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Water Management in Ancient India with reference to Kautilīya Arthaśāstra

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Abstract

Water management has always been a persistent challenge in the countries like India which primarily depend on the agriculture as the main source livelihood and revenue. Agriculture in India majorly depends on monsoon. In spite of advancement in the technology, the problem of water management still continues to exists. In this respect, it is interesting to study some old texts like Kautilīya Arthaśāstra which deal the various aspects of effective water management. Various measures proposed by Kautilya, are seen to be implemented by the ancient Indian rulers, as is evident through the information recorded in the inscriptions. Therefore, attempt has been made to study the water management in the Kautilīya Arthaśāstra in the three respects namely - 1. Management of the available water resources especially for the purpose of agriculture. 2. Management of disasters related to water i.e. flood and famine. 3. Management and regulation of water routes..

Keywords: Agriculture, Kautilīya Arthaśāstra, Water management.

Introduction

The famous Sanskrit saying states that there are three jewels on the earth namely Water, Food and Good Sayings'. Among the three, the water is placed in the first and the foremost especially, many parts in India have received less rainfall than average. Some districts in position. Indeed, it is true that water is the most valuable thing in the world. This year, many provinces in the Maharashtra are facing a flood situation, while some have received less rainfall than average.

This paper deals with the management of water sources in ancient India, especially with reference to the Kautilīya Arthašāstra, a work about the science of polity and also economy, composed by a visionary-Kautilya who is also known by the names Cāṇakya and Viṣṇugupta. The date of his work goes back to the 4th century B.C. He was the preceptor of Candragupta Maurya, the first sovereign emperor in India. This paper throws light on the three aspects of water management in the Kautilīya Arthaśāstra:

1. Management of the available water resources especially for the purpose of agriculture.
2. Management of disasters related to water i.e. flood and famine.
3. Management and regulation of water routes.

Management of available Water Resources - Rain and Irrigation

Collection of Data of Water Resources

Gopa, the revenue officer, looking after the group of five or ten villages had to prepare the complete record of number of villages and the available resources including various types of lands- cultivated, uncultivated, forest lands, wet lands etc., various types of water reservoirs like dams, tanks, drinking water sheds etc.1 Gopa was expected to conduct this work under the direction of Sthānika, the divisional officer who supervised 1/4th part of the countryside. The Sthānika also had to prepare or supervise the preparation of census2. Besides this, spies used to collect the information about goods produced from the mines or water works, foreign goods imported by water routes and also the places like deserted houses, wells, pools, rivers, river-crossings which are resorted by the enemies or the spies of enemies3.

Thus, Samāharta, the chief administrator had the complete information about land resources, human resources, man-made and natural water resources, collected by his subordinates namely Sthānika, Gopa and various spies4. Collection of such information about resources was very important for planning the activity of agriculture,

Agriculture and Rainfall

Like today, in ancient India, economy was primarily based on agriculture. In the opinion of Kauṭilya, land was the main source of revenue. He defines the term Arthaśāstra as 'the science of means of acquisition and protection of land, inhabited by human beings5. In this definition, the land is called as Artha because it is the primary source of income, which is earned chiefly through agriculture.

From ancient times, Agriculture in India is primarily dependent on rain and irrigation facilities. The topic of water management and irrigation is discussed in the Kautilīya Arthaśāstra with reference to agriculture. Kauṭilya has mentioned the factors which constitute irrigation work. They are flower gardens, fruit orchards, vegetable gardens, wet crops, sowing of roots etc6.

The topic of agriculture and irrigation is discussed in the chapter titled ' Sītādhyakṣa Prakaraṇa. Word 'Sītā' means the ploughed land or the revenue brought in by the Sītādhyakṣa, the director of agriculture. This chapter discusses the duties of the director of agriculture. It is stated that Sītādhyakṣa should be conversant with the science of agriculture, water divining i.e. the science of locating underground water sources and the science of rearing the plants or he should be assisted by the experts in the abovementioned sciences. He was also supposed to know about the meteorology7.

It is observed that Kautilya was well aware of the average rainfall, received by different parts in India, e.g. 13.5 Droṇa i.e. (apprx.27 inches) in Aśmaka i.e. Mahārāśtra, unlimited in Aparānta ie. Kokaṇa and snowy regions etc8. Kauṭilya has also mentioned the ideal amount of distribution of rainfall during the four months of monsoon. He states that 1/3rd of the rainfall in the 1st and the 4th month of monsoon together and 2/3rd of rainfall in the two intervening months is the ideal distribution of rainfall for the cultivation of crops9.

Rainfall was measured with the help of a rain gauge. While discussing the duties of the Director of Storekeeping, Kauṭilya states that in a fortified city or a newly set-up settlement, the Director of Storekeeping should install a cubical shaped basin as a rain gauge10. Probably such rain measuring devices were installed in every district or city and the record of the amount of rainfall was maintained regularly which must have made it possible to measure average rainfall in the different parts across the Indian continent.

The forecast of rainfall was ascertained from the position and motion of Jupiter, formation of clouds, rise, setting and movement of Venus and the modification in the natural appearance of the Sun 11 Thus having confirmed the amount of expected rainfall, Sītādhyakṣa was supposed to decide the crops to be sown, requiring plenty of water or less water so that maximum produce can be obtained12. Perfect weather forecast and prediction about rainfall is the first important step towards the best agricultural results.

Irrigation and Water Tax

Indian continent receives seasonal rainfall only for the period of four months. So, taking into account the possible rainfall, irrigation facilities have to

be planned for the sufficient water supply for the remaining eight months. It is seen that the irrigation facilities were provided by means of tanks, wells or by canals, by the state to the lands under cultivation. Farmers were permitted to fetch water from these state-owned reservoirs, on payment of irrigation tax. It is stated that, the farmer should pay 1/5th water tax if water is lifted and carried to the field by hand, 1/4th if carried on shoulder or by bullocks etc. and 1/3rd when set flowing in channels by mechanical devices like water wheels etc. The same rule was applicable to the farmers who owned the water sources like tank, well or else. They also had to pay water tax to the king as he was the owner of land and water as well. 13

The difference in the tax is based on the type of mechanism used for fetching water and thus eventually it depended on the amount of water fetched. Less amount of water is fetched by hands than the water fetched by using mechanical devices like channels or water wheel. Sītādhyakṣa was supposed to decide about the cultivation of wet crops, winter crops summer crops, depending upon the availability of irrigated water. 14

Construction of New Water Works

It was the duty of the state government to construct reservoirs in the newly set up villages. In the chapter named 'Janapadaniveśa', Kauṭilya speaks about an embankment or a dam built for storing water and also about building of tanks. He refers to the two types of sources 1) dams having natural water sources or natural flow of water. 2) A storage tank wherein the water is brought through artificial channels15. Besides the construction of water reservoirs, the state administrators also helped those who voluntarily constructed tanks etc. by rendering aid in the form of land, implements and other facilities16. Thus, state also encouraged the joint activity of building reservoir for common cause. The punishment was severe if anyone denied to participate in the joint venture of building the irrigation work. He had to share the expenses of building dam, but was deprived of any portion of the benefits derived by the construction of dam17.

The ownership of water-work, thus constructed, finally went to the king. Even the fish, ducks and green vegetables in the irrigation work were owned by the king18. Thus, king was the final and ultimate authority of all the water resources, natural and manmade.

The king not only owned the land but all the other seven factors like ports, ferries, water source, which constituted 'Rāṣṭra' the nation19. This shows that, Kauṭilya believed in centralized system of government wherein every aspect of nation is controlled by the central power i.e. the King.

Protection and Maintenance of Water Works

Besides constructing new water works, it was the duty of king to protect and maintain the water works which already existed. Along with state owned water works there were privately owned water works too. If new tanks and embankments were constructed, an exemption was granted from taxes for the five years. If the ruined or abandoned reservoir was renovated, an exemption was granted for the four years and an exemption was granted for the three years if the overgrown weeds were cleared from the tanks20. Thus, state government encouraged Joe's efforts of undertaking the construction or renovation works by granting incentives or rewards.

The owners of such irrigational works were allowed to mortgage or sell the same. Owners ae could lend water in return for the stipulated share of produce. The people who used these water works either on lease or on hire or as a pledge had to maintain and keep them in good state21. In case of failure to repair, the one was fined double of that of loss 22.

Customary water sources in use were also maintained. Obstruction of such water sources or the construction of new ones, when customary sources are already existing, was a punishable offence. Charitable water works were not allowed to be mortgaged or sold off23. In the absence of owner, the villagers were supposed to repair the reservoir 24.

Safety of water resources and reservoirs was of utmost importance. Anyone breaking a dam, holding water, was sentenced to death by drowning him in the water at the same spot. Damaging an abandoned or ruined dam was also a punishable offence 25.

Thus, it is observed about the management of available water sources and irrigation facilities in ancient India, that;

1. Water management and irrigation was a properly planned activity then.
2. In Kautilian state, Administrator had a complete record of the reservoirs - natural and manmade, old and new, repaired and unrepaired. Underground water sources were also examined.
3. Utmost effort was done to ascertain the expected rainfall with the help of various devices. With the proper study of abovementioned water sources, the agricultural activity was planned.
4. According to the need of water, the work of construction of new dams, reservoirs and repairs and renovation of old ones were undertaken. Junāgadha rock inscription is the direct evidence to the fact that rules prescribed in the Kauṭilīya Arthaśāstra were actually implemented by the rulers then. This rock inscription reveals the history of a dam named Sudarśana which was originally built by Candragupta Maurya, on the rivers Suvarnarekha and Palāśini, originating from Aravali Mountain, in the state of Saurāṣṭra which receives less rainfall than average. The dam was modified by Aśoka, by building canals from it. The dam which was severely damaged due to flood, was reconstructed, renovated and modified by Kṣatrapa king, Rudradāman in the 2nd C.A.D.26 and again by Skandagupta in the 5th C.A.D.27. Girnāra inscription of Aśoka mentions that Aśoka dug wells on the roads for the travelers and animals28. The Hāthigumpha inscription of King Khāravela in the 2nd C. B.C., mentions various philanthropic works undertaken by king Khāravela. The noteworthy among them are the repair of the lakes, water tanks and embankment of the lake named Khibirarṣitāla. It is also mentioned that he spent thirty-five lac Paṇa-s for the repair work29. The same inscription also refers to the canal dug by the king Khāravela from the place called Tanasuliyavāta to his capital Udayagiri30. The evidences from inscriptions mentioned above show that the references in the Kauṭilīya Arthaśāstra are corroborated by the inscriptions.
5. Strict rules were made for the safety of the water works.
6. Wastage of water was avoided by imposing water tax.
7. Besides collection of water tax from individual farmer, the practices like mortgaging or selling of irrigational work, lending water in exchange with produce, using water on lease or hiring water etc. show advanced management practices and economic transactions involved in the irrigation system in Kautilian era.

Management of disaster related to water - Flood and Famine

Kauṭilya also deals with the natural calamities related to water i.e. flood and famine. He has counted them in the major eight calamities of the nation. Kauṭilya has suggested practical measures to manage the above-mentioned disasters. It is observed that 'Prevention is better than cure' was the policy adopted by him.

Measures Suggested by Kauṭilya to Manage the Disaster of Flood are as follows

1. In rainy season, villages situated near rivers should be shifted beyond the flood level.
2. Villagers should keep the collection of wooden planks, boats, bamboos, dried gourds, leather bags, etc. to face the disaster and for saving lives.
3. They should rescue a person being carried away by flood. If anybody denies doing so, the fine was imposed on him.
4. Kauṭilya also suggests some religious measures like worshiping the rivers or practicing magical spells against rain etc.31.

Measures Suggested by Kauṭilya for Handling the Disaster of Famine are as follows:

1. King should make a store of seeds and food stuff and help the subjects. The evidence supporting this measure is found in Sohagauda copper plate inscription in the 3rd C.B.C., found near Gorakhapur (U.P.). It mentions about the store houses of essential goods to be used at the time of famine which were situated at the places named Triveṇi, Mathurā, Bhadra etc.32.

2. He should commence the work of building forts or water works with the grant of food and create the alternate employment for the subjects.
3. He should share his provision of food grain etc with subjects
4. He should migrate with people to another land in his own country where crops have grown. The similar reference is found about Chandragupta Maurya who shifted to south from Pāṭaliputra along with 500 laymen to save themselves from the calamity of drought.
5. He should settle along the sea, lakes or tanks.
6. He should sow grains, vegetables, fruits along water works where land is comparatively wet.
7. He should seek shelter with allies or shift population to the land of allies33.

It is observed that the measures suggested by Kauṭilya are practical and are practiced even today, e.g.: distribution of seeds and food grains, creating alternate employments, shifting flood affected people to the safe place.

Measures like river worship or ocean worship or performance of religious rites are also practiced today.

Management of Water Routes

It is noteworthy that Kauṭilya has dealt with the topic of developing water routes and shipping in the Arthaśāstra. According to Kauṭilya, water roots should be developed in the kingdom for the growth of trade commerce and industry. They also should be regulated for safety of the kingdom. Besides all these reasons, it was one of the means of collecting revenue towards the royal treasury. In the Nāvadhyakṣa prakaraṇa, Kauṭilya has discussed the duties of the superintendent of shipping. He states that Nāvadhyakṣa should look after the activities concerning sea voyages, ferries on the rivers, natural lakes, artificial lakes etc34. Fishermen, traders had to pay the rent or duty at various rates for using the water routes35. The fare was charged to the travelers for the ferries on rivers36. Villagers on the bank of the rivers had to pay the fixed tax37. Strict rules were made for crossing the river at various places. This shows that, water transport was well developed and well-regulated during Kautilian period. This topic is not directly related to water conservation but it has indirect benefits due to regulation and taxation system on the usage of water resources.

Thus, Kauṭilya, the man of foresight was aware of the importance of water from geographical, economic, and political perspective. Therefore, he had a very scientific and practical approach towards management of water resources - natural and man-made. The policies and measures suggested by him about water management are relevant and worthy to be followed even today.

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