



## From the Editor's desk:

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There has been a little delay in bringing out this month's edition of the magazine. But the wait has only been for the better. The issue has come out more matured and more informed. This particular release houses significant articles that could change one's perception of the private interest in dairy products forever. It has been disheartening to see how everything is justified in the human society in the name of competition. Cut throat competition is not a mere jargon but is literally cutting throats.

The issue also hosts the third in the much acclaimed Cowpathy Series. A short essay on Methane Farming also adds value to the already long list of information we have filled this with. While we are very excited about TERI's claim to Nobel fame, we are also much worried on how knowledgeable men are pointing fingers at India accusing it for the high amount of Methane emission due to livestock. It also surprises how soon educated Indians are trapped in the circle of negative bias. The essay on Methane farming may prove an eye opener to all those.

Even when a section of the scientific community is emphasizing on the need for Organic farming, there is yet another and a much bigger section that opposes it. The Green Revolutionists no doubt brought a quantum shift in agricultural production but the goal had a definite short sightedness. Days are not far when lands will be impotent to grow even weeds. We might have our stomachs full but will our next generation be blessed with at least a grain?

*"Hail Mother Cow".*

### Cowpathy Part –III

In the last two series we discussed the beneficial properties of Cow's urine and dung. In this edition we shall throw light on the well known and widely used product from Cow, its milk. In India, much of the traditional knowledge percolated from one generation to another orally. Orally or written, all the medicinal schools emphasize on the rejuvenatory health protecting and promoting properties of Cow's milk. Known as the best among vitalizers, it is low in calorie, cholesterol, fat, calcium and phosphorous content and high in carotene, thiamine, riboflavin, vitamin C, sodium and potassium when compared to Buffalo's milk. In India Cow's milk has always been an integral part of our diet.

It is one thing to follow one's tradition and yet another to appreciate and understand the reason behind it. Hence it is becomes mandatory that understand the role cow's milk plays in our health building. Enriched with substances like Vitamin A, Vitamin of B Complex group and also with flavones, sterols and phenols, it delays the ageing process. The presence of fatty and amino acids play a major role in the growth of infants and children. It is also known that a 250 ml serving of Cow's milk contains riboflavin equivalent to 50% of the daily requirement of a pre-school child.

Even the proteins present in Cow's milk are of a different kind that their digestibility is as high as 96% whereas plant proteins fall in the range of 74-78%. The high digestibility factor is attributed to the presence of amino acids in milk. It also acts as brain tonic and maintains the health of kidney. Lactose favors the absorption of calcium and phosphorus and as the principal milk sugar, promotes the growth of lactic acid bacteria in the intestine that helps in the whole calcium absorption process. It is the Cow's milk proteins that are useful for patients suffering from liver and gall bladder diseases. Because of its easy digestibility, the milk fat is also a valuable dietary constituent in the diseases of stomach, intestine, liver, gall bladder, kidney and disorders of fat digestion. Milk fat also fights tooth decay due to adsorption on the enamel surface and the

antimicrobial effect of its fatty acids. Even for infants and people with renal disorders the high biological value in Cow's milk protein relieves strain on the excretory function of the kidney.

The presence of B Vitamins and Vitamin A increases immunity. It is also a source of zinc that helps in increasing immunity. The presence of immunoglobulins which cannot be broken down by enzymes also accounts for its antimicrobial activity and prevents absorption of foreign proteins. Presence of several peptides prolongs gastrointestinal transit time exerting anti-diarrhoeal effect. Constituents of milk also stimulate the macrophages and hence enhance resistance against certain bacteria. The role of Vitamin A in vision building is not new. A 250 ml serving of Cow's milk contain Vitamin A sufficient to meet 75% daily vitamin A requirement of pre-school child. It also reduces acidity thus reducing the chances of peptic ulcer.

Not only Cow's Urine, but its milk also displays anti cancer properties. The fat component in Cow's milk is a potential anti-carcinogenic agent and reduces chances of colon, breast and skin cancer. The Conjugated linoleic acid in cow milk inhibits cancerous growth. In mouse models this has shown to protect against the induction and proliferation of chemically-induced skin, stomach, colon, prostate and mammary tumors. Research suggests that CLA can decrease the amount of fat in blood and hence also helps in the fight against heart disease and obesity.

Low fat content in Cow's milk reduces the risk of heart diseases and obesity. It also reduces the formation of serum cholesterol and a regular intake helps keep the blood vessels healthy. The presence of calcium which acts as a signaling agent to cells to figure out what they need to do is very significant. When there is plenty of calcium in blood, the fat cells start burning the stored fat. As a natural anti-oxidant it reduces the oxidative stress produced in the body through the action on free radicals. It also fights diabetes and yet provides the required sugar for diabetic patients. Hence

consumption of milk enables a diabetic patient to obtain the biologically highly valuable milk proteins without running the risk of high blood glucose levels. The presence of Vitamin K also prevents hemorrhagic disease of newborn. Folic acid prevents anemia and neural tube defects.

Apart from being used as a health enhancer, research on Cow's milk also has led to its use in agriculture. Plant beneficial bacteria from cow milk have been isolated and inoculation of seeds or soil with these beneficial microorganisms has led to crop improvement. Milk of Sahiwal cow was found superior to human, Holstein cow and buffalo. Three strains of *Bacillus* isolated from Sahiwal cow milk have the ability to control phytopathogenic fungi and promote plant growth. Along with fermented press mud (a waste from sugar manufacture), the bacteria isolated from Sahiwal cow milk enhances growth of economically important plants in horticulture, floriculture and agronomic crops in the range of 10-60%. CSIR has even filed a patent on this.

Though culture and tradition differs from place to place and country to country, milk surpasses all such barriers. It is the only food accepted all over and has no adequate substitute. With such high nutrients, Cow's milk scores over all others and hence the rationale behind its usage must be popularized. Indian children suffer from malnutrition and prevalence of underweight children is among the highest in the world. World Bank reports indicate that micronutrient deficiencies may alone cost India US\$2.5 billion annually. Its time that we understand the need for milk in our everyday diet and hence protect Cows that supply us with it. Darker days may not be far if we turn a blind eye now.

### Milk and Adulteration:

*Though adultery is in the very nature of man, business and competition has only made it worse. The current state of the society is a candid reflection of all the filth we carry deep inside our mind. There is no deliverance to the race that cheats itself for a few more pennies and those who express their betrayal in something as basic as the food are committing an unforgivable crime. As we are discussing the significance of milk as a primary component in the common Indian diet, there are so many private milk trading firms that add harmful substances to milk to ensure that they stay ahead in competition at the cost of the very people they serve. In this article we shall throw some light on what kind of adulteration takes place in milk production.*

- *Neutralizers like hydrated lime, sodium hydroxide, sodium carbonate or sodium bicarbonate are added to milk which are prohibited. Even hydrogen peroxide is added to milk.*
- *Formalin is a poisonous agent that is added to milk to preserve it for a long time.*
- *Milk that is already diluted with water will show a low lactometer reading. Hence poor quality sugar is added to milk to increase the lactometer reading.*
- *Milk is even adulterated with starch, wheat flour, arrowroot, rice flour to increase the solid-not-fat content of milk. Again Urea is another one of those adulterants used in increasing the solid-not-fat content of synthetic milk*

*-Continued on page 5*

## Cow Insight - Bargur

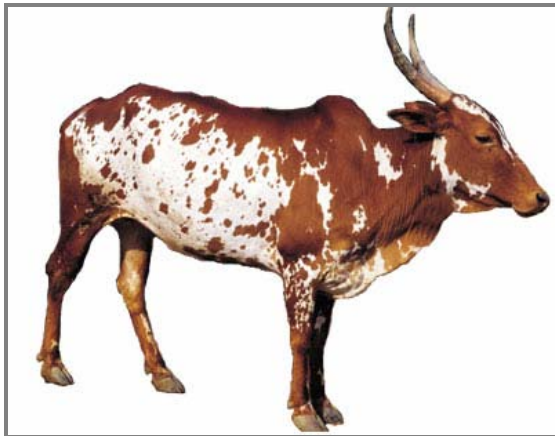
### ORIGIN AND DISTRIBUTION

Bargur is draught breed found around Bargur hills Bhavani taluk Erode district of TamilNadu, and are bred extensively by Lingaiys and Lambadis of that area. This area was earlier a part of Coimbatore district. Animals are of Mysore-type, but smaller and more compact. They are very restive and fiery in disposition, and are difficult to train. They are light in built and developed mainly for carrying out agricultural operations in the uneven and hilly terrain. Cattle of this breed are unsurpassed in speed and endurance in trotting.

The breeding tract lies between 11°40' and 12° north latitude, and between 77°20' east longitudes.

### SOIL

Mostly red sandy followed by black and alkaline. Soil is shallow in depth and texture ranges from sandy to gravel.



### CLIMATE

Climate is usually hot. Maximum temperature varies from 30 to 38°C and minimum from 19 to 26°C. Annual rainfall is about 65 cm and mean relative humidity varies from 53 to 77%.

### MANAGEMENT PRACTICES:

These cattle are mainly reared in the forest area in semi-wild conditions and penned in enclosures called Pattys. They are

tended by hired local tribal labourers called Lingaiyas. Each patty has 50 to 200 heads of cattle. For most part of the year, these cattle remain in the interior of forest and graze on the existing vegetation. They are brought back to villages for harvest operations and sent back to forest area after the next sowing is over. All these cattle are driven to salt licks about 43 km north of Bargur by about January for a few days and then driven to forest again. Cows are not usually milked. Calves remain with their dams throughout.

### PHYSICAL CHARACTERISTICS

Bargur cattle are of brown color with white markings. Some white or dark brown animals are also seen. Calves are generally brown in color. Color does not change with age as in Kangayam and Umblachery breeds. Animals are well-built, compact and medium in size. Head is brownish, well shaped, long and tapering towards the muzzle. Forehead is slightly prominent and has a deep furrow between the roots of horns. Muzzle is moderate and black in color. Eyes are prominent and bright. Ears are moderately long and erect. Horns are of light brown color, moderate length, closer at the roots, inclining backward, outward and upward with a forward curve and sharp at the tip. Neck is fairly long and thin. Hump is moderately developed in females and well developed in males. Dewlap is thin and short extending up to sternum only. Navel flap is present in many animals. Sheath is tucked up. These cattle have thin and bony limbs. Thighs are well developed. Hindquarters are well developed and slightly dropping. Tail is well set, fairly long (below hocks) and thin, tapering to a good brownish switch. Tail length is 85 to 105 cm. Cows have small udders applied close to the body. Teats are small and well set apart. Skin is loose, mellow with fine short hair.

### MORPHOMETRIC AND PERFORMANCE PARAMETERS

Average body length of cows is 120.5 cm (range 98-147), and bulls 176.6 cm (range 172 to 201 cm). Average height is 121.6 cm cows and 125.6 in bulls. Average heart

girth in cows is 123.8 cm (range 120 to 148 cm) and 156.2 cm bulls (range 140 to 169 cm). Average length and width of face are 43.5 and 26.8 cm, respectively, in cows and 46.5 and 34.8 cm in bullocks. Thickness of horns at base is 18.7, 20.1 and 30.9 in cows, bulls and bullocks respectively. Average birth weight in males and females is 18.9 and 18.1 kg respectively, and adult weight is around 340 kg in males and 295 kg in females. Cows are poor milkers and produce 250 to 1300 kg of milk in a lactation period of 270 to 310 days. Mostly cows calve once in 16 to 18 months and sometimes once in a year also.

#### BREEDING FARM

Agricultural Research Station,  
Bhavanisagar, Tamil Nadu

#### CONTACT AGENCIES

State Animal Husbandry Department,  
Tamil Nadu

#### In the news:

*The IT4Cow group met on the 2nd of Dec 2007 at Go Loka, Kaggalipura, Bangalore. The Go Loka houses 207 cows from rare 22 Indian breeds. This is the second Go Shala in the world which boasts of so large number of breeds, next to Sri Ramachandrapura Mutt, Hosanagar. It will not be an exaggeration if one says that the experience was life changing. The Go Loka needs all your support at the moment. For further details please contact*

**Sathya shankar- 9845077840**

#### Milk and Adulteration ( continued from page 3)

- Not only poor quality sugar, but even ammonium sulphate is added to milk to increase the lactometer reading. Even addition of salt helps in the same.
- Private firms go to the extent of adding pulverized soap and detergents in milk. To increase the fatty acid composition, vegetable oils are added as well.

*Though there are tests available to detect the presence of these compounds, it is not feasible to do all of those at home. Hence to prevent such illegitimate practices it needs the food corporation boards to interfere and monitor the activities of these business minded firms thoroughly. With the unbelievable level of corruption that has infiltrated into the system it is a really daunting task for anyone to weed out such practices. But if something isn't done about this at the earliest then we are risking the wellbeing of the whole human race.*

#### Coffee with Cow:

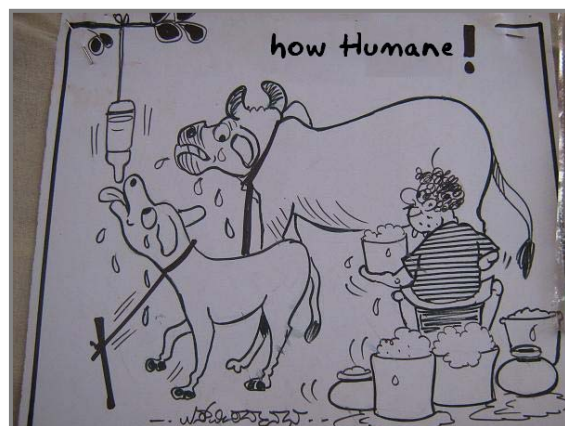
Answers for last month's anagrams

1. MALAVI
2. HALLIKARA
3. DEONI
4. BARAGUR

#### Riddle of the month

*Neighbors we are and yet we fight,  
The heaven sobs and everything is right.*

*Painted I am in chocolate brown  
My name is that of a southern town*





## Indigenous Breeds: Ingenious Indeed

The domestication of indigenous cattle appears to have taken place in the area of present Afghanistan, Sind and Baluchistan before 4000 BC. The seals from Sivikotada in Gujarat and Kalibanga in Rajasthan show images of domestic animals probably reared by Harappans (2200 BC to 1600 BC). Fossils of *Bos acutifrons* have been discovered in Siwaliks, which are regarded as possible wild ancestors of cattle. These findings suggest that domestication of cattle in Indian Subcontinent antedates Europe and North Africa.

The indigenous cattle (*Bos indicus*) differ from *Bos Taurus* cattle found in Europe and North Africa in morphological characters. A prominent hump, a long face, upright horns, drooping ears, a dewlap and slender legs characterize the indigenous breeds. Indigenous cattle have lower basal metabolic rate, better capacity for heat dissipation through cutaneous evaporation and thus adaptation to tropical heat and resistance to diseases specially the thick-borne diseases than *Taurus* cattle. Indigenous breeds are well known for heat tolerance, hardiness and ability to survive and perform even under stressful conditions and low input regimes. Different breeds of indigenous cattle were evolved over centuries to suit to different agro ecological situations.

Indian subcontinent is a rich source of diverse animal germplasm, and only a very few countries have such a large number of breeds of farm animals with such a wide genetic diversity. India has contributed richly to the international livestock gene pool and improvement of animal production in the world. The cattle in India are broadly categorized in to 3 groups, milch breeds, draught breeds and dual-purpose breeds. There are nearly thirty breeds of cattle in addition to a large number of which are generally small in size and low producing. It is estimated that only about 18% of the total cattle in India belong to well defined breeds.

The northern and western region is the home tract for milch breeds like Sahiwal, Tharparkar, Gir and Red Sindhi. Gujarat is the home tract of Kankrej, the heaviest breed of India. The southern region is the home

tract of many indigenous breeds including world famous draught breeds like Amrithmahal, Hallikar, Khillari and Kangayam and dual purpose breeds like Ongole, Deoni and Krishnavalley. Besides these small sized breeds like Punganur, Malnad Gidda and Vechur and other minor varieties like Bargur, Umblacherry, Alambadi etc.

### SPECIAL CHARACTERISTIC OF INDIGENOUS CATTLE:

The general superiority of indigenous cattle with respect to adoptability, disease resistance etc, is well recognized. Indigenous cattle can withstand and graze even at atmospheric temperatures of 40°C. The extensive area covered by the dewlap, loose body skin, more sweat glands and hair coat play a vital role in its heat tolerance. They can switch its body skin and drive away flies, fleas and mosquitoes. The sweat also acts as a repellent to these insects due to its peculiar smell. Indigenous cattle in general are also an alert and intelligent. They can recognize their owners even after lapse of considerable time.

The cholesterol level in milk and other products of indigenous cattle is lower than European cattle and type of fatty acids found in them is beneficial to the human body. The medicinal properties of milk, urine, dung, etc, of indigenous cattle are well known in Ayurveda system of medicine.

### HEAT AND INSECT RESISTANCE:

The indigenous breeds of cattle generally have more sweat glands that are twice as big and 30% more numerous than those of European breeds. In some breeds, the black skin covered by a white or light gray coat helps filtering and reflecting harmful sunrays. Their low level of metabolism also contributes to their ability to withstand for long without food and water, which makes them more suitable for prone areas. Indigenous cattle feed less but often, generating less internal heat which makes them more resistant to heat. Indigenous cattle possess natural resistance to various insects, as their skin has a dense texture, making it difficult for blood sucking insects to penetrate. They also have a well developed subcutaneous muscle

layer, which enables them to remove insects simply by shaking their coat.

#### **METABOLIC EFFICIENCY:**

The indigenous breeds can efficiently convert poor quality forages into milk, beef, etc and withstand long periods without water. Due to their habit of feeding lightly but frequently, indigenous cattle are highly resistant to bloating, and death losses rarely occurs from this cause.

#### **CHARACTERS ASSOCIATED WITH HARDINESS AND THRIFTINESS OF INDIGENOUS CATTLE:**

Have the ability to reverse down metabolism during extremes of scarcity which will be of great use in situations like drought, famine etc. Due to these special characteristics of our cattle they are able to conceive after drought while Crossbreeds fail to conceive after lack of feed and water and are many times sent to slaughterhouse.

Efficient forager and does not force the calf for foraging.

Have high percentage to keep the calves at rapid growth.

Tight sheath and small teats to avoid injuries of grazing animals.

Sloppy rumps are suitable for quick and hard work.

Have more number of bigger, functional, sweat glands per unit area of the skin which helps them to survive under high temperature.

Having white or light colored, short, sleek, densely, reflecting and glistening coat, which will not attract vectors and dislodge them.

Skin – pigmented, mellow, loose, thick and presence of subcutaneous panniculus carnosus muscle, which repels vectors by twitching.

Highest heat tolerant coefficient.

Basal metabolic rate low.

Nutritional uniqueness: ability to convert low protein, high fiber roughage materials into high-grade foodstuffs with the aid of Omasal symbionts, so thrives and performs well on inferior fodders.

Crude protein utilization is highest.

Perform well where even pastures are seasonal, scanty and sparse.

Spend much time in grazing even during daytime; seek shade less than 3% of their total grazing time.

Slow to cycle, when under nutritional stress or lactation stress, but response to cycle is immediate when nutrients are plenty.

#### **CHARACTER ASSOCIATED WITH DISEASE RESISTANCE:**

Premunity high.

Reticulo endothelial system well developed.

Resistance to eye cancer. They have more resistance to viral and bacterial diseases as compared to European breeds.

Through their coating, insulating, secretory characters are more resistant to tick born diseases.

Sebum secretion is fly repellent.

Flexible tail tip helps as a brush to repel vectors.

#### **CHARACTERS ASSOCIATED WITH SELF-RESISTANCE:**

Enduring and estimable.

Generally indigenous cattle are docile but alert.

Intelligent and respond well for treatment if handled with love, skill and care.

Athletic in nature, with majestic appearance, head high, square walk and quickstep.

Most of the indigenous breeds, try to move in groups to avoid predators.

Highest ability to self-preserve and longevity is more than 15 years.

Lack in heart girth due to preponderance of draught type.

Vitality and vigor unique in young ones.

Outstanding mothering ability.

Highest combining ability for cross breeding and formation of new breeds. High ability to walk long distances in search of food and water and to pace with the herds.

Marked tolerance to direct sunlight and radiation.

In the breeds like Ongole loose skin, hump, dewlap and other appendages contribute 12% excess surface area per unit weight over Taurus breeds.

Horns help them to defend from predators.

Have highest cutaneous and lowest respiratory heat loss, as such panting is less.

Have highest multiple ability of adaptation for climate fodder and pathogens.

Sensitiveness, intelligence and shyness make them more independent and less dependent on man, more energetic and resourceful.

Reproductive uniqueness, higher reproduction rates and more number of lifetime calves, high calf survival rates.

Calving ease and minimum dystopias, with more birth rates.

Surviving ability under poor management conditions is very high. Example: Amrithmahal.

There is a great degree of genetic variation in indigenous breeds with respect to their size, productivity, growth rate, reproductive efficiency which can be made use for the cattle worldwide.

In spite of all these superior characteristics the local breeds of cattle are disintegrating and degenerating both in quality and quantity due to intensive modern breeding methods that has crumbled our genetic base. Despite their superiority in certain traits of importance many local breeds of cattle are degenerating both in quality and quantity for want of adequate breeding services and programs for their improvement. The net result is that a few of the well established breeds such as Punganur etc have already become extinct and breeds like Krishna valley is fast approaching the stage of extinction. Excellent draught breeds such as Amrithmahal, Hallikar and Khillari etc and good milch breeds like Sahiwal, Tharparkar and Red Sindhi have reduced in number as well as in quality. The genetic base of our cattle population for future genetic improvement is threatened due to our reliance only on crossbreeds with Jersey and Holstein-Friesian in our efforts to improve the milk production.

These unique qualities of our cattle have been well recognized throughout the world and are effectively used in countries like Australia, USA and many Latin American and African countries for improving the local cattle and also for the synthesis of new breeds. Heavy breeds of indigenous cattle like Ongole, Gir and Kankrej played a dominant role in the emergence of prosperous meat industry in America, but not in India, their native country. On the dairy

side Sindhi was used to evolve the Australian Milking Zebu and Jamaica Mount Hope. While India's gift of its animal wealth to the world's economy has not undermined our own sovereignty over this wealth, emergence of germplasm patenting and bio-piracy create a major threat to India's ownership over its biodiversity.

Despite decades of modernization, India remains as one of the largest, oldest and predominantly rural agricultural societies in the world. Even today, every aspect of the country's economy, policy and day-to-day lives of the majority of its 1000 million populations are governed by what happens in the agricultural sector. The susceptibility of India's agriculture is therefore, of paramount importance. While farmers and environmentalist struggle against the dangers of increasing un-sustainability and ecological/social imbalances, they understood that there are many aspects of conventional farming which are relevant, and that modern farming methods should at best supplement indigenous and local knowledge rather than displacing it.

The rural population, especially the poor and marginal sections, and those living in remote hamlets are still dependent on animal draught power for various agricultural operations and for rural transportation. It is often said that India lives in her Villages, and livestock is an essential feature of the rural scene. The challenge of the millennium is to evolve sustainable farming models for the small and marginal farmers who form the largest chunk of our farming community.

-( To be continued ... )



## Methane Farming

With the prices of crude oil hitting the sky and the quickly depleting nature of fossil fuels, it is time that developing countries take up methane farming aggressively so that their energy requirements don't end up being compromised. Methane farming is generation of biogas from starch or organic waste such as cowdung and not very different from the Gobar gas technology of our Indian villages.

Reports indicate that with a livestock population of 250 million, which produces 125 million tonnes of cowdung, India can produce enough methane gas to entirely replace LPG and kerosene in cooking. There has even been a call from major auto manufacturing firms to use methane gas as a

substitute to petrol in transportation. It is also claimed that methane gas can generate enough electricity to meet all requirements,

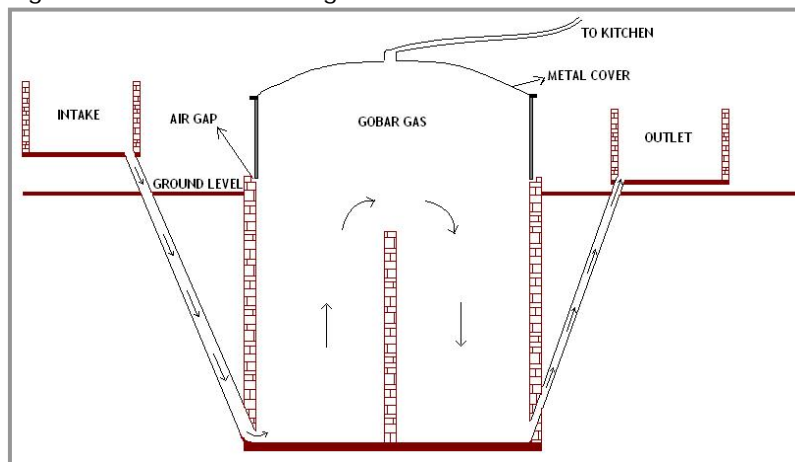
at least in rural areas. Generation of Gobar gas is a "Something for Nothing" idea as methane is only a byproduct and one kg of methane gas is more or less equal in energy content to one kg of petrol, LPG, kerosene or diesel. The cowdung from which methane is extracted serves as a better fertilizer than the raw manure. The Uttar Pradesh gobar gas research station reports say that one cow gives enough cowdung in a year to produce methane gas equivalent to 225 litres of petrol in energy terms.

It will not be an exaggeration if we say that the entire LPG and kerosene requirements of our 100 crore population can be met by methane gas cylinders, produced from the cowdung of 75 million cows. Everyone knows the use of CNG in running automobile

engines. Methane gas can as well act as a substitute for the same and a bit of statistical analysis reveal interesting details. In short, with a total of 200 million livestock we can satisfy all our energy requirements and tapping methane gas from cowdung isn't a daunting task. If one visits the Indian villages, one can see how simple the installation is and how every home taps this rich alternative energy source. A pit is dug of around ten feet deep. Inside the pit a water-tight cement cylinder is built and a wall is built in the middle from the bottom marginally below the top. Intake and outgo pipes are installed in the pit and the whole unit is water-tight. The unit is normally built near the cattle-shed so that the transport of

cowdung to the intake basin of the unit is easy.

The cattle-sheds themselves are intelligently constructed that all the Cow's urine is collected in a drain running at the center of the shed and the drain opens out to a



small reservoir outside. This cow's urine ends up being mixed with the compost to enrich the manure.

The dung is mixed with water in the Intake basin to make slurry, which then goes down the pipe to the bottom of the left side. This side of the cylinder gradually fills and overflows to the right side. Meanwhile, the whole mass bubbles methane up to the top. It collects under the large metal bell-like cover. The gas builds pressure, and can be taken off through a rubber tube to a gas stove in a kitchen.

When both sides of the cylinder are full, the effluent flows out from the bottom of the right side each time more raw dung is added to the left. This effluent is then mixed with organic matter and the Cow's urine to form

compost in a pit separately built for the same. With the livestock population the country boasts of one can produce enough manure to take care of all the fertilizer needs of the entire country and organic manure enhances soil health as opposed to the chemical fertilizers that suck life out of farm lands.

This idea is yet to attain maturity to reach a state of being a profit making business model and all it requires is a compressor to compress the methane gas and fill them in portable cylinders which can then be distributed. Unused methane gas serves as a greenhouse gas that can trap heat in the atmosphere to a degree that is 20 times more than carbon dioxide and India contributes to its emission heavily in the form of livestock. So it is the need of the hour that we understand the potential behind our methane reserves and utilize them wisely.