International Journal of Cow Science, **3**(1&2): 65-69

GENERAL ARTICLE

www.ijcs.tk

EVEN UNPRODUCTIVE SEGREGATED CATTLE ARE BENIFICIAL

DK SINHA AND LOKESH SINGHAL

Indian Veterinary Research Institute, Izatnagar-243122 (UP) INDIA

India ranks first in milk production in the world and having the largest cattle wealth, therefore, the amount of dung and urine production is maximum. Still only 0.03% of land of our country is under organic farming. Industry analysts expect organic production and trade to escalate to as high as US $ 100 billion in coming decade.

After implementation of WTO treaty, it is essential to control animal diseases so that their products can be sold in the world market. Moreover, there are animal diseases which are of zoonotic significance and have an added importance in our country where conditions are conducive to wide spread human infection on account unhygienic condition and poverty. In this context, the role of food animals is of great significance. As such, it is now fully recognized that for control of zoonotic disease in human, the eradication of these diseases in animals is of primary importance. Therefore, screening of herds is essential to segregate the healthy animals from diseased one and keep the latter to separate isolated places to prevent the spread of diseases.

In India, effective control of Tuberculosis, Brucellosis and other zoonotic diseases of animals require a national plan. A major obstacle in the control of these diseases has been the disposal of positive animals. The "Test and slaughter" policy is proved effective in western countries but the existing socio-economic conditions of our country do not permit it. The alternative method of "Test and segregation" is perhaps the most practical and suitable for our country under which the positive reactors will be transferred to a separate farm.

The farm where positive reactors are kept will be of semi closed type i.e. only positive reactors are allowed to come in but never allow to go out till their natural death. Within the farm animals can be grouped in productive and unproductive herds. Within productive and unproductive herds, groups would be made of animal affected with different types of diseases to take due attention while handling. Depending upon the zoonotic nature of the disease, excretions, secretions and products of the animals will be handled carefully.

The bacteria *Mycobacterium* and *Brucella* are known to be secreted through milk. The productive animals which are suffering from tuberculosis and brucellosis must be milked by milkman having no cut on hands and they must wear gloves in hand and mask on face to prevent infection while milking. The dung and urine of such animals are collected in a separate place and treated with lysol (5-10 %). The milk either pasteurized or boiled before marketing. Once dry, these animals are not further used for reproductive purposes.

The productive animals are beneficial, no doubt but those who are unproductive, as economics says, are no more burden. These animals can be utilized to produce organic manure or pest repellant.

COST:

Economics of maintenance of 100 unproductive/ discarded animals is worked out. As said earlier, the positive reactors should be kept in an isolated farm where all infra- structure facilities for maintaining herd are available. Therefore, the major expenditure can be described in the following heads:

1. Cost of feeding (Ration)
2. Medicine, vaccine etc.
3. Electricity, water etc.
4. Maintenance of farm building etc.
5. Labour cost.

Cost of feeding:

Since the animals are positive reactors so they are not used for production purpose, therefore, only "maintenance ration" will be provided, which is the minimum amount of feed required to maintain the essential body processes at their optimum rate without gain or loss in body weight or change in body composition. In most parts of India, green is seldom available and straw is considered to be only basic roughage. Under such circumstances, compound concentrate mixture which will provide at least 20 per cent protein (14-16 per cent DCP) and 68-72 per cent TDN. Reasonable varieties of feed should be included so that when compounded the mixture should be quite palatable and slightly laxative and balanced with minerals and vitamins. The amount of concentrate mixture and straw that will provide optimum maintenance requirement for an adult dairy cattle are given below:

Centre for Animal Disease Research and Diagnosis; E.mail: lksinghal@gmail.com

Sl. No.	Item	Amount
1.	Straw	5.0 Kg.
2.	Concentrate mixture (with straw only or with little greens)	1.0 Kg.

The following concentrate mixture will provide 14-16% DCP and a minimum of 68% TDN.

Oil cakes	= 25-35 parts	To be fortified with 1% mineral mixture, 1-2 % Salt and 20-30 gm. Vit. AD_2 /100 Kg containing 50,000 IU Vit. A and 5000 IU Vit. D_3 per gm.
Millets/cereals	= 25-35 parts	
Cereal by product	= 10- 25 parts	
Pulse chunni	= 5- 20 parts	

Where the principal roughage is straw, limestone powder @ 1-2 % (able to pass through 150 mesh) should also be given. The per day expenditure on one animal will be approximately Rs.19 to 20/- (straw @ Rs. 1.00/- per kg. and concentrate mixture @ Rs.14/- per Kg). Therefore, annual cost of feeding for 100 animals will be around Rs. 7,00,000/-.

Medicine, Vaccine etc:

Though these animals are positive rectors but they are not given any treatment to cure them. However, the day-to-day expenditure on abrasion, abscess, fracture etc. and vaccination of these animals against FMD, HS, B.Q. and Anthrax will be carried out. A sum of Rs. 500/- on each animal per year has been kept for this purpose. Therefore, for 100 animals an amount of Rs. 50,000/- will be required annually.

Electricity, Water etc:

Under this head an amount of Rs. 25,000/- annually has been kept.

Maintenance of Farm building :

A sum of Rs. 25,000/- annually is kept for this purpose also.

Labour cost:

To look after 100 animals and to carryout the various activities of farm, ten labourers are required daily. Keeping Rs. 50/- for one labour per day, a total of Rs. 1,82,500/- required annually.

Total expenditure annually (in Rs.):

Ration	=	7,00,000.00
Medicine	=	50,000.00
Electricity, water	=	25,000.00
Farm building	=	25,000.00
Labour	=	1,82,500.00
Total	=	9,82,500.00

BENEFIT:

Under the head benefit, only monetary values of dung, urine and their various products are discussed.

(A) Cow dung:

Dung is a valuable input for producing manure, which enrich the soil by restoring the nutrients. Dung is also used as dried cakes for cooking as well as for production of biogas. Digested slurry, which is a by-product of biogas is an eminently rich source of manure and is in turn, usable for enrichment of the soil.

Potential of dung:

* 1 Kg wood	=	2 Kg dung cake
* 1 Kg coal	=	4 Kg dung cake
* 1 cubic meter biogas	=	25 Kg fresh dung
* 1 cubic meter biogas	=	2.5 units of Electricity
One animal	=	10 Kg dung /daily
100 animals	=	1000 Kg dung /daily
or	=	365 x 1000 Kg dung / annually or 3,65,000 Kg or 365 ton (T)/ annually

Dung has 26% total solid. Therefore, on dry matter (DM) basis 3,65,000 kg is equivalent to 94,900 kg dung which can save 47,450 Kg wood or 23,725 Kg coal. 3,65,000 kg fresh dung can produce 14,600 cubic meter bio-gas which in turn can produce 36,500 unit electricity.

1) Fuel saving:

Item	Rate @ Rs.	Qty	Saving in Rs.
Wood	1000 / T	47.45 T	47,450/-
Coal	4000 / T	23.725 T	94,900/-
Bio-gas		14600 cubic meter	
Electricity	Rs. 2 per Unit	36500 unit	73,000/-

2) Composition and cost of fertilizers:

Fertilizer	%	Cost (Rs/Ton)
Urea	46 (N_2)	8,000/-
Super Phosphate	16 (P_2O_5)	10,000/-
Murret of Potash	48 (K_2O)	5,800/-

Dung can be used in the production of:

a. Farm yard manure = Dung + Animal waste

b. Compost = Dung + Animal waste + Agriculture Waste

c. Bio-gas production = Biogas + Digested slurry

Biogas technology involves natural processing of cattle dung for value added products, mainly biogas and slurry. Biogas is a clean and efficient fuel while slurry is enriched organic manure. Biogas can be used to replace diesel oil up to 75% in a dual fuel internal combustion

engine. Making a provision for a gas – mixing device below the air filter modifies ordinary diesel engine. The consumption of biogas is about 0.45 to 0.5 cubic meter per H.P. per hour. Dual fuel engine can be used for running water pumps, chaff cutters, etc.

The slurry improves physical, chemical and biological properties of soil because it contains 80% carbon. 1.5% nitrogen, 1.0% phosphorous, 0.9% potash, 188 ppm manganese, 355 ppm iron, 144 ppm zinc and 28 ppm copper. Therefore, it is an excellent source of not only humus but also micronutrients for crop. Extensive field trials conducted in various agro-climatic conditions, showed that yield of different crops was enhanced by 10 to 30% when digested slurry was used @ 10 – 15 tones per hectares per year in irrigated land and @ 5 – 6 tones per hectare per year in non-irrigated land. It can also be used for coating of seeds to improve vigour of seedlings. Slurry can be used for production of:

a. Compost
b. Vermicompost
c. Bio-fertilizer

The nitrogen (N), phosphorous (P) and potassium (K) contents of different products of cow dung are given below:

Item	N (%)	P (%)	K (%)
FYM/Compost	0.5	0.5	0.25
Digested slurry	1.5	1.0	0.9
Vermicompost	1.5	2.0	1.0
Bio- fertilizer	3.0	2.0	1.0

Farm Yard Manure (FYM):

For production of FYM, dung plus leftover animal food materials and organic matters of farm, which is about 1/3 rd of dung, is used. The FYM has solid of 68% on DM basis, which is about 292 T and has a value of Rs. 1,25,506/-.

365 T + 121.667 = 486.667 T
60% DM basis FYM = 292 T

	N (0.5%)	P (0.5%)	K (0.25%)
Amount (T)	1.46	1.46	0.73
Fertilizer equiv. (T)	3.18	9.125	1.52
Cost (Rs.)	25440/-	9125/-	8816/-

Total = Rs. 1,25,506/-

Compost:

Compost is prepared from dung (50%), and animal leftover and agriculture waste, which is a well established pratice in Indian agriculture since ancient times. Compost is very well suited for improving soil fertility. When composted properly (temp. more than 55^0C up to 70 – 80^0C, pH 8.7 – 8.9) most of the pathogens, parasites including their eggs and weed seeds will be killed. Application of compost has also a reducing effect on soil pathogens. Compost has a solid content of approximately 60%. Therefore, an annual production of 730 T of compost has a 438 T of solid, which is equal to Rs. 1,88,204/-

365 T (dung) + 365 T (Animal waste + Agril. waste) = 730 T
On DM basis (60%) = 438 T

	N (0.5%)	P (0.5%)	K (0.25%)
Amount (T)	2.19	2.19	1.095
Fertilizer equiv. (T)	4.76	13.69	2.28
Cost (Rs.)	38080/-	136900/-	13224/-

Total = Rs. 1,88,204/-

Slurry as compost:

Slurry is the byproduct of biogas plant which has immense potential as a organic fertilizer and can be used in different ways, compost is one of them which can give a return of Rs. 7,98,848/- annually.

365 T (slurry)+1095 T (Animal waste + Agril. waste) =1460 T
50% DM basis = 730 T

	N (1.5%)	P (1.0%)	K (0.9%)
Amount (T)	10.95	7.30	6.57
Fertilizer equiv. (T)	23.76	45.625	13.71
Cost (Rs.)	190080/-	456250/-	79518/-

Total = Rs. 7,25,848/- + 73000/-(as electricity)
= Rs. 7,98,848/- (from biogas)

Slurry as vermicompost:

Slurry can be used for production of vermi compost to a tune of 474.5 T on DM basis which has a value of Rs. 7,74,374/- plus Rs. 73,000/- from the production of electricity, resulting in a total value of Rs. 8,47,374/-.

365 T (slurry)+1095 T (Animal waste + Agril. waste)= 1460 T
Vermi compost @ 65% = 949 T
On 50% DM basis = 474.5 T

	N (1.5%)	P (2.0%)	K (1%)
Amount (T)	7.12	9.49	4.745
Fertilizer equiv. (T)	15.48	59.3125	9.898
Cost (Rs.)	123840/-	593125/-	57409/-

Total = Rs. 7,74,374/- + 73,000/- (as electricity)
= Rs. 8,47,374/-

Slurry as bio-fertilizer:

Use of bio-fertilizers agents like Azatobacter, PSM, Rhizobium etc. with slurry, help in nutrient mineralisation in soil and result in sustainable productivity. For production of bio-fertilizer, three times more quantity of agriculture waste along with bio-fertilizer ingredients are mixed with slurry. It has about 50% solid which is equivalent of Rs. 8,98,214/- of chemical fertilizer besides an electricity of

Rs. 73,000/- can also be produced or saved by utilizing bio- gas. Therefore, the total value will be to the tune of Rs. 9,71,214/-.

365 T (slurry)+1095 T (Animal waste + Agril. waste) = 1460 T
Biofertilizer @ 65% = 949 T
On DM basis (50%) = 474.5 T

	N (3.0%)	P (2.0%)	K (1.0%)
Amount (T)	14.235	9.49	4.745
Fertilizer equiv. (T)	30.96	59.3125	9.898
Cost (Rs.)	247680/-	593125/-	57409/-

Total = Rs. 8,98,214/- + 73000/- (as electricity)
= Rs. 9,71,214/-

Cow urine:

Medicinal value:

Cow's urine is of immense medicinal value. Research on cow urine is gaining immense significance in cure of some diseases like cancer, renal failure and so on. Researches at Central Institute of Medicinal and Aromatic Plant (CIMAP) have identified a "cow urine distillate fraction" as a bio-enhancer of commonly used antibiotics and anti-cancer drugs. Bio-enhancers are substances, which do not possess drug activity of their own but promote and augment the bioactivity or bio-availability of the uptake of drugs in combination therapy. Cow urine distillate fraction enhances the activity of antibiotics such as rifampicin by about 5-7 folds against *E. coli* and 3 to 11 folds against Gram's positive bacteria. It enhanced the potency of 'Taxol' (paclitaxel) against MCF-7, a human breast cancer cell line in *in-vitro* assays.

Fertilizer:

It has been observed that addition of cow's urine in composting pits result in production of superior quality vermicompost with higher concentration of major macro- and micronutrients. Such vermicompost was found to be superior in terms of microflora. Application of this vermicompost in pots significantly improved the yields of lucerne (*Medicago sativa*) when compared with pots supplemented with vermicompost product without using cow's urine.

In urine, only N and K are present. More than 90% of the total N content in urine is NH_4^+. The N and K are predominantly present in inorganic form. This means that urine is comparable to commercial N and K fertilizer. The average K content in cattle urine is 0.7%.

5 liter urine /day / cow x 100 =500 lt./day or 500x365 = 182,500lt.annually.

K content of urine @ 0.7% =1277500g or 1277.5 Kg or 1.2775 T annually.

1.2775 T K is equiv. to =2.66 T of chemical fertilizer of Rs. 15428/-.

Pest repellant:

Cattle urine is also a powerful natural pesticide and if used properly can save human beings from the harmful effects of pesticides residues in everything he eats and drinks. For preparing pesticide, take 10 liter of cow urine, add 250 ml. Neem oil and boil it in copper utensils till the quantity become half. Cool it then filtered and kept in clean glass bottle. 500 ml of the organic pesticides mixed in 25 liter of water can be spread in one acre of crop. This can be repeated at an interval of 120-150 days.

Benefit from pest repellant:

Cow urine = 1,82,500 lt.annual/100 animal
Insecticides prepared = 91,250 lt.
Cost (bulk) = Rs. 1200 / 25 lts.

Therefore, $\frac{91{,}250 \quad 1200}{25}$

or Rs. 43,80,000/-

Cost of producton:

Neem oil required = 250 ml/10 lt. urine

$= \frac{250 \quad 182500}{10}$ = 4562500 ml

or 4562.5 lt.

i) Cost of Neem oil (@ Rs.100/-/lt.) = 4,56,250/-
ii) Cost of fuel = 10,000/-
iii) Cost of labour, technician etc. = 1,50,000/-
iv) Cost of equipment etc. (Recurring) = 1,00,000/-
v) Cost of packaging, marketing etc. = 1,00,000/-
Rs. 8,16,250/-

Net profit (Rs.) = 43,80,000 – 8,16,250
= 35,63,750/-

Conclusion:

The aforesaid discussion revealed that use of cow dung for production of biogas and bio-fertilizer as well as cow's urine for the production of pest repellant is the best utilization of the by-product of discarded/unproductive cattle with an annual income of Rs. 9,71,214 + 35,63,750 = 45,34,964/-. Therefore, the net profit will be of Rs. 35,52,464/- (45,34,964-9,82,500) annually.

Production of compost /vermicompost / bio-fertilizers will promote the use of organic manures in agriculture replacing the chemical fertilizers which has degraded the soil fertility status, resulting in low productivity. The effect of organic fertilizers in increasing the productivity is gradual. It increases the micro flora of soil thereby increasing the soil fertility. As a new trend, crops / products of organic farming fetch good return in comparison to chemical farming.

The tenth five year plan (2002- 07) envisages a comprehensive centrally sponsored scheme called "National Project on Biogas Development and Manure Management". The plan target is to promote 10 lakh small biogas plant and establish at least 10 biogas power stations with Plan outlay of Rs. 350 crore. Therefore, it is high time to utilize the dung for the production of biogas and digested slurry and to utilize them in organic farming to generate more and more exchequer thus prosperity to the nation.

FURTHER READINGS:

Annonymous 2002. Kamdhenu kheti. In *Cow Therapy* Published by Shri Krishna Gausala Jeev Raksha Kendra, Gobar- Gaumutra Anusandhan Evam Prashichan Kendra Shri Krishna Gausala Pharmacy, Dairy (Chattisgarh). pp-59-77.

Anonymous I 2003. "Bioactivities of cow urine and its arka (distillate) for utility in Agriculture and Health". Central Institute of Medicinal and Aromatic Plant (CIMAP), Lucknow. In *The Economics of cow* Published by Love 4 cow Trust, New Delhi. pp. 62-64.

Anonymous II 2003. Jaivik Kheti Vikas : Ek Nazar. In *Prakriti – 2003*. (Ed. Dubey, R.) Vishwa Ayurved Parishad, Lucknow. Pp. 38.

Anonymous 2005. Kamdhenu Agriculture Products. Govigyan Anusandhan Kendra, Kamdhenu Bhawan. Nagpur. (http://www.govigyan.com/ medicalproducts. htm).

ISDA 2001. Implication of U.S. and Global Dairy, Livestock, and Poultry production for International trade (www:fas.usda,govt htp/organic/attach.htm).

Khandelwal KC. 2003. Bio-energy and rural development. In *The Economics of cow*. Published by Love 4 cow Trust, New Delhi. pp. 65-78.

Nautiyal CS, Mehta S, Singh HB, Pushpangandan 2003. "Go-mutra and dung based products as viable alternative for sustainable agriculture for our rural marginal farmers". In *The Economics of cow*. Published by Love 4 cow Trust, New Delhi. pp. 29-53.

Pathak PK. 2002. "Farmer's Animal Husbandry practices in relation to organic Animal Husbandry standards: An exploratory study in Bankura district of West Bengal. M.V.Sc.Thesis (Vet. Extension Education) submitted to Deemed University, IVRI, Izatnagar.

Singh RV. 2001. Untapped potential. *Down to Earth*. **10**(8): 34-41

Singh R. 2003. Jaiv Kheti In *Prakriti 2003* (Ed Dubey R.). Vishwa Ayurveda Parishad, Lucknow. pp.23-24.

Swami A. 2003. The cow for drought mitigation. In *The Economics of cow*. Published by Love 4 cow Trust, New Delhi. pp. 79-85.

UNCTAD 1996. Report on Organic Production in Developing Countries, Potential for Trade, Environmental improvement and Social Development, Geneva, Switzerland.