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THE HERITAGE OF WATER MANAGEMENT IN MANIPUR

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ABSTRACT

The present work finds the nuance relationship of hydraulic management system and social, political, and economic development of early Manipur Civilization. It re-examines the role of water bodies such as rivers, streams and lakes which led to the emergence and expansion of the early clan principality and their strategic locations near these water bodies. Further, the present work studies the construction of traditional Shoy weir or fishing traps on rivers and streams and the usage of different canals for transportation some of which are still functional till today. By analysing these early hydraulic management and technological systems through rivers streams and lakes of Ancient Manipur, the paper offers critical insights into the Cultural landscape of Ancient Manipur and the heritage of water management as well as political, social, economic consolidation and advancement of the Manipur Civilization throughout her history. Ultimately, the work sheds light on Manipur ancient society as a hydraulic civilization in line with other great civilization founded on rivers across the globe.

INTRODUCTION

German-American historian Karl August Wittfogel in his book *Oriental Despotism* (1957) has written that civilizations that depends upon large-scale waterworks for irrigation and flood control were called “hydraulic civilizations”.¹ According to his observations, wherever irrigation required substantial and centralized control, the

government representatives monopolized political power and dominated the economy, resulting in an absolutist managerial state.

According to Wittfogel, neither too little nor too much water leads necessarily to centralized water controls and governmental despotism. He says, an economy must be neither too primitive nor too advanced to institute in a water-deficient landscape a “specific hydraulic order of life.” He relates this order further saying it has its own type of division of labour and necessitates cooperation on a large scale. Most of the first civilizations in the dawn of history, such as Ancient Egypt, Mesopotamia, China, India, Pre-Columbian Mexico and Peru, are believed to have been hydraulic empires.

The early Egyptian civilization 3100 BC was developed on the banks of the Nile River.ⁱⁱ Egypt is often called the “Gift of the Nile” due to its dependence on the river for agriculture, transport, trade and commerce and political control. The hydraulic management of the Nile River led to development of monumental architectural structures such as the Pyramids, Temples, and Obelisks which stand the test of time till today. The Egyptian State under the Pharaohs played crucial role in the organization of its various irrigation projects through building canals and levees.

Similarly, the Mesopotamian civilization emerged around the Tigris River and the Euphrates River around 3500 BC. Mesopotamian means “the land between two rivers.”ⁱⁱⁱ Complex architectural designs including canals, dikes, reservoirs, and drainage helps in the development of city states such as the Sumer. Akkad. Babylon, Assyria in and around these rivers. The famous code of Hamurabi also includes water regulation in times of disputes.

In East Asia, the Chinese civilisation emerged around 2100 BC on the banks of the Yellow River. The recently excavated Liangzhu hydraulic system in the Yangtze Delta has pushed back the date of formalized water engineering in China to approximately 5,100 years ago.^{iv} Early Chinese rulers of the Xia Dynasty patronised the construction of hydraulic system such as levees, dike, and canals for controlling floods and irrigation projects. The control of water was a centralised state subject helping in the consolidation of this early dynasties.^v

In the Indian subcontinent, the early Harappan or Indus Valley civilization emerged around 2600 BC. The early city states such as Harappa and Mohenjodaro were founded on the bank of the Indus River and its various tributaries. The urban planning of the Harappan depended on the elaborate mechanism for water management through canals. Water played a crucial role in the religious practices of this early society. The Great Bath of the Mohenjodaro is one significant religious site. One factor for the decline of this civilization possibly linked to the change of river course.

In line with the above theory of Hydraulic civilization, the ancient Manipuri Civilization tracing its history up to the prehistoric period can also be termed as a Hydraulic State. The climatic condition of this ancient Kingdom is predominantly monsoonal type with optimal annual rainfall rejuvenating the rivers, streams, and lakes. The hydraulic potential of this erstwhile Asiatic Kingdom plays a crucial role in the all-round consolidation and development of this region since its early inception and state formation. The Central Valley of Manipur slopes southward and the most of the rivers and streams flow from north to south direction.^{vi} These water bodies consisting of rivers, lakes and streams have provided ample resources for sustenance of large population and meet all the preconditions for state formation. Waterways are an easier and convenient mode of transport in ancient times. Sometimes these large water bodies during torrential rainfall led to regular flooding which calls for regular inspection and maintenance. The ruler of these erstwhile Kingdom and its nobility mustered large labour force for the management of these water bodies from time to time. The ecology and the topographic features of the State with ample water resources had influenced its people immensely in adapting and innovating certain indigenous technology for its consolidation and advancements. This symbiotic relationship of the people with the environment in terms of its water resource for all round development can be called as hydraulic civilisation or hydraulic society.

CULTURAL LANDSCAPE AND HYDRO-CLIMATIC DRAINAGE PATTERNS OF MANIPUR

Based on **structure, topography and geomorphic processes**, the state of Manipur can be divided into two distinct units. Manipur's terrain is marked by **Central Valley** which is oval and **the hills** which surround the valley on all sides. The **Central Valley** lies at an average elevation of 763 m above the sea level and the surrounding the hills range have an average elevation about 1200 to 3050 m above sea level.^{vii} The hill ranges run parallel to the valley and the eastern range are generally higher than the western hill range.

The **topography** of the Central Valley is flat, and elongated in the north to south direction. The Central Valley is slightly slanting towards the southern or southeastern part and due to this physical structure, the rivers flow from north to south direction. The most interesting topographic feature of Manipur is of the **Loktak lake** which is in the southwestern part of the valley. It is considered as the largest fresh water lake in northeastern India. The state covers an area of 22,327 km² (8,621 sq. mi).^{viii} The **Central Valley**, a product of **Pleistocene and Holocene** sediment deposition, is a recent geographical formation characterized by **sand, silt, and clay**. The flat central plain of Imphal was formed when stream were blocked by the convulsion of nature which led to the deposition of alluvium.^{ix}

Apart from these series of low-lying hills there are number of wetlands, lakes and marshes located in the southern portion of the plains. Viz. the Loktak, the Waithou, the Loushi, the Phumlen, the Phumlou, and the Ikop pat (Lakes). The flat alluvial plain of the valley of which is predominantly covered by lakes and marshes has networks of stream and river system.

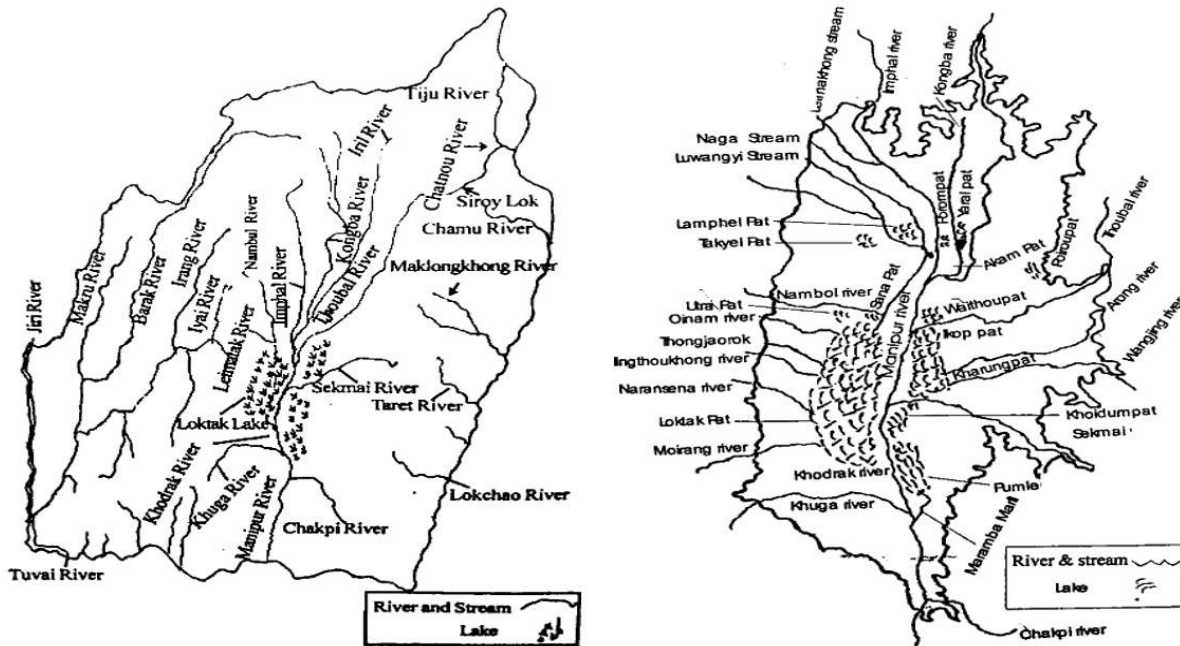


Figure: Drainage patterns, rivers, and lakes in Manipur (Left) and Imphal Valley (Right) (Adapted from Nilkant Singh, 2011)

Sl.No	Name of the River	Catchment Area (Sq. km)	Percentage of Total Area (Sq.km)
1	Manipur River System	5600	25
2	Barak River System	8700	38.8
3	Chindwin River System	8100	36.2

Table: Drainage system in Manipur and its catchment area

BARAK RIVER SYSTEM

The **Barak River** originates from the Manipur hill range south of MaoLiyaiKhullen Village in the Senapati district of Manipur, flowing southwest and forming a segment of the inter-state boundary between Manipur and Nagaland, where it is known as Sangulok. Significant tributaries include the **Makru** and **Irang** rivers. The **Tuivai** converges with the **Barak River** at Tipaimuk and the **Jiri River** merges at Jirimukh. The largest river basin of Manipur is the **Barak** draining an area of 9041 km² with 68% of the total volume contributing to the Ganga-Meghna-Brahmaputra (GMB) basin. It ultimately discharges to the Bay of Bengal.

MANIPUR RIVER SYSTEM

The **Manipur River** is the longest river system in the region and it is characterised by its antecedent drainage pattern. Important tributaries of the river system include **Iril, Thoubal, Khuga and Chakpi Rivers**. These tributaries form an extensive river basin and eventually merges into the **Chindwin River**, which is a tributary of the **Irrawady River** in Myanmar. The river basin encompasses a total catchment area of 5600 km² and it accounts for 25% of the total geographical area of Manipur. This basin is particularly significant as it traverses densely populated regions, covering four valley districts: Imphal East, Imphal West, Thoubal, and Bishnupur. It also extends over significant portions of Senapati district, the western parts of Ukhrul and Chandel districts, and the populous eastern part of Churachandpur district.

CHINDWIN RIVER SYSTEM

The **Chindwin** Drainage System includes the **Imphal River** and its tributaries, along with the lakes and marshes within the valley, and the hill streams of Ukhrul and Chandel districts. These waterways drain into Myanmar's **Chindwin River** or its tributary, the **Yu River**. The Imphal River, also referred to as the Manipur River, originates north of Kangpokpi and flows southward, skirting the eastern side of Loktak Lake. In the valley, its principal tributaries are **the Iril, Thoubal, Nambul, and Nambol rivers**.

River-wise Hydrological Data

<i>SLNo.</i>	<i>Name</i>	<i>Maximum Discharge (in cusec)</i>	<i>Minimum Discharge (in cusec)</i>	<i>Average Annual Rainfall (in mm)</i>	<i>No. of Rainy Days</i>
1.	Imphal River (upto the confluence with Iril river at Lilong)	436.52	0.852	1500	150
2.	Iril River	398.77	0.861	1673	152
3.	Thoubal River	551.77	0.609	1006	144
4.	Chakpi River	423.76	0.432	1281.8	159
5.	Khuga River	1850	0.322	1320	145
6.	Nambul River	43	0.114	1623.8	152
7.	Nambol River	52	0.135	1650	149
8.	Sekmai River	13.5	0.290	1130	140

Table: Hydrological Data of some rivers draining in Manipur (Adapted from Angou Singh, 2012)

The climatic condition of the Central Valley of Manipur is relatively warm and rainy.^x The winter seasons are relatively dry followed by hot summer season. The annual average temperature is recorded 20.25⁰C and the annual average rainfall is 1365.74 mm respectively.^{xi} The region has two predominant seasonal patterns: A. Season of the northeast monsoon (Winter season and summer season with intermittent rain). B. Seasons of the southwest monsoon (Hot and rainy seasons and retreating monsoon).

CLAN PRINCIPALITIES ACROSS THE HYDROLOGICAL LANDSCAPES OF MANIPUR

According to Gangmumei Kabui, the Manipur Valley in the historical time had a social system and lineage based political units which had ultimately emerged into principality.^{xii} The different clans inhabiting the central valley in all probability were competing for control over water bodies and they were depended on natural assets and its ecology. Therefore, the clans relied on these rivers and lakes for easy transportation and fishing activities for their consolidation and development. During the early Pre-State social formation, the Mangang, the Luwangs, the Khuman, the Kha-Nganba, the Sarangleishangthem, the Chenglei, the Angom, the Moirang, the Thanga-Kangbong, etc were emerging from fertile banks of these water bodies consisting of rivers, lakes and streams. It will also be noteworthy to mention that the early clan capitals were connected more efficiently by waterways such as rivers and canals that joins the main river from different settlements. Riverine environments and lakes were intertwined in the development and advancement of these clans throughout history.

The Luwang clan principality settled on the western side of the Lamphelpat lake and on the banks of the Luwangyi river. The Kongba river, the Iril river, the Yaranpat and Porompat lakes were homes to the Angom clan

principality. The Moirang river, Khuga river and the Loktak lake provides livelihood and navel strength to the Moirang clan principality. The Moirang use the Loktak lake as a strategic area for their campaign against other clans. Thanga-Kangbong clan principality were located on the banks of the Waishel river. Wuphongpat lake is located with the principality. On the Imphal river or Turel Achouba, the Khuman clan principality resides. The Khumans had easy excess to the Loktak, the Khoidum and the Kharungpat lakes. Later, these would have led to the Khuman-Moirang clan conflict for possession of the Loktak lake.

The growth of clan principality solely depends on the availability of natural resources. The immediate task for the clans were to exploit the land for the welfare of its people, wage war on the neighbouring clans for more land, power, and wealth. Since they predominantly settled near water bodies such as streams, rivers, and lakes the different clan principalities involved in various waterborne activities. During the Pre-State social formation in Manipur, the clans prefer inland waterways in lieu of difficult roads in tough forested terrains. Frequent inter-clan conflicts were recorded for possession of good fishing lakes and strategic locations. This internecine warfare took place between the Khumans and the Moirangs for the establishing sphere of influence of the Loktak lake. The Loktak lake was useful to both the clans in terms of geographical extent, bountiful natural resources, and transportation facilities. The competition among the clans led to greater social organisation and further propelled these clan principalities to State formation in near future.

HYDROHERITAGE OF MANIPUR: TRADITIONAL PRACTICES OF WATER USE AND CONTROL

The different clans that reside in and around the Central Valley from its early inception were closely bound with water bodies near rivers, streams and lakes. They were depended on these invaluable natural resources for their sustenance including daily water use, fishing activities, gathering of different raw materials and even as mode of transport. Naturally, the peoples were attracted to build their habitational sites on the fringes of the major rivers that runs across the central Valley.

In early days, the chief of the Luwang Clans Shapaiba had undertaken to established fishing weir or in local term “shoy” in and around Lamphel area. This fishing weir also known as fish weir, fishgarth, or kiddie is a type of fishing traps set on the flowing water bodies such as rivers or tidal area which is design to obstruct or directs fish in it. The main purpose for this traditional technology is to trapped fish, directing fish in particular area and also in monitoring fish population. These shoy weirs were usually manufactured from wood.

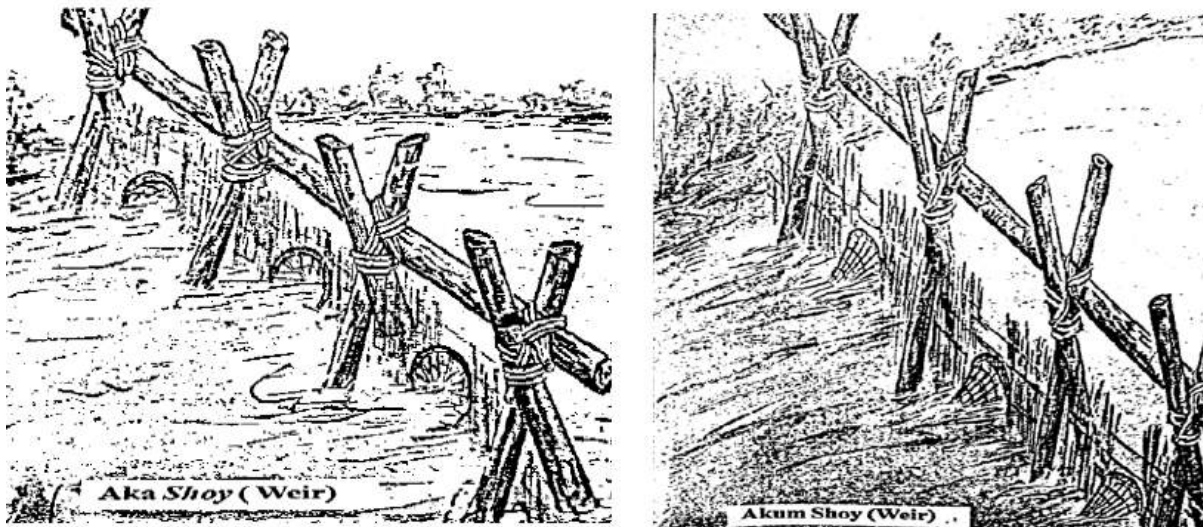


Figure: Traditional fishing traps Aka Shoy Weir and Akum Shoy Weir (Adapted from Nilkant Singh, 2011)

This technology through different designs and materials were in used for thousands of years across various hydro centric societies or cultures around the globe. The Lamphel Shoy Weir was planned to catch fishes and also entrap animals.^{xiii} The Luwang Chief Shapaiba was also tasked with building two pisciculture (fish farming) canals. The first canal for the rearing of Ngaroi fish variety and the second canal was for rearing Ngatel fish variety.^{xiv} Another shoy weir, Mkubi Shoy particularly design for fishing purpose was constructed under the patronage of Luwang Salai Hanba. It is also recorded that Nambulshoy weir was gifted to Yumburembi of Kanglei in marriage to ThangyiNingthouba of the Luwang clan.^{xv} All the above shoy weirs were employed in two modes of fishing; Aka Shoy and Akum Shoy. The Aka Shoy is utilised for fishing during the flood seasons and the Akum Shoy was utilised for fishing during the dry winter seasons. The Akum Shoy in the Nambul river during the dry winter seasons reported the catching of the Ngashep fish.^{xvi} The Nambulriver Shoy weir was given different names i.e., Lumpu Shoy, Hekap Shoy, HeshgotpanNgashepLeikang-Ee, Akum Lairak- Ee and LanloiChingareng Khamla Loukhong Shoy.^{xvii}

At Heipok river, another shoy weir is owned by the Kanglei chief. Here, the HeiremKunjam Clans especially the women were engaged in fishing activities in this river. Their King KhabaShokchrongba was also recorded to have engaged in fishing activities in this river.^{xviii} The people of the HeiremKunjam clan erected dike across the Konte pat or Lake. In this lake under the patronage of the King a shoy weir is constructed using bamboo as primary raw material. Interestingly, a shoy weir made of metal is reported from the possession by one man from the Heirem clan.^{xix}

The Heirem clan chief was tasked with the construction of HeiremNongyai Kong (Canal). This canal is used primarily for fishing activities. The canal is popularly known in local parlance as Ngakha Kong on account of plentiful availability of the Ngakha fish. Interestingly this canal was used for breeding this specific variety of fish.^{xx} It is early evidence for the practised of indigenous fish rearing culture or pisciculture in the Kingdom.

An ancient water canal was constructed by Khuman Nongyai Napanpa at Thoubal area. This canal served the surrounding population as a water resource for daily use. Lokha Canal, NongyaiLeishangkong Canal and Khoupuba Khong or canal were excavated under the supervision of different Khuman personalities like Aton Nongyai Lokcha Heipa, Leishapam Moipa Phap and NongaiKhoupuba.^{xxi} KainouChingsomba of the Angom clan made Chingsombakhong (canal). Chonmeibi and Chonmeiba, these two soldiers dug Chonmeibi-Chonmeiba Khong (canal) Khamtoubi and Khamtoubi created by Kamtoubi-Khamtoubakhong (canal). The four canals such as Chongsomba Khong, Kanglatombi (present Imphal municipality) Khonglen Yai, Chonmeibi-ChonmeibaKhonglen Yai and Khamdoubi-KhamdoubiKhonglen Yai were joining each other to PaotaHiden of Turel Achouba or Imphal River near Kangla.^{xxii} The chief of the Moirang clan was reported to have organised task force for the regular maintenance of water canals, waterways, and construction of fishing shoy weirs. For regular supply of water to its population the Moirang nobleman Nganba Serai Kangcha have patronised for the construction of Hoatangkong canal.^{xxiii} The reign of chief Puriklai in Moirang principality patronised the construction of fishing shoy weir at Ungamel which is located joining of the Khuga and Manipur River. The shoy provides bountiful fish for supporting its population. The Moirang chief Puriklai Miyom Michaoba also constructed Nongkangkong a water canal at Khoiritak to trap wild animals.^{xxiv} The evidence for construction of shoy weir along with early water transportation facility was seen in the patronage of Chief YoirelTompokpa.^{xxv} Both the Khuman and the Heirem clans shared the Sanathoibi Shoy weir which is located in between.^{xxvi} Besides, the people of Moirang regarded their chief as the descendant of their supreme god 'Thangjing'. These water work and projects across the clan principality in ancient Manipur garnered clan support and large-scale labour mobilization under patronage and leadership of the clan chief or nobility. Therefore, it is in line with the concept of "Hydraulic Civilization" as proposed by Karl A Wittfogel.

Kangla stood at an elevation of approximately 2,619 feet above sea level. From these ranges, seven streams originated, channelling water into the nearby lakes and rivers.^{xxvii} The Kangla hillock also known by old name Purum Khonglem Ching features seven drainages which includes Kumshu Khong, Phisukhong, Tumukhong, Taobikhong, Nongdamkhong, Chairoikhong and Muwakong.^{xxviii} These helps to drain water from low lying areas. Naturally, it was encircled by several lakes, including Kekrupat, Akampat, Porompat, Nungjengpat, Hichamyaichampat, Uphongpat, and Lamphelpat.^{xxix} The word 'Khonglam' is derived from

‘Khong’ meaning canal and ‘lam’ meaning road or path, essentially referring to a canal.^{xxx} These canals were likely constructed to manage and drain excess water from the lakes and marshlands. Moreover, they served as connecting waterways between Kangla and nearby lakes and rivers, which further extended to distant regions.

The Khakhong Canal was constructed to connect the Imphal River with Keishampat Lake, while the Laikhong Canal linked the Imphal River to Lamphelpat Lake. Similarly, the Merakhong and Charoikhong Canals were excavated to create a waterway between Porompat Lake and the Imphal River. The Lilakhong Canal was developed to connect the Imphal River with Hichamyaichampat Lake, and the Yambikhong Canal served to link Kekrupat with the Imphal River. These systems of interlinked rivers and canals reflect the ingenuity of the valley inhabitants in regulating rainwater flow across regions—especially important given the area’s intensified rainfall during the monsoon season.

Seasonal monsoon downpours often led to severe floods that damaged farmlands and submerged low-lying settlement areas. To mitigate these natural disasters, managing both advantageous and disadvantageous water bodies became an essential duty of the rulers of Meitrabak (Manipur). The *Tutenglon* (a historical account of river dredging) records how royal figures such as NgangoiYoimongba and King YoiheitonToathingmang spearheaded dredging operations on major rivers like the Turel Achaouba of the Imphal and the Irii.^{xxxii} The account also highlights the mobilization of extensive labor forces—including women—to execute these massive, non-profit waterworks. The king’s hands-on participation in such public welfare activities not only fostered a shared sense of responsibility but also strengthened the people's loyalty to the monarchy.

During King MedinguPengsiba’s reign (379–394 A.D.), Poireipak (Manipur) experienced a catastrophic flood that caused widespread devastation, particularly in the valley. In response, the king-initiated efforts to deepen the Imphal River’s bed within the valley. He also began redirecting the river’s upper course at ThingbaKarong toward the Gwai or Barak River in the Maram hill area—part of the Poireipak kingdom.^{xxxiii} Furthermore, during King Thawanthaba’s reign (1195–1231 AD), the NongchupMerakhong Canal was constructed. Running along the western side of Kangla, this canal served dual purposes—water drainage and transportation. Historical accounts note that this canal was dug by war prisoners, specifically NakhubaNakuni and HaobaThikaba.^{xxxiii}

During the reign of King Tabungba, the Ahingkhon Canal was rapidly excavated overnight as a strategic move to overcome the powerful Kege or Moirang.^{xxxiv} Under the direct oversight of Thingpaingambi, the mother of King Kambomba (1524–1542 AD), a canal known as Thingpaingambi Khong was also dug.^{xxxv} Leima Ningthoingambi, the consort of King Ningthoukhomba, showed deep interest in the excavation of Shayakhong.^{xxxvi} As the kingdom expanded and its political structure evolved, the Meitei rulers continued to

prioritize water management projects to support administrative needs. For instance, when the Cachari Muslims, led by the rebel Sanongba—the younger brother of King Khagemba—dug a lengthy canal from Phumlou to Toupul, it served primarily as a defensive measure.^{xxxvii} Under King Khagemba's rule, and with the supervision of EbungoNongthonba, a stone embankment was constructed at Mayanglam to prevent flooding in the valley area.^{xxxviii} King Khagemba also emphasized the importance of transportation, commissioning the excavation of canals like Kyang Khong and Takhel Khong.^{xxxix} His queen, Lengnaomonbi, played a significant role by mobilizing villagers—including women and children—to dig the ChakppaPumshaikhong canal. Additionally, Queen Taiponganbi was instrumental in creating a fishing canal named Leima TaipombiLamleiNgayok Khong. These initiatives highlight how the Meitei queens actively contributed to the kingdom's economic growth, thereby reinforcing the strength of the state.^{xl}

During the reign of King Khagemba (1597-1654 AD) in Manipur different public welfare work were undertaken. Among this welfare services the large-scalehydraulic management of different water bodies led to improve waterways, transport systems andeasy excess to the main markets and administrative centres in the Central Valley of the kingdom. In term of hydraulic related public works King Khagemba was also known for his patronage in dredging the Nambul river beds specifically from Singjamei to Thangmeiband area. These noble public services by the ruler of the kingdom led to enlargement, widening, and further deepening of the river beds which in turn facilitated transports both people and goods in the riverine inland waterways. An early form of embarkment or dams were constructed across the Imphal River near Sanjenthong to preserve the water resource during the dry winter months by the king. The prevention of flood in and around the valley was an important endeavor of the rulers in those ancient times. In 1661 AD, King Khagemba especially paid attention to preventive control of such natural disaster by constructing a dike along the course the Naga stream in the month of Hiyangei (October and November). In this period the king had taken keen interest in statecraft through welfare programmes including the hydraulic management works under the supervision of the state authority. Subsequently, the Naga stream was blocked during the reign of Paikhomba in 1683 AD. It was also recorded in the chronicle that the King Paikhomba dredges the river beds in the central valley. The Imphal River bank was repaired from areas such as Singjamei to Thonju in the month of Wakching (January-February). Further in time, King Charairongba patronised the digging of the Imphal River specifically in the Kurai area.^{xli}

King Garibniwaz also popularly known as Pamheiba took the task of dredging the Imphal River traversing the central valley especially in the Singjamei area in 1718 AD. It was also recorded that the Naga Thingel and Kaya Thingel dikes were constructed as reservoir which can be used in time of need. Pamheiba also undertook the task of building WaithouThingel dike which constructed across the Waithou stream. The Panas system consisting

of four Panas also works in coordination to repair the Imphal River from Kona Konchin area to Koirengai area in the valley. Interestingly these can be seen as a long-term plan for controlling natural disaster such as floods which is a frequently occurring calamity in the region with large water bodies during torrential rain.

In the Chronicle of the Kingdom, it was recorded that the ruling monarch initiated programmes for large scale hydraulic works such as digging, dredging, and creation of new canals which spread from Sagolband, Naoremthong to the Nambul River near Khwairambandkeithel or Central market of the Kingdom in 1738 AD. During the reign of Pamheiba, large public ponds were constructed. Ningthem Pukhri was a classic hydraulic project to store clean drinking water. It was reported that another pond was dug at Kongba area during his reign.^{xlii}

Further in time, during Maharaj Bagyachandra (1759-1798 AD) reign hydraulic works were reported from the Heipok water route which is located in Mayangningthou Nai area under the supervision of two noblemen Chinkhamba Tangkhomba and Hinaihanba. By draining the Nambul River a new canal was constructed connecting Mongsangkei to Khajingkong. It was also recorded in the Chronicle that a pond was dug at Langthabal in 1782 during his reign. Under the order of Anantasai, Keiroilakpa Malati (noble) by organizing seven Keirpoi lineage, dug Lamlongei pond. In 1783, Anantasai Jubaraj led the entire people of the kingdom to be involved in the construction of dikes at the Iiril River of the Ethem Chingjin area. These water projects in different areas of the Central Valley help in preventive measures undertaken by the ruling monarch including floods. The King's stringent and relentless policy of hydraulic management from time to time by organising large labour task force consisting of the Lois (Outcasts) and Nais (Servants) were remarkably successful in those times. King Bhagyachandra sends various officials in far flung areas of the Kingdom. These officials consist of Shanglakpas (nobles) of the four different Panas. The repair work of Chandranadi river embankments. From Koirengai, the Imphal River was drained to regularize the flow of the river. By organising the entire people of the Kingdom, Maharaj Bhagyachandra initiated to dig a canal named Leishang Hithen. Its main object was to make a proper place for the boat race.^{xliii}

These welfare public works rejuvenate the kingdom with new vigor and won the loyalty of its population. During the short reign of Maharaja Modhuchandra (1801-1803 AD) it was recorded that a pond was dug at Langthabal Capital. In 1811 AD, various dikes across the Imphal River act as reservoir for use in time need and canals were also constructed from Kyamgei to Hyen Khong to channel water to paddy fields for rice cultivation. During this period the Meirenkhong canal was restored. In 1842 AD, regular flow of the Imphal River by dredging it and the overall supervision Kiyang Engkhol was undertaken by Maharaja Nara Singh. It was recorded that over 32 hill tribesmen were assigned to dredge the river flowing inside the Kiyang Engkhol and its

restoration.^{xliv} Further in time, In 1857 AD tribesmen from Northern side of the Kingdom were tasked construction of waterways from Angom LouwaiChingarento the Khabeisoi region of the state.Luwangyi River was drained by the tribes of the northern region of the Kingdom.Thiyam pat was transformed into NingthemLoukon (cultivable land owned by the king) and ChingphuLoukon (cultivable field) was developed.Of course, Phabakchao canal and Ingourok irritated canal were respectively excavated. Several ponds like Yatpokpi Pond, Yumjao Pond, Wangon Pond, Keitenbi Pond, and two ponds of Govinda were drained one after another. Under the direction of Loitongba Subedar water transport route extended from Maklang to EroishembaChingjin. Naoremthong canal at Khongjom and Nganggoukhong canal were constructed.^{xlv}

CONCLUSION

The development of hydraulic systems and water management in ancient Manipur demonstrates a strong relationship between environmental adaptation and socio-political organization. Water technologies influenced both settlement patterns and agricultural practices and governance through clan-based canal construction and royal public works. The practice of fishing together with seasonal water control played a vital role in sustaining both daily life and cultural traditions. The systems demonstrate the resourceful and cooperative approach of the region for natural resource management. Power and legitimacy often received reinforcement through water control mechanisms. The research demonstrates that water management served as a fundamental factor in Manipur's historical growth while providing valuable lessons for contemporary sustainability practices.

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