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Thank you.

IBRU

Durham University

IBRU Training Workshop No. 73
Defining and Managing River Boundaries and International Rivers
08 - 10 May 2024
Bangkok, Thailand

Case Study – Mekong River Commission

Presented by Mr Sophearin Chea, Chief River Basin Planner,
Mekong River Commission Secretariat

Fact about the Mekong River Basin

- Flows from Tibet through **China, Myanmar, Lao PDR, Cambodia, and Vietnam**
- Length of mainstream: **4,800 km – 12th longest river**
- Basin area: **795,000 km²** - 21th largest
- Mean annual discharge: **475 km³, 10th largest**
- **Average flow** from upper Mekong basin: annually 18%, but up to 40% during the dry season
- **Flow contribution:** China 17%, Myanmar 1%, Lao PDR 41%, Thailand 15%, Cambodia 19%, and Vietnam 8%
- **Population:** 72 millions

Long history of Mekong Cooperation

- **1957** – Committee for Coordination on the Lower Mekong Basin under UNECAFE (**Mekong Committee**) – CLTV
  - 1957 *Statute for the Committee for Coordination of Investigations into LMB*
- **1978 - Interim Mekong Committee** (LTV)
- **1995 - Mekong River Commission** - Agreement on the Cooperation for the Sustainable Development of the Mekong River Basin (CLTV)

Opening of Mekong Committee office in Bangkok by Dag Hammarskjold(left), Secretary-General of the United Nations, 1959

1995 Mekong Agreement

Vision of the MRC

"A world class, financially secure, international river basin organisation serving the Mekong countries to achieve the basin vision".

Mission of the MRC

"To promote and coordinate sustainable management and development of water and related resources for the countries's mutual benefit and the people's well-being".

Structure of the Mekong River Commission

MRC Member Countries

Cambodia | Lao PDR | Thailand | Viet Nam

MRC Summit

MRC Council

MRC Joint Committee

- Budget Committee
- Joint Platform on MRC Procedures
- JC Task Force on Organisational Matters
- EG on Basin Planning
- EG on Environmental Management
- EG on Data, Modelling and Forecasting
- EG on Strategy and Partnership

Partners and Stakeholders

National Mekong Committees (NMCs)

Line Agencies

MRC Secretariat

- Administration Division
- Planning Division
- Environment Management Division
- Technical Support Division
- Office of CEO

Dialogue Partners

China | Myanmar

Upper & Lower Mekong Cooperation

- During the 24th MRC Dialogue Meeting with China and Myanmar, MRC and China signed historic agreement on the **provision of year-round data from China to MRC**.
- In addition, discussion was made on a **joint study on changing hydrological conditions and adaptation measures**, and cooperation on the **Mekong-Lancang Information Sharing Platform**… between MRC and MLC Water.

Development Partners

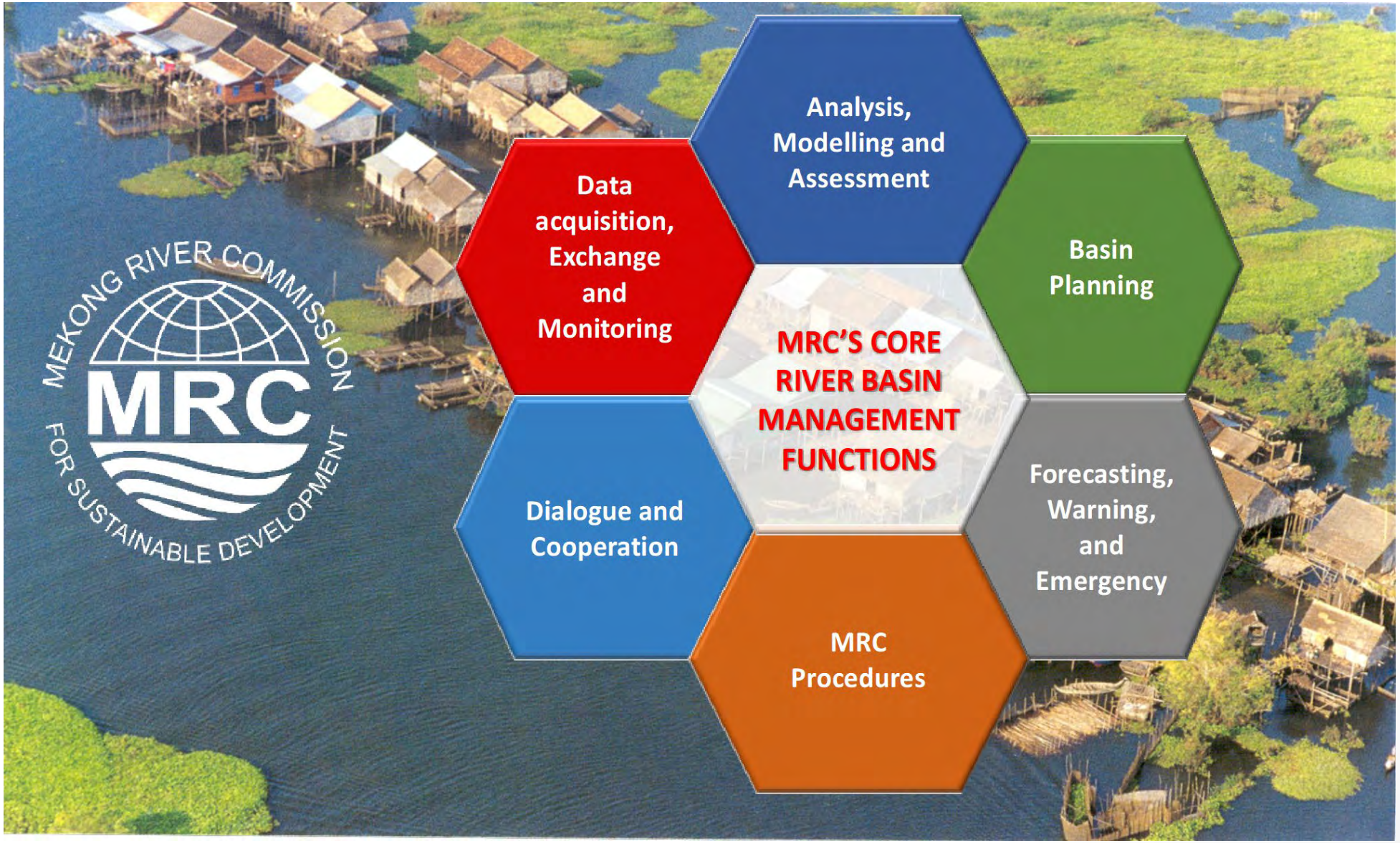
- **Member Countries**
- **Australia (DFAT)**
- **Belgium/Flanders**
- **EU**
- **France** (AFD)
- **Germany** (GIZ)
- **Japan**
- **Luxembourg**
- **Netherlands**
- **Sweden**
- **Switzerland**
- **United States of America**
- **UNEP**

STAKEHOLDER ENGAGEMENT

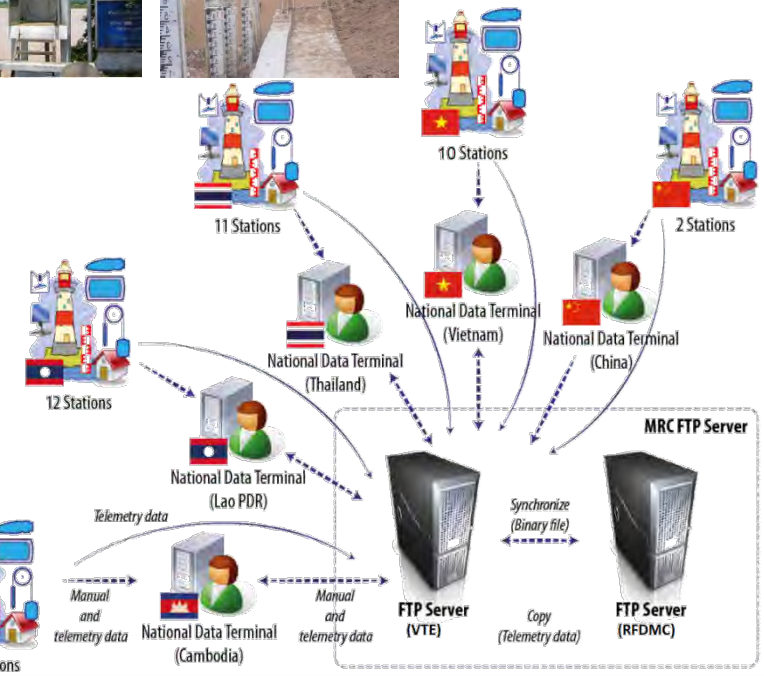
- BDS outcomes will be addressed by basin countries' regional organization, initiatives and programmes in collaboration with relevant counterpart organizations.
- Funding of BDS strategic priorities: by international & regional grant, supplemented by national public budgets, private sectors.
- Active, open and transparent stakeholder engagement.

ENHANCED PARTNERSHIP AND MUTUAL LEARNING

MRC Core Functions



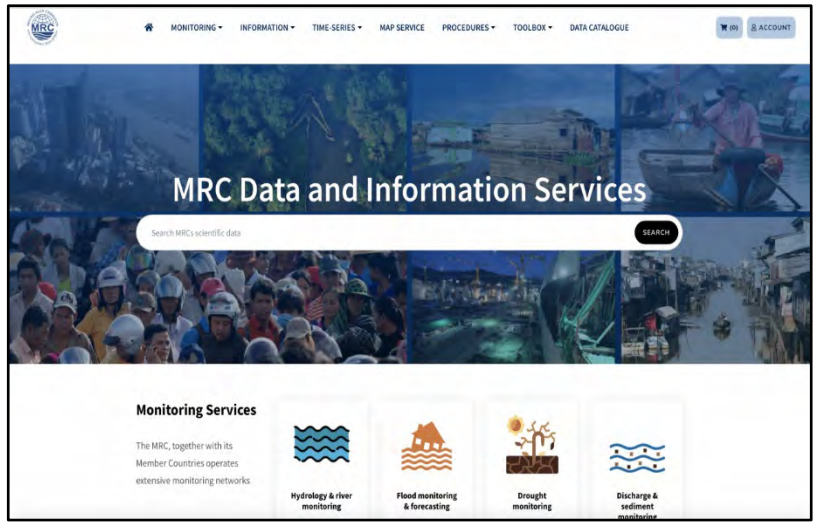
Current hydromet network for river monitoring and data sharing

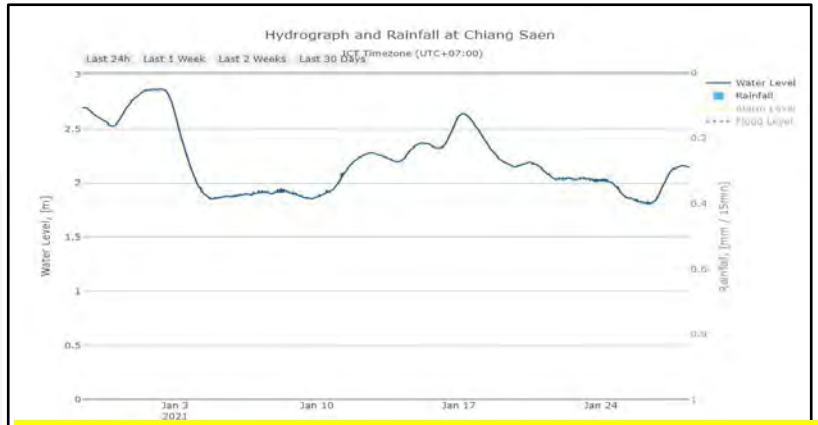


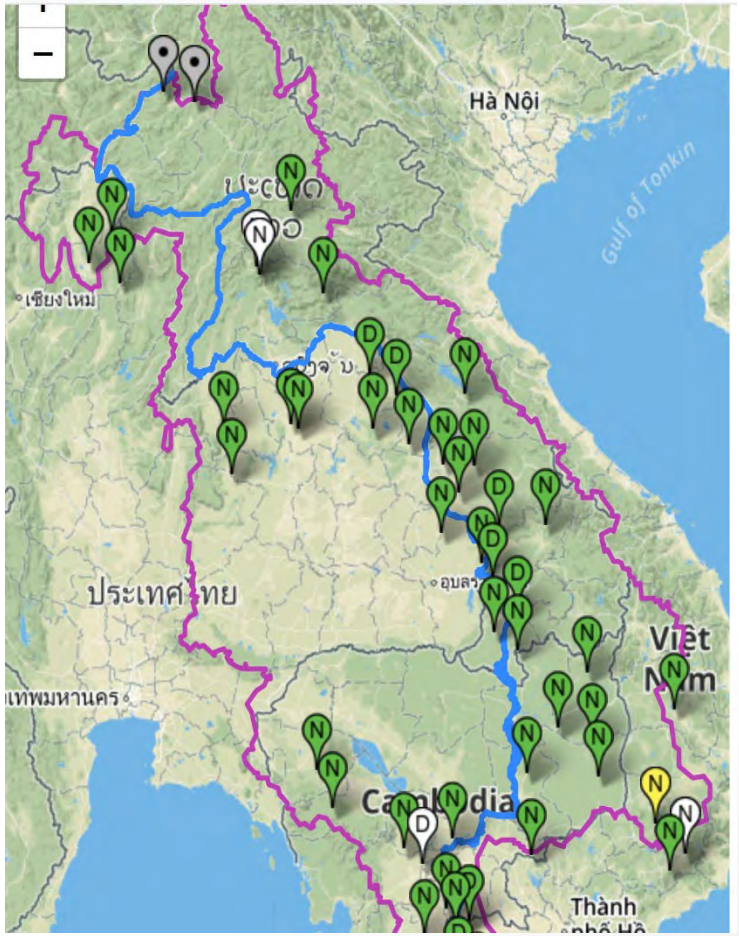
72 telemetry stations for water level

127 Rainfall Stations

Focus on River Hydromet Monitoring and Sharing (Data portal)



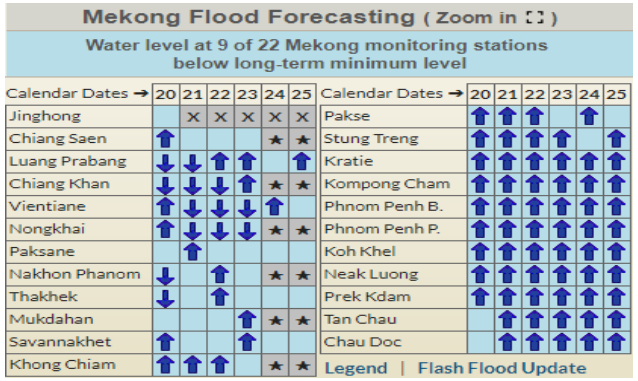


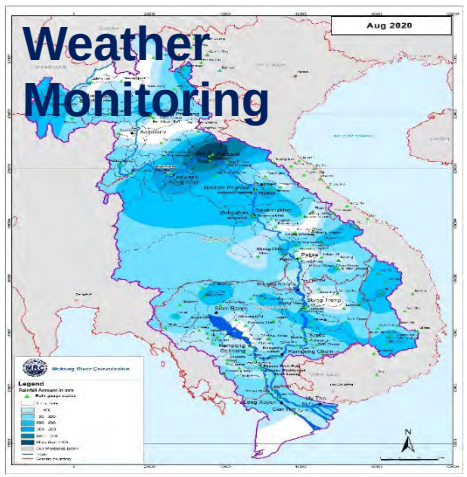


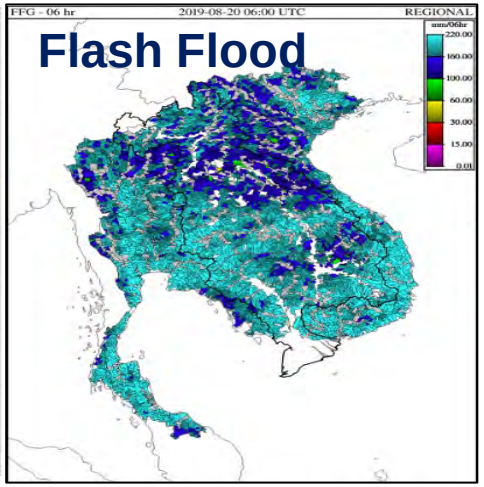
https://portal.mrcmekong.org/monitoring/river-monitoring-telemetry

Flood and drought forecasting improvement

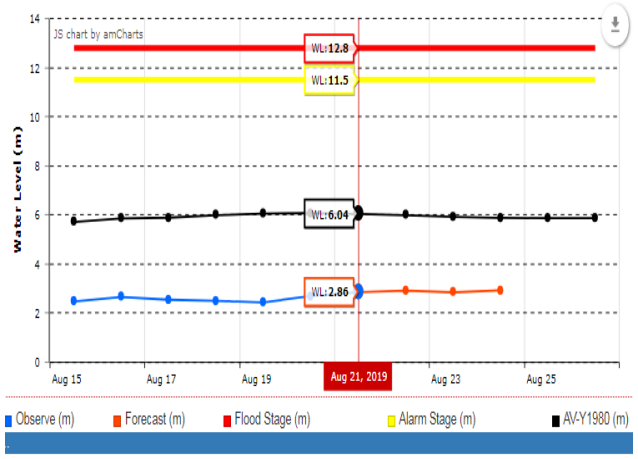
for MRC RFDMC and “National Forecast Centres”





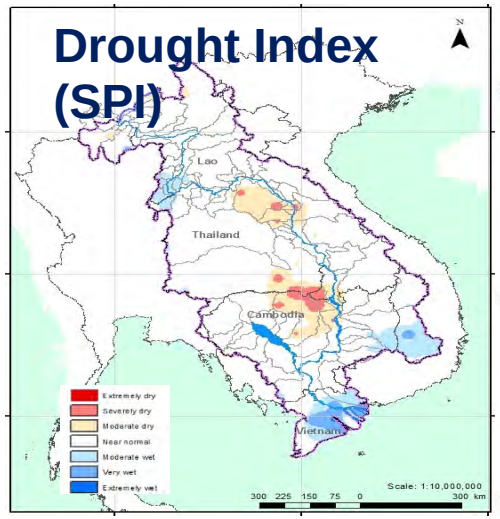


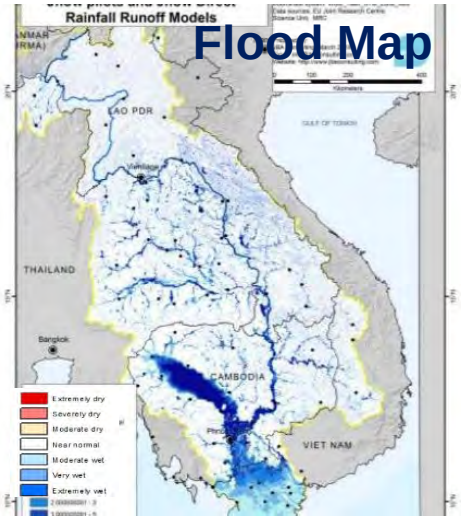
Info. services



Observed water level this season at Chiang Saen

River Flood and Drought Monitoring & Forecasting





Improvements:

- *Medium-Long term flood forecasting*
- *Flood Mapping & Extreme Analysis*
- *Drought monitoring & forecasting*
- *Regional & National Operation Center*

Operation room

Basin-wide Strategies

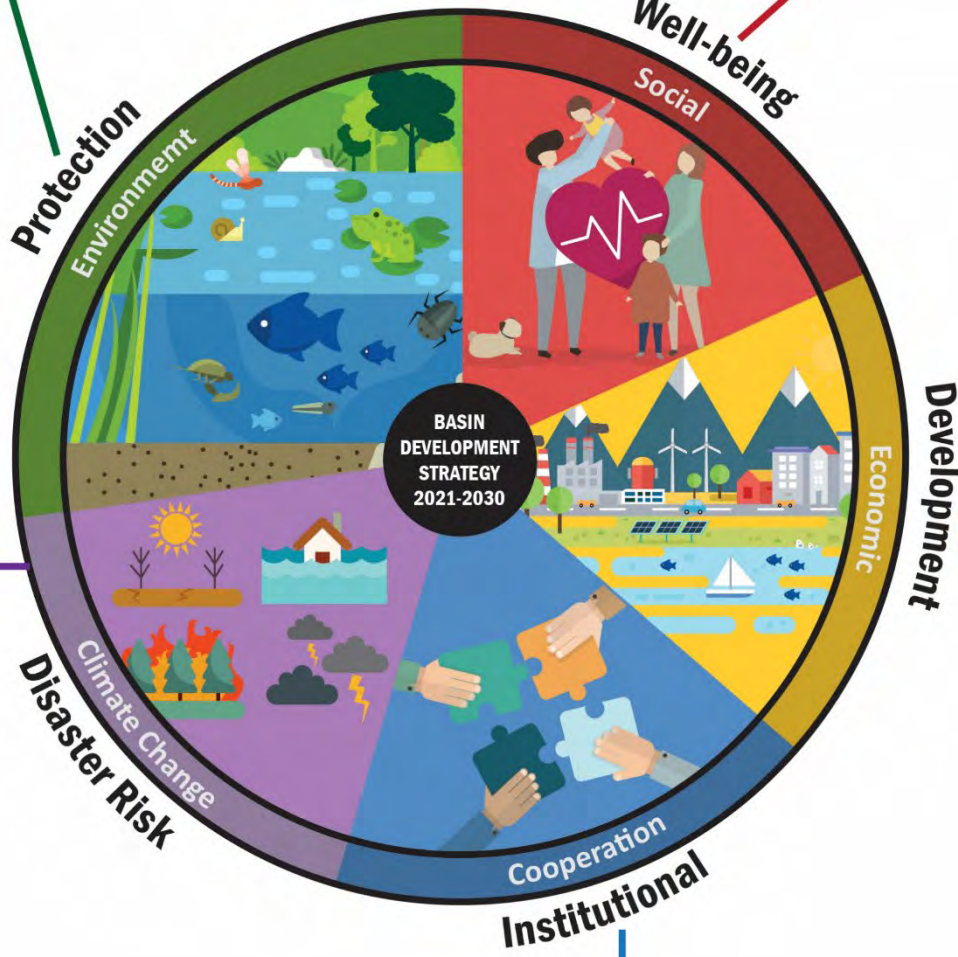
BASIN DEVELOPMENT STRATEGY 2021-2030 AND MRC STRATEGIC PLAN 2021-2025

PRIORITY 1: MAINTAIN THE ECOLOGICAL FUNCTION OF THE MEKONG

- Water flow & quality
- Sediment Transport
- Ecosystem services

PRIORITY 2: ENABLE INCLUSIVE ACCESS & UTILISATION OF WATER & RELATED RESOURCES

- Community well-being
- Poverty reduction



PRIORITY 4: STRENGTHEN RESILIENCE AGAINST CLIMATE RISKS, EXTREME FLOODS AND DROUGHTS

- Informed & prepared against flood & drought
- Disaster management & adaptation

PRIORITY 3:ENHANCE OPTIMAL AND SUSTAINABLE DEVELOPMENT

- Economic growth & benefits
- Inclusive sectoral growth

PRIORITY 5: STRENGTHEN COOPERATION AMONG ALL COUNTRIES AND STAKEHOLDERS

- MRC effective implementation of 1995 Agreement
- Joint efforts & partnerships

5 MRC Procedures

PWQ
Procedures for Water Quality (2011)

PDIES
Procedures for Data and Information Exchange and Sharing (2001)

1995 Mekong Agreement

PMFM
Procedures for the Maintenance of Flows on the Mainstream (2006)

PNPCA
Procedures for Notification, Prior Consultation and Agreement (2003)

PWUM
Procedures for Water Use Monitoring (2003)

The Four Member Countries sign the…

Agreement on the Cooperation for the Sustainable Development of the Mekong River Basin

Signed by Plenipotentiaries and Scope is all Chapters, plus all other agreements between Parties (Art 38)

The Agreement has six Chapters (42 Articles)

- Chapter I – Preamble (Why do we want this?)
- Chapter II – Definition of Terms (How do we interpret?)
- Chapter III – Objectives and Principles (What do want to achieve?)
- Chapter IV – Institutional Framework (Who does what?)
- Chapter V – Addressing Differences and Disputes (How to come to agreement?)
- Chapter VI – Final Provisions

In Chapter III: Objectives and Principles

The Parties agree to certain principles and objectives;

1995 Mekong Agreement

- Art. 1: To cooperate in all fields rrigation, hydro-power, navigation, flood control, fisheries, timber floating, recreation and tourism etc.
- Art. 2: To formulate a basin development plan to seek assistance for and to implement at the basin level.
- Art. 3: To protect environment and ecosystem of the Mekong River Basin.
- Art. 4: Sovereign Equality and Territorial Integrity.

1995 Mekong Agreement

- Art. 5: Reasonable and equitable use
- Art. 6: Maintain flows on the mainstream
- Art. 7: Make effort to avoid, minimize and mitigate harmful impacts, and cease activities that cause substantial damage
- Art. 8: Discuss state responsibility where substantial damage is caused
- Art. 9: Freedom of navigation on the mainstream;
- Art. 10: Notify emergency situations.

In Chapter IV: Institutional Framework (Art. 11 – 33)

The Member States (the Parties) establish the MRC and its institutional and governance structures and give them powers and functions.

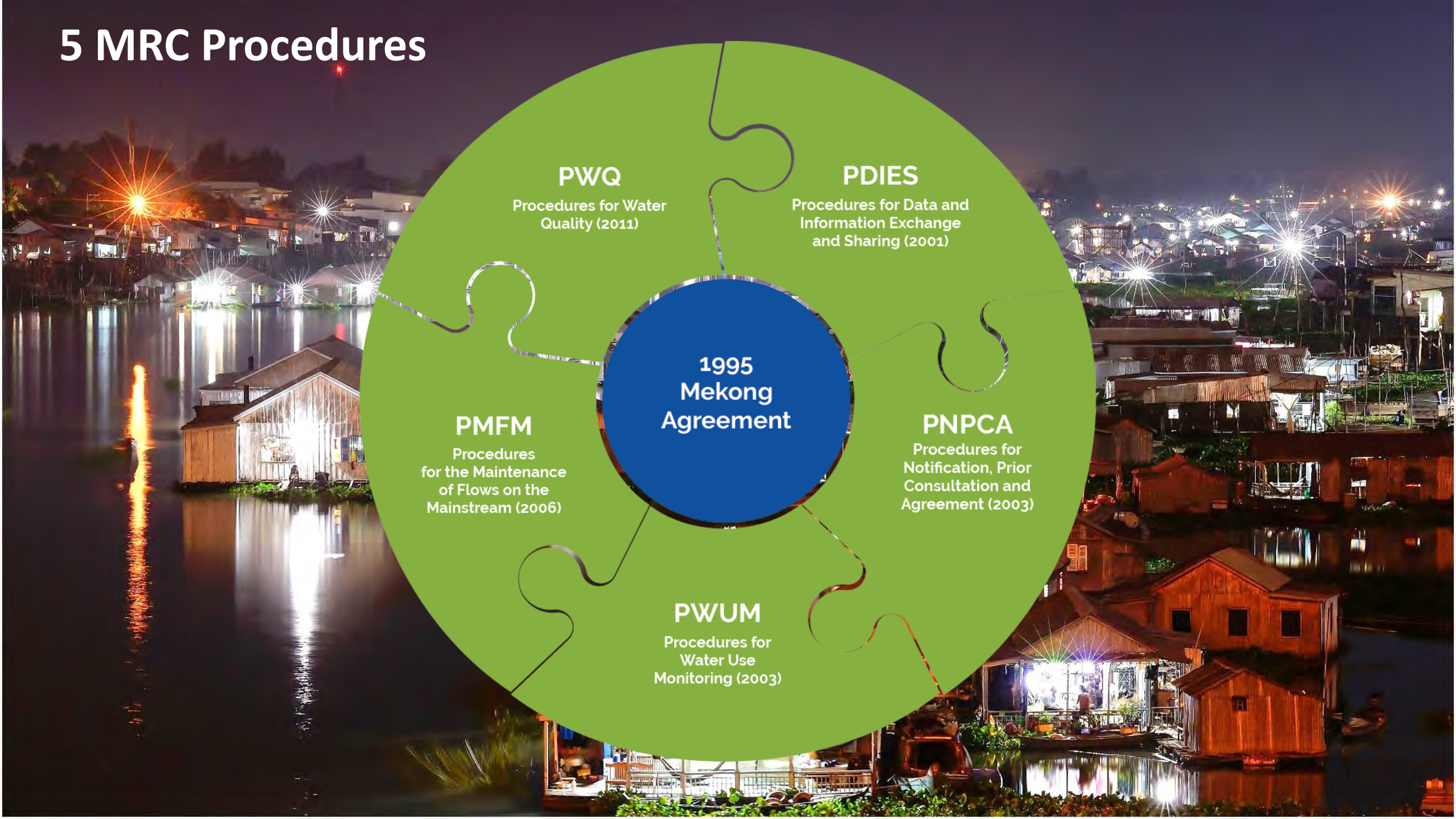
In Chapter : V Addressing Differences and Disputes

- Art. 34: Make effort by within MRC to resolve the issues;
- Art. 35: Take the issue to the government level (diplomatic channel); Then by mutual agreement, request the assistance of mediation through an entity or party

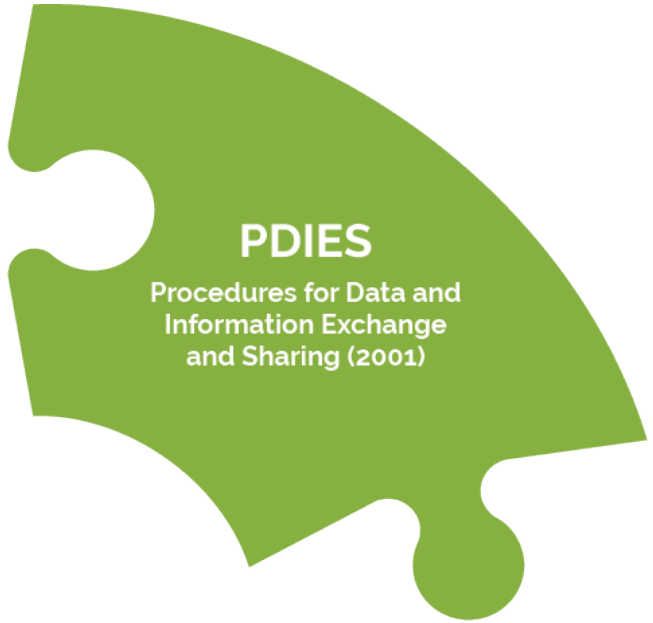
In Chapter VI: Final Provision

- Enter the 1995 Mekong Agreement in force
- To repeal the old agreements
- How to change it.
- The scope of the Agreement.
- How to add new Parties.
- How to withdraw.

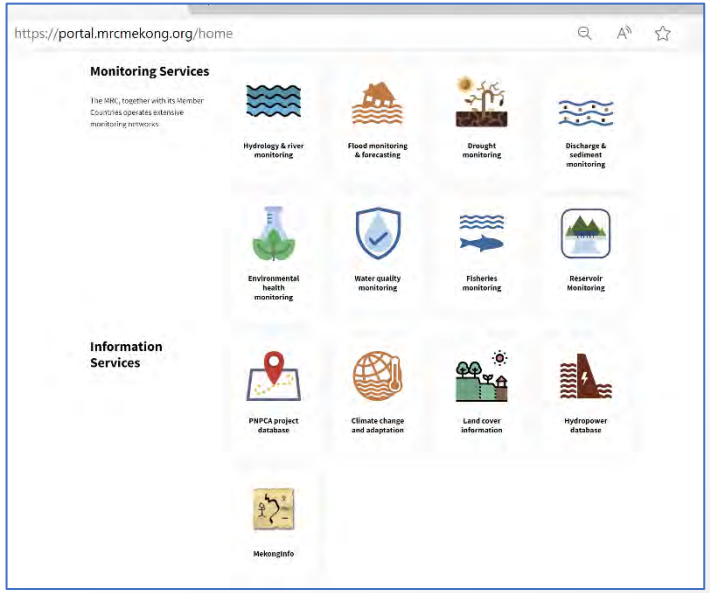
5 MRC Procedures



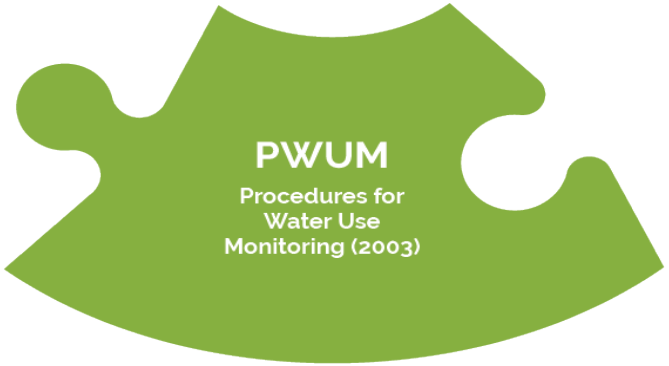
Procedures for Data and Information Exchange and Sharing



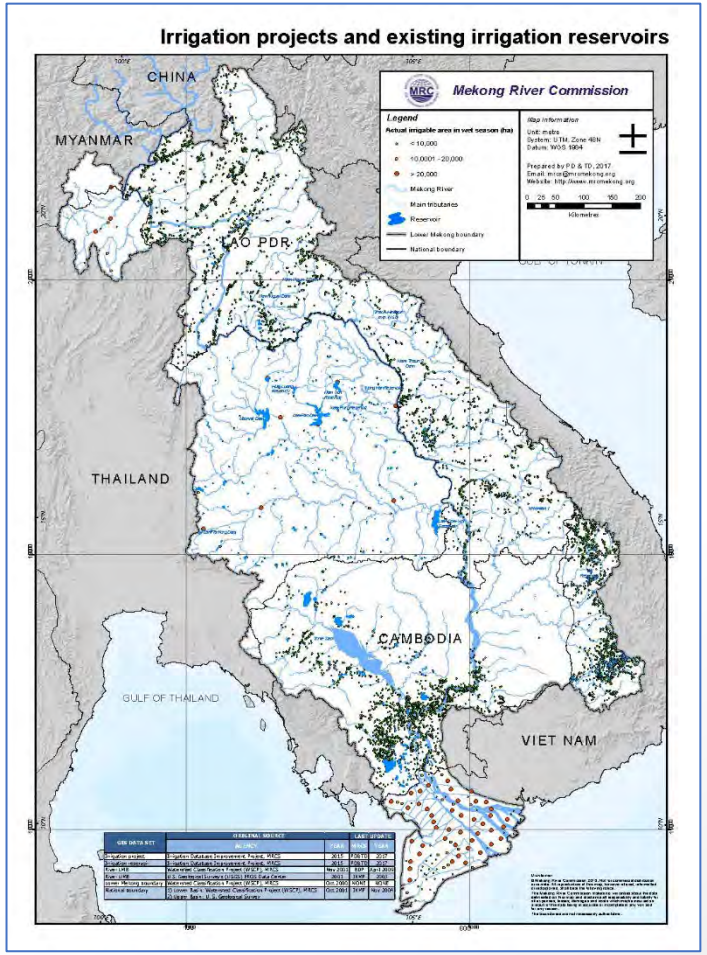
- Aims at sharing and exchanging data and information to support the implementation of the 1995 Mekong Agreement and promote cooperation:
  - Technical Guidelines on Custodianship and Management of the MRC Information System (2002)
  - Technical Guidelines for Management of the MRC Hydro-meteorological Network (2005)



Procedures for Water Use Monitoring

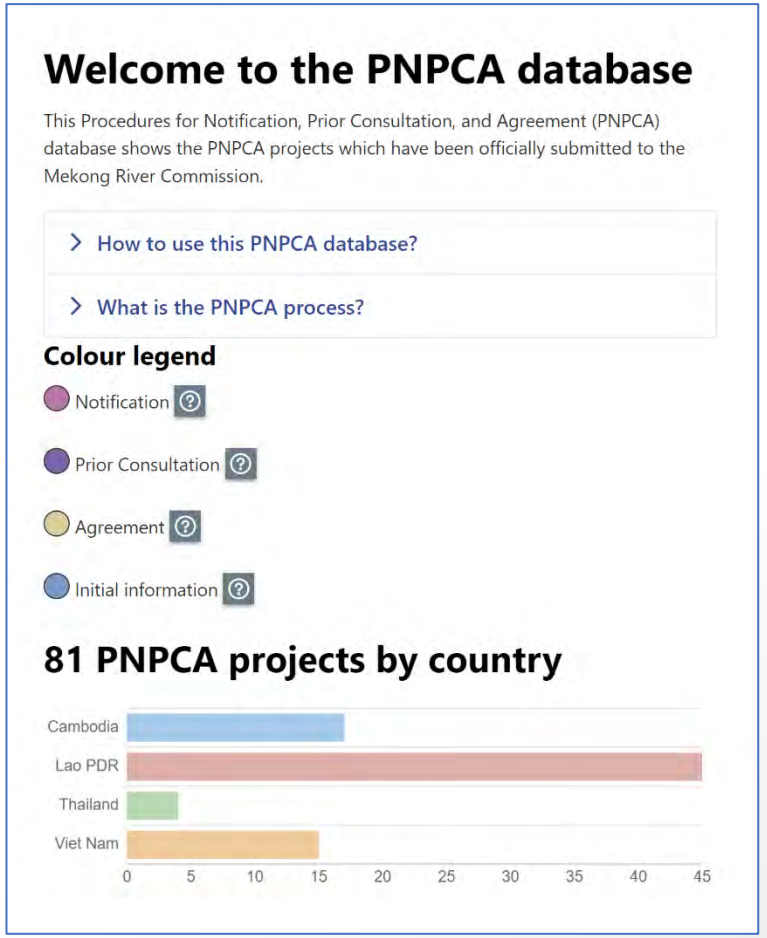


- Aims at setting up mechanisms to monitor intra-basin use, and inter-basin diversions of Mekong River water.
  - Technical Guidelines to implement PWUM was adopted in 2006.



Procedures for Notification, Prior Consultation, and Agreement

- Aims at establishing mechanism to notify the Member Countries of changes in the water use which may affect the system.
  - Technical Guidelines to implement PNPCA was adopted in 2005.



Procedures for Maintenance of the Flows on the Mainstream

- ☞ Aims at managing and maintaining flows on the mainstream of the Mekong River to sustain key ecological functions and meet the needs of downstream water users.

- ✓ Technical Guidelines to implement PMFM (2017) implementing learning by doing..

1995 Mekong Agreement - Article 6: Maintenance of Flows on the Mainstream:

To cooperate in the maintenance of the flows on the mainstream from diversions, storage releases, or other actions of a permanent nature; expect in the cases of historically severe droughts and/or floods:

Article 6A: Of not less than the acceptable minimum monthly natural flow during each month of the dry season;
Article 6B: To enable the acceptable natural reverse flow of the Tonle Sap River to take place during the wet season; and
Article 6C: To prevent average daily peak flows greater than what naturally occur on the average during the flood season.

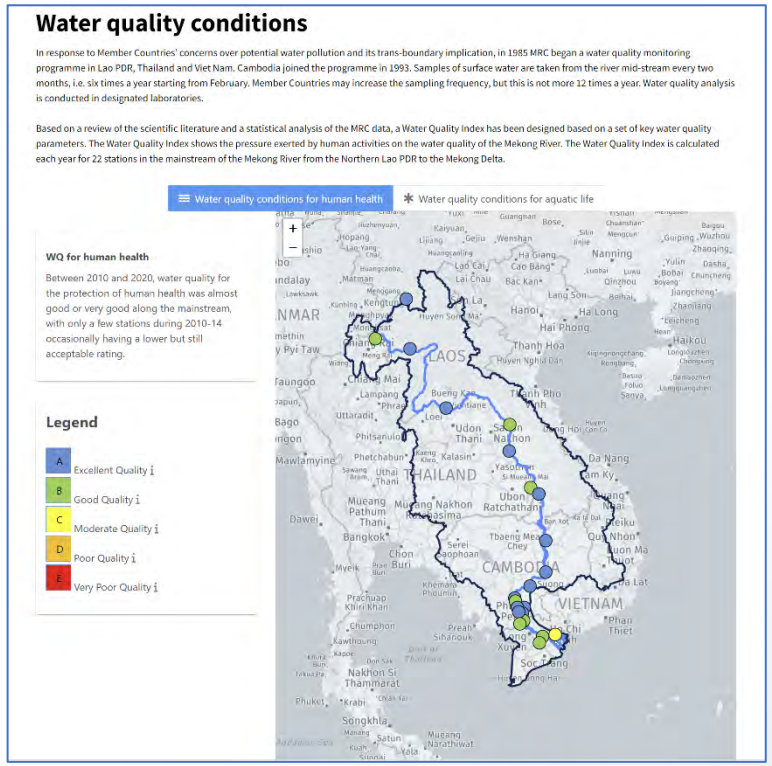
The Joint Committee shall adopt guidelines for the locations and levels of the flow, and monitor and taken action necessary for their maintenance as provided in Article 26.

Maintenance of Flow on the Mainstream overview

Name	Country	Latest observation date	Latest water level zone	Latest rated discharge zone
Click on station name to see flow graph and details associated station				
Chiang Saen	Thailand	06 May 2024	NORMAL	ABOVE AVERAGE
Vientiane	Lao PDR	06 May 2024	ABOVE AVERAGE	ABOVE AVERAGE
Khong Chiam	Thailand	06 May 2024	ABOVE UPPER ARI 1:5	ABOVE UPPER ARI 1:5
Pakse	Lao PDR	06 May 2024	ABOVE AVERAGE	ABOVE UPPER ARI 1:5

Procedures for Water Quality

- Aims at maintaining the water quality of the mainstream fit for both human use as well as for aquatic eco-systems, and to establish emergency response to water quality incidents.
  - ⇨ Technical Guidelines to implement PWQ adopted with four Chapters.



Application of the PNPCA – Water Diplomacy works?

1. Notification

a) intra-basin use and inter-basin diversion on the tributaries, including Tonle Sap; and

b) intra-basin use during the wet season on the mainstream;

2. Prior Consultation

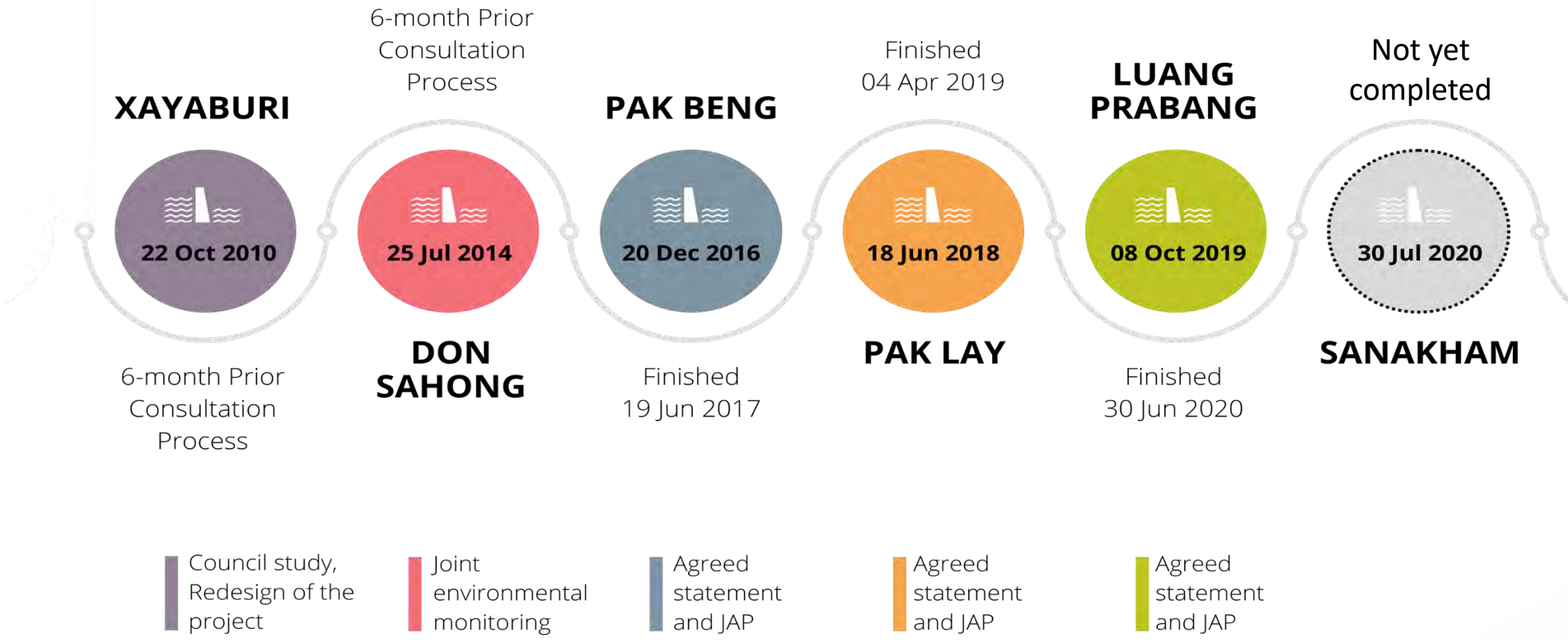
a) Inter-basin diversion from mainstream during wet season;

b) Intra-basin use on the mainstream during the dry season; and

c) Inter-basin diversion of the surplus quantity of water during the dry season

3. Specific Agreement

- Any inter-basin diversion project during the dry season from the mainstream



PNPCA Prior Consultation Process to date

What is Prior Consultation?

*Prior consultation is **neither a right to veto** the use **nor unilateral right** to use water by any riparian without taking into account other riparian's rights.*

It is a **6-month process**, but can be extended by the MRC Joint Committee.

It is **about adapting the proposed use** to make it more **reasonable** and **equitable.**

Prior Consultation Implementation Approach

Pre PC

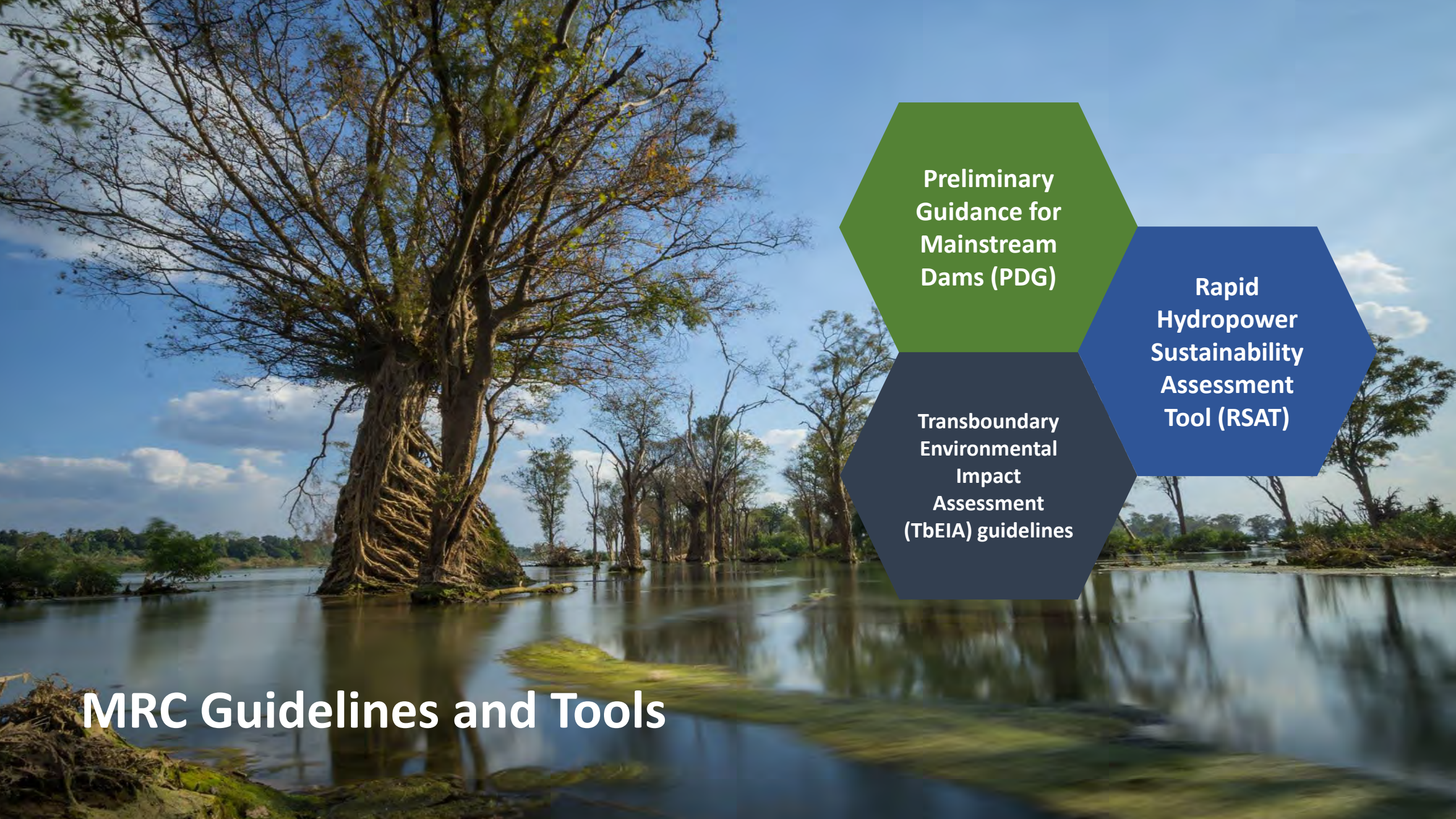
- Filing and inputting into PNPCA inventory list
- Send recommendation to the notified country and inform to NMCs
- Secure the availability of International Experts
- Transmit to the notified MCs
- Official documents shall be sent to the MRCS-PNPCA Core Team
- Distribute the established contents of PDG2009 and Draft PDG2020
- Detail the workplan and task distribution
- Prepare the Concept Note on Implementation (lessons learnt, working modality and roadmap, resources - This report)
- Prepare a stakeholder engagement and communication plan
- Update a fact sheet, and FAQs,
- Prepare Project Overview
- Review the completeness of submitted project documents
- Prepare the Scoping Assessment Report
- Ensure the official submission of submitted project documents
- Agenda and preparation for the 1st Meeting of PNPCA JCWG.

PC (6 months with possible extension)

- Conduct a detailed Technical Review of the submitted project documents by the MRCS using reference to PDG2009 and Draft PDG2020
- 3 Meetings of PNPCA JCWG with site visit. The last Meeting of the PNPCA JCWG will also review and discuss a "Statement"
- Meetings between MRCS and developer
- 2 Regional Stakeholder Forums
- 3 Rounds of National Consultation/Information Sharing Meetings in notified member countries with broader participation of stakeholders (CSOs, Communities, etc.), National Experts, and National Expert Groups
- Rounds of National Consultation Meetings in the notifying country (after 2nd Meeting of PNPCA JCWG) for a comprehensive response to draft Technical Review Report
- Official Reply Forms from notified member countries
- Special Session of the MRC JC to conclude PC (or its extension) and agree on "Statement" and the JAP

Post PC (upon agreement from JC)

- Official response to Technical Review Report by Lao PDR
- Release the Statement, Technical Review Report and its summary, and other related documents to the public.
- Develop a Tracking Matrix for JAP implementation for the JC to track the progress and report by the MRCS on changes to design, progress with construction of the project and outcomes of any monitoring activities
- Meetings between MRCS, LNMC, and developer
- Regional Stakeholder Forum for JAP and its workplan.
- Internal review and reflection of the PC process implementation
- Update the Working Paper on Lessons Learnt from PNPCA implementation



MRC Guidelines and Tools

Lesson Learnt, Gaps and Challenges

- How to determine whether the submitted documents are adequate for the commencement of PC process.
- Six-month timeframe for PC has proved difficult. Extension of the PC could be used by the JC.
- Whether preparatory or construction should be undertaken during the PC process.
- Clarity whether the PC is an approval process.
- Increasing consideration and focus on Tb and cumulative impacts, and cascade operation management.
- Defining significant impact and substantial damage to Member countries.
- Notification is prosecuted as an administrative process.
- Three PC processes from PB, PL and LPHPPs concluded with a Statement and post PC process of Joint Action Plan (JAP). Implementation of the JAP is being improved.
- PC process for Sanakham HPP has been on-going since July 2020.

Stakeholder Engagement matters?

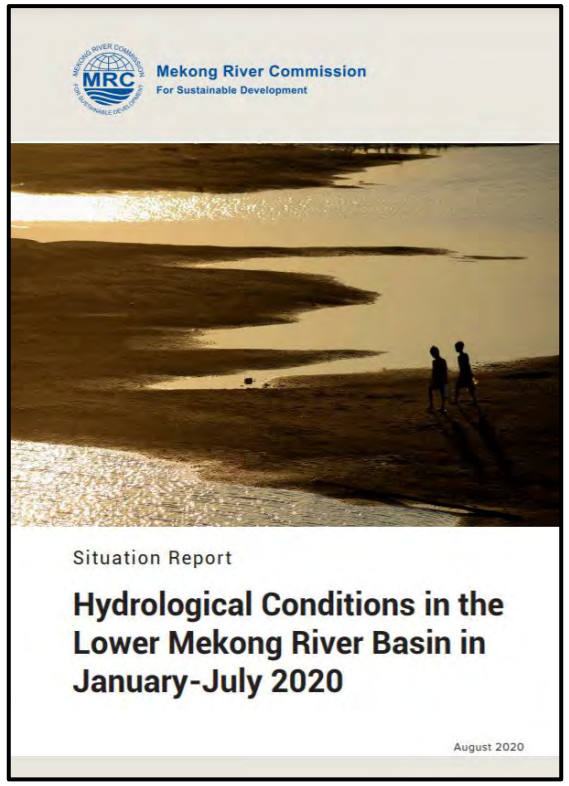
IMPROVED STAKEHOLDER ENGAGEMENT FOR MORE EFFECTIVE MANAGEMENT OF THE BASIN

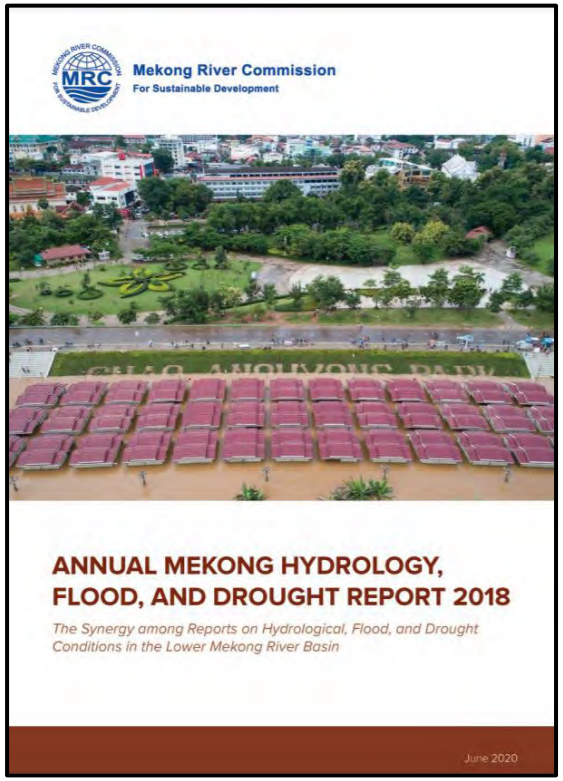
PROACTIVE COMMUNICATION, DISSEMINATION AND OUTREACH TO INFLUENCE PUBLIC PERCEPTIONS

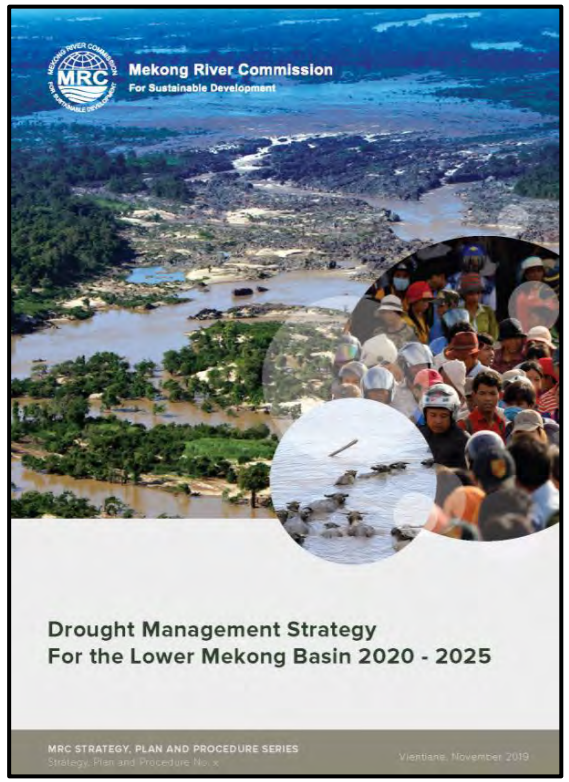
ENHANCED PARTNERSHIP AND MUTUAL LEARNING

MRC
ADB
IUCN
IWMI International Water Management Institute
KDI
MURRAY–DARLING BASIN AUTHORITY
OXFAM
CGIAR
RESEARCH PROGRAM ON Water, Land and Ecosystems
SEAFDEC
SEI
US Army Corps of Engineers.
UNITED NATIONS ESCAP Economic and Social Commission for Asia and the Pacific
UNOPS
WWF

More information: www.mrcmekong.org







- http://www.mrcmekong.org/**publications**/reports/ ....
- https://**portal**.mrcmekong.org/home
- https://**monitoring**.mrcmekong.org/
- http://**ffw**.mrcmekong.org/overview.php
- http://**droughtforecast**.mrcmekong.org/maps

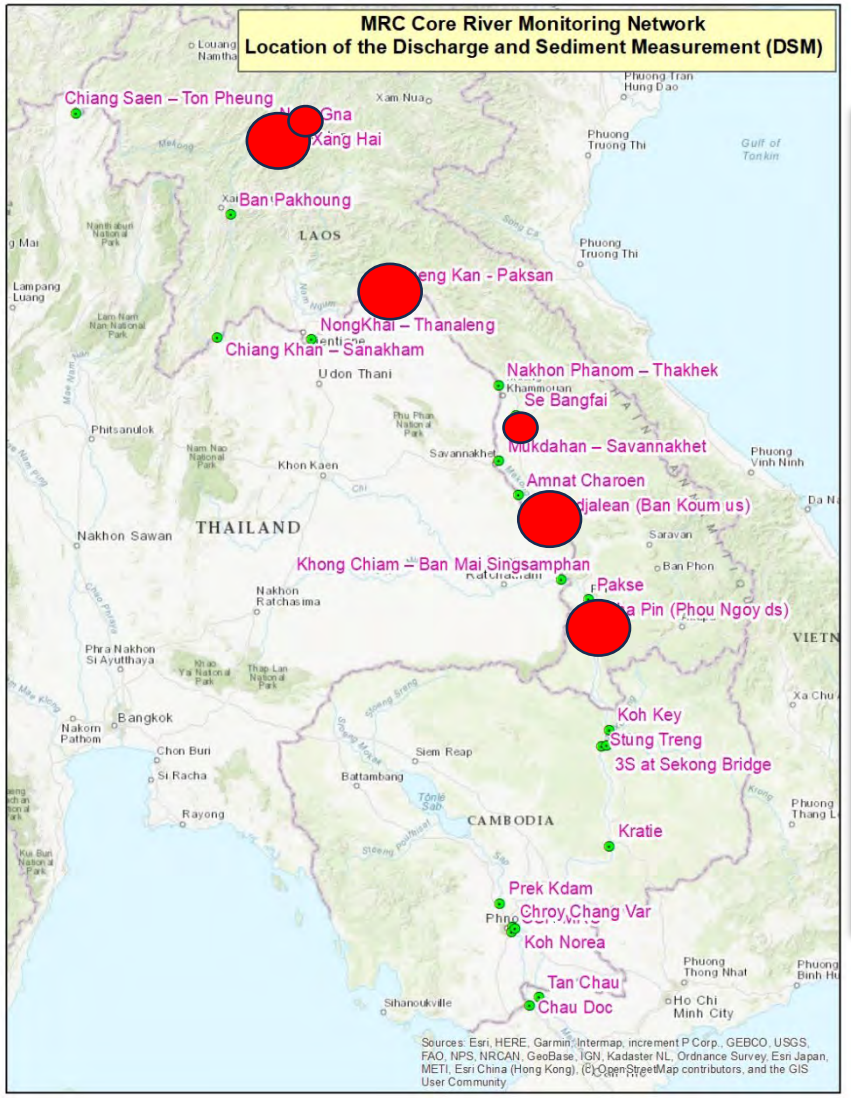
Thank you!

Discharge and Sediment Monitoring

- MRC Discharge and Sediment Monitoring Program (DSMP) was initiated in 2009.

- **17 stations**
  - 10 river sites: Chiang Saen to Kratie
  - 2 tidal sites in Mekong
  - 2 tidal sites in Bassac
  - 1 site in Tonle Sap
  - 1 tributary (3S)
    - Started 2009 at Thai-Lao sites
    - Remaining sites began 2011
    - 3S added in 2012

- **Expanded to 25 stations under CRMN begin 2023**



- Water Levels,
- Discharge,
- Suspended Sediment Concentration,
- Bed load and material grain size.
- River Cross- section surveys (2 times per year)

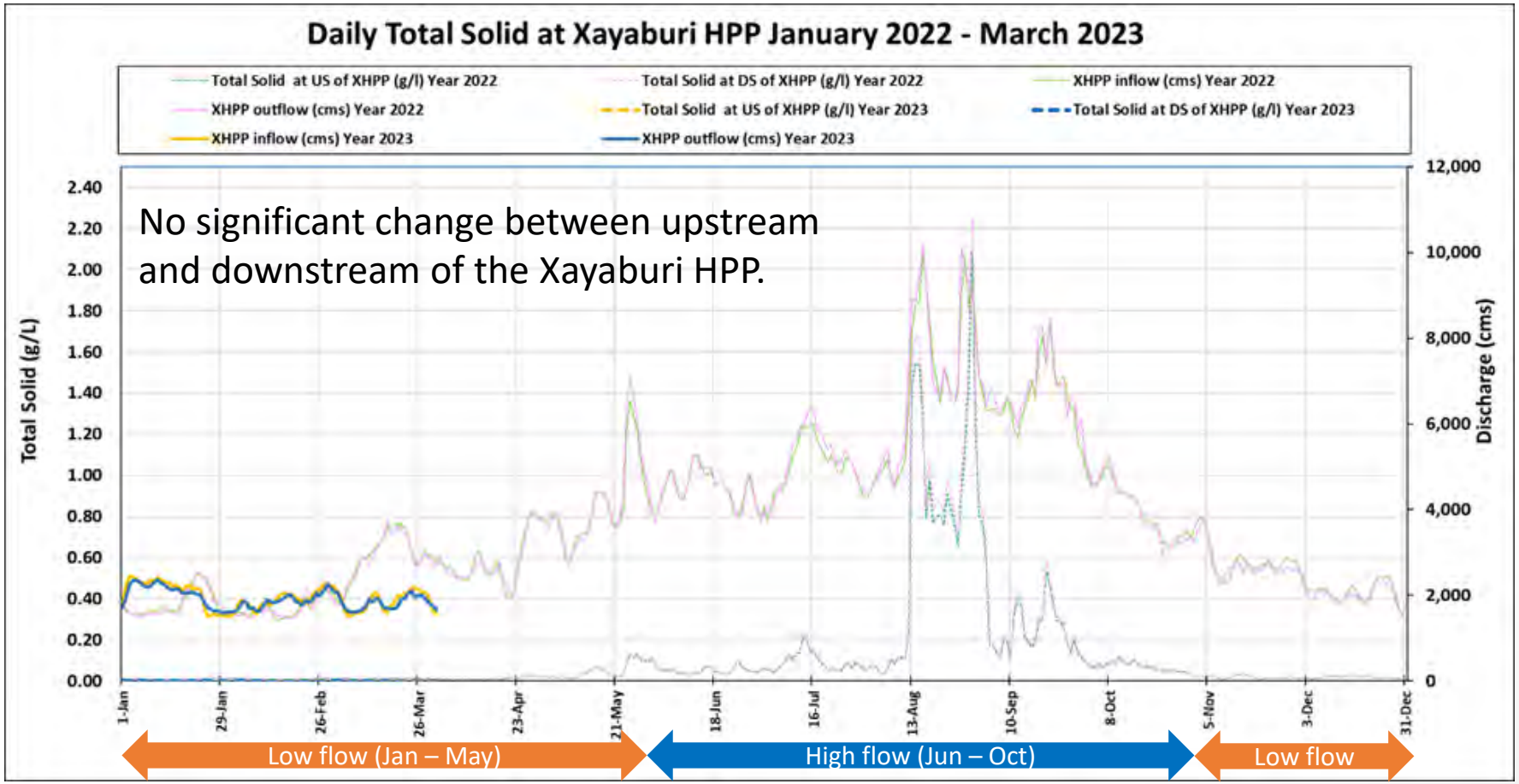
Sediment Status in LMB

Average daily sediment concentrations (mg/L) and loads (tonnes/day) by MRC monitoring station by year measured from 2009 to 2022, with colour gradient indicating highest to lowest values by year at each station

Year	Chiang Saen	Luang Prabang	Chiang Khan	Nong Khai	Mukdahan	Kong Chiam	Stung Treng	Kratie	Chroy Chang Var	Koh Norea	Prek Kdam	MRC OSP	Sekong at Bridge	Tan Chau	Chau Doc	AVERAGE
2009	149		78.9	79.3	250.5	164.1								153.6	80.8	136.7
2010	111		71.2	64.5	237.6	349.5								56.3	41.2	133.0
2011	139	244.3	89.0	123.0	189.4	212.5	159.0	166.6	150.7	174.8	71.3	178.8		118.2	79.4	149.7
2012	216	117.0	90.4	92.9	165.5	125.0	68.4	115.6	109.9	136.1	72.0	146.8	74.1	73.8	46.8	110.0
2013	68	92.9	37.1	60.6	114.0	76.0	46.4	46.5	38.9	42.9	33.0	40.0	53.7	12.1	14.9	51.8
2014	63	94.1	60.5	94.2	142.4	104.6	93.6	105.5	98.4	110.8	60.5	109.1	77.2	82.5	50.4	89.8
2015	418	63.0	38.6	72.4	53.7	95.8	71.9	85.8	44.0	67.2	38.6	55.4	42.3	8.7	8.0	77.6
2018	171		167.3	140.4		108.6	158.7	140.5	106.2	98.0	61.4	146.9	91.4	84.4	60.3	118.1
2019	86	123.3	17.3	40.3	157.8	98.4	68.0	62.2	57.4	52.2	28.8	64.5	81.8	52.3	35.7	68.4
2020	19		55.9	86.6	90.6	234.9	63.5	77.7	55.9	56.7	50.6	57.0	115.6	47.5	42.5	75.3
2021		52.5	61.9	40.3	92.0	160.5	65.0	73.6	57.4	50.6	41.5	58.0	74.6	41.2	33.5	64.5
2022	124	80.1	38.0	53.8	154.5	132.8	55.4	65.3	56.9	55.2	38.9	64.1	51.5	40.4	36.7	69.8

Year	Chiang Saen	Luang Prabang	Chiang Khan	Nong Khai	Mukdahan	Kong Chiam	Stung Treng	Kratie	Chroy Chang Var	Koh Norea	Prek Kdam	MRC OSP	Sekong at Bridge	Tan Chau	Chau Doc	AVERAGE
2009	43,076		38,021	32,468	301,315	240,903								236,225		148,668
2010	29,743		32,509	26,806	270,876	546,480								72,049		163,077
2011	42,187	119,851	59,333	88,685	305,045	453,687	435,308	496,398	386,263	349,571	38,599	58,137				246,656
2012	61,361	63,808	46,876	39,986	205,449	153,853	130,526	233,854	243,932	241,601	31,472	34,668	36,024	160,834		124,649
2013	10,300	14,608	7,389	12,589	55,284	47,749	38,810	40,303	33,156	33,289	4,085	1,868	8,293	3,975		22,853
2014	15,337	40,601	18,813	55,640	151,757	144,448	201,634	215,031	216,679	184,115	18,813	29,580	36,819	1,790		99,266
2015	118,561	11,549	11,082	17,198	31,915	119,987	111,256	133,383	46,210	70,360	11,082	5,700	9,419	79		52,787
2018	59,738		114,608	107,374		200,516	500,031	363,754	273,292	202,165	30,370	51,214	74,215	145,666		176,912
2019	13,776	28,420	4,194	11,939	69,985	125,102	209,761	142,191	137,805	83,334	12,197	15,853	66,290	70,503		74,072
2020	2,512		18,876	34,647	69,659	274,062	104,007	117,932	86,633	74,474	8,456	7,133	72,150	61,349		71,684
2021		13,960	19,995	15,663	47,385	134,302	103,789	85,187	84,078	79,226	9,183	7,546	35,813	51,995		56,180
2022	33,908	33,624	19,691	28,434	129,149	165,905	109,883	123,407	111,813	92,451	8,510	12,115	26,099	47,163		69,887

Sediment Monitoring at HPP



U/S values range between 633 to 103,167 ton/day, and D/S values range between 518 to 175,220 ton/day.

Real-time total suspended solid concentration - upstream & downstream of the Xayaburi HPP

Summary

- MRC continue its sediment monitoring **since 2009 and expanded under the CRMN**. However, **better cost-effective approach** is needed.
- **Two sites** (Chiang Saen and Sekong Bridge) **do not display an apparent declining** trend in suspended sediment concentrations or loads since 2009. Sediment transport at Chiang Saen appears to have stabilised, albeit at a much lower level over the last decade than in earlier years.
- **Five stations** (Mukdahan, Choy Chang Var, Koh Norea, Prek Kdam, and Phnom Penh) show a **statistically significant declining** trend in sediment loads over the last decade. by more than 75 % at Mukdahan over the period since 2009, and around 70 % at Phnom Penh since 2011. SSC at Tan Chau have approximately halved since 2009.
- **Five other stations** show an apparent **decline**, but the trend is **not statistically** significant.
- Insufficient data for analysis at Luang Prabang, Nakhon Phanom and Pakse.
- Based on shared sediment transport monitoring between Jan 2022 to March 2023, **no significant change between the impoundment** just upstream of Xayaburi and immediately downstream of the project.

Number of hydropower projects in various stages in the Lower Mekong Basin by country

Country	Mekong			Tributary			Total
	In operation	Under construction	Planned	In operation	Under construction	Planned	
Cambodia	-	-	2	2	-	9	13
Lao PDR	2	1	5	65	20	5	98
Thailand	-	-	1	7	-	-	8
Viet Nam	-	-	-	14	-	-	14
Total	**2**	**1**	**8**	**88**	**20**	**14**	**133**

China: **11 operational dams** – two of which are large storage dams in the upper basin, making up the cascade along the mainstream

Total installed capacity of hydropower projects in the Lower Mekong Basin countries

Sum of Capacity (MW)	Mekong				Tributary				Grand Total
	In operation	Planned	Under construction	Total	In operation	Planned	Under construction	Total	
Cambodia	-	4,000.00	-	4,000.00	401.00	1,110.00	-	1,511.00	5,511.00
Lao PDR	1,545.00	4,865.00	1,410.00	7,820.00	7,959.39	265.00	1,315.70	9,540.09	17,360.09
Thailand	-	1,079.00	-	1,079.00	744.68	-	-	744.68	1,823.68
Viet Nam	-	-	-	-	2,607.00	-	-	2,607.00	2,607.00
Grand Total	1,545.00	9,944.00	1,410.00	12,899.00	11,712.07	1,375.00	1,315.70	14,402.77	27,301.77

Water quality ratings using the index for the protection of human health

No.	Station Names	Rivers	Country	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
1	Houa Khong	Mekong		B	A	B	B	C	A	A	B	B	A	A	A
2	Chiang Saen	Mekong		B	A	B	B	B	B	B	B	B	A	A	B
3	Luang Prabang	Mekong		B	A	B	A	B	B	B	A	B	A	A	A
4	Vientiane	Mekong		B	A	B	B	B	B	B	A	A	A	B	A
5	Nakhon Phanom	Mekong		B	B	B	B	B	B	B	B	B	B	A	B
6	Savannakhet	Mekong		A	A	B	B	C	B	B	B	A	A	A	A
7	Khong Chiam	Mekong		B	A	B	B	B	B	B	B	B	A	B	B
8	Pakse	Mekong		A	A	A	B	A	B	B	A	A	A	B	A
9	Stung Treng	Mekong		A	A	A	A	A	A	A	A	A	A	B	A
10	Kratie	Mekong		A	A	A	A	A	A	A	A	A	A	A	A
11	Kampong Cham	Mekong		A	A	A	A	A	B	A	A	A	A	A	A
12	Chrouy Changvar	Mekong		A	A	A	A	A	A	A	A	A	A	A	A
13	Neak Loung	Mekong		A	A	A	A	A	B	A	A	A	A	A	A
14	Krom Samnor	Mekong		A	A	B	A	A	B	A	A	A	A	A	A
15	Tan Chau	Mekong		B	B	A	A	A	A	A	A	B	B	A	B
16	My Thuan	Mekong		C	A	A	B	A	A	A	B	B	A	B	B
17	My Tho	Mekong		C	B	B	B	B	A	B	B	B	A	B	C
18	Takhmao	Bassac		A	A	A	B	C	A	B	A	B	B	B	B
19	Koh Khel	Bassac		B	A	B	B	A	B	A	A	A	A	A	A
20	Koh Thom	Bassac		A	A	B	B	A	A	A	A	A	A	A	A
21	Chau Doc	Bassac		C	B	B	A	A	A	A	B	B	B	A	B
22	Can Tho	Bassac		C	B	A	A	A	A	A	A	B	A	A	B
	AVERAGE			B	A	B	B	B	A	A	A	B	A	A	A

Water quality ratings using the index for the protection of aquatic life

No.	Station Names	Rivers	Country	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
1	Houa Khong	Mekong		A	A	B	B	B	B	B	B	B	A	A	A
2	Chiang Saen	Mekong		B	A	B	B	A	B	B	B	B	A	B	B
3	Luang Prabang	Mekong		B	A	A	B	B	B	A	B	A	A	A	A
4	Vientiane	Mekong		A	A	A	B	B	A	A	A	A	A	A	A
5	Nakhon Phanom	Mekong		B	A	B	B	A	A	B	B	B	A	A	A
6	Savannakhet	Mekong		A	A	A	B	B	B	A	A	B	A	A	A
7	Khong Chiam	Mekong		A	A	A	B	A	A	A	B	A	A	A	A
8	Pakse	Mekong		A	A	A	B	B	B	A	A	B	A	A	A
9	Stung Treng	Mekong		B	B	B	B	B	B	B	A	A	A	A	A
10	Kratie	Mekong		B	B	B	B	B	B	A	B	B	B	A	A
11	Kampong Cham	Mekong		B	B	B	B	A	B	A	A	B	B	A	A
12	Chrouy Changvar	Mekong		B	B	B	B	B	B	A	A	B	B	A	A
13	Neak Loung	Mekong		B	B	B	B	B	B	A	A	B	A	A	A
14	Krom Samnor	Mekong		B	B	B	B	B	B	A	A	B	A	A	A
15	Tan Chau	Mekong		B	B	B	B	B	B	B	A	B	B	B	B
16	My Thuan	Mekong		B	B	B	B	B	B	B	B	B	B	B	B
17	My Tho	Mekong		C	C	B	C	C	C	D	C	B	C	C	C
18	Takhmao	Bassac		B	B	B	B	B	B	B	B	B	B	B	B
19	Koh Khel	Bassac		B	B	B	B	B	B	B	B	B	B	B	A
20	Koh Thom	Bassac		B	B	B	B	A	B	B	B	B	A	B	A
21	Chau Doc	Bassac		B	B	B	B	B	B	B	B	C	C	C	B
22	Can Tho	Bassac		C	C	C	C	B	B	B	B	B	C	C	C
	AVERAGE			B	B	B	B	B	B	B	B	B	B	B	A

Macroplastics

Concentration

Upstream

Vientiane (Lao PDR)
0.249 Pieces/m²/h
(Mesh size : 1–3 cm)

Phosai (Thailand)
0.042 Pieces/m²/h
(Mesh size : 1 cm)

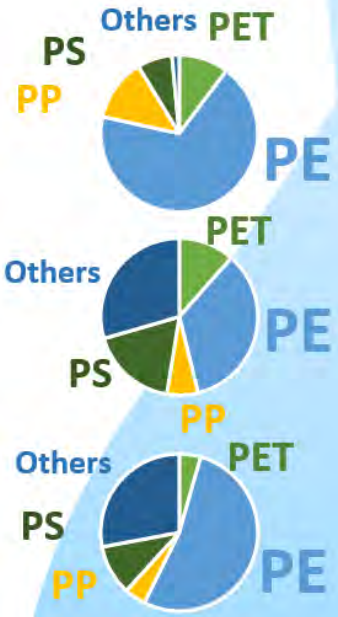
Khong Chiam (Thailand)
0.039 Pieces/m²/h
(Mesh size : 1 cm)

Can Tho (Viet Nam)
0.322 Pieces/m²/h
(Mesh size : 0.7 cm)

Downstream

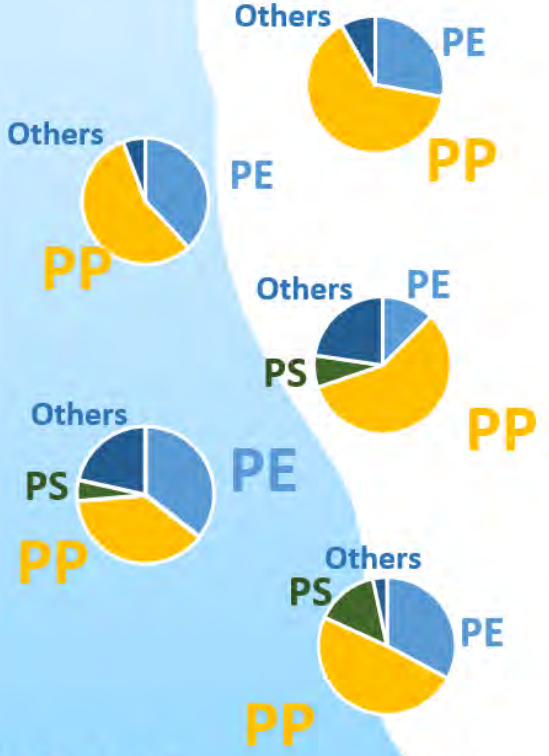
Pieces/m²/h :
The amount of plastic debris that are collected per unit area of net per hour of collection using net

Types of material



Microplastics

Types of material



Concentration

Upstream

Chiang Rai (Thailand)
1.22 Pieces/m³

Vientiane (Lao PDR)
2.10 Pieces/m³

Ubon Ratchatani (Thailand)
2.25 Pieces/m³

Phnom Penh (Cambodia)
14.3 Pieces/m³

Can Tho (Viet Nam)
23.7 Pieces/m³

Downstream

Quick Comparison on Amount of plastic debris

Can Tho (Viet Nam)
2.16 ton / day
Calculated by estimated river width and depth

The Whole Mekong River
17.4 – 101 ton / day
(Schmidt et al. 2017)

Waste accumulation at 8 piers in Cambodia
8 kg / day

Note:
Some of the units shown are modified for comparison.