

Audience Questions and Comments

Presentation-specific Questions

For Dr. Tri:

A question from Pin Chinaporn: From your experiences, what lead time is the most suitable for drought warning? Which drought indices perform well within the Vietnam or Mekong Region and why?

The lack of water from upstream is caused by different factors including the anthropological and natural ones therefore it is hard to do the warning. Considering the natural processes only, different studies have been done to project impacts of hydrological changes along the upstream on the Mekong Delta. However, no solid answer could be made to describe the mechanism of linkages between the hydrology in the upstream sections and the delta agricultural drought.

A question from Atsushi Ishimatsu (JICA CTU Office): How has salinity intrusion affected aquaculture in the Mekong Delta?

Even though the drought and salinity intrusion has caused significant damages to agriculture in the Vietnamese Mekong Delta (e.g., article [here](#)), aquaculture, especially along the coastal zones of the Delta, has been also strongly affected. For the saline-based aquaculture, water in the culture pond was too salty which has gone beyond the acceptability of shrimp, crab and so on leading to either death or serious disease or both. This has been confirmed by local farmer during my recent trip to the Northern region of Ca Mau province. For the brackish-based aquaculture, the damages were not felt so serious as the late of 2019 and early 2020, from local experiences, is not a good period for this types of activities. For the freshwater-based aquaculture, damages could not be found serious but there was water-competition between the agriculture and this type of aquaculture.

For Ms. Phuong:

A question for Ms. Phuong: Where can we find VNMC's reports/analysis? Is there any report or data on how drought is impacting rice yield in the Vietnam region?

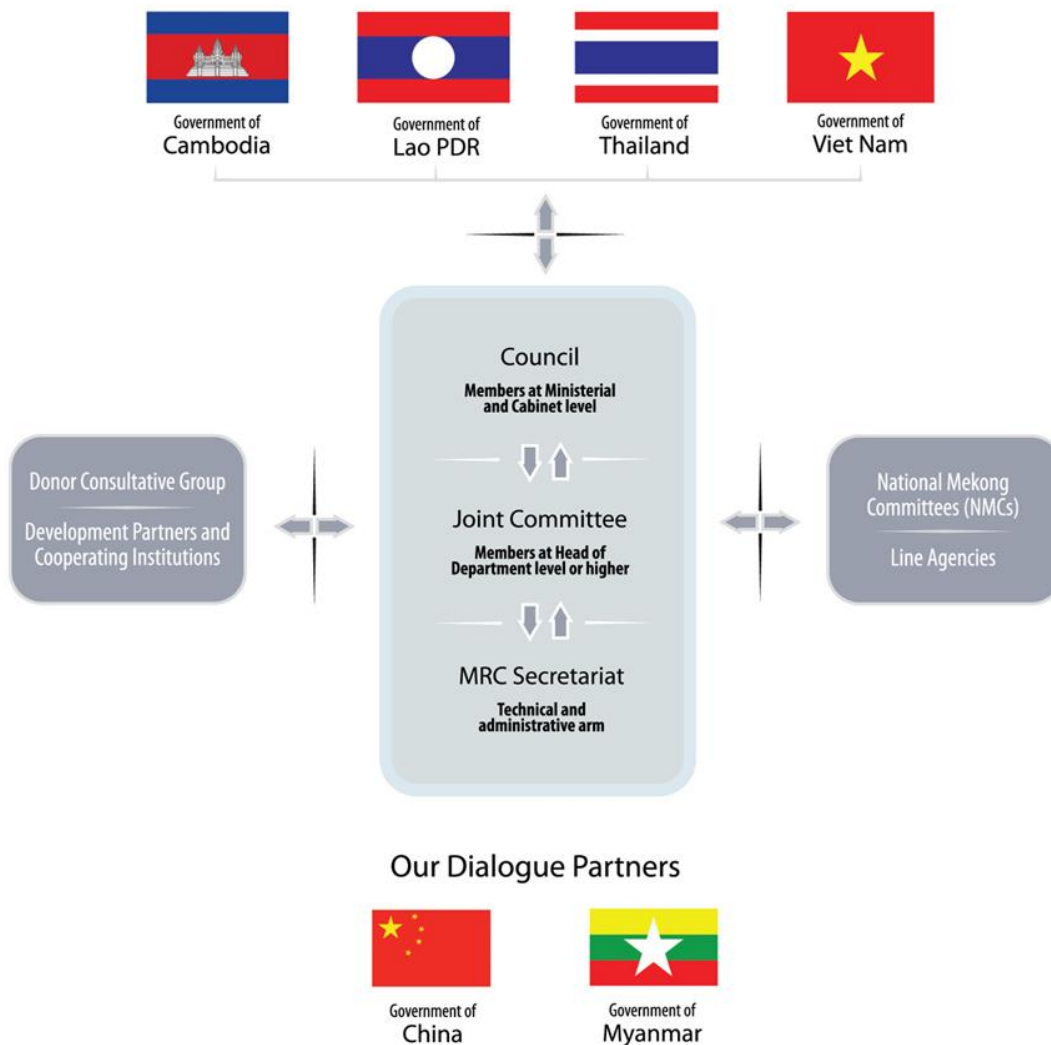
A question for Ms. Phuong: The saline intrusion seems to be getting worse overtime in the Delta. With the knowledge and data-rich resources of the MRC and VMRC, what are your thoughts about measures to improve water resources in the Delta?

To improve the water resources management in the Delta, I think we should improve number of aspects, including but not limited to:
the monitoring: upgrade monitoring network, approach to near real time/real time monitoring, improve measurement methods and equipment,
data and data sharing: upgrade quality control/assurance for data quality, approach to timely data sharing, more effective sharing mechanism, improve openness and transparency
water use efficiency, water saving, more appropriate water allocation...
water management: adaptive policies, strategies, plans..., institutional arrangement, capacity building,
appropriate investment on both structural and non – structural measures
involvement/engagement of different stakeholders in the decision-making process

What is the relationship between VNMC and MRC?

Structure of the Mekong River Commission is in the figure bellow:

Mekong River Commission Governance Structure



The Viet Nam National Mekong Committee (VNMC) is national coordinating agency of Viet Nam to assist the Government of Viet Nam in all activities of the Mekong River Commission to implement the Mekong Agreement 1995. The VNMC closely works the MRC Secretariat, and other National Mekong Committees, and partners to fulfill their duties and tasks.

A question for Ms. Phuong, How does the VNMC assist in the decision making process at the central level on water issues in the Vietnamese Mekong Delta?

The Viet Nam National Mekong Committee (VNMC) is an interdisciplinary agency responsible
- to assist Prime Minister in directing and managing inter-sectoral, inter-provincial and transboundary activities in order to effectively and sustainably manage and utilize water and related resources in the Mekong Basin, including Cuu Long (the Viet Nam's Mekong Delta parts) and Se San - Srepok river basins

- to assist Prime Minister in directing, regulating and coordinating relevant ministries, sectors, provinces, international regional and national organizations and partners and individuals in monitoring and inspecting the implementation of interdisciplinary activities in the Mekong River Basin, including Cuu Long and Se San-Srepok river basins

- To provide inputs in written form, prior to officially submitting to competent levels as stimulated by applicable laws, on water resource planning at provincial/city level, sectoral planning of ministries, agencies relating to water resources utilization (irrigation, hydropower, water supply, inland waterway transportation, fisheries ...) in Cuu Long and Se San – Srepok river basins.

- To provide inputs in written form, prior to officially submitting to competent levels as stimulated by applicable laws, on proposed programs, plan, projects and activities related to water and related resources use, management and protection in the Mekong River Basin, including Cuu Long and Se San - Srepok river basins.

A question for Ms. Phuong from Nina Burkhardt, USGS: Do you have data about how communities use water (how much for agriculture, household use, etc.) and how much is surface water use and how much is groundwater? I ask this because you mentioned the importance of water use efficiency and this seems like useful information.

- most of surface water is for agriculture and household use. Main sources are from Tien (Mekong) river, and Hau (Bassac) river.

- about 80% of surface water is for agriculture, mostly rice. 20% rest of surface water, rainwater (not much), and groundwater are for domestic use.

- 61% of households in the Mekong Delta are supplied with water from centralized water supply works; 39% rest use groundwater from their own wells..

A question from Hironori Hamasaki from Nagasaki University. My question is about the hydropower dam construction on the Mekong mainstream. For the countermeasures for the drought in the Mekong Delta, we can't avoid discussing and considering the impact of those dams. How does MRC and the Vietnamese government think about this issue in relation to drought and climate change?

- hydropower dams on Mekong mainstream are the issues for discussion from time to time. But drought and salinity intrusion in the Mekong Delta recently are due to other factors, especially the weather change, lack of rain for long in the whole basin, ... There are total 11 Dams on Mekong mainstream in the lower Mekong Basin in plan but currently only 2 have just been in operation (Xayabury and Donsahong in Laos) and they are run-of-river dams. 03 others have been notified to the riparian countries of the lower Mekong Basin (Thailand, Cambodia, and Viet Nam) but not yet constructed.

However, the MRC and Viet Nam Government have undertaken number of studies on the impacts of dams on the Mekong Mainstream on the Mekong Delta in terms of hydrology, fisheries, sediment, environment, etc., and also take into account the combination of climate change impacts. The evolution of studies with additional data and information, knowledge, about all the driving factors of drought in the Mekong Delta are on – going, and hope that we can have a clear picture in the near future.

A question from Kenji from JICA: How do you cooperate with MRC on mitigating sea water intrusion?

- *We cooperate in terms of data sharing from upstream countries, so we can understand better the situation of water coming the Mekong Delta from upstream*
- *we also cooperate in terms of modeling and other analytical tools, to help simulate the salinity intrusion in aspects of intrusion area, concentration, on set and off set, etc.*
- *we get the forecasting data and information from the MRC on river flow so that we can have better early warning in case of lack to water from upstream, then causing the salinity intrusion*
- *we can also have technical assistance and experience shared from the MRC for salinity intrusion monitoring network to set up, etc.*

For Mr. Wilson and Mr. Jacobson:

You mentioned users must have a permit/water right to use. Users are all citizens or people use much water?

Water is considered the property of the states in the US. The states set up legal systems to allocate water, called water right systems. The state also establishes a state department that administers the water right system – commonly the State Engineer's Office in the Western US. An entity (a citizen, person or business) may apply to the State Engineer's Office to obtain a permit / water right to divert water from a stream / river to use the water for irrigation, municipal, industrial, or other uses that the state approves. The State Engineer's office will evaluate the application, decide if there is water available in the stream, or if all normal flow is already allocated through existing rights, and award a permit / water right to the entity. The permit / water right usually has a priority as compared to other existing rights. The priority is usually based on when the water was established. Thus, if there is not sufficient water in the stream at any time, only the senior (older) water right holders are allowed to take water.

A question from Jocelyn Roberts of the State Department for our Speakers in Colorado: Could you give an example of a specific conflict and the terms that were used to resolve it? What is an example of conclusions courts came to settle water disputes between upper and lower basin?

Reclamation traditionally runs the Colorado River system reservoirs in consultation with the States. In 2005, the Colorado River Basin was seven years into the current 20-year drought. In response, in 2007 Reclamation and the 7 Colorado River Basin States adopted a set of guidelines to address volumes for releases from Lake Powell (in the Upper Basin) to Lake Mead (in the Lower Basin) would be determined and how shortage sharing and banking in the Lower Basin would be made. The expectation was that these guidelines would prevent the reservoirs (Powell and Mead) from dropping to critical elevations below which hydro-electric power could not be produced.

As the drought persisted, it became clear that these guidelines were not sufficient to prevent the reservoirs from dropping and additional measures would be necessary. The Secretary of the Interior challenged the states to come up with Drought Contingency Plans. The Lower Basin States did not wish to increase their shortage sharing further and the Upper Basin States insisted that the lower Basin increase their shortages as the Upper Basin was using more than they were entitled to under the Colorado River Compact. The over-use by the Lower Basin was causing high releases from Lake Powell and threatening to drop the volume of Powell to levels where the Upper Basin might not be able to meet their required releases under the Compact. At the same time the basin as a whole was facing less inflow due to drought and climate change. Reclamation brought the states' representatives together through meetings over six years. Reclamation recognized that the drought and over-use could affect both basins and

conducted modeling of potential scenarios of shortages that could occur if the states did not reduce their use. The modeling results indicated there could be significant shortages in both basins and convinced the states that drought plans needed to be developed. Despite this, the states could not agree on how much each basin should do or how much water they should give up.

Reclamation brought together a small team of representatives from the basin states and facilitated negotiations between the states to have them to come up with compromises. In the Lower Basin the states agreed to specific reductions as Lake Mead's elevations dropped. In the Upper Basin the states agreed to move water from upper reservoirs to Lake Powell to keep elevations from dropping and agreed to develop plans to reduce use in the upper basin. Both the basin's plans were reviewed by the other basin and the package had to be acceptable to all of the states. The states then obtained federal legislation directing Reclamation to operate in conformance with the plans. Many of the small team, mostly attorneys, had not worked with each other previously and needed to build relationships. Ground rules for meetings were that the team needed to be open to hearing and considering various perspectives of different states. States were responsible for reaching out to stakeholders and bringing their issues to meetings so they could be addressed. Reclamation strongly encouraged the states to be transparent with and reach out to their stakeholders. Getting stakeholder buy in by stakeholders was critical to the states being able to agree to terms. The documents can be found at <https://www.usbr.gov/dcp/finaldocs.html>

In regards to a court decision between the Upper and Lower basins, to my knowledge there has not yet been a direct challenge to the Compacts that divide water between the basins. The most significant case was between Arizona and California over Arizona's desire to build the Central Arizona project which takes water from the Colorado River to central Arizona. California asserted that Arizona's use of the Gila River, a tributary to the Colorado, constituted Arizona's Colorado apportionment. The decision in the case allowed Arizona to use water from the Colorado but also resulted in Arizona having a lower priority to Colorado River water than California. The case documents and other documents considered part of the 'Law of the River' can be found at <https://www.usbr.gov/lc/region/pao/lawofrvr.html#avc>.

A question from Katsuhama from Nippon Koei. Is Mexico satisfied with the water allocation stipulated in the Water Treaty? Do you have any neutral mechanisms to resolve disputes?

I couldn't say that Mexico is 'satisfied' with the allocation they were provided in the 1944 Treaty with Mexico. I would guess that they would have preferred to have a larger allocation. The 1944 Treaty set up an International Boundary Waters Commission (IBWC) with representatives and engineers from both countries. The Commission maintains regular communication between the nations on operations and addresses disputes between the nations. Data and modeling results are shared between the nations. In recent years, Mexico has been included as a party in internal US discussions and operational considerations of Colorado River system reservoirs. This commission successfully negotiated an agreement (Minute 242) wherein the US maintains the salinity in water delivered to Mexico above certain levels. Several years ago Mexico faced a major canal break. Mexico has no reservoirs in which to store it's deliveries so water delivered to them would not have been able to be put to use. The IBWC negotiated an agreement for the US to hold and store Mexico's water deliveries in Lake Mead until such time as Mexico could repair the canal and put the deliveries use. This agreement led to further cooperation, inclusion of Mexico in US deliberations and an agreement to allow Mexico to store water in Lake Mead with the condition that they, along with the Basin States, would participate in drought shortages. The 1944

Treaty and other documents considered to be the 'Law of the River' can be found at <https://www.usbr.gov/lc/region/pao/lawofrvr.html#avc>.

A question from Marc Goichot, Is the Colorado River Basin example relevant to the Mekong? Isn't the Mekong delta problem more about salted water from the sea intruding into land, and less about not paleo-salt deposits in the basin being eroded and flowing downstream?

Yes, the Mekong Delta salinity problem is from salt-water intrusion and the Colorado River salinity is from salt deposits being eroded and carried downstream. However, I feel the reason for including the Colorado River Basin in the symposium was not to focus on the source of salt and but how to control it. The control is how all the stakeholders, e.g. local, state, and national governments, and water users came together in a spirit of comity to learn where the salt was coming from, its impacts, develop controls, and how to fund the control.

Technical Questions on Drought and Salinity

Clean water can be pulled from the sea, desalinated and piped in, but that is extremely expensive and does not address sediment issues. What other water management alternatives could help address salinity, sediment, and drought?

One observation from the Colorado River Basin is the timing of releases. If there are opportunities for releases from impoundments, perhaps the timing and magnitude of the releases, even more so in times of drought, can be timed to maximize their impacts on sediment, salinity, and drought. Again, this requires cooperation and coordination among the all the parties involved. Usually, this cooperation and coordination is based on good data, good modeling, and demonstrating solutions that all can benefit from.

How did Vietnam engage farmers in terms of early warning and to minimise crop loss during the 2019-2020 drought?

A question from Matthew Andersen of USGS: In addition to better planning, why did the drought of 2020 not cause as many negative impacts as the drought of 2016?

- *better forecasting and early warning help reduce negative impacts*
- *better preparedness (like early storing water)*
- *better contingency*
- *timely emergency respond*

A question from Reepal Shah, Is any agency experimenting/modeling Mangrove afforestation to restrict salt-water intrusion?

- there are some agencies do that, Can Tho University is one of them. Some research institutes as well

How do the panelists expect households to adapt to salinity? Do they expect more migration patterns of rural households? How can communities and provinces prepare for increased salinity and its associated impacts?

- *change the attitude of using water: save water, use it more efficiently, store rain water in a larger scale,*
- *migration of rural households are expected. Many rural people are migrating to towns, but due to pressure of livelihood, jobs, incomes...and recently due to COVID-19, many of them have to return to rural, and they are again facing with the issues. They have to adapt with.*

- they have to prepare by changing attitude in using water, cultivating/cropping patterns, thinking about more investment (may be from private sector) for fresh water storage

On MekongWater.org

A comment from Pyrou, Director of the Open Development Initiative on adding standardization regarding sharing of data according to open data principles to MekongWater.org. Open data sharing requires shifts in policies and frameworks by the government, NGO sector, civil society and academia. Panelists, what do you think about data sharing standardization and open data sharing? And how can policies shift to support data sharing?

In my experience, water management systems are only successful when stakeholders are able to meaningfully participate in and have trust in the systems. Key to this in my experience is inclusion of stakeholders in discussions and decision making on system operation and allocation of water. For this to work I believe it is very important for water data to be transparent and widely available. In the US the majority of river and diversion gages are either operated by a state or federal entity or by a water district/irrigation company. States require irrigation companies to post their data on the internet or the state posts it. The federal gages are also posted on the internet. Thus stakeholders can see where water is being diverted and that it is being diverted according to agreed upon rules. Posting and sharing of data does pose some challenges in that if the data is not standardized it may be confusing or misleading and not useful for comparison or analysis. In the US, because the states are in charge of water administration, numerous systems are used sometimes leading to needs for conversions of data. We continually strive for greater standardization of tools and databases to administer water. Additionally, there is the challenge of the level of data and understanding of stakeholders of different levels of sophistication. My experience has been that there is a great need to be able to present and explain data and its meaning at various different levels to promote stakeholder trust. I strongly believe that data sharing and transparency are key to successful water management. I think that this is especially true for agencies as the transparency brings reduces the disputes that agencies face, the trust engenders stakeholder cooperation, acceptance and support of the hard decisions that agencies sometimes have to make. This requires significant efforts on the part of the agencies to adopt policies to be inclusive, transparent and spend more time and resources on reaching out, listening to and explaining data and information at appropriate levels. In my 35 years of experience with Reclamation, the agency has had to learn that lesson and is now spending much more resources on outreach, inclusion and data sharing and as a result, the agency is in a better place to address the challenges of drought.

How can we ensure that Mekongwater.org does not repeat the efforts of the MRC on data sharing?

- the two should cooperate, share and exchange what they have, try to synergize, not repeat, and not compete. The more data we have, the more people can benefit.

On Stakeholder Roles and Solutions/Opportunities

A comment from Karine Hoang on the roles of different stakeholders in addressing solutions and opportunities: I wonder how the information and data can be shared and used for dialogues among the stakeholders, especially the local organization and communities. The general public and communities should get access to the data actively and engage the local initiatives into policy dialogues. Not only to the drought and salinity intrusion context but other severe impacts to the Mekong delta.

How can we better give civil society the platform and resources to participate actively and effectively in communicating community level salinity and climate issues? And how can Local authorities better acknowledge the importance of civil society as partners in addressing these issues?

A question from Yushiou Tsai from Arizona State University. What are the current adaptation approaches in the Delta from government sectors and grassroots approaches?

- *change the attitude in using water: capacity building, awareness raising...*
- *introduce new technologies in cultivation, irrigation management,*
- *study on better operation of salinity control structure*
- *call for private investment in centralized water supply to help remote area people*
- *incentives for good practices.*
- *etc.*

A question from Rapichan Phurisamban from University of British Columbia. The 1995 Mekong Agreement needs to be updated to address new challenges of regional water planning, development, and climate change. What are the levers to push for such a process? What are the different stakeholders doing to contribute to better Mekong governance beyond data sharing?

- *Mekong Agreement 1995 have 05 water use procedures, and to update the Mekong Agreement 1995, we suggest to update its water use procedures and technical guidelines, taking into account new challenges as mentioned.*
- *Different stakeholders are showing their interests in how to have better Mekong water governance, not only data sharing but strengthening the implementation of monitoring, operation, assessment, and so on. Government try to keep commitments and improve policies, strategies...., mid- level try to fulfill duties and tasks, community/grassroot level try to raise their voice, development partners try to share and support resources, etc.*

Additional Questions Addressed During the Program

How do legal frameworks as well as tools like modeling and mapping support better Delta management in the Mekong?

A question from Marc Goichot: Data access is important, but is it currently the main bottleneck? And what about understanding, which is slightly different than data access, and governance or inclusiveness?

A question from Marc Goichot: Rivers are more than just water. For example, the morphology of the Mekong Delta channels have changed dramatically in the last 20 years. How can we measure & model these processes? Do we need more multidisciplinary analysis? Are we measuring the right things?

Audience Comments

A comment from Pyrou, Director of the Open Development Initiative: Sharing data doesn't necessarily equate to knowledge. The technical language around water management precludes most people from gaining knowledge and this is perhaps more fundamental than having access to data.

I would completely agree with Pyrou's comment that just sharing data doesn't equate to improving knowledge and understanding. In my experience, it is important for agencies to be able to explain data and the information generated using it at various different level to improve stakeholder understanding so that they may better participate in water management. A comment from Pyrou, Director of the Open Development Initiative: Decision making tools require data inputs. Data can be biased and without open access to raw data inputs these biases are hidden behind agendas which are not necessarily transparent. Open data sharing could contribute fundamentally to inclusive water governance mechanisms. Along with increased data literacy and approaches which increase accessibility of data and knowledge i.e. language, formats (online/offline), disability considerations etc.

I agree that data use can be biased. I believe, and my experience is, that providing transparent data actually is good for agencies as it improves the trust in the agency management, reduces perceptions of bias and reduces disputes that cost agencies money and time to deal with and their credibility and promotes cooperation from stakeholders.

A comment on the solutions and opportunities for the MWDI: To deal with drought and salinity in the delta and other places in the Lower Mekong Basin, groundwater data sharing is necessary in the region.

Huong: From the description of how the MRC is working on sharing data , it is important to understand what this LMI could bring in without repeating the same support by MRC. The report and data sharing in the regard of ground water is a key solution

A comment from Matthew Anderson, USGS: It seems that the most useful lesson from the Colorado River that could apply to the Mekong River that we heard tonight is that with cooperation among the broad stakeholder community it is possible to have some positive impacts on controlling salinity. One of the comments asked what the MRC could do to control salinity; potentially this is the answer, that with greater cooperation among all basin water users there is the potential to address big problems that are caused over big basins/catchments.

Audience Resources

From Pyrou, Director of the Open Development Initiative: Data sharing - there are certainly a broad spectrum of different kinds of 'sharing' and within the data ecosystem these could include; closed - everything in between to - open (see: <https://theodi.org/about-the-odi/the-data-spectrum/>) for more information.

From Jason Riley from the U.S. Department of the Interior: Smart Infrastructure for the Mekong here: https://www.doi.gov/sites/doi.gov/files/uploads/doi-itap_factsheet_-_smart_infrastructure_mekong_-_final.pdf

From Zeb Hogan: Participants can learn more about our project in Cambodia from our fact sheet: <https://www.usaid.gov/cambodia/fact-sheets/wonders-mekong> And our Facebook page: <https://www.facebook.com/MekongWonders/>

From Marc Goichot,

WWF: http://wwf.panda.org/our_work/water/freshwater_initiatives/resilient_asian_deltas_initiative/

SERVIR-Mekong's Regional Drought and Crop Yield Information System (<https://rdcylis-servir.adpc.net/map/>) might be useful to assist local governments and the agricultural sector with seasonal drought forecasting and in implementing short and long-term mitigation measures during and in advance of droughts.

Rishi from Asian Disaster Preparedness Center in Thailand. Through our SERVIR-Mekong programme, we have been working with Vietnamese government on strengthening their capacity on drought monitoring and forecasting. The Regional Drought and Crop yield

Information system developed under SERVIR-Mekong is now being customized in Vietnam for improving their drought forecasting capabilities (<https://rdcyis-servir.adpc.net/map>)

John D. Bolten (NASA)- This paper may be of interest.... Mohammed, I. N., J. D. Bolten, R. Srinivasan, and V. Lakshmi. 2018. "Satellite observations and modeling to understand the Lower Mekong River Basin streamflow variability." *Journal of Hydrology*, 564: 559-573 [10.1016/j.jhydrol.2018.07.030]

Marc Goichot: You may want to consider this research ; conclusion is that impacts of hydropower and sand mining are key to explain worsening of salt intrusion <https://www.nature.com/articles/s41598-019-55018-9?proof=true>

Please see www.mekongwater.org for copies of presenters' slides (up in about one day) and more resources for collaborating for Mekong solutions.

For more information on future webinars about the Mekong, follow the Bureau of Oceans and International Environmental and Scientific Affairs on Facebook (<https://www.facebook.com/ScienceDiplomacyUSA>) and Twitter @SciDiplomacyUSA