

Harnessing the Energy of Indian Cow Breeds: A Holistic Approach to Biodiversity

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Abstract: In India, the belief that the cow symbolizes divine and natural beneficence and should so be conserved and worshiped could be traced to the Vedic period. Even though cows were sacrificed and their flesh was consumed in ancient India, killing milk-producing cows became more and more outlawed. The Manusmirti, a religious and ethical law, forbids it in certain passages of the epic Mahabharata, while the milk cow was already described in the Rigveda as being "unslayable." Cattle have contributed to the survival of both humans and other animals for thousands of years. For more than 10,000 years now, our ancestors utilized them for meat, milk, to make leather, and as draft animals. Hence this paper further highlights and appreciates the motherly nature of cow that creates positivity by its presence.

Keywords: Veda, humanity, biodiversity, sustainability, Kamadhenu, Panchagavya, aura.

Introduction

Bharat (India), the land of ancient wisdom is endowed with its first place in buffalo, cattle, goats and second in sheep and third in poultry population playing a significant role in the livelihood of small, marginal farmers and landless rural people. The ancient history shows that animals were considered a wealth and was essential for existence of humanity, culture and religion. Cow rearing, worship and protection helped in the prosperity of the cows. The vedic society of India was dominated by the cow culture and vedic prayers adored the cow as a source of good fortune, happiness and good health.

Indian breeds of cows contribute to the extent of 25% of country's milk production. This

paper describes the importance of Indigenous breeds under the following heads.

1. Biodiversity of Indian breeds
2. Holistic farming system for livelihood security
3. Energy (Aura) of the cow
4. Recycling or utilization of animal waste
5. Technologies utilization for energy harvesting
6. Panchagavya production

1. Biodiversity of Indian breeds:

Indigenous livestock breeds of India were originated by the result of natural selection for thousands of years under local environment i.e., climatic conditions, fodder availability from grazing areas and by-products from agriculture and their economic sustainability for the specific needs of the farmers. Bharat is the abode for 200 indigenous breeds of different livestock species. These breeds are known for its high milk production efficiency by utilizing the crop residues apart from heat tolerance and disease resistance and efficient reproductive characters. The Indigenous Indian cattle are characterized by a prominent hump, long face, upright horns, drooping ears and slender legs. The colour varies from white to grey and black. They have low metabolic rate and better capacity for heat dissipation. They easily adapt to tropical heat, develop resistance to diseases especially tick borne and have heat tolerance capacity.

2. Holistic farming system for livelihood security:

A holistic animal farming represents a key solution for enhancing livestock production, minimizing the effects of intensive farming and safeguarding the environment through effective

usage of resources. There is a need to effective linkages and compartmentalizes of various components to develop holistic farming system. The sustainable livestock development should reorient the current farming practices of the rural areas. A holistic approach of livestock sustainability should aim at greenhouse gas mitigation, biodiversity conservation at global scale and provide products and services to meet the food, ecological and society needs at the national/ regional level and securing the livelihoods with nutritional security at farm level. The Integrated Livestock Crop farming systems are most desirable and environmentally friendly production systems. In recent years, intensification of mixed systems and unfavourable government policies (subsidies on fertilizers, diesel etc) has led to weakening of Crop- Livestock interactions having implications on the environment and sustainability of the systems.

3. Energy (Aura) of the cow:

Ancient history shows that cow energies are positive and constructive for human growth and prosperity. Cow was the symbol of prosperity and was called as “Kamadhenu”. They have high energies and used to neutralize the negative energies existing in the environment. The Indian Cow is having a hump, a store house of energy absorbed from Universal god,” Sun” . The cow as Aura energy of 4.5 to 6.0 m’ (m’ = Aura energy measured in metres). The Panchagavyas used in rituals have the following energies.

1. Cow ghee : 14m’
2. Cow dung: 6m’
3. Cow urine : 8.9m’
4. Cow milk: 12 to 13 m
5. Cow curd: 6.5 to 6.7m’

The Go-pradakshana around the pious cow absorbs the negative energy and neutralizes with its high pyramid energy from the hump. (Murthy,2007)

4. Recycling or utilization of animal waste:

The livestock waste include straw, animal bedding mixed with dung, urine and feed waste. Livestock waste can lead to huge nutrient surplus concentrated in areas close to humans leading to soil and water pollution and has even been implicated in climate change (Martinez et al, 2009). Among the wastes, animal dung and waste water constitute the maximum of the total waste generated on the farm. It is estimated that only 9 percent of the livestock sector is involved into methane recovery and utilization projects. In India, livestock wastes are managed generally in

three ways. The dung excreted by livestock is removed from the sheds by dumping into heaps nearby the cattle sheds. The heaps get converted into manure which is spread into fodder fields/ agriculture crops as an organic matter. A part of it is utilized in the form of dung cakes for energy purposes at the village level for cooking purposes. Another method is the establishment of bio- gas plants. The methane gas is used for cooking purpose and the bio gas slurry after methane extraction is utilized as farm yard manure (Gautam, 2006). According to FAO (2009) cow dung is highly valued for cooking and heating in many countries and alternatively 25 kg of fresh cow dung makes one cubic metre of biogas, which is used to provide energy for light, heat or motor power. The livestock waste production in cattle farming is to the tune of 40 kg per day per adult animal unit. The most important livestock wastes are cow dung and cow urine. Cow produces 17 to 45 ml of urine/kg body wt/ day (Kaneko et al, 1997). The production of 6 to 15 litres of urine per animal per day if collected separately in clean vessels can be of high-quality product from even unproductive cows.

5. Technologies for energy harvesting:

As per the available information reports, presently 2/3 rd of animal dung is being used as fuel and 1/3 rd as manure. The fuel value of the dung cake is equal to 1 kg firewood or 0.5 kg coal. It is estimated that 25 kg of fresh dung can produce one cubic metre of biogas and one cubic metre of biogas can produce 1.6 to 4.7 (2.7) units of electricity (Sharma,2006). The farm yard manure or compost consists about 0.5, 0.5, and 0.25 percent of nitrogen, phosphorous and potash respectively while the percentages of the same nutrient in Vermicompost are 1.5, 2.0 and 1.0 respectively. The NPK values in Vermicompost increase 3 to 8 times as compared to compost. If the utilization of the cow dung is done properly it has potential to convert 30 times of organic matter into good quality compost. So it is better not to use the dung directly as such to the fields/ fodder plots but rather utilize them more effectively by Vermicomposting. Experiments have proved that judicious use of animal dung can provide more income than milk on the animal farm. It can provide twice the income of milk if utilized as a source of Bio-gas, Vermicompost or Bio-fertilizer. For eco-sustainability of the farming system/ livestock production system, it provides micronutrients, humus, humic acid, and ulmic acid to maintain fertility, texture and water holding capacity of soil which constitutes the “Mother

Nature''. The dung of animal can do miracles for the country if utilized properly. As a fuel "Dung Cakes" provides slow heat for long time saving a number of trees besides coal and kerosene for the country. According to estimate dung as fuel can save or earn a sum of about Rs 109.5 billion per year while as manure it saves Rs 78.5 billion per year. The use of dung as farm yard manure saves a sum of Rs 241 billion while as Vermi-compost can save a sum of Rs 3078 billion per year.

Biogas plants help in recycling of dung in an environment friendly manner. It can be applied as a profitable waste management in institutions that generate huge quantities of organic wastes like schools, colleges, universities, hotels besides big livestock farms (Dairy, Sheep and Poultry). The methane potential has been estimated to be 0.29 m³CH₄/kg of volatile solid pig manure, 0.21 m³ CH₄/kg of volatile solids in cattle manure (Nasir et al, 2012). From one tonne of manure with 20 percent solid content, 20-25 cubic metre biogas can be generated with a total energy value of 100-125KWH and the same can be utilized to generate 35-40 KWH of electricity and 55-75 KWH of heat energy (Burton and Turner, 2003). Khoiyangbam et al (2011) estimated that about 980 million tonnes (on wet basis) of cattle dung produced in India alone every year could produce 41,000 million cubic metres of biogas per annum that is sufficient to produce 196 MW of electric power. It is estimated that approximately 1.2 crore tonne of manure is produced from broiler and layer industry (Tenuta, 2001). The integrated farming involves using the farm wastes for production of biogas that can be used for lighting, as kitchen fuel and for generation of electricity. The leftover biogas slurry can be used for preparation of organic fertilizers, Azolla production (as animal feed) and Vermi-compost production which is highly beneficial for soil physical condition as well as plant nutrient availability in soil. (Sastry, 2012).

Energy efficient utilization of draught for sustainable agriculture is to be focused as 80% of operational holdings are in marginal and smallholding category. It is estimated that around 75 Mha which is nearly 55% of the total cultivated area of the country is commanded by the draught animals with 1.5 to 2.0 ha command area per animal pair. The equivalent power available as per the population of draught animals is estimated to be 20000 megawatt (nearly 25% of the total electricity generation capacity of the country) with the energy value of 8000 M kWh considering the present annual use of 400h. It is further estimated

that by the use of draught animal power in agriculture about 3000 million litres of diesel are being saved (value = Rs 120000 million) per year, which ultimately save the import bill of the country on petroleum products. Besides the draught animals provide dung (value= Rs 40000/-million per year) for use in biogas plant, to save fire wood worth Rs 4000/- million and serve as a potential base into organic farming. (Rautaray, 2007). The All India coordinated Research Project on utilization of animal energy with enhanced efficiency beside developing appropriate equipment package specific to the site needs and cropping systems has been making concerned efforts to develop technologies for rotary mode application of draught animals to create additional work avenues other than cultivation and transport. It would facilitate efficient utilization of draught animals round the year in villages creating employment opportunities to farmers and gradually improve the quality of rural life.

6. Panchagavya production:

Panchagavya is the holistic approach of treatment involving cow's milk, curd, ghee, urine and dung to enhance the immune response of human body. Cow urine or Ark was considered as a sanjivini because of its antioxidant properties. Urine should be considered as a good revitalizing natural resource from livestock and not as a waste produced from them. Cow urine is one of the ingredients of 'Panchagavya' used extensively in Ayurvedic preparations (Pathak and Kumar, 2003). 'Panchagavya' is also used as a fertilizer and pesticide in agricultural operations. Cow urine is an excellent germicide and potent bioenhancer. Distilled cows' urine is an activity enhancer and availability facilitator for bio active molecules (Mohanty et al, 2014). Roughly 11.4 to 22.8 crorelitres of cow urine is produced every day (Sunil and Mathews, 2015).

Conclusion:

The dependence on milk and its by-products, namely, curd, butter and ghee, from the cows, not to speak of its dung that serves as fuel and fertilizer, their urine that has miraculous properties and their utility in tilling the fields, has raised the status of the cow from that of a custodian, to that of a maternal level, causing it to be revered as the "Gau Mata". Rig Veda equates cows with the river Goddesses, and venerates them as symbolizing wealth. Atharva Veda tells us that different Devas find abode in the cow's body. Brahma Samhita tells us how Krishna tended to his Surabhi cows in Goloka Vrindavana, his spiritual realm. Kamadhenu is considered an

embodiment of prosperity, and represents the sacred cow.

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