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CLIMATIC AND ECOLOGICAL VARIATIONS OF GOBARGAS UTILITIES IN INDIA

D. VIJAYA KUMAR

Principal & Professor, Sri Sivani Institute of Technology,
Srikakulam

ABSTRACT:-

The objective of this study were to estimate the potential for gobargas production and coverage of rural population by this, technology, to examine the potential for replacing fuel wood by gobargas. This study examines general impact of gobargas technology on the economy. To compare the availability and nutrient content of manure from rural compost with biogas manure, and to assess the socio-economic ecological impact of introduction of gobargas technology.

METHODOLOGY

For the purpose of this study, time series data of cattle and buffaloes population were taken from the various issues of Statistical Abstracts of India. The data were available only upto 2007. So the number of cattle and buffaloes for 2003 and 2007 were projected by fitting the linear trend. Thus the projected figures for 2007 worked out to 199.1 million for cattle and 105.3 million for buffaloes. Nelakaton (1975) estimated the average dung excretion per animal per day at 11.3 kg and 11.6 kg for cattle and buffaloes respectively. The norms suggested by him were used to estimate the daily dung production in India. The dung recovery has been assumed at 70 percent. Because of the kacha floor of most of the cattle sheds about 30 percent of the dung got puddled by the animals which is technically not usable for the goabargas plant.

Number of animals in India, 1951-2007
(In Million Numbers)

Year	Cattle	Buffaloes
1951	155.3	43.4
1956	158.7	44.9
1961	175.6	51.2
1966	176.2	53.0
1972	178.3	57.4
1977	180.0	62.0
1982	192.5	69.8
1987	199.7	76.0
1992	204.6	84.2
1997	198.9	89.9
2003	185.2	97.9
2007	199.1	105.3

Further, as gas production per unit of dung varies from season to season on account of temperature variations, ICAR's (1976) estimates were used to work out the daily gas production potential in different seasons. Assuming gas requirement of 0.57 cubic meters per person the number of potential beneficiaries and potential coverage of rural population has been estimated. KVIC estimates about calorific value of biogas have been used to estimate the heat value of the potential gas production. The daily wood requirement to produce the equivalent heat has been worked out assuming the calorific value of herd wood as 3600 Kcal per kilogram. Availability of dry manure is about 43 per cent higher when the dung is put through biogas plant, instead of composting it in the open manure pit. By using this conversion factor the potential availability of dry manure has been calculated. The nutrient content of biogas manure has also been compared with the nutrient content of rural dry compost.

RESULT AND DISCUSSION:

The total availability of dung from cattle and buffaloes for biogas production has been given the. It is evident from the table that on the assumption of dung production of 11.30 metric tonnes per thousand cattle and 11.60 metric tonnes per thousand buffaloes and recovery rate of 70 percent the useful dung potential works out to 2087 thousand metric tonnes for 1987. Table 3 represents the total daily gas production potential in different seasons. The gas production per unit of dung varies widely in different seasons which results in the variation in the number of potential beneficiaries. It would be seen that total daily gas production potential works out to 195 million cubic meter for summer, 119 million cubic meters for monsoon and 78 million cubic metres in winter. In this way the installed capacity is bound to remain under-utilized in winter and monsoon seasons. So the technology needs to be refined to maintain the uniformity of gas production.

Table 2-Esatimation of dung per a day for gobargas production in India

Breed	No.of Animals (000')	Dungprod./000 animals (M.T)	Total dung Prod.(ooo'M.T)	Reco - very (%)	Useful dung For biogas (000'M.T)
Cattle	192068	11.30	2170	70	1519
Buffaloes	69866	11.60	811	70	568
Total	**261934**	**11.38**	**2981**	**70**	**2087**

Table-3-Daily potential gas production and number and percentage of potential beneficiaries in different seasons

Season	Dung proud. (000'M.T)	Gas prod. Kg.	Total Daily gas prod. Mill.M³	Gas requirement Per person M³	No.of potential beneficiaries	potential rural population Coverage
Summer	2087	3.3	195	0.57	341.5	64.9
Monsoon	2087	2.0	119	0.57	208.7	39.7
Winter	2087	1.3	78	0.57	135.6	25.8

Table 4- Potential fuelwood replacement

Season	Total gas Prod./daily (Mill.M³)	Calorific value of gas (K cal/M³)	Total heat (Mill.K cal)	Wood required to produce equivalent heat(000'Tons Daily	Fuel season
Summer	195	4935	962325	268	32696
Monsoon	119	4935	587265	163	20049
Winter	78	4935	384930	106	12720
					65465

Further the per capita requirement of 0.57 cubic metre of gas for cooking can be reduced by introduction of modern cooking devices. In this way, the population covered by biogas can be increased.

Species	% Change from 2007-2012			% Change from 2007-2012		
	Rural	Urban	Total	Rural	Urban	Total
Buffalo						
Male	1.05	-8.70	9.60	-17.37	-28.37	-17.83
Female						
* In Milk	8.00	-6.50	-7.00	3.49	-10.53	2.61
* Dry	-5.30	-26.10	-6.50	12.37	-9.11	11.41
* Milch (In milk +Dry)	4.04	-11.38	3.00	5.90	-10.24	4.96
Total Female	8.30	-9.60	7.10	9.17	-12.74	7.99
Total Buffalo	8.70	9.50	7.60	4.18	-15.11	3.19

The variation s of animals in -milk of Buffalo population during the period 2003-07 and 2007-12 showing a decline of 56% in rural area. The percentage changes in - milch Buffalo population during the periods has increased by 46% in rural areas. The percentage changes in total female Buffalo population showing an increase of 10% in rural areas. The decline of Male Buffalo population is on higher side for both rural and urban areas during 2007-12.

PROBLEMS

All these benefits can play a great role in maintenance of ecological balance. Inspite of these advantages this programme is not catching up due to socio-technical reasons. It requires at least 4-5 cattle to provide enough dung to run even a small gobar gas plant and hardly 10-12 percent of farmers in India possess even this number. No wonder the spread of individual gobargas plants has been limited to the relatively richer strata of the community. A community gobargas plant also allows the pooling of all the dung produced in the village and would also make the use of human wastes easier if units could be attached to the public latrines. Community plants being large would also justify hiring trained operators and ensure that they function efficiently.

CONCLUSION

From above the analysis it can be concluded that gobargas technology offers lot of potential for meeting the energy requirements of the rural population, replacing wood as a source of fuel and thus preventing manure with a richer nutrient content, besides providing environmental benefits in the form of improved sanitation. The 19th Livestock Census shows an overall decline of 3.33% in the total livestock population as compared to the previous census of 2007.However, some states such as Gujarat (15.36%), Uttar Pradesh (14.01%), Assam (10.77%), Punjab (9.57%) Bihar (8.56%), Sikkim (7.96%), Meghalaya (7.41%), and Chhattisgarh (4.34%) have shown an increase in their total livestock population.

The number of milch animals (in-milk and dry), cows and buffaloes, has increased from 111.09 million to 118.59 million, an increase of 6.75%. The number of 'animals in–milk' has increased from 77.04 million to 80.52 million showing an increase of 4.51%.The Female Cattle (Cows) Population has increased by 6.52% over the previous census (2007) and the total number of female cattle in 2012 is 122.9 million numbers. The Female Buffalo population has also increased by 7.99% over the previous census and the total number of female buffalo is 92.5 million numbers in 2012. Further, the exotic/crossbred milch cattle increased from 14.4 million to19.42 million, showing an increase of 34.78% whereas the indigenous milch cattle increased from 48.04 million to 48.12 million, an increase of 0.17%. The milch buffaloes increased from 48.64 million to 51.05 million with an increase of 4.95% over previous census. Poultry sector has also shown a healthy increase by 12.39% over the previous census and the total poultry in the country was 729.2 million numbers in 2012.

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