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Literary evidences of agricultural development in ancient India

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Introduction

No animal can live without food. Food is the basic need of each and every being. We should remember that we eat to live, not live to eat. In course of evolution when human beings appeared in this planet, they wandered from one place to another in search of food. They were then hunters and food collectors. They hunted wild animals with the help of stone, sticks etc. and collected fruits and roots from forests. In this pre-historic age human beings were nomads. Gradually they advanced towards developed livelihood. They learnt the technology of burning fire and next the know-how of agriculture. Agriculture entirely changed the human habitats. It is one of the most important inventions of human society. With the invention and development of agriculture, pre-historic people left their nomadic lives and settled down villages. Some famous civilizations were established with the growth of agriculture. It is noted that all this oldest Civilizations were formed on the valley of rivers. Cities and towns were set up based on the agricultural industries.

Here we are going to discuss about the agricultural activities in ancient India. Most probably agriculture in India began by 9000 BC ^[1]. From that very period, cultivation of plants and domestication of crops and animals were started. Various agricultural implements and tools were developed during this time ^[2-3]. Harvesting of crops would be reaped twice in a year due to the blessing of double monsoons ^[4]. Domestication of animals was essential to the ancient Indian people. All the above information is received from the archaeological evidences of history.

Agriculture in the Vedas

People in the Rigvedic era were engaged in at least twenty types of occupations ^[5] and agriculture was considered the most important and primary occupation among those. Actually agriculture was the basis of livelihood in the Rigvedic society and later times. In the Rigveda agriculture would be stated as wealth (vitta) and a proper home with cattle and wife. Agriculture had been the most important activity of the Rigvedic society. The cultivator was highly honoured and attributed as divine dignity. Yajna is the principal form of worship in the Rigvedic society. Ploughing, sowing and reaping were the divine performances to the Vedic people and these are compared with the sacrifice. The Satapatha Brahmana refers this traditional ritual continued in the later Vedic age. It is said that Asvins⁶ (the twin gods) ploughed the fields and sowed barley for the Aryans. Later Asvins taught agriculture to Manu and it was handed down to the Aryans. We find another Vedic mythology relating to the Vedic agriculture. The story says that Mitra-Varuna gifted the fabled horse to Trasadasyu who won fields and ploughed lands for the Aryans (Rigveda.II.13.6). Indra, the principal god of the Aryans is invoked in a prayer to protect the tilled lands and home steeds as guard. G.C.Pande ^[7] makes a remarkable comment in this regard, 'they represent the divine archetype of the cultivator'.

It is the Vedic literature in which some of the earliest written evidences of agriculture in India are recorded. The Rigveda refers 12 types of lands such as urvara (fertile), ushara (barren), maru (desert), aprahata (fallow), shadvala (grassy), pankikala (muddy), jalaprayah (watery), kachchaha (land contiguous to water), sharkara (full of pebbles and pieces of limestone), sharkaravati (sandy), nadimatruka (land watered from a river), and devamatruka (rainfed). According to G.C. Pande ^[8] there are all about thirty six references of agricultural fields in the

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Rgveda. The term Ksetra is mostly used in the Vedic literature. Actually it is used to indicate the agricultural field. It is recorded in the Rgveda that productive lands are changed into uncultivable lands due to the blazing of fire. We find the terms Ksetrapati (the lord of field) in the Vedic literature who is obeyed as the presiding deity of field. Ksetrapati is offered sacrifices and prayers for good crops.

It is supposed that the ownership of agricultural lands were divided into three categories such as communal theory, king theory and peasant theory in ancient India.

So many hymns, related to agriculture are composed in the Rgveda. Many agrarian deities' names such as Ksetrasyaapati or Ksetrapati (the lord of fields), Suna, Sira, Sita, Pusan and Parjanya are mentioned in these hymns of the Rgveda. The hymns were recited at the beginning of the ploughing. We are mentioning here one of such most remarkable hymns, which is dedicated to a supposed god of agriculture, the Lord of the Field, as he is called.

Dharma Sastra

The Dharmasastra, an ethical literature is the collection of ancient Sanskrit texts. It contains the religious and legal duties for Hinduism. The Dharmasastra explains the responsibilities, duties and ethics for an individual's behavior towards oneself, one's family and one's community. The texts were composed by various composers in different times. It is estimated that the texts were composed between c.600 B.C. To c.200A.D. The Dharmasastra includes sutras or smritis composed by Gautama, Baudhayana, Apastamba, Vasishtha, Narada, Manu, Vishnu. Among these Gautama Dharmasutra is considered to be the oldest which may be composed sometime between 600 and 400 BC. Apastamba Dharmasutra, written between 450 and 350 BC. describes aphoristic verses and rituals for daily life such as marriage and conjugal life, property laws, rebirth and so on. Most probably, the Vasishtha Dharmasastra is composed between 300 and 100 BC. It is famous for its sections on adoption. Besides this, it describes various objects of social law. Manusmriti or Manava Dharmasastra which is treated as a significant recognition for its unique metrical style is composed between c.200 BC. and 200 AD. Yajnavalkyasmriti, the best crafted text of the Dharmasastra tradition is composed between fourth to fifth century CE. Naradasmriti is a juridical text as opposed to a text about righteous conduct which is probably written between 500 to 600 AD. and Vishnumriti (from about 7th century CE), the bhakti tradition rather than dharma directly which were designed as manuals of human conduct. But in a wider sense, the term was also applied to the Dharmasastras^[9] which antedate the metrical smritis and postdate the early Grhyasutras.

Agricultural taxes are referred in the Dharmasastra. The Baudhayana Dharmasastra^[10], the Gautama Dharmasastra^[11] and Manusmriti^[12] describe that one sixth of the produce should be calculated as land revenue. Manu also refers that the rate may be increased into 25% only in time of distress^[13]. Narada^[14] and Vishnu^[15] describe that the rate may be varied from one third to one fifth according to different regions besides the uniform rate of one sixth as land revenue in all the cases. Brahaspati, the first law-giver prescribes the doctrine that the taxes should vary from one tenth to one sixth (10% to 16.66%) according to season and the characteristic of land. He refers that one tenth of the produce would be charged on khila land. One eighth on the land exposed to rain and one sixth of the crops harvested in spring season were levied^[16].

The Ramayana

The Ramayana represents a society where agriculture was more important. Agriculture was regarded not only as an occupation of farmers (krsikarah, krsijivanah)^[17] but also of kings. We may mention the example of king Janaka who himself was engaged in ploughing, when Sita was found^[18]. In the Ramayana, Rama mentions a ceremony of the autumnal namely Navagryayanapuja. It is probably connected with agriculture because pits and gods were offered to the new harvest on the occasion of this festival.

Cultivators depended on rain-water for successful crops^[19] But it may be asserted that irrigation was prevalent during the age of the Ramayana and a term "Adevamatrika"^[20] is used the then period. According to Bose, this term is the reference of "relying on irrigation and not on rainfall."²¹ We also find other terms like nadimatrika and devamatrika^[22] Nadimatrika is the cultivation, depending on river-water and devamatrika is the term depends on rainfall. Obviously we may assume that in Indian Subcontinent due to the whims of weather, agriculture in the period of Ramayana has to depend on irrigation.

The tools used for agriculture were langala and hala drawn by bulls^[23]. The other tools such as kuddala (hoe), kuthara (axe), tanka (hatchet), sula (crowbar) and datr (sickle) were used in agricultural activities^[24]. There are six calamities such as draught, floods, locusts, rats, birds and invasions^[25] referred in the Ramayana. The kings were also beware of these calamities and used to try to dissolve this menace. We see in the Ramayana that Rama asks Bharata if agricultural pursuits were free of troubles (himsa)^[26]. Most probably he wanted to mean these troubles as the six calamities.

The Mahabharata

Many detailed references related to agriculture are found in the Vedas but we do not have any elaborative description of agriculture in the Mahabharata. According to the Mahabharata, King Kuru, the legendary ancestor of the Kauravas and the Pandavas, decided to extend an area of five Yajanas square on the bank of Sarasvati River for the purpose of cultivation and to strengthen their economic position^[27].

We find the terms 'annadana' and 'jaladana' in the Mahabharata. 'Annadana' stands for the giving of food and 'jaladana' means bestowal of water. These two duties are regarded as the greatest of all sharing in life. We find detailed instructions on the giving of water by means of constructing ponds, wells, reservoirs etc. It is to be remembered that 'bhoomi' (earth) and 'vriksha' (trees) cannot be separated from 'anna' and 'jala'; hence the Mahabharata instructs 'bhoomidana' and 'vrikshadana'. The significant meaning of these two terms is –the giving of fertile land upon which to grow crops and the planting of trees as sustenance and nourishment of all.

The Mahabharata refers that the state would perform an important role for the well being of agriculture. The state had the entire responsibility for any damage to crops due to its inadvertence or negligence. Kalidasa expresses the same view in the Abhijnasakuntala. It was the duty of the king to look after the cultivators as and when they would be in distress. The state had to supply seeds and other materials related to agricultural operation free of cost. The cultivators had to pay a sixth part of the produce as revenue.

We do not find any detailed description of agricultural crops, grown in the age of the Mahabharata. Different crops, grown in the age of the Mahabharata were vrhi (rice), barley, various types of medicinal herbs, barley sesames etc. The Taittiriya

Samhita refers to two harvests in a year ^[28]. Barley was harvested in the summer and medicinal herbs were collected in the rainy season. Vrhi (rice) was harvested in the rainy season and matured beans and sesames were gathered in the dew season and winter ^[29]. It was clear that there was a rotation of crops. Barley was followed rice, bean and sesame.

Krsi-Parasara

The "Krishi Parashara" authored by Maharshi Parashara consisting of 243, verses mostly composed in the popular anustubh (Chhanda) meter, is the only available scientific text on agriculture in ancient India. The text includes all aspects of agriculture such as meteorological observations relating to agriculture, management of agriculture, management of cattle, agricultural tools, seed collection and preservation, ploughing and all the agricultural processes involved right from preparing fields to harvesting and storage of crops. The 243 verses of the text are divided into two parts. The first part relates to the forecast of rainfall and the influence of planets and stars on agricultural operations, whereas the second part describes the practical details of agricultural activities. The theory of agriculture in this text is explained in such a simple way that the farmers can understand it very easily and gain benefit by applying to their profession. Undoubtedly, this text can be called the farmer's ready reckoner containing the basic data of geographical and climatic conditions, which can help him in planning and managing the activity of farming spread over several months. We can call it the farmers' almanac.

The Arthashastra

The Arthashastra by Kautilya is an authentic and a valued document which clearly presents a realistic economic, political and social view not only of the Mauryan times but also of ancient India. Kautilya mentions in his book that suitable agricultural operations can be performed with the supply of good seeds and other inputs. A fruitful agriculture requires optimum rainfall and arrangement of proper irrigation. Arthashastra emphasizes on marketing and safe storage. All these important aspects in agriculture are highly relevant till today. According to Arthashastra soil test is necessary for particular crops. Kautilya says something for good yield of rainfed crop. He refers a rainfall of 16 dronas (640mm-800mm) is required for rice. It is significant that a circular vessel (20 fingers width, 8 fingers width depth) was used to gauge the quantity of rainfall. To unit to measure rain was adhaka (1 adhaka is approximately 12 mm). Kautilya classifies the months according to optimum distribution of rainfalls. One third of the rainfall is required for the months of July, August, October and December. Two third rainfall is suitable for August, September and October. The Arthashastra refers the proper seasons for proper crops. At the commencement of rainy season sesame, millets, viru (direct sown rice) and Sali (transplant rice) should be sown. Pulses to be sown in the middle of season and others such as linseed, mustard, wheat, burley, Kusumbha (sunflower), kuluttha (horsegram), kalaya (leguminous seeds), atasi (linseed), sarshapa (mustard) etc are better to sow in the later season. The same rules are followed till the modern age. It is also clearly mentioned in the Arthashastra that Squash, pumpkin, some gourds, watermelon, cucumber etc are to be sown in the bank of rivers. Grapes, sugarcane and long-peeper require the soil charged with water. Frequent irrigations are required for vegetables.

The Gupta Age

So many scholars such as Kalidasa ^[30], Aryabhata, ^[31] Varahmihir, ^[32] Vatsyayana, ^[33] Amarsimha, Shanku, Betalbhatta, Dhanvantri, Khapanaka and Harisena were born in this age. All these scholars made great advancements in many academic fields. The Guptas then reached the zenith of glory in the sphere of arts and culture, science, economy and so many.

Now we will discuss something on agricultural activities during the Gupta period. A well developed irrigation system was set up during the Gupta era. The great rivers like Ganga, Brahmaputra, Narmada, Krishna and Kaveri surrounded the Gupta empire. All these rivers provided the source of irrigation. The Gupta administration constructed numerous aqueducts, dams, and canals. Large areas of the Empire became very fertile for farmers to till due to excellent infrastructure of irrigation system. The canals which were meant to prevent inundation are mentioned by Amarasimha as jalanirgamah. Amarasimha refers the names of different types of tanks according to their sizes, as the vapi, tadaga and dirghula. Another method for irrigation was the use of ghatiyatra or araghatta

The agricultural activities during the Gupta era were performed with a scientific way. Proper manuals were used to know the type and quality of soil for each plant and various plant diseases. The distances between plants as well as sowing techniques are recorded in the manuals. Techniques for processing grain, vegetables and fruits are scientifically described in the manuals. The use of iron for making various agricultural implements became widespread. Ploughshares were forged in a scientific way and the designs and weights of these were fixed for different types of soil. Varahmihira³⁴ refers some rules related to preparation of soil and tree plantation. He refers the method of grafting a tree branch on another tree, how to treat a diseased tree and the proper method of watering plants.

Inscriptions

Inscription is one of the most important archeological evidences which plays a vital role to be aware of the bygone days. It is an authentic document. The Hatigumpha inscription of Kharavela mentions the digging of an irrigational canal by a Nanda king in the past.

Types of agricultural lands are referred in the various inscriptions of the Gupta era. According to various Gupta inscriptions, lands are classified as at least five categories such as 'ksetra', 'khila', 'aprahata', 'gupta sarah' and 'vasti'. Khetra is defined as a land under cultivation and a cultivable land is referred as khila. Jungle or forest land is called aprahata. Gupta sarah is a pasture land and vasti is referred to a land where human habitation is seen.

In the Gupta period, we find the appearance of certain new land revenue terms in several inscriptions. These references are mentioned in the contemporary records usually followed by the word adi, etyadi. In this connection we may mention some Pallava charters, in which we see, donees are granted land pieces with eighteen pariharas, without mentioning their names. Similarly fourteen pariharas are referred in the Basein grant of Vakataka ruler Vindyasakti II ^[35]. Some terms for land revenue such as hiranya, bhaga, bhoga, uparikari, klapta, halikakara, visti, halasadi, dasaparadha, jalakara, hasti-danda, medhiharaka, mangaliyaka etc are referred in the inscriptions of the early medieval period.

Some copper-plate inscriptions of fifth century, found in the various places of Bengal entirely differentiated the fertile lands from the ancestral homesteads and jungles. The inscriptions refer to the various measurements of lands such as arvap, dronvap, kulyavap, etc. Once, the term patak was used^[36].

Conclusion

It should be remembered that search is yet to be continued. The sources, obtained from early literature about ancient agriculture in not satisfactory. We are unable to get a complete view regarding early agriculture. For an example, the Rgveda is written primarily with religion and nature and other sources are related to high thoughts, society, and ritualistic performances and so on. What we get from such sources is dark and obscure. That's why new search is going on and we hope soon we shall be able to know more and more about the agriculture system of ancient India.

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