

Agricultural Implements and Water Lifting Devices in Medieval India

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Abstract

This article is focused on the different types of agricultural implements and water lifting devices used in Medieval India. Medieval period started with Islamic era over the ruin of Hindu sovereignty. This was the big change from political, religious, social, economic and cultural point of view. Everything was in the control of Muslim rulers. In the field of economy, the agriculture was the source of revenue. Muslim rulers much paid attention on the irrigation works. They constructed wells and canals for irrigation. Agricultural implements were same as used in Ancient time. A little change was, plough used with iron share and sowing of seeds was done with the use of dibbling. In the field of irrigation, Persian wheel, *Charasa*, *Shadoof* was the water lifting devices in the Medieval India.

Keywords: Agricultural Implements: Plough, Hoe, Leveler, Sickle, Sugarcane crusher
Water lifting Device: Persian Wheel, Charasa and Shadoof

Introduction: Agriculture is the mainstay of Indian economy and livelihood of the Indian people. Our historical sources list the various agricultural implements used from the ancient period. Our economy was dependent on agriculture and our society revolved around the cultivator. There are so many work in agriculture like ploughing, sowing, harvesting, threshing and winnowing etc, were done with different agricultural implements, which are described here. Intensive ploughing was done with Plough. Hoe and *Kudal* (spade) which is used even now was also used in those days for cultivation. The fields were manured with animal dung. A better agricultural practice, known as dibbling was introduced; this was dropping of seeds into holes driven into grounds by sticks. The use of iron was minimal and wood was used predominantly in making of implements during medieval period.

Irrigation is also an important part of the agriculture. There were different types of methods for lifting water, which I have mentioned in this article. Many new canals were dug and old ones were repaired for irrigation. The construction of water works and water technology used in India is described in Arabic and Persian works. The diffusion of Indian and Persian irrigation technologies gave rise to an irrigation system which brought about economic growth and this lead to material culture.¹

In this article, I am trying to give the detail of different types of agricultural implements and water lifting devices used in Medieval India.

Ploughing: Tillage was performed by harnessing a pair of oxen to the plough with three basic things. A long wooden beam or shaft was attached to the plough and was fastened to the middle of the yoke which was placed over the depression between the neck and the hump of the animals. Two ropes were used one for each ox. One end of a rope was passed through the nostrils of the oxen, while the other end was held in the hands of the tiller.

Oxen were driven by the tiller with a stick or a small whip in his one hand to goad the animal, while he held the ropes in his other hand to guide them.²

A Persian dictionary, the *Miftahu-l-Fuzala*, written in 1468-69 in Mandu (Malwa) by Mahmud Shadiabadi, renders great service by giving us the explanations of a number of words for instruments used in cultivation. It defines *Aimar*, for which it supplies the Hindwi equivalent, *Phal* (ploughshare), as the iron coulter (share) which drove furrows into the land. The unique manuscript of the text also contains a drawing in which the iron coulter is shown attached to a wooden plough drawn by two humped oxen. The wooden board drawn by oxen in order to smoothen ploughed land which is given a Persian name (*Takhta-i-Shiyaz*).³

The plough (with a horizontal beam structure) was called *Takht-i-Istarash* in the Persian lexicon and *Hal* in the local dialect. It had a metal, pointed downwards known as plough-share, which made deep line of furrows in the ground as it was pulled along by the yoked bullocks. The wood-cum metal character of the plough made it imperative for every village society to incorporate carpenters and blacksmiths in its folds.⁴

Irfan Habib writes about plough that was found in Tijara, a village in Rajasthan in 1666, which showed that out of thirty-eight peasants, twenty-six had only one plough each. Only two had three ploughs each and another two had as many as five. Those who had more than one plough had like Akbar's master-dyer Ramdas above 8 hectares of land in a village near Agra in 1562 as 'self-cultivated holding'.⁵

Common use of iron contributed to the development and better use of plough. The coulter (share) was made of iron. This iron piece in the plough helped in the tillage of comparatively harder soil. John Fryer, records in 1670s, about the Combies (*Kumbies*) in South India that, "their coulters [are] unarmed mostly, iron being scarce, but they have hard wood [which] will turn their light grounds",⁶ this shows that iron was still not commonly used to make coulter.

Figure: 1 Ploughing Scene



Source: britishlibrary.typepad.co.uk

Hoeing: A Persian dictionary, the *Miftahu-l-Fuzala*, describes the wooden hoe or digging stick (*Ranba, Kuraz*) as used in medieval India.⁷ The author Duarte Barbosa⁸ writes that wooden hoe or *Ramba* was widely used and considered as a normal tool of use in India.⁹ The *Tuhfat-i-Punjab* mentions an instrument

named *Dandal* comprising a very heavy plank with teeth at one end, drawn by four oxen and pressed by two men. This was used for paddy cultivation.¹⁰

Sowing: Four ways of sowing seeds were known. They were broadcasting and seed drilling or dibbling. In *Baburnama*, the illustration shows three persons working in a garden, one of whom is scattering seeds which he takes out from the improvised cloth-bag slung over his shoulder.¹¹

Dibbler was a three feet long hollow wooden, bamboo or metal rod with tapering knobs at the bottom and was known as *Veer* in the vernacular. The seeds were skillfully scattered in the holes made previously in the field at regular intervals by a man walking backwards and carrying the dibbler in each hand.¹² Duarte Barbosa found that the plough share had a hollow in it.¹³ In the hollow the rice (seed) was carried, to the flooded field and planted under water. Barbosa observed that in North India the seed drill “consists of a hollow attached to the share and not a hollow in the share itself”. This was the earliest known reference to drill-sowing, a method practiced extensively in Indian agriculture.¹⁴

Figure: 2 A Scene of Seed Broadcasting from *Baburnama*



Source: britishlibrary.typepad.co.uk

Leveling: To break the clods or lumps of earth and level the ground, the wooden board called *Patela* (plank) was used. The board was large and rectangular in shape, on which a man would stand controlling the oxen in a manner similar to ploughing. The yoke was used for harnessing but it was different from ploughing, here two ropes were fastened to the centre of the yoke, the other ends being attached to the leveling board. This process eliminated the wooden beam or shaft used in the plough.¹⁵ Shovels or spades and horizontal planks were used to dig and break up the clod in the Sultanate period.¹⁶

Harvesting: Crops were normally harvested with the aid of sickles, hooks and scythes.¹⁷ One Mughal painting displays a man cutting the crop with a semi circular sickle.¹⁸ The Persian dictionary, *Miftahu-l-Fuzala* also mention the iron sickle (*Das*) used to cut the crops. Duarte Barbosa described the use of iron sickle (*Das*) in India.¹⁹

Threshing: Two methods of threshing were practiced worldwide. The first was by employing animals and second by using flail or sticks. John Fryer in 1670 mentions both in the context of South India, according to him Hindus did the job with stick and the Muslims used animals for threshing.²⁰ Another English traveller wrote in 1770s that in Surat “the corn was trodden out by oxen walking over the ears”, Homer described it as, “where round and round, never varied pain, the trampling steers beat out th’unnumber’d grain”.²¹

Wind power was used for separating the chaff from the grain: the threshed out matter was first put in a basket and then, it was shaken at a set pace throwing the contents outside the basket, then the light matter, that was, the chaff got scattered by the wind and fell on the ground.²²

Sugarcane Crushing: Sugar and *Gur* (Jaggery) manufacturing constituted another important village industry. The juice was obtained from sugarcane by use of wooden rollers worked by oxen in the southern regions and by the stone mortar and pestle mill also turned by oxen in the Gangetic zone. The juice used to be put in iron cauldrons serving as boilers and *Gur* and various varieties of sugar were produced by different degrees of refining.²³

The reference of the sugarcane crusher in Mughal India is given by S.P Verma, according to him the mortar and pestle device for milling and crushing was wide spread in medieval India. The sugar press is found in the manuscript of *ShahjahanNama* (1657). It shows three sugar presses in an open field in separate enclosures. A long wooden post, (pestle) loosely fits the deep cavity in the stone mortar fixed on the ground. A handle attached to the pestle was moved in circular motion by a pair of bullocks. The sugarcane was cut into pieces before being put into the mill. The mortar and pestle sugar press co-existed in India with the press based on parallel worm. A vertically mounted wooden roller was recorded in the 1700. The remains of large mortars were discovered with inscribed dates corresponding to 1553 and 1579 A.D.²⁴ The rolling mill machine was first described ('two great wooden rollers, turn'd about by oxen') by Giovanni Careri,²⁵ who observed farmers on the western coast in 1695.²⁶

Water Lifting Devices: In the upper Gangetic Plains and also parts of the *Dakhin* (South), wells were the chief source of irrigation. There were different methods of drawing water out of the wells in use, in India. Most of the wells were *Kaccha* (unbricked), which was made without use of masonry. These necessarily had to be dug or dug afresh, every year.²⁷

Persian Wheel: Schioler's researches (Roman and Islamic water lifting wheels, p-58, 62-78) shows that Ibn Sida (d.1066) in an Arabic encyclopaedia described a pot-garland turned by a camel, ox or donkey, with the aid of a gearing mechanism (*Manjanun*). The pot-garland turned with pin drum gearing was known to Al-jazari, Islam's famous technologist (c.1206), who curiously designated the pot-garland by the name Sindi, which may suggest that at least the pot-garland, if not the gearing, had by that time become so common in Sind as to get the name of that province tagged on to it.²⁸

Kalhana (1149-50) refers to the use of *Araghatta* in Kashmir. He says that Lalitaditya in the 800 A.D. set *Araghattas* on the Jhelam (*Vitasta*) river to distribute the raised water among villages. In his (Kalhans) own time a minister's wife also set up such water wheels.²⁹ The gear less device with the chain of pots (*Aaraghatta or Noria*) was present in India as early as the seventh century. The geared water-wheel which was used in the Islamic world from 1100 A.D., onwards is first described in India only by Babur (1526), who found it extensively in use in Punjab.³⁰

East of the Jhelam, in the regions of Lahore, Dipalpur and Sirhind, there was the wooden *Arhat* or *Rahat* called by the English the Persian wheel, with its chain of pots and pin-drum gearing. It was present in Sind and a number of villages of Marwar.³¹ The Persian wheel from the manuscript *Jog Bashisht* (1602) shows a

different adjustment of the pin-drum. The axle with gear wheel was fixed quite above the pin-drum, which the bullocks turned in circular. This form of the device is also depicted in the miniatures of the later period (circa 1610; 1650).³²

About *Charasa* (a water lifting device) Babur in his memoirs *Tuzuk-i-Baburi* writes, “At the well edge they set up a fork of wood, having a roller adjusted between the forks, tie a rope over the roller and tie its other end to the bullock. One person must drive the bullock, another empty the bucket. Every time the bullock turns after having drawn the bucket out of the well, that rope lies on the bullock tract in pollution of urine and dung before it descends again into the well.” This method was followed in the regions of Agra, Chandwar, Bayana (Rajasthan) and the neighbouring districts.³³ Around Agra and further east, the *Charasa*, or the leather bucket was lifted out of water by yoked oxen, pulling a rope thrown over a pulley, this was the most common system.³⁴

Another system used was called by different names, such as *Dhenkli* or *Shadoof* / *Tula* / *lat/Latha*. The *Dhenkli* is illustrated in the manuscript *Mrigavat*, found in Uttar Pradesh around 1525 to 1570.³⁵ John Fryer (traveller), in his general account of India, describes, the *Dhenkli*, which was based on the lever principle and was used wherever the water-level was close to the surface.³⁶

A long rope was lashed to the fork of an upright beam or trunk of a tree (especially meant for this purpose) to put it in a swinging position. The bucket was fastened to a rope whose other end was tied to the one end of the swinging pole hovering over the well. The pole's other end carried a counterweight, a little heavier than the bucket when filled with water. Thus, the fulcrum formed at the centre of the pole with weights and counterweight (effort) at its two ends. This device is known as *Shaduf* in Egypt. It is called *Tula* (balance) in Sanskrit, in Bihar and Bengal it is known as *Dhenkli* or *lat/Latha*. Even today, this technique can be seen in Bihar and Bengal.³⁷

Figure: 3 Water lifting Device (*Charasa*) Scenes from *Shahnamah*



Source: British Library, London, IO, Islamic, 3450, f.10r

Conclusion: As research shows, agriculture remained the mainstay of livelihood of the people of the country through the ages. At the ground level nothing much seemed to change, only political masters changed. The main source of state income continued to be land revenue. Most of the agricultural implements and water lifting devices remained the same as that of the ancient period. The main change was in the use of iron especially in plough. Another was in sowing of seeds where dibbling was the method.

References

- ¹Iqtidar Husain Siddiqui, 'Water Works and Irrigation System in India during Pre-Mughal Times', *Journal of the Economic and Social History of the Orient*, 29 (1), 1986, 52–77.
- ² A. Jan Qaisar, 'Agricultural Technology Depicted in Mughal Painting', Irfan Habib, *Technology in Medieval India*, Volume-XVI, No.2, Itinerario, 1992, 63-64.
- ³Irfan Habib, 'Means of Cultivation and Irrigation', Edited, Irfan Habib, *Economic History of Medieval India 1200-1500*, History of Science Philosophy and Culture in Indian Civilization, Centre for Studies in Civilization (PHISPC), Volume-III, Part-I, New Delhi, 2011, 37.
- ⁴Hamida Khatoon Naqvi, *Agricultural, Industrial and Urban Dynamism under the Sultans of Delhi: 1206-1555*, Munshiram Manoharlal Publishers Pvt.Ltd, New Delhi, 1986, 19.
- ⁵ Irfan Habib, *Economic History of Medieval India: A Survey*, Aligarh Historian Society Kalaka, 2001, New Delhi, 28.
- ⁶A. Jan Qaisar, 'Agricultural Technology Depicted in Mughal Paintings', Irfan Habib, *Technology in Medieval India*, Volume-XVI, No.2, Itinerario, 1992, 63.
- Note: John Fryer was an Englishman who made record in 1670. His book is *New Account* (noted in the Deccan, p-63)
- ⁷ Irfan Habib, 'Means of Cultivation and Irrigation', Edited, Irfan Habib, *Economic History of Medieval India 1200-1500*, History of Science Philosophy and Culture in Indian Civilization, Centre for Studies in Civilization (PHISPC), Volume-III, Part-I, New Delhi, 2011, 37-38.
- ⁸ Duarte Barbosa a Portuguese observer, who came in India (from 1500 to 1516). He wrote a book (*Book of Duarte Barbosa I*, p-192).
- ⁹ Irfan Habib, 'Means of Cultivation and Irrigation', Edited, Irfan Habib, *Economic History of Medieval India 1200-1500*, History of Science Philosophy and Culture in Indian Civilization, Centre for Studies in Civilization (PHISPC), Volume-III, Part-I, New Delhi, 2011, 37.
- ¹⁰Harbans Mukhia, 'Agricultural Technology in Medieval India', Aniruddha Ray and S.K. Bagchi, *Technology in Ancient and Medieval India*, Sandeep Parkashan, New Delhi, 1986, 114.
- ¹¹A. Jan Qaisar, 'Agricultural Technology Depicted in Mughal Painting', Irfan Habib, *Technology in Medieval India*, Volume-XVI, No.2, Itinerario, 1992, 67.
- ¹²Hamida Khatoon Naqvi, *Agricultural, Industrial and Urban Dynamism under the Sultans of Delhi: 1206-1555*, Munshiram Manoharlal Publishers Pvt.Ltd, New Delhi, 1986, 16.
- ¹³ Barbosa reports about a place near Bhatkal along western coast, where he saw plough with oxen and buffaloes yoked in pairs and the ploughshare had a hollow in it.

- ¹⁴ Irfan Habib, 'Means of Cultivation and Irrigation', Edited, Irfan Habib, *Economic History of Medieval India 1200-1500*, History of Science Philosophy and Culture in Indian Civilization, Centre for Studies in Civilization (PHISPC), Volume-III, Part-I, New Delhi, 2011, 37.
- ¹⁵A. Jan Qaisar, 'Agricultural Technology Depicted in Mughal Painting', Irfan Habib, *Technology in Medieval India*, Volume-XVI, No.2, Itinerario, 1992, 78-79.
- ¹⁶Hamida Khatoon Naqvi, *Agricultural, Industrial and Urban Dynamism under the Sultans of Delhi: 1206-1555*, Munshiram Manoharlal Publishers Pvt.Ltd, New Delhi, 1986, 14.
- ¹⁷ Ibid, 19.
- ¹⁸A. Jan Qaisar, 'Agricultural Technology Depicted in Mughal Paintings', Irfan Habib, *Technology in Medieval India*, Itinerario, Volume-XVI, No.2, 1992, 79.
- ¹⁹ Irfan Habib, 'Means of Cultivation and Irrigation', Edited, Irfan Habib, *Economic History of Medieval India 1200-1500*, History of Science Philosophy and Culture in Indian Civilization, Centre for Studies in Civilization (PHISPC), Volume-III, Part-I, New Delhi, 2011, 37-38.
- ²⁰Ibid, 53.
- ²¹A. Jan Qaisar, 'Agricultural Technology Depicted in Mughal Paintings', Irfan Habib, *Technology in Medieval India*, Volume-XVI, No.2, Itinerario, 1992, 78-79.
- ²² Ibid, 79.
- ²³ Irfan Habib, *Agrarian System in Mughal India*, Orient Publishers, 1999, New Delhi, 64-66.
- ²⁴S.P. Verma, 'Technology in Mughal India Evidence of Mughal Painting', *History of Science and Technology in India*, Kuppuram and Kumudamani, Volume-II, New Delhi, 1990, 158.
- ²⁵ Giovanni Careri see his book 'Girodel Mondo', p-169.
- ²⁶Irfan Habib, 'Agricultural Manufacturers', Edited, Irfan Habib, *Economic History of Medieval India 1200-1500*, History of Science Philosophy and Culture in Indian Civilization, Centre for Studies in Civilization (PHISPC), Volume-III, Part-I, New Delhi, 2011, 53.
- ²⁷Irfan Habib, *Agrarian System in Mughal India*, Orient Publishers, 1999, New Delhi, 28-29.
- ²⁸ Irfan Habib, 'Means of Cultivation and Irrigation', Edited, Irfan Habib, *Economic History of Medieval India 1200-1500*, History of Science Philosophy and Culture in Indian Civilization, Centre for Studies in Civilization (PHISPC), Volume-III, Part-I, New Delhi, 2011, 38.
- ²⁹ Irfan Habib, 'Means of Cultivation and Irrigation', Edited, Irfan Habib, *Economic History of Medieval India 1200-1500*, History of Science Philosophy and Culture in Indian Civilization, Centre for Studies in Civilization (PHISPC), Volume-III, Part-I, New Delhi, 2011, 39.

- ³⁰ Irfan Habib, *Economic History of Medieval India: A Survey*, Aligarh Historian Society Kalaka, 2001, New Delhi, 12.
- ³¹ Irfan Habib, *Agrarian System in Mughal India*, Orient Publishers, 1999, New Delhi, 29.
- ³² S.P.Verma, 'Technology in Mughal India evidence of Mughal Painting', Aniruddha Ray and S.K.Bagchi, *Technology in Ancient and Medieval India*, Sandeep Parkashan, New Delhi, 1986, 18.
- ³³ Mrs Tanuja Kumari, 'Agriculture Science in Mughal Period and Its Socio-Economic Impact', *International Journal of Humanities and Applied Sciences (IJHAS)*, Volume-I, No.4, 2012, 108.
- ³⁴ Irfan Habib, *Agrarian System in Mughal India*, Orient Publishers, 1999, New Delhi, 28-29.
- ³⁵ Harbans Mukhia, 'Agricultural Technology in Medieval India', Aniruddha Ray and S.K. Bagchi, *Technology in Ancient and Medieval India*, Sandeep Parkashan, New Delhi, 1986, 115.
- ³⁶ Irfan Habib, *Agrarian System in Mughal India*, Orient Publishers, 1999, New Delhi, 29.
- ³⁷ A.Jan Qaisar, 'Agricultural Technology Depicted in Mughal Paintings', Irfan Habib, *Technology in Medieval India*, Itinerario, Volume-XVI, No.2, 1992, 73.

