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Manure and Manuring System as Depicted in Ancient Indian Sources

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Abstract:
Agriculture was the basis of life in ancient India and was developed in a sustainable manner by maintaining balance with nature. The use of manure at that time was not just a means of maintaining soil fertility but was part of a holistic agricultural philosophy that ensured harmonious use of land, water and the environment. Manure was prepared from sources such as organic waste, animal dung, grass, leaves, crop residues, kitchen waste, and bone meal. The process of its preparation involved placing organic matter in pits and allowing it to rot, creating a fertile and nutrient-rich mixture.
Regular application of manure increased the amount of organic matter in the soil, thereby improving its structure and water retention capacity. Crops yielded more by getting more nutrition, and the long-term effect of manure was helpful in maintaining the permanent fertility of the soil. This process also contributed to green manure, in which specific plants, such as green gram, flax, and rice, were planted in the field and allowed to rot, so that they could add nutrients directly to the soil.
Although the process of preparing manure was inherently environmentally friendly, it was associated with certain challenges. It took time to produce (3-6 months), and the amount of nutrients was limited, which was slower than chemical fertilizers that gave immediate results. In addition, large-scale production, storage, and transportation of manure were also fraught with difficulties. Despite these problems, the use of organic manure was helpful in keeping the agriculture of the time sustainable and free from environmental damage.
This manure system of ancient India is a source of inspiration towards organic farming in modern times. Ancient manure methods provide solutions to current agricultural challenges in the context of climate change, soil erosion and pollution caused by chemical fertilizers. Along with this, this method can also help in biodiversity, land restoration and environmental conservation. Hence, this research area not only gives us an opportunity to combine ancient knowledge with modern science, but also leads to the restoration of an agricultural model that can promote long-term sustainability and environmental balance.

Keywords: Manure, cowdung Shakrit, Karish, Shakan Jeevamrutha, Biodiversity, Krishini, Shatpath Brahman, , Panchamrit, Gosthi ,Goshkrid, Organic Waste, Brihat Samhita, Agni Purana, Krishi Parashar, Mānasollāsa ,Upvan Vinod and Vrikshayurveda

Background of Manure:
Agriculture in ancient India was not just an economic activity but was the basis of the lifestyle, culture and religious practices of the society. India's fertile land, favorable climate and diverse biodiversity helped it to become an agricultural civilization. From the Indus Valley Civilization to every period of

ancient India, the importance of agriculture can be clearly seen not only from the economic point of view but also in religious and cultural contexts. Ultimately, once the two basic parts of agriculture, land and water, were managed, manure was used for the purpose of producing more food grains.[1]

Manure means that organic or inorganic substance, which helps in increasing the fertility of the soil. In other words, the use of natural residues, cow dung, plant remains and mineral elements, bone powder etc. to maintain the fertility of the land and improve crop production is called manure. That is, in ancient times, ashes, husks, trees, plants and vegetation burnt in forest fires, oil cakes of various types and the meat and bones of dead animals were generally used as manure.[2] This was the most prominent method before the use of chemical fertilizers prevalent today. In ancient Indian history, manure has been described as an essential element in the form of food for plants, which usually has two sources - one natural, which is automatically arranged by nature, and the other artificial - which has to be done by oneself.[3] From various literary and archaeological sources related to different periods of ancient India, we get references related to the use of manure for fulfilling various purposes such as improving soil structure, increasing land fertility, increasing crop production, etc., types of manure, method of making manure, proper time of manure use and the effect of manure on crops and environment. For example, on the basis of remains of birds, animals, dung and organic wastes found from the excavations of the archaeological sites of India's first Indus Valley Civilization, historians have been presenting the point about the use of fertilizers in the agricultural sector from the very beginning. However, this information is completely based on archaeological findings.

Since agriculture and animal husbandry have been integral parts of the Vedic civilization as well. Water and manure are two primary elements, necessary for the survival and growth of crops. Though the ancient Indian agriculturists knew the proper methods of manuring their fields and crops, but on the basis of the references available in the Vedic literature, it is not clear as to whether they were manuring their crops or not. Some scholars[4] like Macdonell and kieth, R.B. Pandey, Damoder Satavalekar and V.B. Rao have taken the Vedic words such as *Shakrit Karish Shakan* (*AV*., XII. 4.9; XIX 31.3; XIV. 3.4 and *RV*. 1.161.10), etc. in the sense of manure and expressed their views very strongly that the Vedic farmers were well acquainted with the knowledge of manuring their crops. Shripad Damodar Satvalekar[5] has also clarified the description of fertilizers for agriculture on the basis of the following mantras of the Vedas –

अस्मिन गोष्ठे कृषिणी:।[6]

इहैव गाव एतनेहो शकेव पुष्यत।[7]

शिवो वो गोष्ठ भवतु शारीशाकेव पुष्यत।[8]

यदस्या: पल्पूलन शकृत दासी समस्यति।[9]

आ निभ्रूच: शकृदेको अपाभरत।[10]

Dr. Munshiram Sharma[11] is also of the opinion that the adjective 'Prithvi' in *Atharvaveda* is used in the context of *Krishini* manure, but Lallanji Gopal[12] differs from this view and says that there is no clear evidence of the use of manure in the Vedas. Similarly, there is a difference of opinion among scholars regarding the word '*Sharishaka*'[13] used in *Atharvaveda*. However, at one place in *Shatpath Brahman*, there is a description of the land east of the *Sadanira River* being barren, which was later made fertile by the Brahmins by performing yajna.[14]

Thus, in the Vedic period and subsequent periods, we see not only the continuous development of agriculture but also the agricultural science getting connected with the agricultural sector, in the

background of which manure has also been an important element along with other elements included with time such as iron agricultural equipment, variety of crops. In ancient India, manure made agriculture sustainable and environment friendly. It was not only helpful in increasing the productivity of crops, but also contributed in maintaining the balance of soil, water and environment. But generally, the use of manure in ancient India was much more complex than it appears to be. The reason for this is that different manures were used according to the different needs of the soil and crops. Vishuddhanand Pathak[15] is of the opinion that cow dung manure was used in abundance in ancient India. To make the land more fertile, the Aryans used cow dung obtained from animals as manure.[16] According to the *Atharvaveda*[17], natural manure of animals was more valuable. Similar references are found in the *Shatapath Brahman* that cow dung creates the power to grow plants in the soil, so cow dung is collected for agricultural work.[18] Apart from cow dung, probably naturally occurring grass, dry leaves of trees and plants, fruits and flowers fallen from trees, neck meat and bones of dead animals etc. must also have been used as manure, as is evident from literary sources. There is manure even better than these, which is called *Yagya* manure. It is said in *Yajurveda* that "*Krishicha Mey Yajyen Kalpantam*"[19] / "कृषिच मे यज्ञेन कल्पन्ताम" i.e. perform *Yagya* while making the land useful, only then the earth will become strong and powerful. At the second place it is said "*Prithivi Cha Mey Yagyan Kalpantham*"[20] /"पृथिवी च मे यज्ञेन कल्पन्ताम" i.e. may my land become strong through *Yagya*. The usefulness of manure has also been mentioned in Panini's *Ashtadhyayi*.[21] In the important text *Arthashastra* of the Maurya period, Kautilya has mentioned three types of fertilizers - *Gosthi* (bone), *Goshkrid* (dung) and *Asushk katu mtsya* (non-dry bitter fish).[22] In *Brihat Samhita*[23] and *Agnipuran*[24], a method for preparing manure in seven days has been suggested. Harshcharit[25] is the first to clearly mention the use of cow dung as manure in the fields. The texts related to the early medieval period - *Agni Purana, Krishi Parashar, Upvan Vinod* and *Vrikshayurveda of Sarpal* etc. also confirm the evidence of the use of manure.[26] It is stated in *Uktivyakti Prakaran*[27] that Indian farmers used manure. Therefore, it is clear that manure was used in agriculture in ancient India.

Importance of Manure and Method of Preparation:-

Manures have played an extremely important role in making the land or fields fertile since ancient times. Describing the use and importance of manure, *Shukra* says that for good growth of plants, "nutrition should be obtained from the excreta of goat, sheep, cow, water and meat."[28] At the same time, *Agni Purana* says that by mixing sesame, jowar and goat excreta and soaking it in beef water for seven consecutive nights, the trees become laden with flowers and fruits.[29] *Varahamihir*[30] has also suggested the use of fish wash water to get good leaves in plants.

Krishi Parashar,[31] a treatise on agriculture, recognizes the importance of manure for crops and says that without manure, the crop grows but does not bear fruits. Many quotes have been found in it regarding the use of cow dung as manure. Cattle manure contains considerable quaintities of potassium, phosphorus and nitrogen which plants needs for their nourishment. Parasara also prescribes the methods how dung is to be carefully preserved, stored, grinded and finally applied to the field. It also gives the following instructions-"the heap of cow dung should be loosened with spade in the month of *Māgha* and turned into powder and dried up in the sun and then the fertilizer should be deposited holes dug for the purpose in the fields in the month of *Phālguna* and afterwards scattered on the field at the time of sowing the seeds. According to R. Gangopadhyay, cow dung manure mainly supplied nitrogen and other nutrients by improving the water holding capacity of the soil, improving the soil structure.[32] *Harshcharit* clearly mentions cow dung manure and says that farmers used to load heaps of manure and garbage in

carts and put them in those fields whose fertility had decreased.[33] On the other hand, *Aashvyachurni* mentions making manure by burning animal horns, bones and sugarcane leaves.[34] This manure was used as a source of natural potash and phosphorus which strengthened the roots of the crop along with increasing the water holding capacity of the soil. Similarly, to increase organic matter in the soil and recycle environmental waste, organic waste manure made by rotting dry leaves and organic waste was used which was effective in increasing the growth of microorganisms in the soil and improving crop yield. It was believed that the land which had rotten rice as manure was suitable for growing chillies.[35] In ancient India, crops like dhaincha, moong, urad, arhar or guar were sown in the field for the production of green manure and after six to eight weeks when these plants attained sufficient height, they were ploughed and mixed in the soil of the field. After mixing the crop in the soil, the field was left for 15-20 days so that during this time the crop rots and gets converted into fertilizer in the soil. This manure not only improved the structure of the soil by increasing the availability of nitrogen element in the soil but also kept the soil fertile for a long time. This manure was mainly used to help in weed control as well as to enrich the soil with organic elements. Apart from these, *Vriksharveda* composed by Sarpal has an interesting description of different types of crops and preparation of different types of manure. In these, body water (*Kunapa*) and Ankola oil have been recommended for general use.[36] Whereas in *Upvan Vinod,* instructions have been given to use mainly white mustard cake or joe, paddy, excreta of humans and different animals, animal meat as manure.[37] The *Mānasollāsa*[38] also contains interesting accounts of the preparation and application of manure. For this it required a pit four hastas in diameter equally deep to be filled with bones and cowdung. These are to be brunt and then the ashes are to be removed. The pit is then filled with sand and the washings of a she-goat's fat and flesh are sprinkled over it. Seeds or plants sown in it bear abundant flowers and fruits. The text also recommends the use of the decoction made of *aṅkola* washings, honey, ghee, and the fat of a pig and deer and, also manuring of the soil with *Vidanga* honey, mustered and cow's milk.

Ultimately, it is clear that manure was very useful in ancient India and the method of preparing these manures and manuring was mainly based on practical observations and not much of scientific knowledge.

Manure Usage Method: -

In ancient India, along with the method of making manure being different, the method and time of using these manures was also different, according to the required elements and type. Hence, there was a proper time and method for every manure. Cow dung manure was mixed with the soil or put near the roots of the plants mainly at the time of field preparation i.e. before sowing of Rabi and Kharif crops. On the other hand, since the seeds were sown during the rainy season, it was considered good to sow green manure related plants like moong, urad, arhar, dhatura etc. during the rainy season because at this time the soil remained moist and the plants grew rapidly. Ash manure was used after sowing of Kharif crops and in winter to make the soil fertile. During monsoon or during the growth of the crop, cow urine was sprayed on the roots of the plants directly or mixed with other organic elements. Vacuum manure, that is, manure made from plant residues, leaves, grass and cow dung waste, was used throughout the year to increase soil fertility, but it was considered especially useful during monsoon and spring. Apart from this, another manure prepared by mixing cow urine, cow dung, jaggery and soil in water was called *Jeevamrit* or *Panchamrit* manure.[39]

It was sprayed on the roots of plants. It is clear that in ancient India, different types of manure were used from time to time according to the required nutrients to fulfill various purposes such as increasing the fertility of the land, increasing crop production, maintaining environmental balance, improving soil structure, water conservation, controlling pests and diseases in crops, providing stability to agriculture, biodiversity conservation and maintaining the balance of natural cycle. In this way, it is noteworthy that just as there has been a relationship between food production and life in ancient India since the beginning of civilization, the same relationship has been there between manure and organic fertilizers with agriculture. On one hand, the use of manure and organic fertilizers in the agricultural sector led to prosperity in crop yield, while on the other hand, human life also became prosperous due to the prosperity of agricultural produce. Absolutely, the following high quality and sophisticated conclusion may be more suitable for your research paper.

Conclusion:

The use of compost and organic fertilizers was an integral part of the agricultural systems in ancient India, which were not only essential for maintaining the fertility of the land but also helped in creating environmental balance and sustainable agricultural practices. Traditional composting methods, such as cow dung, crop residues, and green manure, improved soil structure, increased water holding capacity, and enhanced plant nutrition. These processes not only increased agricultural production but also maintained the health of the land in the long term, which is extremely important given the environmental impact of today's chemical fertilizers.

Although composting had some challenges such as time, labor, and limited availability of nutrients, these traditional practices made invaluable contributions from the point of view of sustainable agriculture and environmental protection as a whole. Re-understanding the scientific and practical approach of the composting system of ancient India and incorporating it into modern agricultural practices can not only maintain soil fertility but also reduce chemical dependency in agriculture.

This research makes it clear that ancient Indian agricultural practices, particularly the use of manure, offer solutions to today's environmental challenges and provide a model for sustainable agriculture. In the context of climate change, land degradation and the harmful effects of chemical fertilizers, reverting to these ancient practices may be of utmost importance to the global agricultural community. Ultimately, these findings are an important step in this direction, which will inform future agricultural policy and planning.

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