) in the work plan of activities and tasks. An example of a typical impact pathway is presented in Figure 8.1. In particular, the first step of the impact pathway – the sign off by national implementing agencies on an informative concept note - is often forgotten, which makes the relevance and uptake of the Output uncertain from the beginning.

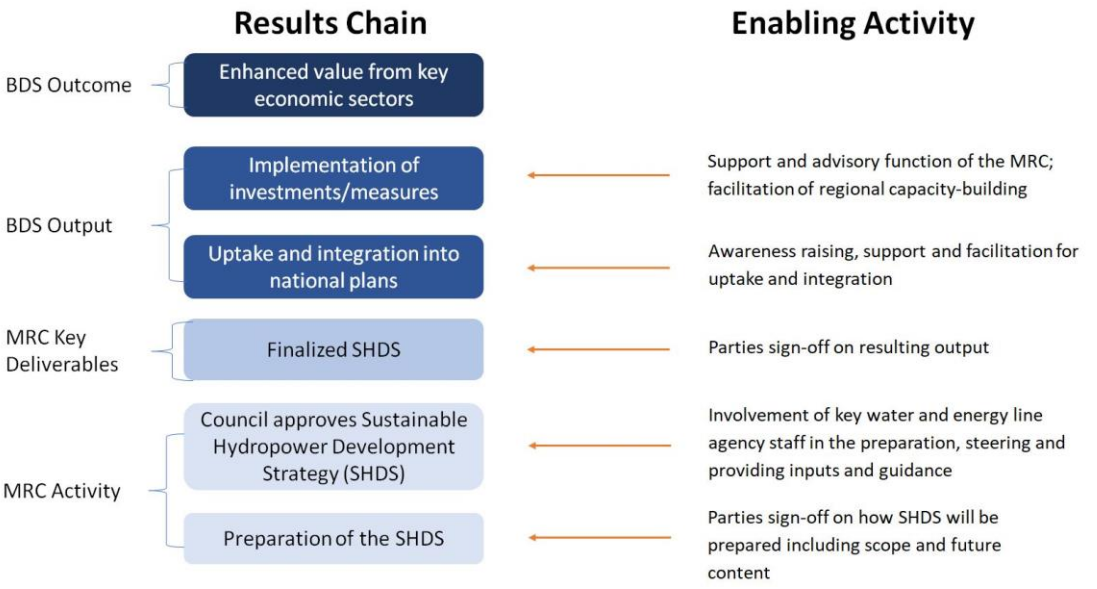


**Figure 8.1:** Impact pathway example with the existing Sustainable Hydropower Development Strategy (SHDS) in mind

## 8.2 Strategic Priority 1: Maintain the ecological function of the Mekong River Basin

Under this strategic priority, the BDS identifies and describes 3 Outcomes and 5 Outputs (see Sections 5.4 and 5.5). For each of these Outputs the tables below summarize the key activities that will be implemented and the deliverables that will be prepared. For the preparation of multi-year work plans, the activities under each Output will be further broken down into tasks, including the enabling tasks related to the impact pathway and the necessary stakeholder engagement and capacity building to ensure uptake (Section 8.1).

| **Strategic Priority 1: Maintain the ecological function of the Mekong River Basin** | | |
|---|---|---|
| **Outcome 1.1:** River flows support a healthy environment and productive riparian communities | | |
| **Output 1.1.1:** Water flow and quality in the mainstream managed in accordance with agreed guidelines<br>**Deliverables**<br>1.1.1.1 Updated PMFM technical guidelines with additional flow thresholds (2025)<br>1.1.1.2 Notifications and management actions in accordance with PMFM<br>1.1.1.3 Updated PWQ technical guidelines with additional methods in relation to emergencies (2024)<br>1.1.1.4 Notifications and management actions in accordance with PWQ<br>1.1.1.5 Evaluation report on the implementation of RAP (2023)<br>1.1.1.6 Notification and management actions in accordance with PWUM | | |
| **Activities** | **Lead** | **Related to Outputs** |
| 1.1.1.1 Identify and evaluate potential additional flow thresholds for guiding the monitoring and management of flow conditions in the mainstream (incl. for rapid river level fluctuations, minimum flood season, and maximum dry season flows) | TD-RFDMC | Outputs 3.1.1, 4.1.2, 5.2.1, 5.2.2 |
| 1.1.1.2 Implement updated PMFM guidelines including | TD-RFDMC | Outputs 4.1.2, |

| | | |
|---|---|---|
| additional flow thresholds | | 5.2.1, 5.2.2 |
| 1.1.1.3 Develop methods and protocols for identifying and monitoring water quality related emergency incidents and emerging water quality issues (e.g. plastics) in accordance with the PWQ | ED | Outputs 5.2.1, 5.2.2, 5.2.3 |
| 1.1.1.4 Implement updated PWQ guidelines including new methods and protocols | ED | Outputs 5.2.1, 5.2.2, 5.2.3 |
| 1.1.1.5 Support implementation of the *Regional Action Plan for Sustainable Transport of Dangerous Goods* | PD | Output 3.2.3 |
| 1.1.1.6 Implement PWUM using upgraded DSS connected to ground, global and satellite datasets | TD-RFDMC | Outputs 5.2.3 |
| **Output 1.1.2:** Guidance and measures for sustainable hydropower implemented<br>**Deliverables**<br>1.1.2.1 Evaluation report on implementation of PDG (2024)<br>1.1.2.2 Evaluation report on implementation of JAPs (2024) | | |
| **Activities** | **Lead** | **Related to Outputs** |
| 1.1.2.1 Support use and integration of Preliminary Design Guidance in regional and national regulatory frameworks | PD | All activities support the achievement of outputs 1.1.1, 1.2.1, 1.3.1, 2.1.2, 2.1.3, 2.1.4 |
| 1.1.2.2 Support implementation of Joint Action Plans for all mainstream hydropower projects | PD | |
| 1.1.2.3 Support implementation of RSAT in Mekong tributaries | PD | |

The activities under Outcome 1.1 can be implemented through the usual MRC delivery model which uses (individual) consultants, as needed, to support the work of the expert groups. The activities under Output 1.1 will be led and supervised by a senior official or expert with a deep understanding of how the combined technical (PMFM, PWQ, PWUM) and procedural Procedures (PDIES, PNPCA) should support and facilitate development and management planning in the Mekong River Basin (and thus the implementation of this BDS).

Activity 1.1.1 will be integrated with the pro-active regional planning activities under Outcome 3.1 that will provide useful basin-wide modelling and assessment inputs to test the feasibility of existing and new thresholds for monitoring and management of flow conditions in the mainstream.

| **Strategic Priority 1: Maintain the ecological function of the Mekong River Basin** | | |
|---|---|---|
| **Outcome 1.2:** Sediment transport helps mitigate bank erosion and land subsidence | | |
| **Output 1.2.1:** Basin-wide sediment management plan developed and implemented<br>**Deliverables**<br>1.2.1.1 Enhanced monitoring of erosion and sedimentation and improved estimates of sediment transport (2021)<br>1.2.1.2 Inventory and feasibility report for measures to reduce river sand mining and sediment trapping (2022)<br>1.2.1.3 Basin-wide sediment management plan based on results of alternative scenario assessments (2025) | | |
| **Activities** | **Lead** | **Related to Outputs** |

| | | |
|---|---|---|
| 1.2.1.1 Enhance monitoring of erosion, sedimentation and transport of sediments (incl. by using modern earth observation technology) as part of the core monitoring network | PD | Outputs 5.2.2, 5.2.3 |
| 1.2.1.2 Investigate options for reducing sediment trapping at existing and planned dams and for reducing river sand mining (for input to basin-wide scenario assessments) | PD | Outputs 1.1.2, 3.1.1, 3.2.2 |
| 1.2.1.3 Prepare a basin-wide sediment management plan | PD | Output 3.1.1 |

The activities under Outcome 1.2 will be implemented as part of the proactive regional planning activities, which is led by PD, under Outcome 3.1. ED, TD-RFDMC and OCEO will actively collaborate with PD in a core team. With the oversight of the joint basin expert group on basin planning, the proactive regional planning activities will be outsourced to a consortium of companies which has the required qualifications and relevant experience to perform the services for the formulation, modelling and assessment of the alternative basin-wide development scenarios and related activities in the environmental, economic, climate change and cooperation dimensions (Outputs 1.1.1, 1.2.1, 1.3.1, 4.1.2, 4.1.3, and 5.1.2). In the process, MRC's modelling, assessment and data management capacities will be improved (Output 5.2.3).

The preparation of the sediment management plan will include the assessment of the future spatial extent of bank erosion along the mainstream and in the Mekong delta, as well as the evaluation of the options to reduce bank erosion. Extensive engagement with infrastructure developers and operators, and the sand mining industry and national regulators will be critical to the success of these activities.

| **Strategic Priority 1: Maintain the ecological function of the Mekong River Basin** | | |
|---|---|---|
| **Outcome 1.3:** River and wetland habitats and watersheds provide important ecosystem services | | |
| **Output 1.3.1:** Limits of acceptable change for key river and connected wetland habitats identified and implemented<br>**Deliverables**<br>1.3.1.1 Proposed limits of acceptable change for key environmental wetland assets for input to alternative scenario assessments (2022)<br>1.3.1.2 Updated management plans for key environmental wetland assets (2025) | | |
| **Activities** | **Lead** | **Related to Outputs** |
| 1.3.1.1 Identify and assess limits to adequately protect key regional environmental assets (i.e. wetlands) including consideration of ecosystem functions and services, through engagement of scientific expertise, national agencies and local communities | ED | Outputs 3.1.1, 2.1.2, 2.1.3 |
| 1.3.1.2 Support Member Countries in updating, developing and implementing management plans for key regional environmental assets identified in the SBEM and other regional environmental strategies | ED | Outputs 1.3.2, 2.1.2, 2.1.3 |
| **Output 1.3.2:** A regional planning and management framework for watersheds agreed and implemented<br>**Deliverables**<br>1.3.2.1 Options report on best practice institutional, governance and regulatory arrangements for | | |

| managing key regional watersheds (2023)<br>1.3.2.2 Regional planning and management framework for key regional watersheds (2024) | | |
|---|---|---|
| **Activities** | **Lead** | **Related to Outputs** |
| 1.3.2.1 Identify good practice institutional, governance and regulatory arrangements for the management of watersheds with opportunities for harmonisation and capacity building between countries | ED | |
| 1.3.2.2 Develop a regional planning and management framework for watersheds that are key regional environmental assets due to their role in providing regionally significant ecosystem services | ED | Output 3.1.1 |
| 1.3.2.3 Facilitate the integration of an agreed regional framework for watersheds within relevant national sector planning and management frameworks related to watersheds (i.e. agriculture, forestry, mining, urban planning, biodiversity) | ED | Output 1.3.1 |

Most of the activities under Outcome 1.3 can be implemented through the usual MRC delivery model which uses (individual) consultants, as needed, to support the work of the expert groups. Gender-sensitive engagement with local communities will be important to identify initial proposed limits of change for wetlands (Output 1.3.1) that will be further developed through an iterative testing and evaluation process.

The implementation of activities 1.3.1.1 and 1.3.2.2 will be integrated with the pro-active regional planning activities under Outcome 3.1 that will provide useful basin-wide modelling and assessment inputs to: (i) test the feasibility of proposed limits of acceptable change and (ii) the characteristics of watersheds in terms of groundwater recharge, soil erosion and sediment loads, water storage potential, ecosystem services, susceptibility for flash floods and others. The Strategic Basin Environmental Management Strategy provides a mechanism to identify and integrate key regional environmental assets, both wetlands and watersheds, into regional and national management frameworks. The activities under this outcome will support the adaptive implementation of this and other regional environmental strategies.

## 8.3 Strategic Priority 2: Enable inclusive utilisation of the basin's water and water-related resources

Under this strategic priority, the BDS identifies and describes 2 Outcomes and 5 Outputs (see Sections 5.4 and 5.5). For four of these Outputs (those relevant to the MRC), the tables below summarize the key activities that will be implemented and the deliverables that will be prepared. For the preparation of work plans, the activities under each Output will be further broken down into tasks, including the enabling tasks related to the impact pathway and the necessary stakeholder engagement and capacity building to ensure uptake (Section 8.1).

| **Strategic Priority 2: Enable inclusive utilisation of the basin's water and water-related resources** |
|---|
| **Outcome 2.1:** Basin communities are food, water and energy secure, thus strengthening climate resilience |
| **Output 2.1.2:** Capture fisheries regulatory frameworks improved and implemented<br>**Deliverables** |

| | | |
|---|---|---|
| 2.1.2.1 Updated list in SBEM of key regional environmental assets relevant to critical fish habitats, with identified conservation measures (2022)<br>2.1.2.2 Updated national sector policies, plans and institutional arrangements (2025) | | |
| **Activities** | **Lead** | **Related to Outputs** |
| 2.1.2.1 Incorporate important fisheries habitats into network of key regional environmental assets; and include agreed conservation measures in management plans | ED | Output 1.3.1 |
| 2.1.2.2 Support enhanced institutional, governance and regulatory arrangements within national and provincial fisheries management frameworks | ED | Output 1.3.1 |
| 2.1.2.3 Support agreed transboundary fisheries management projects | ED | |
| **Output 2.1.3:** Risks to capture fisheries productivity and diversity minimised<br>**Deliverables**<br>2.1.3.1 Recommended actions for improving fish passage or other adaptation measures for hydropower and irrigation structures (2022)<br>2.1.3.2 Evaluation report on the uptake of recommended actions for improving fish passage or other adaptation measures (2025) | | |
| **Activities** | **Lead** | **Related to Outputs** |
| 2.1.3.1 Evaluate the effectiveness of existing fish passages for hydropower and irrigation structures and potential alternative designs in relation to the unique fish ecology of the basin | ED | Outputs 1.1.2, 3.1.1, 5.2.2 |
| 2.1.3.2 Support national uptake of recommended actions and guidelines for improving fish passage or other adaptation measures for hydropower and irrigation structures | ED and PD | Outputs 1.1.2, 3.2.2 |
| **Output 2.1.4:** The gender and vulnerability aspects of basin water, food and energy security are identified and addressed by policy makers<br>**Deliverables**<br>2.1.4.1 Report on gender and vulnerability related to water resources development including recommendations on disaggregated data needs (2021)<br>2.1.4.2 Updated MoUs and ToRs for data sharing to enhance collection of data on people in vulnerable situations (incl. women) (2022)<br>2.1.4.3 Options report on improving equity for vulnerable groups including recommended measures for regional and national plans (2024) | | |
| **Activities** | | **Related to Outputs** |
| 2.1.4.1 Undertake a study on the gender and vulnerability aspects of basin water, food and energy security identifying specific needs, challenges and opportunities and including recommendations on cost effective and priority gender disaggregated data requirements | PD | |
| 2.1.4.2 Coordinate national disaggregated data collection efforts on gender and vulnerability and incorporate within the data acquisition and generation action plan | PD | Output 5.3.2 |
| 2.1.4.3 Support identification and evaluation of policies, programs and measures to improve equity for vulnerable | PD | Outputs 2.2.1, 5.1.2 |

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| groups in different parts of the basin in conjunction with water resources development |

The capture fishery activities under Outputs 2.1.2 and 2.1.3 can be implemented through the usual MRC delivery model which uses (individual) consultants, as needed, to support the work of the expert groups. Output 2.1.2 relates to improving national and sub-national systems of fisheries management and so requires extensive engagement with sub-national authorities and local fisheries bodies. Output 2.1.3 will be informed by the work of the Joint Environmental Monitoring of mainstream hydropower.

The implementation of the activities related to gender and vulnerable people under Output 2.1.4 depends on being successful in working with the responsible national agencies to collect the required disaggregated sub-national data for identifying poor natural resource users, determining where the vulnerabilities lie, and how they could benefit from national social and economic development policies and programmes, including investments in conjunction with (joint) water resources development projects.

| **Strategic Priority 2: Enable inclusive utilisation of the basin's water and water-related resources** | | |
|---|---|---|
| **Outcome 2.2:** Employment and livelihoods reduce poverty and inequality through less direct dependence of vulnerable people on river and wetland resources | | |
| **Output 2.2.1:** Alternative livelihood strategies for poor, resource dependent communities impacted by water resources development developed and mainstreamed at national levels<br>**Deliverables**<br>2.2.1.1 Identified livelihood strategies for poor, resource dependent communities impacted by water resources development (2024) | | |
| **Activities** | **Lead** | **Related to Outputs** |
| 2.2.1.1 Facilitate dialogue between countries on the identification and implementation of alternative livelihood strategies for poor, resource dependent communities in conjunction with water resources development | PD | Output 2.1.4 |
| 2.2.1.2 Oversee and coordinate the incorporation of alternative livelihood strategies in joint projects and within national plans | PD | Output 5.1.2 |

The activities under Outcome 2.2 can be implemented through the usual MRC delivery model which uses (individual) consultants, as needed, to support the work of the expert groups. The achievement of Output 2.2.1 depends amongst others on whether the required disaggregated sub-national data can be collected under Output 2.1.4 above. The results of these activities support the pursuit of sustainable development opportunities by basin countries in relation to improving outcomes for people affected by water resources development.

## 8.4 Strategic Priority 3: Enhance optimal and sustainable development by increasing regional benefits and decreasing regional costs

Under this strategic priority, the BDS identifies and describes 2 Outcomes and 6 Outputs (see Sections 5.4 and 5.5). For each of these Outputs the tables below summarize the key activities that will be implemented and the deliverables that will be prepared. For the preparation of work plans, the activities under each Output can be further broken down into

tasks, including the enabling tasks related to the impact pathway and the necessary stakeholder engagement and capacity building to ensure uptake (Section 8.1).

| **Strategic Priority 3: Enhance sustainable development by increasing regional benefits and decreasing regional costs** | | |
|---|---|---|
| **Outcome 3.1:** The economic growth of each country and the region is higher as a result of more proactive regional planning | | |
| **Output 3.1.1:** The Basin Development Plan and associated national plans are informed by the findings of a more proactive regional planning approach<br>**Deliverables**<br>3.1.1.1 Comprehensive Concept Note and Terms of Reference for proactive regional planning work including integration of activities under other relevant outputs in SP1, SP4 and SP5 (2021)<br>3.1.1.1 Storage identification and assessment report for the formulation of basin-wide scenarios (2022)<br>3.1.1.2 Scenario formulation and assessment methodology report (2023)<br>3.1.1.3 Report on the results of the assessment of alternative basin-wide development scenarios (2024) | | |
| **Activities** | **Lead** | **Related to Outputs** |
| 3.1.1.1 Assess options for increasing natural and constructed water storage, using GIS/EO technology and field work | PD | All activities support activities under Outputs: 1.1.1, 1.2.1, 1.3.1, 1.3.2 3.2.1, 3.2.2, 3.2.3, 3.2.4, 3.2.5 4.1.1, 4.1.2, 4.1.3 5.1.2 |
| 3.1.1.2 Formulate alternative basin-wide development scenarios and update the existing BDP assessment methodology | PD | |
| 3.1.1.3 Assess the agreed alternative basin-wide development scenarios and the distribution of benefits and costs | PD | |

The implementation of the activities under Output 3.1.1 will be supported by a competitively selected company (or consortium) which has the required qualifications and relevant experience to perform the services for the formulation and assessment of the alternative basin-wide development scenarios and interdependent activities in the environment and climate change dimensions. These interdependent activities include: (i) the development of the sediment management plan (Output 1.2.1); (ii) modelling and assessment services for testing the feasibility of additional flow thresholds (Output 1.1.1) and limits of acceptable change for key river and connected wetland habitats, including the Tonle Sap River and Lake (Output 1.3.1); (iii) modelling and assessment services for the characterisation of watersheds in terms of groundwater recharge, soil erosion and sediment loads, water storage potential, ecosystem services, susceptibility to flash floods and others (Output 1.3.2); (iv) modelling and assessment services for supporting the development of operating protocols for dams and flood and drought mitigation to achieve multiple benefits (Output 4.1.2); and (v) modelling and assessment services for flood protection in various parts of the delta to increase overall benefits and reduce overall costs (Output 4.1.3). In the process, MRC's modelling, assessment and data management capacities will be improved (Output 5.2.3).

Together the above interdependent set of activities will provide the information that the countries need to discuss the trade-offs and benefits of adapting national plans with new joint infrastructure and significant national projects to increase regional benefits and reduce regional costs under Output 5.1.2 while provide a comprehensive response to: (i) climate change through reducing flood and drought risks and (ii) the need for coordination of basin management operations. The services of the consortium will be coordinated and managed by the MRCS/NMCSs and directed and overseen by the joint basin expert group for regional planning and coordinated basin management operations and their line/implementing agencies. The multi-year work plans will maximize the engagement, and help build the capacity, of line/implementing agencies and other stakeholders throughout the implementation process to ensure national uptake, starting with the review and approval of a detailed TOR of the company/consortium.

| **Strategic Priority 3: Enhance sustainable development by increasing regional benefits and decreasing regional costs** | | |
|---|---|---|
| **Outcome 3.2:** Enhanced value from key economic sectors including agriculture, hydropower, navigation, environment and fisheries, through implementation of regional strategies | | |
| **Output 3.2.1:** Investment and associated measures in irrigated agriculture implemented<br>**Deliverables**<br>3.2.1.1 Regional guidelines for sustainable groundwater management (2023)<br>3.2.1.2 Policy paper on measures in irrigated agriculture to adapt to climate change and improve food security (2024) | | |
| **Activities** | **Lead** | **Related to Outputs** |
| 3.2.1.1 Coordinate development of guidelines on sustainable groundwater management for agriculture | PD | Output 2.1.1 |
| 3.2.1.2 Identify opportunities, and promote and provide guidance on irrigation development opportunities, to adapt to climate change and improve food security | PD | Outputs 1.1.2, 2.1.2 |
| **Output 3.2.2:** Sustainable hydropower development strategy and related regional energy plans implemented in synergy<br>**Deliverables**<br>3.2.2.1 Evaluation report on the implementation of the Sustainable Hydropower Development Strategy (2024) | | |
| **Activities** | **Lead** | **Related to Outputs** |
| 3.2.2.1 Implement SHDS and coordinate and promote alignment with regional energy plans (incl. GMS and ASEAN) | PD | Output 3.1.1 |
| **Output 3.2.3:** Investment and associated measures in basin navigation plans implemented in synergy<br>**Deliverables**<br>3.2.3.1 Recommended updates to improve alignment of MRC Masterplan for Regional Waterborne Transport in the Mekong River Basin and the JCCCN Development Plan on International Navigation on the Lancang-Mekong River (2015-2025) (2021)<br>3.2.3.2 Evaluation report on implementation of Navigation Master Plan (2024) | | |
| **Activities** | **Lead** | **Related to Outputs** |
| 3.2.3.1 Implement the MRC *Masterplan for Regional Waterborne Transport in the Mekong River Basin* in alignment with the JCCCN *Development Plan on* | PD | Output 1.1.1 |

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| *International Navigation on the Lancang-Mekong River (2015-2025)* in consultation with all basin countries | | |
| 3.2.3.2 Harmonise the navigation rules and regulations between LMRB countries and support national implementation | PD | |
| 3.2.3.3 Facilitate and coordinate investments in accordance with existing or updated plans | PD | Output 3.1.1 |
| **Output 3.2.4:** Investment and associated measures in regional environmental strategies and programmes implemented in synergy<br>**Deliverables**<br>3.2.4.1 Technical note and guidelines on leveraging ecosystem services from wetlands and watersheds through alternative financial mechanisms (2023) | | |
| **Activities** | **Lead** | **Related to Outputs** |
| 3.2.4.1 Support the preparation of identified investment projects and associated measures for wetlands and watersheds | ED | Based on the results of 3.1.1 |
| 3.2.4.2 Develop guidance and build capacity in leveraging ecosystem services from wetlands and watersheds through alternative financial mechanisms including carbon offsets, and ecotourism | ED | Output 1.3.2 |
| **Output 3.2.5:** Investment and associated measures to adapt to changes in fish populations and catch composition identified and implemented<br>**Deliverables**<br>3.2.5.2 Policy paper on options for investment and associated measures to maximise fisheries production under changed river conditions (2023) | | |
| **Activities** | | **Related to Outputs** |
| 3.2.5.1 Explore alternative futures for fish populations and catch composition resulting from water resources development and climate change and identify options to adapt to these changes | ED | Outputs 3.1.1 |
| 3.2.5.2 Investigate and evaluate investment and other options to maximise fisheries production under changed river conditions as a result of water resources development and climate change | ED | |
| 3.2.5.3 Support the preparation of concept notes for identified investment projects and associated measures for fisheries enhancement | ED | |
| 3.2.5.4 Raise awareness, build capacity and support implementation of agreed investments and associated measures to adapt to likely future fish populations (incl. in reservoir and rice field fisheries, stock enhancement, and sustainable aquaculture) | ED | |

The activities under this Outcome 3.2 are designed to implement the relevant, important and urgent recommendations in the existing MRC regional sector strategies. These activities can be implemented through the usual MRC delivery model which uses (individual) consultants, as needed, to support the work of the expert groups. For the implementation of the activities under Output 3.2.5, 'visionary' experts will be engaged who can help national

and local stakeholders think 'outside the box' on the opportunities for the capture fisheries sector in a different land and waterscape in the Mekong River Basin. The various activities need to be carefully planned in the rolling two-year work plans to capture the synergies with the related activities under the other Outcomes. It is expected that by 2025, the new information produced under the other Outcomes will render the existing regional strategies obsolete.

## 8.5 Strategic Priority 4: Ensure water security by mitigating floods and droughts

Under this strategic priority, the BDS identifies and describes 2 Outcomes and 5 Outputs (see Sections 5.4 and 5.5). For each of these Outputs the tables below summarize the key activities that will be implemented and the deliverables that will be prepared. For the preparation of work plans, the activities under each Output can be further broken down into tasks, including the enabling tasks related to the impact pathway and the necessary stakeholder engagement and capacity building to ensure uptake (Section 8.1).

| **Strategic Priority 4: Ensure water security by mitigating floods and droughts** | | |
|---|---|---|
| **Outcome 4.1:** There is sufficient flow in the dry season to support livelihood activities and mitigate salinity intrusion; and reduced flood peaks in the wet season | | |
| **Output 4.1.1:** Transboundary projects to facilitate regional cooperation on climate change implemented<br>**Deliverables**<br>4.1.1.2 Evaluation reports on implementation of transboundary projects to facilitate regional cooperation on climate change (2022) | | |
| **Activities** | **Lead** | **Related to Outputs** |
| 4.1.1.1 Identify and facilitate implementation of transboundary climate change projects (including pilot projects to improve knowledge, management, systems and cooperation in response to increased floods and droughts) | PD | Outputs 3.1.1, 4.1.3, 4.2.1, 4.2.2 |
| **Output 4.1.2:** Coordinated dam operations and use of flood protection infrastructure for flood and drought mitigation<br>**Deliverables**<br>4.1.2.1 Options report on opportunities for coordinated operating rules and governance arrangements on dam operations (2021)<br>4.1.2.1 Preliminary coordination and communication protocols for existing dams (2022)<br>4.1.2.2 Proposed operating protocols for existing and newly identified dam projects (2024)<br>4.1.2.3 Proposed operating protocols for existing and new floodplain infrastructure (2024) | | |
| **Activities** | **Lead** | **Related to Outputs** |
| 4.1.2.1 Continue review of existing dam operating rules and governance arrangements and identify opportunities for coordinated flow management to help mitigate floods and droughts | PD | Output 3.1.1 |
| 4.1.2.2 Develop coordinated dam operating protocols to optimise regional benefits and minimise regional costs | PD | Outputs 3.1.1, 4.2.1 |
| 4.1.2.3 Develop protocols for coordinating the operation of | TD-RFDMC | Output 3.1.1 |

| | | |
|---|---|---|
| flood protection infrastructure to optimise regional benefits and minimise regional costs | | |
| **Output 4.1.3:** Cooperative socio-economic and spatial planning on the floodplain<br>**Deliverables**<br>4.1.3.1 Inventory and assessment report of options for flood protection in the Mekong Delta (2022)<br>4.1.3.3 Policy paper on long-term vision for coordinated floodplain development (2024) | | |
| **Activities** | **Lead** | **Related to Outputs** |
| 4.1.3.1 Based on the Initial Studies work, identify, assess and prioritise options for flood protection in various parts of the delta to increase overall benefits and reduce overall costs based on results of joint scenario planning | TD-RFDMC | Outputs 3.1.1, 3.2.1, 3.2.4, 3.2.5 |
| 4.1.3.2 Facilitate dialogue on trade-offs and benefit sharing in relation to coordinated floodplain development and management | TD-RFDMC and OCEO | Output 3.1.1 |
| 4.1.3.3 Develop a long-term vision and associated guidance for the coordinated development of the delta floodplains including cooperation on flood ways, flood protection infrastructure, and floodplain storage | TD-RFDMC | Output 4.2.2 |

The activities under Outcome 4.1 are designed to reduce (extreme) floods and droughts through new (joint) storage projects, coordinated floodplain management and dam operations. The activities can be implemented through the usual MRC delivery model which uses individual consultants, as needed, to support the work of the expert groups. Most of the activities will be informed by the proactive regional planning activities under Outcome 3.1. The results will feed into a range of important activities during 2026-2030 that will be designed to support uptake in national governance and planning systems and help coordinate the preparation of infrastructure projects.

| **Strategic Priority 4: Ensure water security by mitigating floods and droughts** | | |
|---|---|---|
| **Outcome 4.2:** Basin communities are better prepared for more frequent and severe floods and droughts as a result of climate change | | |
| **Output 4.2.1:** Integrated basin-wide forecasting and early warning<br>**Deliverables**<br>4.2.1.1 Feasibility and design report for improved flood and drought forecasting and early warning including data requirements (2021)<br>4.2.1.2 Data sharing agreements (2022) | | |
| **Activities** | **Lead** | **Related to Outputs** |
| 4.2.1.1 Identify member country requirements for an improved regional system for basin-wide forecasting and early warning based on enhanced and compatible DSS's | TD-RFDMC | Outputs 5.2.2, 5.2.3 |
| 4.2.1.2 Implement improved and integrated flood and drought forecasting and early warning to basin countries through compatible DSS's, enhanced exchange of data, consolidated water monitoring networks, and agreed communication protocols | TD-RFDMC | Outputs 5.2.2, 5.2.3 |

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|---|---|---|
| 4.2.1.3 Enhance flash flood guidance to basin countries through compatible DSS's, enhanced exchange of data, consolidated water monitoring networks, and agreed communication protocols | TD-RFDMC | Outputs 5.2.2, 5.2.3 |
| **Output 4.2.2:** Climate change adaptation, including measures to adapt to flood and drought, mainstreamed at national levels<br>**Deliverables**<br>4.2.2.2 Accreditation of MRC under international climate funds (2022)<br>4.2.2.4 Updated basin-wide flood management and mitigation strategy (2025) | | |
| **Activities** | **Lead** | **Related to Outputs** |
| 4.2.2.1 Support mainstreaming of climate change adaptation to increased floods and droughts into regional and national strategies, plans and projects | PD | |
| 4.2.2.2 Promote access to international climate finance | PD and OCEO | Outputs 1.3.2, 3.1.1, 3.2.4 |
| 4.2.2.3 Support implementation of drought adaptation guidelines | TD-RFDMC | |
| 4.2.2.4 Update the flood management and mitigation strategy enabling future integration with the drought management strategy | TD-RFDMC | Outputs 3.1.1, 4.1.3 |

The activities under Outcome 4.2 are designed to support adaptation to (extreme) floods and droughts. The implementation of most of the above activities requires coordination or cooperation with MLC Water and/or ASEAN to create synergies and added value from taking a basin-wide approach and avoiding duplication (see Annex 1). The updating of the flood and drought management and mitigation strategy will be carried out towards the end of this SP period as it will be informed by the results of proactive regional planning activities under Outcome 3.1 and on agreed joint infrastructure projects and national projects of basin-wide significance under Outcome 5.1.

## 8.6 Strategic Priority 5: Strengthen cooperation among all basin countries and stakeholders

Under this strategic priority, the BDS identifies and describes 3 Outcomes and 10 Outputs (see Sections 5.4 and 5.5). For each of these Outputs the tables below summarize the key activities that need to be implemented and the deliverables that will be prepared. For the preparation of work plans, the activities under each Output can be further broken down into tasks, including the enabling tasks related to the impact pathway and the necessary stakeholder engagement and capacity building to ensure uptake (Section 8.1).

| **Strategic Priority 5: Strengthen cooperation among all countries and stakeholders** |
|---|
| **Outcome 5.1:** Higher benefits and lower costs from the integrated management of the entire river system |
| **Output 5.1.1:** Common understanding on the potential future institutional arrangements for basin management<br>**Deliverables**<br>5.1.1.2 Evaluation report of institutional options for managing the Mekong River Basin by 2030 (2021) |

| 5.1.1.3 Institutional development and cooperation action plan for the management of the Mekong River Basin (2022) | | |
|---|---|---|
| **Activities** | **Lead** | **Related to Outputs** |
| 5.1.1.1 Clarify mandates, areas of common interests, and comparative advantage in the changing basin context and develop partnerships, where relevant for Mekong related regional cooperation mechanisms and frameworks | OCEO | Outputs 5.2.4 |
| 5.1.1.2 Identify and evaluate in a participatory manner the institutional options for managing the Mekong River Basin by 2030 | OCEO | |
| 5.1.1.3 Facilitate a consensus building process around the preferred institutional arrangements for managing the Mekong River Basin by 2030 | OCEO | |
| 5.1.1.4 Identify needs and opportunities to strengthen the MRC, and enhance cooperation with MLC Water to develop the preferred institutional options of basin countries | OCEO | Outputs 5.2.1, 5.2.2, 5.2.3, 5.2.4, 5.3.1, 5.3.2, 5.3.3, 5.3.4 |
| **Output 5.1.2:** Significant joint infrastructure projects and national projects of basin-wide significance and associated measures agreed (BDP), and project preparation in progress<br>**Deliverables**<br>3.1.1.3 Discussion paper with options for cost and benefit sharing (2024)<br>3.1.1.3 High level proposal on choices for addressing trade-offs, benefit sharing, and joint infrastructure projects (2025) | | |
| 5.1.2.1 Facilitate trade-off and benefit sharing discussions, and the comparison with benefits and costs of existing national plans | OCEO | |
| 5.1.2.2 Support the preparation of concept notes for agreed significant joint infrastructure projects and national projects of basin-wide significance | PD | Based on the results of 3.1.1 |
| 5.1.2.3 Coordinate and support joint working groups, including private developers, for the preparation of the joint infrastructure projects | PD | |
| 5.1.2.4 Support the review of TORs and project preparation reports such as (pre)feasibility and ESIA studies | PD | |

This future basin management options assessment will be carried out in the beginning of this SP period to provide direction to MRC's organisational development plan and to the focus of cooperation with other regional cooperation mechanisms (under Outcomes 5.2 and 5.3). The assessment will be implemented in consultation with the technical leaders of the two regional water platforms (MRC and MLC Water), drawing on relevant international experience. The facilitation of agreement to significant joint infrastructure projects and national projects of basin-wide significance and associated measures, including to help mitigate floods and droughts, will be informed by the proactive regional planning under Output 3.1.1. Key deliverables in relation to project preparation are expected in the next MRC SP period.

**Strategic Priority 5: Strengthen cooperation among all countries and stakeholders**

| | | |
|---|---|---|
| **Outcome 5.2:** A Strengthened Mekong River Commission supports the achievement of higher regional benefits, lower regional costs, and increased water security | | |
| **Output 5.2.1:** Implementation of the 1995 Mekong Agreement Procedures enhanced<br>**Deliverables**<br>5.2.1.1 Action plan for enhanced implementation of Mekong Agreement Procedures (2022)<br>5.2.1.2 Updated technical guidelines for PNPCA (2023)<br>5.2.1.3 Updated technical guidelines for PDIES (2023) | | |
| **Activities** | **Lead** | **Related to Outputs** |
| 5.2.1.1 Synthesise evaluation results and lessons learned from the implementation of the 1995 Mekong Agreement Procedures, and develop an agreed action plan for their improved implementation with regard to current and future challenges | PD | Outputs 1.1.1, 1.2.1, 3.1.1, 4.1.2 |
| 5.2.1.2 Based on the agreed action plan, improve the technical guidelines for implementing the PNPCA and PDIES | PD | |
| 5.2.1.3 Based on the agreed action plan, improve the technical guidelines for implementing the PDIES | TD-RFDMC | |
| 5.2.1.4 Implement the enhanced PNPCA and PDIES, taking into account the updated technical guidelines for PMFM, PWQ and PWUM (Under Strategic Priority 1) | PD and TD-RFDMC | Output 1.1.1 |
| 5.2.1.5 Support continued operation of the Joint Platform for implementation of the 1995 Mekong Agreement Procedures | PD | Output 1.1.1 |
| **Output 5.2.2:** A core river monitoring network for the mainstream and remaining national river monitoring networks consolidated<br>**Deliverables**<br>5.2.2.1 Design report of the core mainstream monitoring network (including JEM) and integration with full basin network (2023)<br>5.2.2.2 Evaluation of the operation of the core mainstream monitoring network (2025) | | |
| **Activities** | **Lead** | **Related to Outputs** |
| 5.2.2.1 Assess and redesign the basin's river monitoring networks for regional and national planning and management based on a comprehensive network analysis informed by current and future needs | ED | Output 4.2.1 |
| 5.2.2.2 Develop and implement a modern core river monitoring network for the mainstream and key tributaries to be managed by the MRC | ED | Output 4.2.1 |
| 5.2.2.3 Strengthen capacity for the consolidation and enhancement of nationally managed river monitoring networks | ED | |
| 5.2.2.4 Implement river monitoring activities (hydro-meteorological, discharge and sediment, water quality, fisheries and ecological health) including incorporation of agreed components of the Joint Environmental Monitoring of mainstream hydropower | ED | Outputs 1.1.1, 1.2.1, 4.1.2, 5.2.1 |
| **Output 5.2.3:** Compatible Decision Support Systems with reinvigorated data and information management and sharing, modelling, forecasting, and communication | | |

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| **Deliverables**<br>5.2.3.1 Design report for reinvigorated and aligned DSS's at regional and national levels (2022)<br>5.2.3.2 Upgraded DSF, aligned at regional and national levels (2023)<br>5.2.3.5 Standards and protocols for data sharing over the full year between all basin countries and communication with stakeholders (2023)<br>5.2.3.6 Agreed communication protocols for emergency response (2023) | | |
| **Activities** | **Lead** | **Related to Outputs** |
| 5.2.3.1 Further study the design, management and use of the region's DSS's and plan a regional system of compatible DSS's (MRC's and member countries', as well as linkages to DSS's in Upper Mekong River Basin countries) | TD-RFDMC | |
| 5.2.3.2 Upgrade the MRC's Decision Support Framework (MRC's DSS) to the latest and highest international standards and technologies in order to serve both planning and operational management purposes, in conjunction with the reinvigoration of MRC's data, information, modelling and communication systems | TD-RFDMC | Output 3.1.1 |
| 5.2.3.3 Promote and coordinate the development of reinvigorated and compatible DSS's in all basin countries including connection with MLC data centres | TD-RFDMC | Output 3.1.1 |
| 5.2.3.4 Operate and maintain data, information, modelling and communication systems and tools in support of decision-making and active public communication | TD-RFDMC | Output 3.1.1 |
| 5.2.3.5 Facilitate harmonisation of data and information sharing among all basin countries and stakeholders (incl. infrastructure developers and operators, CSOs and research institutes) | TD-RFDMC | |
| 5.2.3.6 Develop and implement communication protocols for data and information sharing on water-related emergencies including floods, droughts and water quality incidents | OCEO | Outputs 1.1.1, 4.1.2, 4.2.1, 5.2.2 |
| **Output 5.2.4:** Organisational development of the Mekong River Commission<br>**Deliverables**<br>5.2.4.1 Organisational development plan for the MRC towards 2030, including Council, JC, MRCS (and RFDMC), NMCs and expert groups (2022)<br>5.2.4.2 Multi-year work plans (All)<br>5.2.4.5 Operational plan for help-desk function on supporting implementation of sustainable development opportunities (2023)<br>5.2.4.12 MRC Strategic Plan 2026-2030 (2025)<br>5.2.4.13 Policy paper on options for establishing a Mekong Fund including governance and oversight, modalities of operation and financing mechanisms (2021) | | |
| **Activities** | **Lead** | **Related to Outputs** |
| 5.2.4.1 Prepare and implement an organisational development plan for the MRC towards 2030 (including the Council, JC, MRCS (and RFDMC), NMCs and Expert Groups) based on agreed vision of future capacity, secretariat structure and function, and operating arrangements | OCEO | Outputs 5.1.1 |
| 5.2.4.2 Prepare the multi-year work plans to implement the | OCEO | |

| MRC SP | | |
|---|---|---|
| 5.2.4.3 Coordinate and build capacity for national implementation of decentralised CRBMFs to achieve regional objectives, planning and management | OCEO | Outputs 5.2.2, 5.3.3 |
| 5.2.4.4 Establish a staff secondment programme between regional level and national implementing agency levels (all 6 countries) building on the Junior Riparian Professional Programme | AD | |
| 5.2.4.5 Promote and advise on identification, preparation and implementation of the BDS development opportunities including through a help desk function for technical queries and requests for support from stakeholders (including the private sector) | PD | |
| 5.2.4.6 Institutionalize 'uptake of Outputs' as part of the development and implementation process for all MRC products and services based on the Uptake Guidelines | OCEO | |
| 5.2.4.7 Manage human resources and procurement in-line with HR and Procurement Manuals and FPAC | AD | |
| 5.2.4.8 Operate and administer the MRCS in-line with the Admin Manual | AD | |
| 5.2.4.9 Operate the new financial management information system in line with Finance Manual, and in support of work planning, budget monitoring and reporting | AD | |
| 5.2.4.10 Enhance internal controls, including through the Audit Committee and Internal Auditor | AD | |
| 5.2.4.11 Organise and coordinate MRC governance meetings including 2022 Summit, Council, Joint Committee, Joint Committee Task Force, and Budget Committee | AD and OCEO | |
| 5.2.4.12 Prepare the MRC SP 2026-2030 to implement the remaining five years of the BDS 2021-2030 | OCEO | |
| 5.2.4.13 Explore the options for establishing a Mekong Fund including governance and oversight, modalities of operation, and financing mechanisms | OCEO | |

The implementation of Output 5.2.1 will be led by a senior official or expert with a deep understanding of how the combined technical (PMFM, PWQ, PWUM) and procedural (PDIES, PNPCA) Procedures should support and facilitate development and management planning in the Mekong River Basin (and thus the implementation of the BDS). When this relationship is not clear or when basin planning and the development/implementation of the Procedures are 'out of sync', the Procedures may be seen as restraining and/or ineffective mechanisms that dis-benefit national interests.

The implementation of the activities under Output 5.2.2 can best be implemented by a company (or consortium of companies) that has the capacity and experience to effectively inventory, consolidate, align, and (re)design the many water-related monitoring networks in the basin for future national and reginal planning and management purposes. This company will also support the design and development of the core water-related monitoring network for the mainstream.

The ongoing reinvigoration of the MRC's data, information, modelling and communication systems (Output 5.2.3) will be supported by the company/consortium which will be engaged

for supporting the proactive regional planning activities under Outcome 3.1. It is expected that this company will support the development of a contemporary DSS for planning and management across spatial and time scales, which is connected to global, satellite and ground data, and has a web interface that makes data and information available to stakeholders in the basin, providing opportunities to comment and participate in formulation and assessment of basin-wide alternative development scenarios.

For the implementation of the organisational and institutional activities under Output 5.2.4 it will be important to use experts and consultants that have been involved in a leading role in similar activities for similar organizations elsewhere within or outside the region. Many of the activities will need to be complemented with capacity building of the relevant national line/implementing agencies by regional MRC bodies. For example, MRC's RFDMC will help strengthen national flood and drought centres, where needed).

| **Strategic Priority 5: Strengthen cooperation among all countries and stakeholders** | | |
|---|---|---|
| **Outcome 5.3:** Cooperation among all relevant regional water-related mechanisms and relevant partners based on need and complementary strengths | | |
| **Output 5.3.1: Mekong-related cooperation mechanisms and relevant partnerships implemented in synergies**<br>**Deliverables**<br>5.3.1.5 Enhanced monitoring, evaluation and reporting system for contributions to the BDS (2021)<br>5.3.1.5 MRC Annual Reports (All)<br>5.3.1.5 Mid-Term Review of the MRC Strategic Plan (2023) | | |
| **Activities** | **Lead** | **Related to Outputs** |
| 5.3.1.1 Implement and enhance partnerships between MRC and Dialogue Partners as well as the Mekong-Lancang Cooperation on Water | OCEO | |
| 5.3.1.2 Implement and enhance partnerships between MRC and other Mekong-related regional cooperation mechanisms (ASEAN, GMS, ACMECS, LMI, Mekong-Japan and Mekong Korea) | OCEO | |
| 5.3.1.3 Implement and enhance partnerships towards BDS Strategic Priorities between MRC and all other relevant partners, including development partners, international organisations, RBOs, research institutes and universities, non-governmental organisations and the private sector | OCEO | |
| 5.3.1.4 Align fund raising and implementation of BDS and projects in NIPs with relevant regional cooperation mechanisms | OCEO | |
| 5.3.1.5 Monitor, evaluate and report on the implementation of the MRC SP, NIPs and the contribution of water-related activities (projects and programmes) of Mekong-related regional cooperation mechanisms to the BDS | OCEO | |
| **Output 5.3.2:** Joint State of Basin Report and Basin Development Strategy<br>**Deliverables**<br>5.3.2.1 Memorandums of Understanding and Terms of Reference agreed for implementation of the DAGAP (2021)<br>5.3.2.2 State of Basin Report 2023 identifying the effectiveness of progress with BDS | | |

| | | |
|---|---|---|
| implementation (2023) | | |
| **Activities** | **Lead** | **Related to Outputs** |
| 5.3.2.1 Implement the *Data Acquisition and Generation Action Plan* to enable preparation of the 2023 State of Basin Report with improved consistency and alignment of basin-wide datasets | ED | Output 5.2.2, 5.2.3 |
| 5.3.2.2 Prepare the 2023 State of Basin Report with all six basin countries as a mid-implementation report on the BDS 2021-2030 | ED | |
| **Output 5.3.3:** Joint Basin Expert Groups<br>**Deliverables**<br>5.3.3.1 Operational plan for the establishment and operation of Joint Basin Expert Groups agreed by all six basin countries (2022)<br>5.3.3.3 Updated plan for mobilising national implementing agencies to increasingly implement basin planning and management (2023) | | |
| **Activities** | **Lead** | **Related to Outputs** |
| 5.3.3.1 Building on the current MRC Expert Groups, establish four Joint Basin Expert Groups with representatives from all six basin countries for (i) basin-wide planning; (ii) basin management coordination, (iii) DSS related activities (incl. information management and communications), and (iv) strategy, partnerships and cooperation | OCEO | Outputs 5.1.1, 5.2.4 |
| 5.3.3.2 Coordinate and support the operations of the Joint Basin Expert Groups | OCEO | |
| 5.3.3.3 Prepare guidance and support countries to mobilize national implementing agencies (i.e. for work planning, assigning staff responsibilities, budgeting, and resourcing) to increasingly implement basin planning and management functions | OCEO | Outputs 5.1.1, 5.2.4 |
| **Output 5.3.4:** Harmonised basin-wide stakeholder platform<br>**Deliverables**<br>5.3.4.1 Feasibility and design report of the Mekong-Lancang Multiple Stakeholder Platform (2023) | | |
| **Activities** | **Lead** | **Related to Outputs** |
| 5.3.4.1 Develop a Multiple Stakeholder Platform with MLC Water and in consultation with all other relevant partners (to consolidate and align) including clear objectives and guidelines on participation and contribution | OCEO | |
| 5.3.4.2 Develop a stakeholder database and consistent recording, reporting and impact tracking procedures | OCEO | |
| 5.3.4.3 Coordinate and support the management and operations of the Multiple Stakeholder Platform including the regional stakeholder forum and proactive engagement and communication with the media and general public | OCEO | |

The implementation of most of the activities under Outcome 5.3 requires consultation with MLC Water, which may lead to joint or coordinated implementation of the activity. In case of joint implementation, the resources and implementation modalities will be jointly agreed.

Some of the activities can be implemented through the usual MRC delivery model which uses (individual) consultants, as needed.

# 9.0 IMPLEMENTATION OF THE MRC SP

This Chapter describes the MRC's institutional arrangements for implementing the SP, the roles of the MRC's key stakeholders in the implementation of the Plan, the multi-year work planning for implementation of the activity chains in Chapter 8, and the financial and human resource requirements and arrangements for the Plan. It also describes how key risks to Plan will be managed and how the Plan implementation will be monitored and evaluated.

## 9.1 Institutional arrangements for SP implementation

**A results-based mutual accountability process**. The MRC at regional and national levels is committed to implement the activities in Chapter 8 and contribute to the delivery of the related BDS Outputs over the next 5 years. A key focal area that needs to be managed during implementation is the continuing and gradual transition of MRC towards a leaner, 'expert' organization funded by the Member Countries. This process will be supported through implementing an organisational development plan (Output 5.2.4) to:

1. **Support increasing national implementation** of core river basin management functions and the transition towards regional planning and management processes that are integrated in national planning and governance systems by 2030;

2. **Strengthen the MRC** to enable increased cooperation with MLC Water for the purposes of integrated management of the whole Mekong River system by 2030, ensuring the adequate sharing of data and information, joint studies and assessments, an integrated whole-of-basin monitoring network, and common state of basin reporting and basin development strategy.

**A key mechanism in this transition process** is the enhancement of the existing MRC expert groups to joint basin expert groups with technical leaders from key national line/implementing agencies of all 6 basin countries (see Section 6.2). These groups will steer, oversee and increasingly implement (through their agencies) regional planning and management functions with coordination and facilitation of MRCS at the regional level and NMCSs at the national level. The joint expert groups will gradually take over many activities that are currently dependent on consultants and the financial support of development partners.

**Institutional development**. To achieve this higher degree of national implementation by 2030, institutional mechanisms, technical processes, and tools and capacity need to be developed in the national line/implementing agencies and the NMCSs. The required institutional strengthening, decentralization and cooperation processes are fully incorporated in the activity chains for Strategic Priority 5: Strengthen cooperation among all basin countries and stakeholders (see Section 8.6). The following provides a summary of the (changing) roles and responsibilities for SP implementation of the bodies that make up the MRC governance structure (Figure 9.1).

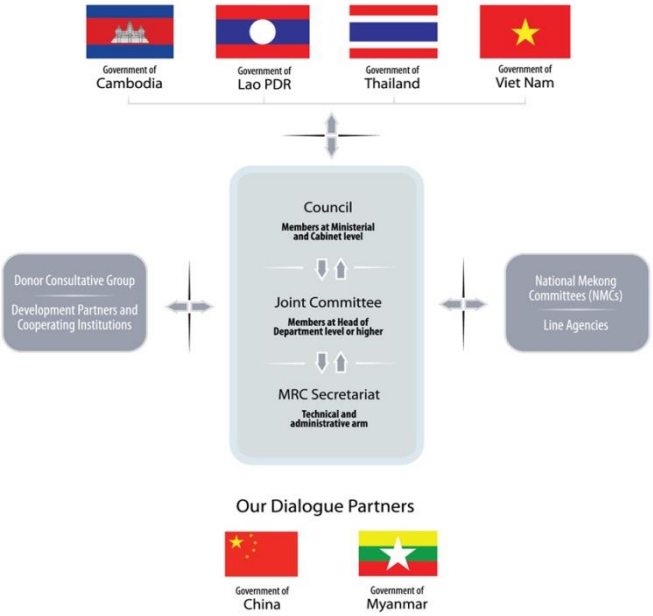


**Figure 9.1:** MRC Governance Structure

**Summit of Heads of Government**

The four-yearly MRC Summit of Heads of Government, first organised in 2010, is the highest political forum of the MRC whereby outcomes of cooperation are assessed, and directions set for the following four years. The fourth Summit in 2022 – towards the mid-point in the implementation of this SP - is an important milestone for the MRC to assess the direction of its development.

**Council of Ministers**

As the highest decision-making body in the MRC, the Council approves the SP and makes decisions on all policy-related matters concerning its implementation, including organisational policies, basin-wide strategies and plans, strategic cooperation partnerships, and resolution of differences. The Council provides strategic guidance on priority setting, including by approving the multi-year work plans (including annual budgets) based on endorsement from the Joint Committee and the recommendation of the Budget Committee.

In what is a critical transition phase for MRC in a changing institutional landscape, the Council also oversees high-level risks relating to the implementation of the BDS and the organisational development of the MRC, including the transition to national implementation of core river basin management functions and increasing cooperation with MLC Water for the purposes of integrated management of the whole Mekong River system. It helps in this regard that the MRC Council members are the same ministers for four LMRB countries providing policy direction in Ministerial Meetings of MLC Water.

**Joint Committee**

In coordinating the implementation of the Council's decisions, the Joint Committee steers the implementation of this SP. This role includes technical priority setting and guidance on delivery of activities as well as reviewing and endorsing policy-related resolutions for submission to the Council for approval. The Joint Committee provides guidance on the preparation of the multi-year work plans, including the definition of activities and allocation of annual budgets.

The Joint Committee establishes and is assisted in its work by task forces, working groups, expert groups or similar arrangements that provide technical input and advice on certain institutional, technical and policy related issues. As senior officials in their respective countries, Joint Committee members also have extensive networks which need to be mobilised to advance the MRC's aims with respect to engagement with external stakeholders. The CEO works closely with Committee members in this regard. Most of the JC members are also members of the Joint Working Group (JWG), which is the coordination and decision-making body of MLC Water.

**National Mekong Committees of line/implementing agencies**

In each Member Country, line or implementing agencies in water and related sectors, as well as those agencies relevant to Mekong cooperation (such as planning and investment and foreign affairs), are members of a National Mekong Committee (NMC), supported by a Secretariat (NMCS) which performs cross-sectoral, cross-agency coordination, communication and reporting. The NMCSs are attached to the ministry responsible for water resources management and/or environmental management.

Each NMC provides policy advice and technical information to enable regional decision-making in the interest of the respective country with due consideration of opportunities arising from BDS/SP implementation. Each committee advises the Council Member and Government on national position for regional consensus building and help ensure that regional decisions are implemented by concerned sectors. Each NMC secretariat fulfils its coordination function for Mekong cooperation and is an advocate of transboundary cooperation and IWRM in each country.

**With the ongoing transition towards national implementation** of core river basin management functions, including regional planning and basin management, the NMC's will need to facilitate and oversee basin activities to ensure they are integrated in the annual work plans and budgets of relevant national line/implementing agencies. This will enable the joint basin expert groups and their working groups (with representatives of the line/implementing agencies) to implement basin activities with their agencies. The NMCSs/MRCS will coordinate the preparation and implementation of the work plans of the expert groups to ensure proper basin-wide synergy and to monitor and assess performance.

**Integration of regional and national planning**. This transitioning process towards national implementation through the joint basin expert groups will result in growing networks with wide understanding and ownership of regional needs and opportunities. This will increase the effectiveness of BDS/SP implementation and bring national perspectives into future updates of the BDS/SP, creating a "circle of ownership" between MRC and the Member Countries. This ownership of regional outcomes in turn facilitate the further integration of the regional planning and management processes in the national planning, decision-making and governance systems.

**MRC Secretariat (MRCS)**

The MRCS is the operational arm of the MRC and performs technical, facilitating and administrative functions under the management of a Chief Executive Officer (CEO). It facilitates regional meetings of the Member Countries and provides technical advice on joint planning, coordination and cooperation. It also works closely with the four countries' coordinating bodies, the NMCs, partners and stakeholders.

The MRCS undertakes many of the SP activities in cooperation with national counterparts and others. Each of the Secretariat's divisions and office will lead implementation of specific Activities with the contribution of other divisions identified in delivery plans. All divisions will be

accountable not only for their lead deliverables but also for their agreed contribution to Activities led by other divisions. These arrangements will be further developed in multi-year work plans.

**Change of MRCS delivery model**. In the current delivery model of the MRCS, international and national consultants are carrying out many of the activities/tasks with coordination, facilitation and supervision from MRCS staff. In addition, the staff of MRCS facilitates and supports regional discussion, negotiation and communication with support from the NMCSs. The ongoing transition towards national implementation of regional planning and basin management processes will gradually change this delivery model. The joint basin expert groups (with their national agencies) will in future carry out most of the activities/tasks that are now being implemented by consultants.

**It may take 10 or more years to transition towards this delivery model, as the basin and countries become developed and the region more integrated,** whereby regional planning and basin management is an integral part of national planning and governance processes, coordinated by the MRCS/NMCSs. The MRC, as a coordinating RBO, would be supported by a smaller, expert Secretariat (to coordinate policy, diplomacy, and technical analysis, and to undertake contract management) with much of the integrated river basin management work undertaken by Member Countries. This is the model that has evolved for many international RBO's as they reach a more 'mature' phase.

## 9.2 External stakeholder engagement

The BDS provides the rationale for broader and deeper engagement with partners and other stakeholders in sustainable water resources development and management throughout the basin. Indeed, there is a common interest from stakeholder groups throughout the basin to engage in proactive regional planning and coordinated basin management operations. The (joint) projects and measures to build climate resilience and manage flood and drought risks will require extensive stakeholder consultation as their implementation may have significant trade-offs and socio-economic, spatial and institutional implications.

MRC stakeholder engagement will be managed by the OCEO. The BDS approach for enhanced stakeholder engagement (Section 6.3) will be mainstreamed in the MRC multi-year work plans through dedicated tasks, similar to the enabling tasks aimed at capacity building for decentralization of CRBMFs and for uptake of MRC deliverables in national governance, decision-making and planning (see Section 8.1). Key external stakeholders and their interests have been identified and the purpose of engagement for this SP period described (Table 9.1).

**Table 9.1:** Interests and roles of external stakeholders

| Stakeholder | Interest of stakeholder | Purpose of engagement by the MRC |
|---|---|---|
| **China** | Regional cooperation for socio-economic development, economic integration and political stability | Further increasing policy dialogue, data and information sharing and technical exchanges to facilitate basin planning and management, including flood and drought management<br>Securing greater substantive involvement in the 5-yearly updating of the State of Basin report |
| **Myanmar** | Knowledge sharing on basin development and management<br>Regional cooperation | Strengthening dialogue and technical exchanges |

| | | |
|---|---|---|
| **MLC Water** | Water resources and green development<br>IWRM and climate change adaptation<br>Water sector production capacity<br>Rural areas, water conservancy and livelihood improvement<br>Sustainable hydropower development and energy security<br>Transboundary river cooperation and information sharing<br>Coordination with other areas | Implementation of current MoU<br>Dialogue to explore opportunities to optimize the basin-wide approach in water and related resources development and management<br>Setting up joint basin expert groups for regional proactive planning, coordinated basin management operations, and water-related monitoring and DSS facilities<br>Collaboration on common projects and activities, including the development of the Multiple Stakeholder Platform, strengthening flood and drought management capacity, enhancing data sharing and developing a mainstream early warning system, and reviewing cooperation mechanisms and modalities for Mekong transboundary river management |
| **ASEAN** | Regional cooperation and integration<br>IWRM Country strategy guideline and indicator framework implementation<br>Water quality and sanitation<br>Water-related disasters<br>Climate change mitigation, adaptation and resilience | Implementation of current MoU<br>Making contributions to BDS Outcomes and Outputs, particularly in relation to environment, social improvements and water security<br>Collaboration on common projects, including on water-related disasters and water quality<br>Key MRC strategies, guidelines and perspectives are discussed and supported at relevant ASEAN forums and agendas<br>Ensuring debates about critical, water and related basin-wide opportunities and issues are framed appropriately and influence relevant decision-making processes, including through a standing ASEAN-MRC Water Security Forum |
| **GMS** | Natural resources and ecosystem services<br>Regional power market integration<br>Climate resilience and disaster risk management<br>Agriculture | Making contributions to BDS Outcomes and Outputs, particularly in relation to energy and environment<br>Participation in GMS Regional Power Trade Coordination Committee (RPTCC) to keep abreast of future developments<br>Strengthen integration of MRC strategies and guidelines into GMS water and related investment appraisal and planning tools and the support of ADB for further integration into national frameworks |
| **Development partners and multilateral agencies (UN, World Bank, ADB)** | Raising living standards and securing socio-economic benefits and regional political stability<br>Sustainable water resources development and management | Greater awareness and strategic and water diplomacy support among senior officials for alignment/harmonization of approaches in line with MRC assessments, strategies and recommended development pathways<br>Technical and financial support<br>Making contributions to BDS Outcomes and Outputs |

| | | |
|---|---|---|
| | | Promotion of sharing experiences with other international river basins |
| **Private sector entities** | Participation in national development activities<br>Confidence in national and regional governance processes for beneficial investments | Preparation and implementation of BDS sustainable development opportunities in line with national and regional frameworks (procedures, strategies and guidelines)<br>Uptake and use of relevant MRC Procedures, strategies, guidelines and tools |
| **Civil society organizations, communities** | Securing socio- economic benefits and avoiding negative impacts from water-related developments | Promotion of common understanding of the evidence base relating to the basin<br>Participation in the basin planning and management process to raise their interests, concerns and policy recommendations<br>Represent the interests of the vulnerable groups, women and children, and the environment |
| **Research institutes and academia** | Bringing in new perspectives to policies and development strategies to ensure equitable distribution of wealth and opportunity | Promotion of common understanding of the evidence base relating to the basin<br>Collaboration in preparing and promoting MRC assessments and tools development |
| **Media** | Raising awareness | Promotion of greater understanding of the role and benefits of MRC<br>Clarification of issues from scientific perspectives |

The BDS proposes to 'institutionalise' external stakeholder engagement in a Multiple Stakeholder Platform (MSP) with a mandate to undertake regular stakeholder reviews of the implementation of the BDS (see Section 6.3). This would offer an opportunity for cooperation between MRC and MLC Water since an MSP for Lancing-Mekong water resources cooperation is also on the list of proposed projects of MLC Water (with support from all six basin countries). The management and operations of the MSP may provide an opportunity to further streamline, synergize and synchronize the many Mekong related stakeholder forums in order to maximize stakeholder input, reduce stakeholder engagement fatigue, and achieve common objectives.

## 9.3 Multi-year work planning

This 5-year SP serves as a macro-level planning tool for the MRC at the regional level. It will be operationalised through rolling two-year work plans. The preparation of the work plans will be guided by the schedule of activities and provisional budgets in this SP. Each of these activities will be further elaborated in tasks, progress milestones, required resources, linkages to other tasks, and then consolidated in an overall work plan with procurement plans, management responsibilities, and matching revenue and budget streams. Every year account will be taken of progress made over previous years and the ongoing availability of funds.

**Preparation of the work plan**. MRCS will lead the preparation of the work plan in accordance with the procedures provided in the updated MRC Finance Manual (20 November 2019). The process starts with the issuing of a Guidance Note by the CEO setting out the broad parameters within which each work plan is to be prepared (see Figure 9.2). To prepare the Guidance Note,

the CEO, with the support of OCEO, will consult with senior management staff (comprising Division Directors), Joint Committee and Development Partners. The Guidance Note will include:

- A Statement of the overall budget for the two years, based on the indicative budgets set out in this SP and modified by funding realities for the specific years;
- Implementation priorities (SP activities) for the years including significant crosscutting issues to be addressed, with associated timelines;
- Template for activity and task descriptions, interdependencies between activities/tasks, progress milestones, resourcing, procurement, and budgeting;
- Assignment of responsibility for the implementation of SP activities to MRC organisational units, and the management, reporting and MRC's organisational M&E system;
- A consultation framework, stipulating whom to be consulted as part of the preparation;
- Tentative timetable, including national and regional consultations, working sessions, the circulating of the final draft and formal meetings of Budget Committee, Joint Committee and Council.

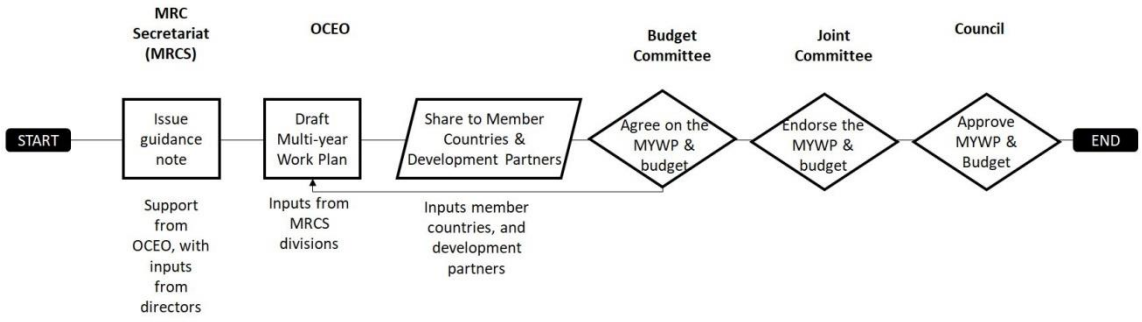


**Figure 9.2**: The MRC work plan formulation process

The OCEO will prepare the two-year work plans, and update them as necessary each year, with inputs from the MRCS Divisions, Member Countries and Development Partners. The work plan preparation process includes the balancing of budget and revenue projections through prioritization of activities. The inputs from Member Countries and development partners will be sought.

**Approval of work plan**. The completed draft work plan will be submitted to the BC for review. Once agreed by the Budget Committee, the work plan will be submitted to the Joint Committee for endorsement and to the Council for approval, in line with Article 14 of the 1995 Mekong Agreement.

**The implementation of the work plan** will be managed in accordance with the updated MRC operational manuals. The delivery of activities and tasks will be distributed among MRC organisational units. Each activity and task has a responsible management unit and a budget line. Delivery agreements spell out the services and requirements from other organisational units. MRC's organisational M&E system tracks activity/task delivery, and financial status. The system flags key areas of concern where interventions are needed to bring an activity back on course to regular senior management meetings (see BDS Section 6.5). This feedback loop will facilitate timely corrective measures to be taken, including prioritisation of resources in annual work planning to redress delays in critical activities.

## 9.4 Financial arrangements and budget

This section will be completed in late March after review at regional and national level of the updated and completed BDS/SP results chain. The section will include:

- Summary budget table with the estimated breakdown of the budget by the 5 Strategic Priorities, 12 Outcomes and 31 Outputs, followed by a few paragraphs with supporting findings and guidance regarding the distribution of the budget, cost-effective and efficient use of the budget, and others;
- A figure with the estimated budget allocation per year, followed by a few paragraphs with supporting findings and guidance regarding the funding approach and financial roadmap. MRC associated budgets, and others;
- Financing of the budget with paragraphs related to the basket fund, earmarking funds, financial management issues (e.g. working with different currencies), bilateral support, and others.

## 9.5 Risk management

The following section sets out the main risks and risk management strategies for the period of the SP. The risks identified reflect both basin-wide and organisational challenges facing the MRC. Several risks and risk management strategies identified in the SP 2016-2020 remain valid. The risk management strategies are integral part of the implementation of this SP and are addressed in the activity/task chains in Chapter 8.

**The MRC's expertise & impartiality are not valued in the region (Medium likelihood, High impact, and thus a High risk)**

Without its position of trust and impartiality with Member Countries, MRC could not deliver its SP. Because of this unique position, MRC can provide information and recommendations to Member Countries without the suspicion of bias or a hidden agenda. However, this trust and impartiality cannot be taken for granted; MRC must work to maintain it.

The mitigation measures include improved communication of the MRC's mandate & work, improved engagement with wider stakeholder groups, and strengthened quality (evidence based and balanced) of MRC products. MRCS will also more often publicly address unbalanced, biased and incorrect statements and journalism on water-related issues in social and other media, including by providing timely factual and even-handed information on the actual situation in the basin.

**Coordination and inputs to the preparation and implementation of national development plans are insufficient to improve regional outcomes (High likelihood, High Impact, and thus a Critical risk)**

If national development plans are not sufficiently informed about basin-wide effects and linkages, there is a high risk that collectively they will remain sub-optimal for all Member Countries (see Chapters 3 and 4). In the past, some of the MRC's strategies, guidelines and tools have not been taken up and/or used.

This situation will be mitigated by building 'uptake' into the multi-year work plans as described in Section 8.1 and through greater involvement of national line/implementing agency staff in the preparation and implementation of work plans as described in Section 9.1 and 9.3. In addition,

the MRC's organisational M&E system now informs and tracks impact pathways, which are supported by enabling activities.

**There is difficulty in reaching consensus among Member Countries on critical issues (High likelihood, High impact, and thus a Critical risk)**

Differences of view between some or all Member Countries are always likely to exist. In some cases, these differences can be deeply held. Resolving differences by mutually satisfactory solutions remains an ongoing challenge for MRC. Failure to manage this risk will jeopardize Member Country commitment to the MRC.

This risk will be mitigated by a combination of proactive regional planning that goes beyond what countries are currently planning (as described in Section 4.2), the development of in-house (MRCS) hydro-diplomacy capacity to enable MRC to act as an honest facilitator, and levering partnerships with MLC, ASEAN and other (multilateral) organisations.

**There is difficulty in effectively implementing the MRC's cooperation mechanisms (High likelihood, Medium impact, and thus a High risk)**

There is a risk that MRC cooperation mechanisms, including its five Procedures, as well as the BDS and basin-wide sector strategies, are not implemented effectively. This may arise through insufficient understanding of the purpose and role of a mechanism but also in cases where mechanisms fail to adapt to changes in expectations and needs.

This risk will be mitigated by incorporating the updating of the (interdependent) set of five Procedures in the results chain to ensure they are fit-for-purpose under the new basin realities and continue to deliver full value to Member Countries (see Section 8.6). Building 'uptake' into the multi-year work plans as described in Section 8.1 will also help implement MRC's cooperation mechanisms.

**There are limited resources and capacity at national level to implement MRC's decentralised activities (Medium likelihood, High impact, and thus a High risk)**

Under the decentralisation roadmap, Member Countries themselves are increasingly responsible for core MRC activities, not only for monitoring and data collection but increasingly also for basin planning and management activities, with coordination by MRCS, as described in Section 9.1. Capacity in Member Countries differs, however, and any significant gaps in the basin-wide knowledge base and deficiencies in institutional mechanisms for engaging in basin planning in some countries, will adversely affect the value for all Member Countries.

A key focal area of this SP is to support increasing national implementation of core river basin management functions to enable the continuing and gradual transition of MRC towards a leaner, 'expert' organization, as described in Section 9.1. For this purpose, a major organizational development and capacity plan will be implemented (Section 8.6), Output 5.2.4), joint basin expert groups with representatives of national implementing agencies strengthened, and institutional mechanisms developed for mobilizing national implementing agencies to increasingly implement basin planning and management functions (Section 8.6, Output 5.3.3).

**Bureaucratic implementation of the SP (Medium likelihood, High impact, and thus a High risk)**

Experiences suggest that important SP activities may not be adequately elaborated into informative concept notes and/or Terms of References, and therefore not adequately resourced and implemented. This lack of focus on Outcomes has hampered 'uptake' of Outputs and led to

fragmented approaches to the development of MRC cooperation mechanisms (knowledge base, procedures).

To help mitigate this risk, this SP provides guidance for the resourcing and implementation modalities of activities (Chapter 8). The development of a vision for the MRC by 2030 and the implementation of the organizational development plan will also contribute to the development of a less bureaucratic 'expert' organization (Section 8.6).

**There is significant unexpected funding shortfall (Low likelihood, High impact, and thus a Medium risk)**

The SP is based on the financial commitments made to MRC. While the likelihood may be low, failure by MRC Member Countries and/or Development Partners to deliver on these commitments would have a significant adverse impact for achievement of the Plan.

The mitigation measures to reduce this impact, should the risk be realized, include the prioritization of activities for Outputs with high relevance in the in multi-year work planning process (Section 9.3) to achieve the most important BDS Outcomes and the implementation of a fund mobilization strategy by the CEO.

## 9.6 Monitoring, evaluation and reporting

MRC's results-based monitoring and evaluation framework is summarized in Table 9.2 below. It combines the basin monitoring system (see section 6.5) and the organizational M&E system. The latter also tracks the contribution of national agencies (through monitoring of NIP implementation) and other regional cooperation mechanisms to the achievement of BDS Outputs and Outcomes, based on the regularly updated BDS alignment table in Annex 1.

**MRC's basin monitoring system** comprises of a dashboard traffic light and trend display of the BDS Outcomes and their contributions to relevant SDG targets. The Outcomes and SDG contributions will be assessed in the State of Basin Report (SOBR), which is updated every 5 years**.** The SOBR records and evaluates the development impacts, positive and negative, within the Mekong River Basin as a measure of the effectiveness of the implementation of the BDS. The SOBR quantifies the strategic and assessment indicators of the Mekong River Basin Indicator Framework (MRB-IF) and, as described in Section 6.5. The next update, which also evaluates the contributions to SDG targets, is in 2023.

**MRC's organizational M&E system** monitors and evaluates the implementation of this Strategic Plan in terms of inputs, activities, financial status, key deliverables and output indicators. The system monitors implementation progress against milestones and flags issues and concerns to the regular senior management meetings. Mid-year and annual reports are the main communication channels for monitoring, which is conducted internally by the lead divisions under the coordination of the MRCS OCEO's M&E team. A team of independent external experts will be engaged for the assessment of the output indicators and deliverables and the overall SP implementation, including cost effectiveness at mid-term of the 5-year SP cycles. The evaluation feeds into the next Strategic Plan that will be prepared in 2024 to contribute to the remaining BDS for 2026-2030.

**Table 9.2**: Monitoring and evaluation framework for BDS and MRC SP

| Issues of interest | Methodology | Parameters | Function |
|---|---|---|---|
| **Contribution to** | Five-yearly updating of the | The SDG targets that | SDG monitoring |

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| **implementation of SDGs** | State of Basin Report (next 2023) | are relevant to Mekong river basin management | (OCEO) |
| **BDS Outcomes & Outputs**<br>(Basin status and trends) | Dashboard which tracks progress towards Outcomes (see Section 6.5) and outputs based on the 5-yearly updated State of Basin Report | Strategic and assessment indicators of the Mekong River Basin Indicator Framework (MRB-IF) | Mekong River Basin monitoring<br>(ED) |
| **MRC contributions to BDS Outputs**<br>(Results, interim outcomes) | Assessment of the quality of the output produced<br>MRC Annual Report, Mid Term Review Report | Output indicators in SP Table 9.3 | Monitoring (OCEO)<br>Evaluation<br>(external) |
| **MRC deliverables** | Dashboard that tracks progress against milestones and flags issues to management<br>MRC Annual Report | MRC deliverables<br>Rolling multi-year work plan with milestones, budgets, etc. | Monitoring<br>(Lead division) |
| **MRC Activity implementation** | Dashboard that tracks progress against milestones and flags issues to management<br>MRC Mid-Year Report | Rolling multi-year work plan with milestones, budgets, etc. | Monitoring<br>(Lead division with OCEO) |
| **MRC Budgets and expenditures** | Integrated with activity implementation above | Rolling multi-year workplan with budgets<br>Cash flow planning<br>Accrual accounting | Monitoring<br>(Lead division with AD and OCEO) |
| **Gender aspects** | Verification of gender aspects reflected in relevant outcomes and outputs<br>MRC Annual Report, Mid Term Review Report | Collected gender-disaggregated data<br>Gender output indicators for MRC | Monitoring (OCEO)<br>Evaluation<br>(external) |
| **Overall SP achievements** | Level of benefits and change through MRC interventions<br>Value for money/C&B analysis<br>MRC Mid-Year Report<br>SP Completion Report | Output indicators<br>Budget expenditure | Evaluation<br>(Internal, external) |

**Output Indicators for MRC.** The BDS Outcomes seek to describe the resulting end state that basin countries would like to see by 2030. Their achievement will be evaluated using the strategic and assessment Indicators of the MRB-IF. The Outputs, which would be implemented by all relevant actors including MRC, are the immediate results necessary for producing one of the Outcomes through an identified impact pathway. This takes a more subjective survey-based approach to periodically assess the extent that outputs have been taken-up and utilized and are influential in attaining BDS Outcomes. For MRC, the output indicators and their scheduled emergence are defined in Table 9.3 below. The indicators generally comprise two aspects:

1) A measure to signify that the output has been delivered to the end user, for example the agreement or approval of a regional strategy or guideline by MRC governance bodies, through which relevant national line or implementing agency is consulted, which is relatively easy to assess.

2) A more subjective assessment of the quality of the output that is contributed by MRC and the extent it has been taken up in the national governance and planning system, which is inherently more difficult to assess as they relate behavioural, policy and institutional change that typically occurs over a longer time frame than 5 years.

**Table 9.3**: Defined BDS Output indicators for MRC

| **Strategic Priority 1: Maintain the ecological function of the Mekong River Basin** | | |
|---|---|---|
| **Outcomes** | **Outputs** | **Output indicators** |
| 1.1 River flows support a healthy environment and productive riparian communities | 1.1.1 Water flow and quality in the mainstream managed in accordance with agreed guidelines<br>1.1.2 Guidance and measures for sustainable hydropower implemented | |
| 1.2 Sediment transport helps mitigate bank erosion and land subsidence | 1.2.1 Basin-wide sediment management plan developed and implemented | |
| 1.3 River and wetland habitats and watersheds provide important ecosystem services | 1.3.1 Limits of acceptable change for key river and connected wetland habitats identified and implemented<br>1.3.2 A regional planning and management framework for watersheds agreed and implemented | |
| **Strategic Priority 2: Enable inclusive utilisation of the basin's water and water-related resources** | | |
| **Outcomes** | **Outputs** | **Output indicators** |
| 2.1 Basin communities are food, water and energy secure, thus strengthening climate resilience | 2.1.1 Access and supply of safe water to people in vulnerable situations improved<br>2.1.2 Capture fisheries regulatory frameworks improved and implemented<br>2.1.3 Risks to capture fisheries productivity and diversity minimised<br>2.1.4 The gender and vulnerability aspects of basin water, food and energy security are identified and addressed by policy makers | |
| 2.2 Employment and livelihoods reduce poverty and inequality through less direct dependence of vulnerable people on river and wetland | 2.2.1 Alternative livelihood strategies for poor, resource dependent communities impacted by water resources development are developed and mainstreamed at national levels | |

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| resources | | |
| **Strategic Priority 3: Enhance optimal and sustainable development by increasing regional benefits and decreasing regional costs** | | |
| **Outcomes** | **Outputs** | **Output indicators** |
| 3.1 The economic growth of each country and the region is higher as a result of more proactive regional planning | 3.1.1 The Basin Development Plan and associated national plans are informed by the findings of a more proactive regional planning approach | |
| 3.2 Enhanced value from key economic sectors including irrigated agriculture, hydropower, navigation, environment and fisheries, through implementation of regional strategies | 3.2.1 Investment and associated measures in irrigated agriculture implemented<br>3.2.2 Sustainable hydropower development strategy and related regional energy plans implemented in synergy<br>3.2.3 Investment and associated measures in basin navigation plans implemented in synergy<br>3.2.4 Investment and associated measures in regional environmental strategies and programmes implemented in synergy<br>3.2.5 Investment and associated measures to adapt to changes in fish populations and catch composition identified and implemented | |
| **Strategic Priority 4: Ensure water security by mitigating floods and droughts** | | |
| **Outcomes** | **Outputs** | **Output indicators** |
| 4.1 There is sufficient flow in the dry season to support livelihood activities and mitigate salinity intrusion; and reduced flood peaks in the wet season | 4.1.1 Transboundary projects to facilitate regional cooperation implemented<br>4.1.2 Coordinated dam operations and use of flood protection infrastructure for flood and drought mitigation<br>4.1.3 Cooperative socio-economic and spatial planning on the floodplain | |
| 4.2 Basin communities are better prepared for more frequent and severe floods and droughts as a result of climate change | 4.2.1 Integrated basin-wide forecasting and early warning<br>4.2.2 Climate change adaptation, including measures to adapt to flood and drought, mainstreamed at national levels | |
| **Strategic Priority 5: Strengthen cooperation among all basin countries and stakeholders** | | |
| **Outcomes** | **Outputs** | **Output indicators** |
| 5.1 Higher benefits and lower costs from the | 5.1.1 Common understanding on the potential future institutional | |

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| integrated management of the entire river system | arrangements for basin management<br>5.1.2 Significant joint infrastructure projects and national projects of basin-wide significance and associated measures (BDP) agreed, and project preparation in progress |
| 5.2 A Strengthened Mekong River Commission supports the achievement of higher regional benefits, lower regional costs, and increased water security | 5.2.1 Implementation of the 1995 Mekong Agreement procedures enhanced<br>5.2.2 A core river monitoring network for the mainstream and remaining national river monitoring networks consolidated<br>5.2.3 Compatible Decision Support Systems with reinvigorated data and information management and sharing, modelling, forecasting, and communication<br>5.2.4 Organisational development of the Mekong River Commission |
| 5.3 Cooperation among all relevant regional water-related mechanisms and relevant partners based on need and complementary strengths | **5.3.1** Mekong-related cooperation mechanisms and relevant partnerships implemented in synergies<br>5.3.2 Joint State of Basin Report and Basin Development Strategy<br>5.3.3 Joint Basin Expert Groups<br>5.3.4 Harmonised basin-wide stakeholder platform |

The above monitoring and evaluation framework support the preparation of various progress and performance reports that MRC needs to manage the implementation of the BDS, to demonstrate the benefits of regional cooperation on Mekong water resources, to report on achieving SDG, and other purposes. The reporting system is summarized and illustrated below.

**Monitoring**

**Mid-Year Report**: (total amount to be issued: 5) Once the first rolling multi-year work plan is approved by the Council, activity implementation will begin. Progress in implementing activities and delivering the planned deliverables (see Section 8.2 to 8.7) will be reported every mid-year. The status of key deliverables (Table 9.2) will be assessed (on track or off track) and issues and challenges that need JC support will be identified. The Mid-Year Report will also include forecasts for deliverables and activities for the next six months for coordination purposes.

**Annual Report**: (total amount to be issued: 5) Midway and at the end of each two-year work plan cycle, an Annual Report will be issued to report progress in terms of delivery of key deliverables and achievement of outputs. The assessed output indicators will be checked in collaboration with the M&E team for quality assurance. Major differences between actual and planned delivery/achievement will be explained and addressed. The Annual Report will also include a section on financial status. The annual reports may include a section on the contribution of other regional cooperation mechanisms to BDS Outputs.

**Evaluation**

**Mid-Term Review Report 2023** (total amount to be issued: 1): Half-way through the Strategic Plan implementation cycle (2.5 years), a Mid-Term Review will be undertaken to sharpen the SP and to review the organization set-up, the achievements and the synergy among the implementation units and partners. Recommendations will be made to re-orient the SP to avoid possible risks for the remaining years. Recommendations on indicator improvement can also be made at this review session. The review will also assess the contribution of other regional cooperation mechanisms to BDS outputs and outcomes.

**Strategic Plan Completion Evaluation Report 2025** (total amount to be issued: 1): At the end of the SP implementation cycle, an evaluation mission will be done to assess the overall achievements under this SP. The cost-effectiveness of the implementation will also be determined. The overall implementation process, the most significant changes and story-based practices that bring results (both positive and negative) can also be documented to serve as the MRC knowledge base.

# ANNEX 1. CONTRIBUTION OF REGIONAL COOPERATION MECHANISMS TO BDS OUTCOMES AND OUTPUTS

| BDS Strategic Priorities, Outcomes, Outputs | Regional cooperation mechanism activity contribution to BDS |
|---|---|
| **Strategic Priority 1: Maintain the ecological function of the Mekong River Basin** | |
| **Outcome 1.1: River flows support a healthy environment and productive riparian communities** | |
| Output 1.1.1: Water flow and quality in the mainstream managed in accordance with agreed guidelines | **MLC Water.** River health assessment.<br>**MLC Water.** Study on the minimum flow in 2S river basin under climate changes and increasing water demands.<br>**ASEAN** (with UNDP). GEF project proposal on environmental flows (need more info)<br>**ASEAN** (AWGWRM Action Plan). Develop ASEAN water quality indicators and water quality monitoring standards (more info from ASEC?)<br>**ASEAN.** Guidelines on Water Conservation, led by Thailand (need more info)<br>**ASEAN** (with Japan). Decentralization of Wastewater Management project (need more info) |
| Output 1.1.2: Guidance and measures for sustainable hydropower implemented | **MLC Water.** Joint research on transboundary assessment impacts of the Mekong-Lancang hydropower cascade<br>**GMS Hanoi Action Plan.** Conduct capacity building for effective environmental management in the planning and implementation of power projects |
| **Outcome 1.2: Sediment transport helps mitigate bank erosion and land subsidence** | |
| Output 1.2.1: Basin-wide sediment management plan developed and implemented | **MLC Water.** Joint research on sediment management on the Mekong-Lancang river basin.<br>**MLC Water**. Bank Protection to prevent bank collapse<br>**MLC Water**. Experience sharing on River training |
| **Outcome 1.3: River and wetland habitats and watersheds provide important ecosystem services** | **GMS Hanoi Action Plan**. Facilitate regional knowledge sharing on natural resources and ecosystem services |
| Output 1.3.1: Limits of acceptable change for key river and connected wetland habitats identified and implemented | **ASEAN** (Cooperation Framework on Environment): Key terrestrial biodiversity area conservation, including protected areas, access and benefit sharing:<br>(i) ASEAN Center for Biodiversity (check for projects)<br>(ii) ASEAN Heritage Parks (49) (more info needed) |
| Output 1.3.2: A regional planning and management framework for watersheds agreed and implemented | **MLC Water.** Improvement of capacity for mountain flash disaster forecasting in small watersheds.<br>**MLC Water.** Integrated management of small watersheds.<br>**GMS Hanoi Action Plan**. Provide policy and legal framework support for natural resources conservation and sustainable land management<br>**GMS Hanoi Action Plan.** Land resource planning support: integrated spatial planning, ecosystem assessment, valuation and mapping, risk assessment, and integration in key sector |

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| | plans and investments<br>**GMS Hanoi Action Plan.** Project preparation support for integrated natural resources and land management for sustainable development (protection of high value ecosystems, restoration or remediation of degraded lands, and soil pollution control and remediation) |
| **Strategic Priority 2: Enable inclusive utilisation of the basin's water and water-related resources** | |
| **Outcome 2.1: Basin communities are food, water and energy secure, thus strengthening climate resilience** | |
| Output 2.1.1: Access and supply of safe water to people in vulnerable situations improved | **MLC Water.** Demonstration and extension of key technologies for drinking water safety<br>**MLC Water.** Demonstration of sewage treatment plants/facilities in concentrate/scattered villages<br>**MLC Water.** Demonstration of drinking water safety (quantity/quality)<br>**MLC Water.** Assessment and risk evaluation of rural area drinking water safety<br>**MLC Water.** Building technical standard for drinking water safety<br>**MLC Water.** Demonstration of drinking water safety in rural areas<br>**ASEAN** (AWGWRM Action Plan). Water Conservation: ASEAN Guidelines on water supply and water demand management (led by Malaysia – no progress) |
| Output 2.1.2: Capture fisheries regulatory frameworks improved and implemented | **ASEAN.** Update of the Plan of Action on fisheries 2021-2025 (internal draft)<br>**ASEAN.** Feasibility Study on ASEAN Fisheries Policy (led by Thailand, supported by EU) |
| Output 2.1.3: Risks to capture fisheries productivity and diversity minimised | **MLC Water.** Joint research on transboundary assessment impacts of the Mekong-Lancang hydropower cascade<br>**ASEAN** (with SEFDEC): Plan of Action to address food security in fisheries<br>**ASEAN.** Guidelines on anti-biotic (need more info) |
| Output 2.1.4: The gender and vulnerability aspects of basin water, food and energy security are identified and addressed by policy makers | **ASEAN.** Strategic Framework on Gender Mainstreaming (to implement the ASEAN Declaration on Gender Mainstreaming)<br>**ASEAN**. Multi Vulnerability Index and ASEAN Multi Poverty Index<br>**ASEAN**. Food Safety regulatory framework (internal draft) |
| **Outcome 2.2: Employment and livelihoods reduce poverty and inequality through less direct dependence of vulnerable people on river and wetland resources** | |
| Output 2.2.1: Alternative livelihood strategies for poor, resource dependent communities impacted by water resources development are developed and mainstreamed at national levels | **ASEAN**. Update Strategic Plan of Action for food security 2021-2025<br>**ASEAN**. Declaration on Social Welfare and strategic framework 2016-2020<br>**ASEAN.** Food Security Information System (secretariat in BKK)<br>**ASEAN**. Plus 3 Rice Emergency Reserve Agreement (secretariat in BKK) |

| Strategic Priority 3: Enhance sustainable development by increasing regional benefits and decreasing regional costs | |
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| **Outcome 3.1: The economic growth of each country and the region is higher as a result of proactive regional planning** | |
| Output 3.1.1: The Basin Development Plan and associated national plans are informed by the findings of a more proactive regional planning approach | **MLC Water.** Joint water resources management strategy for Mekong-Lancang River Basin<br>**ASEAN** (AWGWRM Action Plan). Water-related Disasters: Proposed joint MRC-ASEAN activity on promotion of dialogue on Basin Development Plan for the Mekong<br>**Hanoi Action Plan.** Update regional system planning to incorporate higher share of renewable energy |
| **Outcome 3.2: Enhanced value from key economic sectors including irrigated agriculture, hydropower, navigation, environment and fisheries, through implementation of regional strategies** | |
| Output 3.2.1: Investment and associated measures in irrigated agriculture implemented | **MLC Water.** Groundwater mapping and survey<br>**MLC Water.** Demonstration and extension of key technologies for small and medium irrigation schemes<br>**MLC Water.** Demonstration of operation and maintenance of irrigation systems/reservoirs/canals<br>**MLC Water**. Modernization and automation of irrigation systems<br>**MLC Water.** Master plan for irrigation district<br>**MLC Water.** Application of clean energy in small scale irrigation systems<br>**MLC Water.** Demonstration application of irrigation water fertilizer optional management technology<br>**MLC Water.** Demonstration of photovoltaic irrigation technologies<br>**MLC Water.** Water-saving rehabilitation of irrigation schemes and capacity building<br>**MLC Water**. Water allocation and maintain water supply for irrigation and domestic demands in 3S River Basin.<br>**ASEAN.** Guidelines for Responsible Investment in agriculture, food and forestry (and Action Plan)<br>**ASEAN.** Good Agriculture Practices<br>**GMS Hanoi Action Plan.** Project preparation support including:<br>(i) climate proofing rural infrastructure investments<br>(ii) DRM and risk financing options<br>(iii) value chain approach to promote social and economic inclusion for pro-climate initiatives |
| Output 3.2.2: Sustainable hydropower development strategy and related regional energy plans implemented in synergy | **MLC Water.** Demonstration and promotion of dam safety management technologies<br>**MLC Water.** Demonstration and extension of small hydropower technologies<br>**MLC Water.** Development and demonstration of dam safety management system.<br>**MLC Water.** Comprehensive impact evaluation of hydropower development and collaboration from perspective of water-energy-food nexus.<br>**MLC Water.** Sustainable hydropower development strategy and |

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| | policy dialogue.<br>**MLC Water.** Application and demonstration of key technologies in design of environment-friendly small hydropower stations<br>**MLC Water.** Evaluation capacity building for sustainable hydropower development<br>**MLC Water.** Construction and demonstration of dam safety management system in LMC countries<br>**ASEAN**. Cooperation on Energy (APEC):<br>(i) Regional power grid development and the integration of renewables into the ASEAN Power Grid<br>(ii) Power grid integration and multilateral power trade<br>**Hanoi Action Plan.** Update regional system planning to incorporate higher share of renewable energy |
| Output 3.2.3: Investment and associated measures in basin navigation plans implemented in synergy | **MLC Water**. Experience sharing on River training<br>**GMS Hanoi Action Plan.** Promote use of coastal shipping and inland waterways for domestic and international trade by providing and improving support facilities and services<br>**GMS Hanoi Action Plan**. Improve port policies and regulations<br>**GMS Hanoi Action Plan**. Streamline terminal and port operations |
| Output 3.2.4: Investment and associated measures in regional environmental strategies and programmes implemented in synergy | **GMS Hanoi Action Plan**. Identify and adopt measures to de-risk investments, and matchmaking, develop and provide linkages to risk and vulnerability assessment tools, facilitate public and private sector involvement through impact investment, viability gaps, green bonds, and other innovative funding mechanisms<br>**GMS Hanoi Action Plan.** Development of sustainable financing policy, pricing support, and benefit distribution mechanism (payment for ecosystem services potentially with tourism industries and hydropower companies, biodiversity offsets, etc.) |
| Output 3.2.5: Investment and associated measures to adapt to changes in fish populations and catch composition identified and implemented | **GMS Hanoi Action Plan.** Harmonize standards related to (amongst others) aquaculture and surveillance systems and laboratories |
| **Strategic Priority 4: Ensure water security by mitigating floods and droughts** | |
| **Outcome 4.1: There is sufficient flow in the dry season to support livelihood activities and mitigate salinity intrusion; and reduced flood peaks in the wet season** | **MLC Water.** Strengthening flood and drought management capacity in the Mekong-Lancang River Basin |
| Output 4.1.1: Transboundary projects to facilitate regional cooperation on climate change implemented | **MLC Water.** Pilot projects on flood risk management.<br>**MLC Water.** Pilot applications of transboundary cooperation mechanisms to improve the communications on the water level/flow risks in China, Thailand and LAO PDR.<br>**MLC Water.** Dissemination and advocacy of the experience for pilot projects.<br>**MLC Water.** Pilot project to climate change adaptation<br>**MLC Water.** Joint regulation of reservoirs for disaster mitigation<br>**ASEAN**. Cooperation on Disaster Management: Project on DRR by integrating climate change projection into flood and landslide risk assessment (check with DMHA)<br>**GMS Hanoi Action Plan.** Technical support for strengthening CRV and DRM assessments in investment planning<br>**GMS Hanoi Action Plan.** Project preparation support including: |

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| | (i) climate proofing rural infrastructure investments<br>(ii) DRM and risk financing options<br>(iii) value chain approach to promote social and economic inclusion for pro-climate initiatives |
| Output 4.1.2: Coordinated dam operations and use of flood protection infrastructure for flood and drought mitigation | **MLC Water.** Joint regulation of reservoirs for disaster regulation.<br>**MLC Water.** Joint study on cause and impact of extreme drought in 2019 for developing adaptation measures.<br>**MLC Water.** Multipurpose cascade hydropower operation<br>**MLC Water.** Influences of cascade reservoirs of key biogenic elements and ecological protection strategy |
| Output 4.1.3: Cooperative socio-economic and spatial planning on the floodplain | **GMS Hanoi Action Plan.** Land resource planning support: integrated spatial planning, ecosystem assessment, valuation and mapping, risk assessment, and integration in key sector plans and investments |
| **Outcome 4.2: Basin communities are better prepared for more frequent and severe floods and droughts as a result of climate change** | |
| Output 4.2.1: Integrated basin-wide forecasting and early warning | **MLC Water.** Establishment and demonstration application of mountain torrent disaster monitoring and early warning system.<br>**MLC Water.** Strengthening flash-flood and land-slice warning capacity in the Mekong Lancang River Basin.<br>**MLC Water.** Guidelines for natural disaster management (forecasting/early warning, avoidance, control, mitigation, adaptation, relief….)<br>**MLC Water.** Flood and drought predication to reduce risks and damages<br>**MLC Water.** Coordination mechanism for transboundary river disaster prevention and mitigation<br>**MLC Water.** Research on information sharing mechanism in flood and drought emergencies<br>**MLC Water.** Sharing of flood forecasting technologies for transboundary rivers.<br>**MLC Water.** Building an early warning system in the mainstream of the Mekong-Lancang River Basin<br>**MLC Water.** Building an early warning system for the 3S River Basin<br>**MLC Water.** Strengthening flash-flood and land-slice warning capacity in the 3S River Basin<br>**MLC Water.** Mechanism for Transboundary river disaster prevention and mitigation<br>**ASEAN**. (AWGWRM Action Plan). Develop forecasting and information exchange system (no progress, no lead country yet)<br>**ASEAN** (AWGWRM Action Plan). Conduct regional scoping study on the causes, severity and impacts of potential flood and drought hazards (no progress, no lead country) |
| Output 4.2.2: Climate change adaptation, including measures to adapt to flood and drought, mainstreamed at national levels | **MLC Water.** Impacts of climate change on water resources and adaptive management strategy.<br>**MLC Water.** Climate change and flooding adaptation strategies for cultural heritage preservation for LMC and ASEAN members. |

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| | **ASEAN** (Cooperation Framework on Environment). Climate Change: Adaptation and resilience, mitigation, climate finance: ASEAN Climate Financing Strategy<br>**ASEAN** Cooperation on Disaster Management. ASEAN – UNESCAP Joint study on drought to support ASEAN Declaration on Drought and Regional Action Plan on Drought (MRC can collaborate / potential joint activity)<br>**GMS Hanoi Action Plan.** Regulatory framework for climate proofing infrastructure<br>**GMS Hanoi Action Plan.** Regional sharing of best practices on CRV assessment and adaptation<br>**GMS Hanoi Action Plan.** Technical support for strengthening CRV and DRM assessments in investment planning |
| **Strategic Priority 5: Strengthen cooperation among all basin countries and stakeholders** | |
| **Outcome 5.1: Higher benefits and lower costs from the integrated management of the entire river system** | |
| Output 5.1.1: Common understanding on the potential future institutional arrangements for basin management | **MLC Water.** Lancang-Mekong water resources cooperation and delivery of water-related SDGs.<br>**MLC Water**. Joint water resources management strategy for Mekong-Lancang River Basin<br>**MLC Water.** Practice of international water laws in transboundary river cooperation<br>**MLC Water.** Study of mechanisms on transboundary river cooperation<br>**MLC Water.** Modalities of transboundary river cooperation and policy dialogue.<br>**MLC Water.** Review of international practice relating to water laws in transboundary river cooperation<br>**MLC Water.** Review of cooperation mechanism/modality on transboundary river<br>**ASEAN** Proposed ASEAN role in contributing to study and facilitation of dialogue on future institutional arrangement(s) |
| Output 5.1.2: Significant joint infrastructure projects and national projects of basin-wide significance and associated measures (BDP) agreed, and project preparation in progress | **GMS Hanoi Action Plan**. Provide environmental policy, strategic planning and safeguards support (strategic environmental assessment, environmental impact assessment, environmental quality standards, economic instruments, air, water, and soil pollution control and remediation, waste management, and low carbon)<br>**GMS Hanoi Action Plan.** Technical support for strengthening CRV and DRM assessments in investment planning<br>**GMS Hanoi Action Plan.** Project preparation support including:<br>(i) climate proofing rural infrastructure investments<br>(ii) DRM and risk financing options<br>(iii) value chain approach to promote social and economic inclusion for pro-climate initiatives |
| **Outcome 5.2: A Strengthened Mekong River Commission supports the achievement of higher regional benefits, lower regional costs, and increased water security** | |
| Output 5.2.1: Implementation of the 1995 Mekong Agreement Procedures enhanced | |

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| Output 5.2.2: A core water-related monitoring network for the mainstream and remaining national water-related monitoring networks consolidated | **MLC Water.** Demonstrated monitoring on meteo-hydrology-environment and river (lake) health assessment.<br>**MLC Water.** Building a water resources monitoring system the 3S River Basin<br>**MLC Water.** Study on applying advanced technology on transferring hydro-meteorology data in #S River Basin<br>**MLC Water.** Water resources monitoring strategies for Mekong-Lancang River Basin |
| Output 5.2.3: Compatible Decision Support Systems with reinvigorated data and information management and sharing, modelling, forecasting, and communication | **MLC Water.** Guidelines for natural disaster management (forecasting/early warning, avoidance, control, mitigation, adaptation, relief….)<br>**MLC Water.** Review on applying tools and models for water resources planning and management in the Mekong-Lancang River Basin<br>**MLC Water.** Building information systems of water resources to share data and knowledge<br>**MLC Water.** Technical sharing of information systems<br>**MLC Water.** Coordination mechanisms for transboundary river disaster prevention and mitigation<br>**MLC Water.** Research on information sharing mechanism in flood and drought emergencies<br>**MLC Water.** Establish a database for Mekong-Lancang water resources cooperation<br>**MLC Water.** Establish a mechanism on water resources data and information sharing for Mekong-Lancang cooperation<br>**MLC Water.** A Mechanism on water resources data and information sharing the 3S River Basin<br>**MLC Water.** Building a hydrological model for Mekong-Lancang River Basin<br>**MLC Water.** Design and operate and information service for the Mekong-Lancang water resources cooperation<br>**MLC Water.** Mechanism for Transboundary river disaster prevention and mitigation<br>**MLC Water.** Mechanism for information sharing on flood and drought emergencies |
| Output 5.2.4: Organisational development of the Mekong River Commission | **MLC Water.** Capacity building on water resources management on gender mainstreaming<br>**MLC Water.** Coordination monitoring center |
| **Outcome 5.3: Cooperation among all relevant regional water-related mechanisms based on need and complementary strengths** | |
| Output 5.3.1: Areas of complementary strength integrated into each mechanism's strategic and work planning processes, and implemented | **MLC Water.** Facilitation of policy dialogue amongst member countries<br>**GMS Hanoi Action Plan.** Development of sustainable financing policy, pricing support, and benefit distribution mechanism (payment for ecosystem services potentially with tourism industries and hydropower companies, biodiversity offsets, etc.)<br>**GMS Hanoi Action Plan.** Promote climate and disaster risk financing options |

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| Output 5.3.2: Joint State of Basin Report and Basin Development Strategy | **MLC Water.** River health assessment<br>**MLC Water.** Framework for river health assessment for 3S river basin.<br>**ASEAN** (AWGWRM Action Plan):<br>(i) Maintain ASEAN Water Data Management and Reporting System Design (Website on status of water resources management in each ASEAN country)<br>(ii) 6th ASEAN State of Environment report (6th edition, by mid-2021)<br>(iii) ASEAN State of Climate Change Report<br>(iv) ASEAN (with UN Women): Gender Outlook, monitoring and reporting on 63 SDG indicators<br>(v) ASEAN (with Cambridge University): ASEAN Development Outlook (to 2030) |
| Output 5.3.3: Joint Basin Expert Groups | **MLC Water.** Multiple Stakeholder Platform (MSP) for working group implementation and cooperation.<br>**ASEAN** Working Group on Water Resources Management<br>**ASEAN** Working Group on Environment |
| Output 5.3.4: Harmonised basin-wide stakeholder platform | **MLC Water.** Multiple stakeholder platform (MSP) for Lancang-Mekong water resources cooperation.<br>**MLC Water.** Public participation in protection of water resources and ecological environment.<br>**MLC Water.** Multiple Stakeholder Platform (MSP) for working group implementation and cooperation.<br>**ASEAN** (AWGWRM Action Plan):<br>(i) ASEAN Development Forum (June 2020)<br>(ii) ASEAN-MRC High-level Water Security Dialogue (every two years) |