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| RESEARCH ARTICLE

Stakeholders' Forum on Integrated Flood Risk Management in Cagayan River Basin: Basis in Writing Policy Recommendations

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| ABSTRACT

The stakeholders' forum aimed to enhance the capacities of policymakers, managers, and practitioners of river basin organizations on flood management through knowledge sharing of new approaches, techniques, methodologies, and good practices from partners here and abroad to help achieve effective implementation of integrated flood risk management as a component of integrated water resources management. The study followed a qualitative research methodology; thus, observation and documentation of each series of planned activities, semi-structured and unstructured interviews with the executive leaders of national agencies and international partners, and discourse analysis of the shared presentations and knowledge exchange between or among the stakeholders were conducted to surface specific themes that described how this stakeholders' forum enhanced the implementation of integrated water resources management in the country through a multipartite communication platform. The research findings revealed that international and national partnership is fortified and R&D efforts will be rapidly realized through a multipartite information exchange, collaborative workshop, technology transfer, and other knowledge-sharing activities. Moreover, legal agreements entered by all stakeholders to scale up global and community linkages are a salient measure to encourage and motivate stakeholders to take part in the implementation of STI-based efforts stipulated in such legal documents. Joint field visits, series of fellowships, and use of websites for information dissemination also have pivotal roles in acquiring a profound understanding of dam situations in the Philippines and Japan, and how integrated water resources management will be communicated to various community partners. Thus, the forum served as a channel that bridged what the government agencies and organizations know about flood and sedimentation management and what the community partners need to understand to revitalize science-community-government-academe collaboration.

| KEYWORDS

Knowledge sharing, technology transfer, water security, integrated water resources management, flood and sedimentation management, policy recommendation writing

| ARTICLE INFORMATION

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1. Introduction

UN-SDG 6.5 states that by 2030, integrated water resources management (IWRM) should be implemented at all levels through transboundary cooperation. IWRM enhances the efficiency and effectiveness of water resource management by exchanging information and collaboration with related organizations.

In the Cagayan River Basin, flood and sediment management are major agendas of IWRM. The recent flooding in 2020 was brought about by the succeeding occurrences of six (6) tropical cyclones in the country, the last of which was Typhoon Vamco (known in the Philippines as Typhoon Ulysses), bringing unprecedented rains to the Cagayan Valley region resulting to

unexpected flood heights and extensive inundation to the provinces of Isabela and Cagayan. In 2019, torrential rains brought by Typhoon Tisoy affected over 70,000 people in the province of Cagayan alone, causing more than 900 million in economic losses in 26 villages in Isabela and an estimated 600 million in damages to school classrooms.

As a fitting response, the Regional Development Council of Cagayan Valley Region prepared and approved for implementation an updated and more focused "Cagayan Valley Flood Mitigation and Mitigation Program" where two task forces were created namely: 1) Task Force for Structural Measures led by the Department of Public Works and Highways (DPWH) Region 02; and 2) Task Force for Vegetative measures led by the Department of Natural Resources (DENR) Region 02. The program also highlighted various strategies, plans, and proposed projects for the Cagayan River Basin for possible funding by the government and partners.

The increasing frequency and magnitude of flood events have become a new "normal" associated with climate change which entails high damage to agriculture and rural infrastructures which threatens food security. Hence, there is an urgent need for an integrated approach to managing the impact of recurring floods using a practical assessment tool to quantify flood risk damages and appropriate measures for immediate use by relevant agencies.

One of the Sustainable Development Goals (SDGs) brought forth by the United Nations is on partnerships for the goals. Considering the aforementioned premise, a global phenomenon could only be solved and addressed through forging linkages in both local and public spheres. According to Bulmer and Yáñez-Araque (2023), multi-stakeholder partnerships play a vital role in promoting sustainable development and ensuring the successful implementation of the SDGs by fostering collaboration and considering the interests of all stakeholders. Thus, there is a need for further understanding and sharing of best practices to enhance their effectiveness in achieving the SDGs.

While the literature offers a multitude of research on integrated water resources management, particularly flood and sediment management, there is still limited research documenting science-government-academe-community collaboration in an actual communication platform. In fact, in the research done as part of the Circle/Era-Net program, which aimed to strengthen the connections between scientists and stakeholders in transnational European research regarding climate change adaptation, collaboration, and knowledge exchange were acknowledged as intentions but not as visible practice (Bento et al., 2016). To address this research gap, this research then explicated the best practices, relevant programs and/or projects, and studies of Japan and the Philippines on integrated water resources management through a series of stakeholders' forums or information exchange between or among policymakers, legislators, managers and practitioners of river basin organizations, and academicians. By and large, a comprehensive water resources management plan for institutional and international collaboration on S&T-based technologies, R&D efforts, and capacity development would be the study's contribution and tangible outcome out of the knowledge exchange between or among the stakeholders.

2. Literature Review

Integrated water resources management entails the cooperation and collaboration of various stakeholders like academicians, policymakers, technical and executive directors of government agencies, communities, and the like. It necessitates collaboration among multiple disciplines and a diverse group of stakeholders with varying interests and resources. These stakeholders must integrate objectives and funding from different policy areas, considering a variety of options across all spatial scales and time horizons (Herk, 2014). Based on the study of Almoradie et al. (2015), flood risk management (FRM) plans should also be developed through participatory processes involving all stakeholders, fostering collaboration among experts and stakeholders to identify agreed-upon FRM measures. However, challenges such as limited financial resources, spatial distribution of stakeholders, and varying levels of interest can hinder effective participation. In a similar vein, according to Tseng and Penning-Rowsell (2012), there were barriers to stakeholder engagement in FRM, focusing on stakeholder-based, time-related, and power-related barriers identified in the literature. Critiquing existing ideas and using a case study from Taiwan, they found that ignoring micro-political dynamics during engagement led to unexpected obstacles, particularly in power-sharing processes. The study underscored the importance of analyzing stakeholders' micro-political positions to effectively manage conflicts inherent in decision-making processes.

Considering the vast of literature, there are just few studies which recognized the inclusion of multipartite dialogues for a more holistic approach in addressing water-related hazards in the world. Lim et al. (2023) underscored that engaging stakeholders is a crucial component for the successful implementation of Integrated River Basin Management (IRBM). This engagement fosters social learning, with leadership playing a vital role in ensuring its effectiveness. Despite this, stakeholder management collaboration is often viewed as the solution or a cure-all for the complex issue of flood risk management. However, there is a clear lack of understanding about the processes and capacities needed to facilitate effective collaborations in practice (Paxmohob, 2022). This has also been supported by Pasquier et al. (2019) as they mentioned that decision-makers encounter

significant challenges when planning for climate adaptation. Increasing scrutiny on the ability of science to meet policy actors' expectations has emphasized the need to integrate stakeholder and scientific knowledge. Their research findings underscored the difficulties in conducting integrated scientist-stakeholder assessments of future flood risk, but they also highlighted the potential of these assessments to generate valuable information for decision-making. Similarly, Mariele (2012) stressed that involving stakeholders in flood risk management is crucial and challenging, and the European Flood Directive requires their active participation. Decision-makers must transition from decision-makers to persuaders and act as moderators between experts and the general population, which is both the most important and most difficult aspect.

On the other hand, Mitiku et al. (2020) highlighted that an integrated flood management approach that incorporates social and stakeholder involvement, considers the environmental and economic conditions of the basin, and includes both structural and non-structural technical flood mitigation measures, can offer a comprehensive alternative on how to effectively manage water resources. In fact, interactive governance offers a method for negotiating and balancing the varied interests of stakeholders. One key benefit is that it enhances satisfaction through active participation, thereby making stakeholders less likely to pursue legal action against the implementation process (Nouzari et al., 2022).

On the other side, once crucial aspect of IWRM is risk communication. According to Liang and Huang (2016), risk communication is a crucial tool in risk management, helping stakeholders reach consensus. In the context of flood disaster risk governance, effective communication among stakeholders managing basin reservoirs is essential when floods are unavoidable.

3. Methodology

3.1 Design

The study followed more of a qualitative research methodology since it documented and published information and records of the Stakeholders Forum on Integrated Flood Risk Management in Cagayan River Basin on July 14-16, 2022, an international event organized and sponsored by Isabela State University-Echague Campus, Department of Science and Technology, Asia Pacific Network for Global Change Research, Japan-ASEAN Science, Technology and Innovation Platform, Kyoto University-Disaster Prevention Research Institute, Japan Water Agency, Department of Environment and Natural Resources – Region 2, City Government of Santiago, and the Provincial Government of Isabela. Specifically, observation and documentation of each series of planned activities, semi-structured and unstructured interviews with the executive leaders of national agencies (i.e., NIA, DENR, DPWH, OCD, and ISU) and international partners from Kyoto University, and discourse analysis of the shared presentations and knowledge exchange between or among the stakeholders were conducted to surface specific themes that described how this stakeholders' forum enhanced the implementation of integrated water resources management in the country through a multipartite communication platform. The forum served as a way to engage with leading-edge research as it encompassed best practices and methodologies and presented new techniques in the field of science and engineering. This was validated by its theme: "Mainstreaming Knowledge Sharing and Communication in Integrated Flood Risk Management to Strengthen Effective IWRM Practices".

3.2 Study Areas

As the stakeholders' forum was a complex and multifield activity, the communication platform was situated in the following contexts to unfold the different modes of knowledge-sharing activities between or among stakeholders:

Zen Hotel, Santiago City, Isabela. This was where the first and second day of the stakeholders' forum was conducted. It was intended for the formal talks, particularly welcome and keynote messages including update reports of the renowned speakers from the Integrated Flood and Water Resources Management (IFWaRM) project and ISU's international and national partners as well as from other stakeholders. This was also where the workshop on research and development collaborations, capacity-building plans, technology transfer, and institutional arrangements was conducted along with the signing of the Memorandum of Agreement and closing ceremony that clinched the formal engagement of the stakeholders who attended the said international event.

NIA-MARIIS – Division 1, Batal, Santiago City. It was where the meeting on the proposed measures for Magat Dam Rehabilitation was held. It was participated by all the Japanese partners, resource speakers, and key organizers from the Isabela State University, National Irrigation Administration, and Department of Science and Technology.

International Organization on Climate Change Adaptation and Disaster Risk Reduction Management (IO-CCA-DRRM) at Isabela State University, Echague, Isabela. This was another study site where the inauguration of the organization's office was held along with the launching of its official website. All the Japanese partners, resource speakers, key organizers, and University officials from the Isabela State University, and representatives from the National Irrigation Administration, and Department of Science and Technology attended the organized inaugural program.

NIA-Dam and Reservoir Division, Ramon, Isabela. The visit to this area concretized Japan-Philippines collaboration as the transfer of technology was very evident in this phase of the stakeholders' forum. The Japanese partners, along with representatives from the Department of Science and Technology, toured the Forecasting Center, upstream sites, and sedimentation monitoring station of the National Irrigation Administration-DRD. The finalization of the way forward for Magat Dam and reservoir upgrading and rehabilitation was also conducted in this area.

Mango Suites, Santiago City. The visit to this area clinched the stakeholders' forum as it was the venue where the signing of a Memorandum of Understanding between the City of Santiago and Japan Water Agency to expand partnerships with international stakeholders was held. This was conducted to promote UN-SDG 6 (clean water and sanitation for all) and water security in the city.

3.3 Specific Strategies

This study utilized six useful and practical strategies to lay out the research context and methodologies. It is presented in the illustration below:

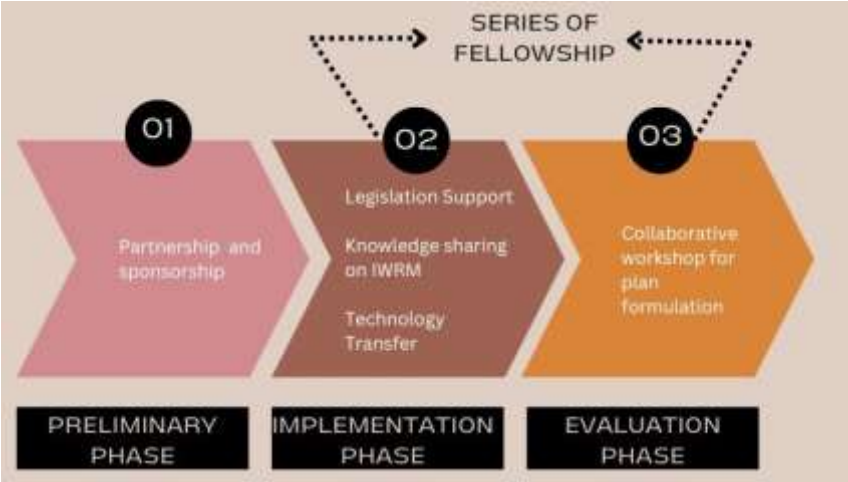

Figure 1. Specific Strategies Employed in the Conduct of Stakeholders' Forum

The preliminary phase is composed of partnership and sponsorship which are both pivotal areas in the sound implementation of this large-scale forum for stakeholders. In partnership and sponsorship, the stakeholders' forum underscored the need to have multipartite funding from partner agencies to ensure the maximum participation of all stakeholders in the region. The implementation phase of the forum, on the other hand, comprised legislative support, knowledge sharing on integrated water resources management practices, and technology transfer. Legislative support included the support messages from political leaders and/or legislators during the conduct of the forum. Specifically, the prime movers of the international venture sought the participation and support of the municipal, district, and provincial political leaders to strengthen the cause or advocacy of the research project teams about the smart way of dealing with water-related hazards.

On the other side, knowledge sharing on integrated water resources management practices covered the multipartite information exchanges as well as presentations of update reports and research programs and projects that were extensively slated in the forum's program to communicate to the community partners the various effective IWRM practices in the ASEAN region, particularly from Japan and Philippine contexts. Furthermore, technology transfer incorporated a series of field visits and shared technology from the international partners to a national agency. All the Japanese stakeholders had a series of meetings with the National Irrigation Administration staff and toured the facilities and stations of NIA-DRD, Ramon, Isabela for the transfer of knowledge and technology. This is evidenced by the installation and utilization of the bathymetric survey instruments given by the Japanese partners to the Isabela State University which were conferred to and were adopted as technology by NIA. The shared methodologies and techniques in flood and sediment management and the utilization of the aforementioned instruments that facilitate the operations of NIA are concrete manifestations of technology transfer.

In the evaluation phase of the study, the stakeholders reviewed all the information conveyed by the executive leaders of national agencies, policymakers, academicians, and international partners through a series of presentations and update reports during the forum per se. Particularly, a collaborative workshop participated by various stakeholders from national and international

agencies was conducted to accentuate the need to formulate plans focused on research and development collaborations, capacity-building programs, technology transfer, and institutional arrangements. The participants were grouped according to their agency so they could work together in the same context and delve into similar issues influencing their respective operations. The collaborative workshop was facilitated by the staff from the Department of Natural Resources – Region 2. In doing such, a series of fellowships were organized to ensure the sustained knowledge exchange of stakeholders in both formal and informal communicative contexts. To further strengthen and fortify the partnership between or among the stakeholders who attended the forum, there was a series of fellowships conducted in various venues or sites, and it was even embedded as the planned activities for the international event were deliberately carried out. Examples of activities that heightened the camaraderie and rapport among the forum participants were the collaborative workshop, exchange of information among participants in every activity in the work plan, group tour at the NIA-DRD stations and facilities, and cultural presentation, among others.

4. Results and Discussion

4.1 Approaches, Strategies, and Programs Among Government Agencies on Integrated Flood Management in Cagayan River Basin

The triumph of effective integrated flood management lies in various programs and plans of different agencies and or institutions unified towards sustainable development. As part of the government agencies' accountability to present update reports on their major accomplishments, the various heads of government agencies such as DPWH, DENR, NIA-MARIIS-DRD, and DOST-PCIEERD presented their update reports on their research ventures.

Science and Technology-based Water Resources Management Interventions. The Executive Director of DOST-PCIEERD discussed the "Philippine's Water Resource Management Climate Resilient Infrastructure Initiative Program." He detailed the various Science and Technology interventions that their agency adopts which revolved around surveys, monitoring, and assessment, planning and management, and water technologies and infrastructure. The essence of S&T interventions is embodied as a stronghold of integrated water resources management. This is further elucidated by the international partner from Japan as he explicated the topic "Flood Mitigation and Risk Communication under Successive Typhoons at Cagayan River Basin in the Philippines (DPRI International Collaborative Research Project)." Likewise, he expounded flood control dam scenarios as well as an integrated approach for risk communication and reduction as a way forward.

In addition, as the stakeholders' forum gives prominence to knowledge-sharing activities, a water expert from ISU expounded on the topic "Integrated Flood and Water Resources Management Research and Development in the Cagayan River Basin" to update the stakeholders regarding the case of the Philippines. She presented the CRB baseline information, various water management sectors, water-related disasters in the basin, and numerous schematic frameworks for integrated flood, sediment, and water resources management, as well as the research projects' accomplishments. Based on the presentations and elucidations cited above, it can be deduced that S&T-based water resources management plays a vital role in flood mitigation and in building climate-resilient infrastructures for the continuous development of the Cagayan River Basin.

To this end, the Regional Director of DOST Region 2 also conveyed her empowering messages to support the advocacy of this undertaking. She then rekindled the department's shared commitment to the region, as evident in this line: "*I would like to continue what I have started; we will continue to provide opportunities and access to various S&T programs and services to all our stakeholders in Cagayan Valley*,". With this remark, she pledged the department's accountability and investment to achieve a flood-resilient community.

Agencies' Mandate-based Programs. Government agencies perform different functions which are anchored on the nature of their operations and mandates. The initiatives and programs proposed, implemented, and monitored by every agency are key ingredients of a multifaceted and collaborative success as each agency fills in the puzzle to arrive at holistic and quality outcomes despite diversity in operations and functions in the community.

During the stakeholders' forum, the manager of NIA-MARIIS-DRD gave an update on ongoing programs and activities on Magat dam safety and reservoir sedimentation. Moreover, the Regional Director of DPWH Region 2, also gave an update on the Build Back Better Program on Flood Mitigation in Cagayan River Basin: Task Force on Structural Measures, while the Regional Director of DENR Region 2 focused her discussion on vegetative measures. Essentially, they presented their practices and operation highlights on water resources management and watershed rehabilitation programs and some of their proposed projects and way forward, which all adhere to their respective agencies' mandates.

Furthermore, the international partners in Japan also expressed their notions about dam rehabilitation to support the different programs implemented by the abovementioned national agencies, especially NIA. They explicated the topic "Proposed Measures for Magat Reservoir Rehabilitation: Technical Feasibility and Institutional Arrangements". They specifically highlighted the

impacts of dam and reservoir sedimentation as well as the use of turbidity current meter and 2D numerical simulations for Magat reservoir. Also, they systematically presented research-based procedures to rehabilitate the Magat reservoir.

To complement this in a national context, the RD Lead of DOST-NRCP presented the Philippine Water Resources Management Plan and discussed some Philippine Water resources planning and management initiatives. He also accentuated his major contributions in crafting the Philippine Water Supply and Sanitation Master Plan and the Unified Resource Allocation Framework for Water Supply and Sanitation, National Irrigation Master Plan 2020-2030, Flood and Drainage Management Master Plans of the DPWH, and the draft guidelines on dam safety and safe operation of dams and reservoirs in the Philippines.

As the international event culminates the series of talks, a question-and-answer portion was conducted to intensify the multipartite information exchange of the stakeholders. The focal point of the Q&A part was on sediment and erosion mapping and monitoring of Magat tributaries, interagency communication mechanisms, implementation of Japan's good practices in the Philippine context, analysis of particles through a turbidity meter, training master plan for Cagayan and Magat, excess water management, and water shortage during summer. The heads of agencies responded by explicating their designs and practices on multiagency vulnerability assessment, tree-planting activities, institutional arrangement through the Cagayan River Basin Management Council (DENR and DPWH) and Water Management Division (NIA), continuous knowledge-sharing activities on sediment management, and improvement of dam operations and rainfall-runoff forecasting.

To this end, the Chief of the Conservation and Development Division of DENR Region 2 even encouraged the forum delegates that the knowledge gained in the stakeholders' forum should be done in practice as it is the next thing to do; it is a science shift to governance. After the formal culmination of the program, there was a meeting among dignitaries from JWA, Kyoto University, ISU, NIA-MARIIS, and DOST-PCIEERD at the NIA-MARIIS Division 1, Batal, Santiago City to deliberate on the proposed measures for Magat reservoir rehabilitation.

Indeed, the international and local stakeholders took their partnership to a greater height to channel their research ventures on flood risk management to their community partners through knowledge-sharing activities.

Understanding Dam Situations Towards Contextualized S&T Solutions. To bridge the theories and research outcomes of hydrology with the governance and practice of implementing government agencies, the forum delegates voyaged around the premises of the National Irrigation Administration's divisions to clinch the way forward plans for Magat Dam and reservoir upgrading and rehabilitation. This is a concrete example of a research-based procedure for knowledge and technology-sharing undertakings between global partners --- the catchwords encapsulating the essence of the Stakeholders Forum on Integrated Flood Risk Management in the Cagayan River Basin.

As a culminating activity of the international event, the said dignitaries visited the NIA-DRD Forecasting Center and its main office, the station for the bathymetric survey equipment, downstream sites particularly the MARIIS Dam, and Carlos S. Salazar Viewdeck. The NIA hydrologist also presented to the Japanese stakeholders the location map and features of Magat Dam and Baligatan Hepp and Diversion Dam. She also explicated the operations of NIA by identifying SN Aboitiz Magat Power Plants as the operator of Magat Hydroelectric Power Plant, describing the Magat flood forecasting stations and early warning system, and presenting the operation rule curve and the protocols on dam discharge and flood warning as well as the categories of dam discharge warning system.

Through the brief lecture and audio-video presentations, the international partners have become more cognizant of the flood and dam situations in the Philippines. This mutual partnership shrouded with shared objectives is a promising avenue for global ties to ensure water security and a better and safer community in the future.

4.2 Good Practices from River Basins in Japan on Flood and Sediment Management

A good outcome of collaboration and the essence of the stakeholders' forum is the sharing of good practices to comprehensively and cooperatively propose solutions to environmental issues. Through this large-scale forum, the Japanese stakeholders presented numerous ways for effective flood and sediment management, which could aid in the advancement of water resources management practices in the Philippines. In essence, a dignitary from the Japan Water Agency (JWA) explicated the concepts of integrated water resource management in river basins. Specifically, he introduced the role of the JWA in the enhancement of people's lives and economic development. He also explained that the concept of IWRM emerged in response to increasing pressures on water resources from frictions among various users for a limited resource, the recognition of ecosystem requirements, pollution, and the risk of water availability due to climate change.

Moreover, an academician from Kyoto University and notable at JASTIP accentuated various work plans for Japan-Philippines collaboration in the Cagayan River Basin. He highlighted several projects for 2020-2025, the challenges on dams in the 21st century, dam asset transfer to the next generation, Japan's situation of dam flood control, pre-release operation practices, and the target basins and research groups. He even emphasized the position of Japan in the future vis-à-vis water resources management, as evidenced in the following extract:

> Japan will proactively contribute to the solution of water-related social issues faced by the Asia-Pacific region by developing "quality infrastructure" capitalizing on Japan's advanced technologies…and public-private partnerships, and fostering digitization and innovation to solve social issues as a growth engine for sustainable development and the formation of a resilient society and economy (International Partner 1).

JWA also explained the protocol for discharge pre-release of dams in Japan. They also illustrated certain responses to recent abnormal rainfalls/floods and pre-flood drawdowns. To this end, the multiagency information exchange serves as an avenue for the formulation of plans for institutional collaboration on research, development, capacity-building, technology transfer, and knowledge-sharing activities.

4.3 Institutional Collaboration on Research, Development, Capacity Building, Technology Transfer, and Knowledge Sharing

To magnify the collaborative efforts of all the stakeholders, a workshop by group, facilitated by the National Economic and Development Authority team, was deliberately conducted to accentuate the need to formulate plans focused on research and development collaborations, capacity-building programs, technology transfer, and institutional arrangements. Subsequently, the output presentation and open forum concluded the series of activities slated for this stakeholders' forum. The cornerstone of the open forum was on the collaborative science-based decision and policy-making to bring forward integrated coastal and water management in the Cagayan River Basin.

Strengthening Internationalization Efforts Through a Multipartite Forum on Flood Risk Management. Upon the establishment of a network of institutions, agencies, and organizations, the activities of the assemblage are always collaborative, and concerted efforts are constantly expected among its members in the network. The realization of a large-scale and multipartite stakeholders forum in a global arena had been made possible through the sponsorship of the Isabela State University, Kyoto University- Disaster Prevention Research Institute (DPRI), Japan-ASEAN Science, Technology and Innovation Platform (JASTIP), Japan Water Agency (JWA), Asia-Pacific Network (APN) for Global Change Research, Department of Science and Technology (DOST), Department of Environment and Natural Resources (DENR) Region 2, National Irrigation Administration- Magat River Integrated Irrigation System (NIA-MARIIS), and Local Government Units (LGUs) of Santiago City and Isabela. Moreover, this international endeavor was primarily schemed by a forerunner in soil and water management – the Vice President for Research and Development, Extension and Training, and the Program Leader of various water resource-related research projects, Dr. Orlando F. Balderama.

As the event intends to include numerous parties or groups of stakeholders for a more extensive and comprehensive way to address water-related problems in the Cagayan River Basin, several delegates convened for the said international activity. The dignitaries from JWA, Nippon Koei, Philkoei International, Inc. (PKII), professors from Kyoto University, top-ranking political leaders, research and development leaders from DOST-NRCP, regional and provincial directors of DOST-Region and PCIEERD, experts from the National Economic Development Authority (NEDA), Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA), Office of Civil Defense (OCD), DENR, DPWH, and NIA, directors of various Niche Centers in the Regions (NICER), administrators from State Universities and Colleges (SUCs) in the region, research project leaders, and ISU research staffs were all involved in the forum.

By and large, a wider audience in a forum on flood and sediment management not only broadens the scope of knowledge and resources available but also promotes more inclusive, equitable, and effective management practices.

Top Execs Promising Support and Commitment. Likewise, the genuine commitment and support of the leaders of organizations, agencies, and institutions are keystones in the success of any joint R&D endeavors, capacity development programs, technology transfer, and knowledge-sharing activities. In gracing the international event, several administrators, executives, directors, and political leaders conveyed their ideas about the pressing issues of integrated flood risk management. This is validated by the following extract: "*Through sharing of innovative ideas in this forum…and with the help of our visitors, we can open an interactive dialogue from where we can exchange our enhancements and best practices*" (Political Leader 1). This was one of the political leader's statements as she hoped for innovations and appropriate management strategies for flood control.

As interactive dialogue was highlighted by a political leader, one of the influential institutional executives who attended the forum also validated the necessity for collaboration among agencies or institutions, as shown in this extract: "*May this collaboration be our effort in underlying integrated multisector responses in enabling longer-term, catchment-wide perspective to emerge in the Cagayan River Basin flood risk management*" (Executive 1). His expressed his statement while calling for help in reducing the risk of flood-induced human and economic losses.

In a similar vein, the top executive official of the province also accentuated the need for cooperation and linkages among diverse groups of stakeholders to effectively manage floods in the region. He stated "It is my fervent hope that this forum will now set into motion a fruitful partnership and collaboration with our Japanese and other international counterparts in...strengthening communication linkages" (Political Leader 2). By and large, all the organizational leaders and institutional heads from various agencies, and top-level political leaders of the Province of Isabela recognized the all-out support of international partners from Japan to revitalize the science-community-government-academe collaboration and for the sustainable development of the country.

To reassure and accentuate the legislative support that top-level political leaders offer, another political leader conveyed a message of commitment to further link the efforts of the government to scientific and academic communities. The essence of a multisectoral partnership was accentuated in this extract:

> Flood management in the Cagayan River is a gargantuan task…it will take a lot of effort from different government agencies, different partners like Local Government Units (LGUs), State Universities and Colleges (SUCs), private [sector] because it takes a collective effort to really solve the problem that we have (Political Leader 3).

To exemplify the significance of partnership which was given prominence in all the conveyed messages of commitment of top execs and various leaders of organizations, the first day of the stakeholders' forum concluded with a fellowship between the international and local stakeholders to further fortify the friendship which was instigated by academic and research collaborations.

Signing of Memorandums of Understanding to Seal Partnership. Partnership functions as the key to the successful implementation of various initiatives and programs to a wider audience. To instigate change and address perennial and global environmental issues, linkages with local and international partners play a pivotal role in crafting and implementing S&T-based solutions. Thus, it is through the stakeholders' forum that two (2) Memorandums of Understanding were signed. To expand the international ventures of the stakeholders, a ceremonial MOU signing between the Japan Water Agency and the Cagayan River Basin Management Council has been conducted to seal the forged partnership.

Moreover, through the leadership of Isabela State University's International Organization on Climate Change Adaptation and Disaster Risk Reduction Management Inc. (IO-CCA-DRRM), another MOU between the JWA and the City of Santiago, Philippines was signed. As this newly forged partnership accentuated the promotion of water security and UN-SDG 6 (clean water and sanitation) in the City of Santiago, it then adhered to the advocacies of the transformative and innovative leaders of the international organization.

Being at the forefront of integrated water resources management ventures in the Philippines, Dr. Aquino and Dr. Balderama are both pioneers of Japan-Philippines collaborative efforts on flood and sediment management in the ASEAN region. Thus, they are able to link the City of Santiago, a first-class independent component city dubbed as the investment hub and commercial center of the Cagayan Valley Region, Philippines, and the Japan Water Agency, a government agency in Japan that contributes to the world's Integrated Water Resources Management (IWRM) efforts.

This ceremonial signing of MOU aimed to establish a partnership between the aforementioned parties in conducting collaborative activities and projects to achieve water security in Santiago City and sharing knowledge on water issues concerning flood and sediment management of Magat Dam and Cagayan River Basin. During the MOU signing, the enormous need of the city to conduct international collaborative projects for the investigation of flood and sediment management of Magat Dam and Cagayan River Basins as a part of effective mechanisms to achieve UN-SDG6 and water security in the city was highlighted in the interactive dialogues among the political leaders, local government units (LGUs), and local partners.

The outcome of the partnership – strategic collaboration and helping hands from partners – is stressed in the following extracts made by the Director General for International Affairs of Japan Water Agency:

> The Japan Water Agency has contributed to the development of Japan by promoting water resource development and flood control measures. We strongly hope that this kind of knowledge will be beneficial for the further development of the Cagayan River Basin and Santiago City (International Partner 2).

As the Stakeholders' Forum on Integrated Flood Risk Management in Cagayan River Basin concluded, the collaborative efforts among stakeholders in various partner agencies in the ASEAN region will just begin. Each partner carries hope and motivation to fortify synergy on integrated water resources management in the global landscape.

Establishment of Physical Structure and Website for International Operations. Aside from legal documents embodied by MOUs, and the spoken commitment and support of various stakeholders, a physical structure in the form of an office where the collaborative operations will be planned and worked out is another critical factor in the success of any kind of partnership. The Isabela State University, having set another milestone for holding a seat in the global network of agencies promoting the integration of climate change adaptation and disaster risk reduction management, environmental awareness, and mitigation, took the lead in the inauguration of the International Organization on Climate Change Adaptation and Disaster Risk Management (IO-CCA-DRRM) Inc. Office on July 16, 2022, along with its international partners.

This is one of the highlights of the three-day Stakeholders Forum on Integrated Flood Risk Management in the Cagayan River Basin as it embodies the University's global community linkages with international partners. Partnership is once again accentuated in this kind of activity as the inauguration was attended by dignitaries from the Japan Water Agency (JWA), Japan-ASEAN Science, Technology and Innovation Platform (JASTIP), Kyoto University (KU), Department of Science and Technology - Philippine Council for Industry, Energy, and Emerging Technology Research and Development (DOST-PCIEERD), Asia-Pacific Network (APN) for Global Change Research, and top campus officials of ISU-Echague. As the physical structure embodies every stakeholder's commitment and support, the following interview extract sums up the trajectory of the partnership forged through this large-scale forum: "*We are counting so much on this collaboration, and I hope that the presentations…will be synthesized and consolidated so we can submit to the leaders not only in the province but in the national government for consideration* (Executive 1)."

For the partnership to be extensive, wide-ranging, and far-reaching, a physical structure is better complemented by a space in the cyber world. Thus, the IO-CCA-DRRM also launched its website to truly realize its goals. Primarily, this website was developed for the wider dissemination of the University's internationalization efforts and ventures. During the inauguration, all the features and contents of the website were presented by a web developer to facilitate information searching and navigation around the control system of the website.

To this end, the following extract from another executive gave prominence to the upscaling of research projects among the stakeholders: "*The collaboration has just started, and it just becomes bigger in scope…we will continue what we have agreed upon for new collaborative projects* (Executive 2)".

The commencement of the operations of the international office today exemplifies the University's pivotal role in establishing a larger network of agencies around the world as other international offices are expected to rise in Malaysia and Vietnam to further fortify the forged friendship between Japan, the Philippines, and other countries in the ASEAN region.

5. Conclusion

This study aimed to describe the best practices, relevant programs and/or projects, and studies of Japan and the Philippines on integrated water resources management through a series of stakeholders' forums or information exchange between or among policymakers, legislators, managers, and practitioners of river basin organizations, and academicians. In terms of communication of effective IWRM practices, the stakeholders' engagement in knowledge-sharing activities to present and discuss research ventures on flood risk and sediment management as well as their respective IWRM approaches, strategies, and practices served as a wide-ranging platform to reach all their community partners. On the other hand, two Memorandums of Understanding were signed by the concerned stakeholders (Japan Water Agency and Cagayan River Basin Management Council and the City of Santiago) as proof of intensified international ventures and expanded linkages with global partner agencies. Furthermore, the stakeholders' forum yielded formulated plans focused on research and development collaborations, capacity-building programs, technology transfer, and institutional arrangements. Likewise, the International Organization on Climate Change Adaptation and Disaster Risk Reduction Management, Inc. Office and website was launched to promote the integration of climate change adaptation and disaster risk reduction management, environmental awareness, and mitigation.

In addition, the stakeholders' forum workshop yielded a draft of policy notes on integrated water resources management which will be subsequently submitted to the concerned government agencies (i.e., NIA, DENR, DPWH, CRBMC). This is to inform them about water security issues and water-related hazards based on research evidence so they can make sound and best decisions

on how they operate based on their mandate and contribution towards sustainable development of the country's resources. Moreover, multipartite exchange of information and fortified partnerships through a series of fellowships and MOU and MOA with stakeholders can lead to more national and international collaborative research projects that contribute to the existing body of knowledge, human and natural resources development and management, and the country's further development, and facilitates technology transfer and implementation of synergy programs.

This study just revolved around the planned activities implemented during the stakeholders' forum such as MOU signing, knowledge-sharing activities, collaborative workshop, and launching of an international organization for institutional collaboration. Moreover, the updates of the government agencies, and best practices shared by the Philippines and Japan were limited to pre-prepared speeches and presentations. Thus, for future research, validating the information about the strategies and programs on integrated flood management in the Cagayan River Basin shared by top execs of government agencies during the stakeholders' forum through the lens of the grassroots level is suggested to determine if what is presented to policymaking bodies and the scientific community is actually practiced in every government agency. Likewise, since the data of this research were mainly derived from the forum, other modes of stakeholders' participation like conferences, technical and organizational meetings, and the like could also be a good source of data to explicate the involvement of all key players in the promotion of integrated flood risk management in Cagayan River Basin. This is pivotal in writing policy recommendations apt to the needs of the target communities.

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