

# **HISTORY OF IRRIGATION DRAINAGE AND FLOOD MANAGEMENT IN SINDH**

**(An Abstract from M.H. Panhwar's book  
"Six thousand years of history of irrigation in Sindh" in press)**

**By**

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- (i) Domestication of crops in the whole South-Asia started at Mehrgarh 13 kms South of Dhadhar and Sibi in Kachhi plains some 8,500 years ago. This area was part of Sindh from antiquity up to 1740 AD, when Nadir Shah Conqueror of Delhi (1739) and Sindh (1740), transferred it from Sindh to Khan of Kalat and from whom, the present Baluchistan Province inherited it.
- (ii) At that time the rain-fed river Bolan, used to discharge into the Manchar Lake and thence to river Indus via a natural canal now called the Aral.
- (iii) During the period rainfall was 2.5 to 3.5 times the present and most of it came in winter. There were rich pastures in Thar and Kohistan. Settlement started along the Bolan river to Manchar and people raised wheat, barley, some oil seeds, onions some vegetables, zizyphus rotundifolia, and dates. It was basically rain fed agriculture, though some crops may have been raised on preserved moisture, left by rainy floods in some depressions.
- (iv) Soon people in Dadu district found that use of spring water could give better yields than on preserved moisture or sailabi cultivation or rain fed crops and many thousand acres came, under irrigation on some 50 springs in the southern part of that district.
- (v) Between 4,250-3,750 BC, climate became slightly dryer and people in Dadu and Larkana districts constructed water diversion dams, on rain fed streams to divert water into fields, wherein it seeped down to a depth of about 2.5 meters and on the preserved moisture winter crops were raised. These structures called gabarbands have survived to this day.
- (vi) Man was afraid to settle in the Indus plains of Sindh, covered with thick forests, in a width of 1520 miles on both banks of the river Indus, but necessity made him to shift to Amri at the foot of hills in 3,750 BC. He cut down forests and on preserved moisture of the Indus floods, raised winter crops, when the river receded in each October. The yields were better than on

rain fed or springs waters diversion dams, as the Indus floods brought rich silt with low pH than in the western foot hills of Sindh.

- (vii) Although in actual sense it was not irrigation or deliberate and planned attempt to apply water to land, but the whole Indus flood plain had Dhoros, Dhoris, lakes and depressions, left by changing courses of the Indus and its branches but by 3,500 BC the man learnt to drain some of them back to the river by deliberate cuts and this then became a planned and routine method of drainage making lands in the depressions suitable for crops on preserved moisture.
- (viii) The process continued for another 800 years by about 2500 BC rain fall again increased and more and more area was cleared of forests in the Indus plains, to produce surplus food to feed priests, bureaucrats, tax collectors, artisans, businessmen and exporters and it gave rise to the Indus Valley Civilization represented by Mohenjo Daro, Chanhudaro, Lothal and many other settlements in Sindh. It was period of optimum rain-fall from 2,500 to 2,000 BC and Indus Civilization flourished becoming more important than contemporary civilizations of Egypt and Mesopotamia. Up to this time only winter crops were raised.
- (ix) Around 2,000 BC, rainfall started reducing, aridity, also set in. The whole river Sarsuti-Dirashadvati started drying up and within a few hundred years it became the “Lost River” of South Asia.
- (x) The aridity not only reduced the flooded area in the Indus plains but also reduced cropped area and the population. The Mohenjo Daris then put more animals in Thar and Kohistan deserts than what that area could support on fragile grass lands. Desertification in those areas started with reduction of rainfall and with this move it has further increased and continued to this day.
- (xi) Out of these desperations for food some new solutions came up. Rice was introduced in Sindh from Upper Pradesh around 1950 BC. It needed summer irrigation which was introduced. Two other summer crops sorghum and millets originating from Africa were introduced in Sindh, the first via Arabian Peninsula and surprisingly the second via Maharashtra, where it had mysteriously reached from Africa, and is yet unanswered by archaeology. These summer crops promoted establishment of irrigation which probably existed in rudimentary form in Mohenjo Daro times, but certainty was known in Sindh 6,000 years ago from cultivation on spring water.
- (xii) By 1,300 BC hyper-aridity started and continued up to 800 BC.
- (xiii) Slight relief in aridity in Sindh around 800 BC and introduction of summer crops brought hordes of Scythian immigrants from Scythia in the Central Asia and they settled in Sindh as farmers.

- (xiv) By 550 BC the climate in Sindh improved some what but not in the Central Asia and Iran and therefore, desert dweller Achaemenians, organized themselves into hordes and subdued agriculturally settled lands of the Nile, the Euphrates and the Indus, imposing heavy taxes on them and also organizing themselves as despotic rulers. Sindhu (Sindh and southern Punjab) was the richest land due to irrigation and bore maximum burnt of subjugation between 519 to 400 BC, when Sindh got out of the yoke.
- (xv) There was improvement in climate and agriculture and that brought Alexander's conquests of lands from the Nile to the Indus between 334 to 324 BC. He saw Sindh very rich and its rulers were subdued after bitter fights, clearly showing that their strength came from rich irrigated agriculture.
- (xvi) Manuryars established their empire in 321 BC, and introduced scientific methods of control of water by sluices and measurement of land by triangulation. Sindh was rich due to irrigated agriculture.
- (xvii) Subsequently there was dry period from 200 BC to 350 AD and the Central Asian tribes namely; Bactrian Greeks (187-80 BC), Scythians (80 BC – 46 AD), Parthians (46-78 AD), Kushan (65-283 AD) and Sassanians (283-356 AD), occupied Sindh and these was insignificant progress in irrigation, though many Central Asian crops and agricultural implements were introduced.
- (xviii) From 356 to 700 AD, was a warm period with more water in the Indus, better irrigation, many field crops, sugarcane, fruits and vegetables and country became rich under rule of Vahlikas (456-499 AD), Rai Dynasty (499-641 AD) and Brahman Dynasty (641-711 AD). All Buddhist classical religious monuments in Sindh were constructed during this period of irrigational prosperity.
- (xix) By the second quarter of 7<sup>th</sup> century it became dry along the Mediterranean coast countries and it caused economic depression in them. It helped quick rise and establishment of Islamic empire and religion in these Christian territories.
- (xx) Climate became arid and dry around 700 AD in Sindh. The river Indus also changed its course around 700 AD and the whole irrigation system was destroyed in the whole southern Sindh. It lead to evacuating of present area under Kotri Barrage irrigation command, weakening of the government and easy fall of Brahman dynasty to Arab conquerors.
- (xxi) Arabs conquered Sindh under bad luck of arid climate and wreck and ruin of irrigation system, which could not be restored, as their governors had no experience of canal irrigation, peculiar to that in Sindh where the river, flowed

on a ridge, formed by itself and canals flowed obliquely parallel to its course, with their alignment along some old bed of the river or its branches. The one hundred and forty years of Arab rule saw local uprisings civil wars and finally a locally settled Arab tribe Habaris, took over Sindh and ruled it independently for 171 years from 854-1011 AD.

- (xxii) Habaris had good luck of having “Climatic Optimum” from 900-1250 AD, more rainfall, more snow melt in Himalayas, more water in the river Indus, and its tributaries in Sindh more canals and more cropped area. It was the best period of irrigated agriculture in Sindh since 2,000 BC to 1900 AD. The country was rich and peaceful and attracted a large number of tourists, businessmen and lead to the development of traveler and businessmen’s guide books, which describe Sindh its crops and prosperity in some details.
- (xxiii) In 1011 AD, Soomras took over peacefully from Habaris, their close relatives by marriages and social contacts. They ruled peacefully for nearly 350 years, but had bad luck at the end of “Climatic Optimum” around 1250 AD and change in course of the river Indus water 1,300 BC. It had become mild dry and it caused local change of loyalties and Sammas replaced Soomras in 1351 AD.
- (xxiv) Samma ruled for 173 years (1351-1524 AD). Mild aridity had caused reduction in agricultural productivity all over India leading simultaneously to collapse of Delhi Sultanate after 1351 AD. Since there was no outside taxation burden of Delhi, Central Asian Mongols, or Iranian and Arab empires and wars of conquests, the Sindh province could support itself peacefully under the stable irrigation system. It was during this peaceful period that new dimensions came up in local culture, local language developed and new techniques in construction of unique architecture evolved.
- (xxv) By 1450 AD started Little Ice Age in Central Asia and the world over. The Central Asia tribes first fought among each another for supremacy and finally Mongols under Babur threw out Arghoons and Tarkhans from Herat and Kandahar. The latter conquered Sindh in 1524 AD and the former Delhi in 1526 AD. The intensity of the Little Ice Age increased to the extent that waters in all rivers in South Asia decreased and in 1576 Akbar abandoned his newly built capital Fatehpur Sikri, as water from the river Jammuna, could not be lead to it. The intensity of cold spell and aridity kept increasing and irrigation system could not be restored. Aridity in the Central Asia brought more and more people to Mughal court in Delhi and Aghra and they had to accommodate these tribes by conquering more and more lands, until almost nothing was left to conquer and Mughal Empire started collapsing around 1680 AD, but it took another 70 years for war lords to virtually end it.
- (xxvi) Sindh had some respite under Kalhoras (1701 to 1783 AD), as in first half of 18<sup>th</sup> century, there were some warm years followed by cool and dry climate

and Kalhoras as master canal builders, raised area under cultivation to 2.2 million acres in 50 years ending in 1754 AD and population to 3.0 millions. But soon in 1758 AD Kalhoras had bad luck of change in the course of the river Indus from its old bed north of Hala to Shahdadpur, Oderolal, Nasarpur, Shaikh Bhirkio, Tando Muhammad Khan, Matli, Talhar, Badin, Kadhan, Lowari and Kori Creek to the present course from Hala, Matiari, Kotri, Jherruck, Sujawal, Thatta and Ketu Bunder. About 1.0 million acres were abandoned by the river Indus and population was to be reduced by 45% as no food would be available.

(xxvii) There were uprisings and civil, wars, for 25 years, of 1758 to 1783 AD. The population reduced to half i.e., 1.4 millions, the area under cultivation to 0.9 million acres and yet within 60 years of their rule (1783-1843 AD), Talpurs could not restore irrigation system, as cold spell and aridity of the Little Ice Age, continued up to 1850 AD.

(xxviii) 1850-1950 AD was the warmest period in the globe since 1200 AD. It led to glory of the British in Sindh and they increased area under cultivation from 0.9 million acres to about 5.0 million acres by the time of their departure in 1947 and they left two more barrages Kotri and Guddu just for execution after settling the Sindh-Punjab Water Agreement of 1945. Already they had opened Sukkur barrage in 1932 AD. The two barrages planned by them were executed and opened in 1955 and 1962 respectively. The area under irrigation command has increased to 14.0 million acres, but population also has shot up ten folds of what it was in 1931 and also in 1758 at 3.0 million people.

We have to praise, Vahlikas, Rais, Brahmans, Habaris, Soomras, Sammas, Kalhoras and the British for their efforts to take irrigation to the maximum possible extents and limits under technologies then available and at their disposal. All left no stone unturned and made best use of favorable climate. However none was as lucky as Mehrgarians to Mohenjo Daris with rainfall 2.5 to 3.5 times the present and rise of Indus Valley Civilization in that antiquity.