

# Efficient Utilisation of Animal Power- is need of the time ?

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- Animal as a holistic source of rural energy-decentralized, locally producible, renewable and environment friendly.
- Long tradition of the use of animal power, only affected in a major way by the introduction of fossil fuel.
- Major deficiency in the use of animal power is that of slow speed and poor efficiency of transmission.
- Thus, there is very strong need for improvising the speed and efficiency of utilization of animal power by improvised technologies.
- This will also open up tremendous potential for rural industries.

# **Draught Animal Power- “Present Status”**

- **Present population – 68 million**
- **27000 MW power contribution which is almost 31 % of total electricity generation capacity.**
- **60-65 % of the total cultivated area is still managed by draught animals**
- **Against 18 % by tractors**
- **Replacement rate option with tractor – 10 bullock/tractor**
- **Present population equivalent to 35 hp tractors – 6.8 million tractors ( Existing tractors – 2.22 million)**
- **Annual saving of diesel due to draught animals – Approx. 22.12 million tonnes worth Rs. 33792 crores**
- **Present market value of draught animals – 40,800 crores**

# Continue

- Present value of animal carts 14.3 million @ Rs. 12000/- per cart – Rs 17,160 crores
- Replacement value of existing draught animals, implements and carts by 6.8 million tractors and equipment @ Rs. 3.5 lakh/tractor and set of equipment – Rs. 23,800 crores
- Draught animals provide approx. 93 million tonnes of dry dung/ year approx. Rs. 5000 crores / year – raw material for biogas plants
- Provide by products – hide skin, bone, horn etc. – Approx. Rs. 100 crores/ year

# Increased Utilization of Animal Energy with Enhanced System Efficiency

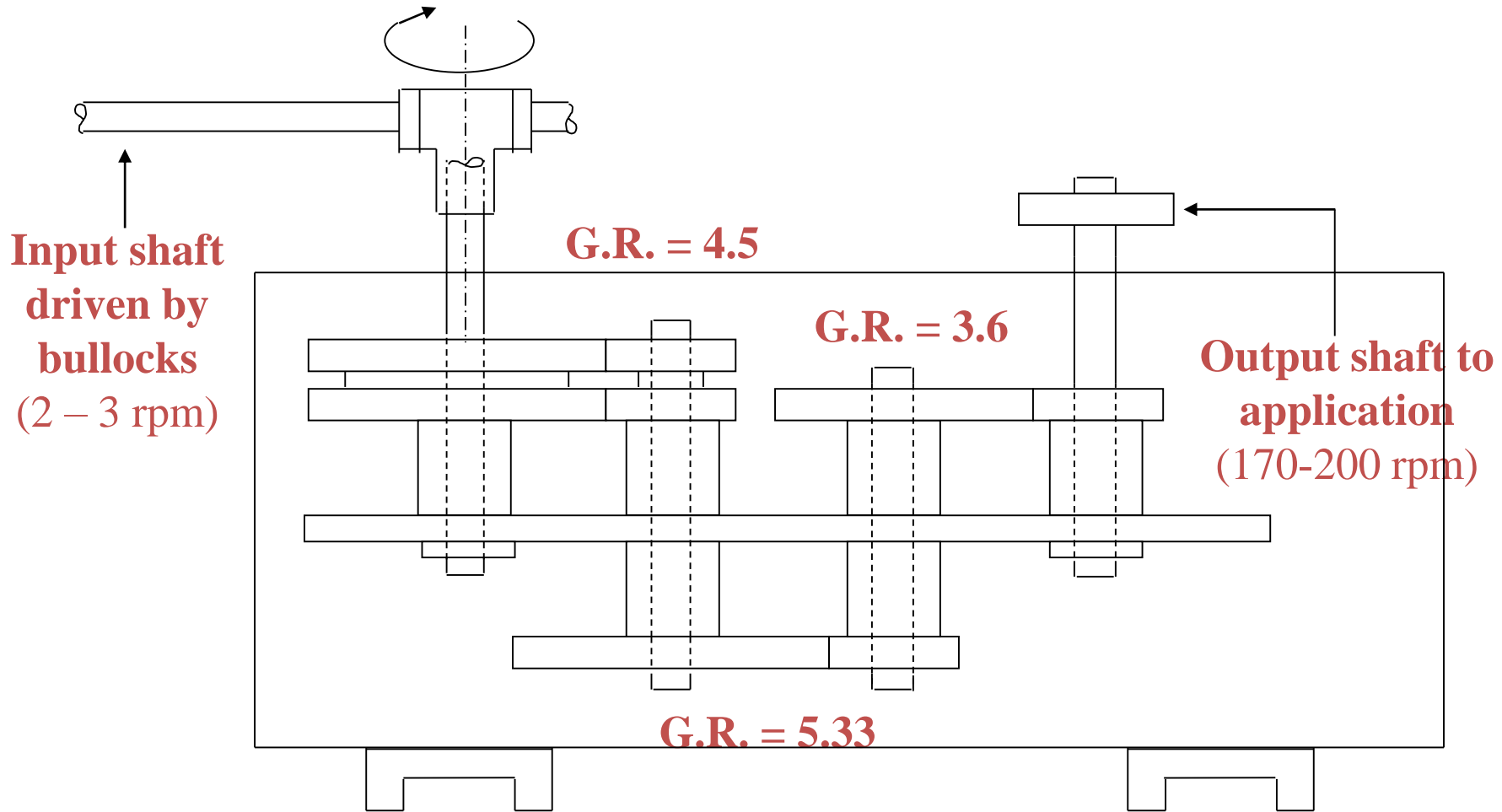
- Comforts and outputs of the draught animals could be increased from the 30% to 70% or even more by adopting improved yokes and harness matching implements and by following proper work rest cycles for different types of animals
- It can save a large quantity of petroleum products
- As a result of adoption of mechanical power in agriculture and development of road transport and irrigation system role of draught animals is however declining. Their annual use is also going down.

# Different Modes of Utilization of Draught Animal Power

1. Efficient conversion of the natural animal movement into high speed rotation to drive common gadgets
2. Efficient utilization of tractive effort of animals- Design of animal drawn tractor

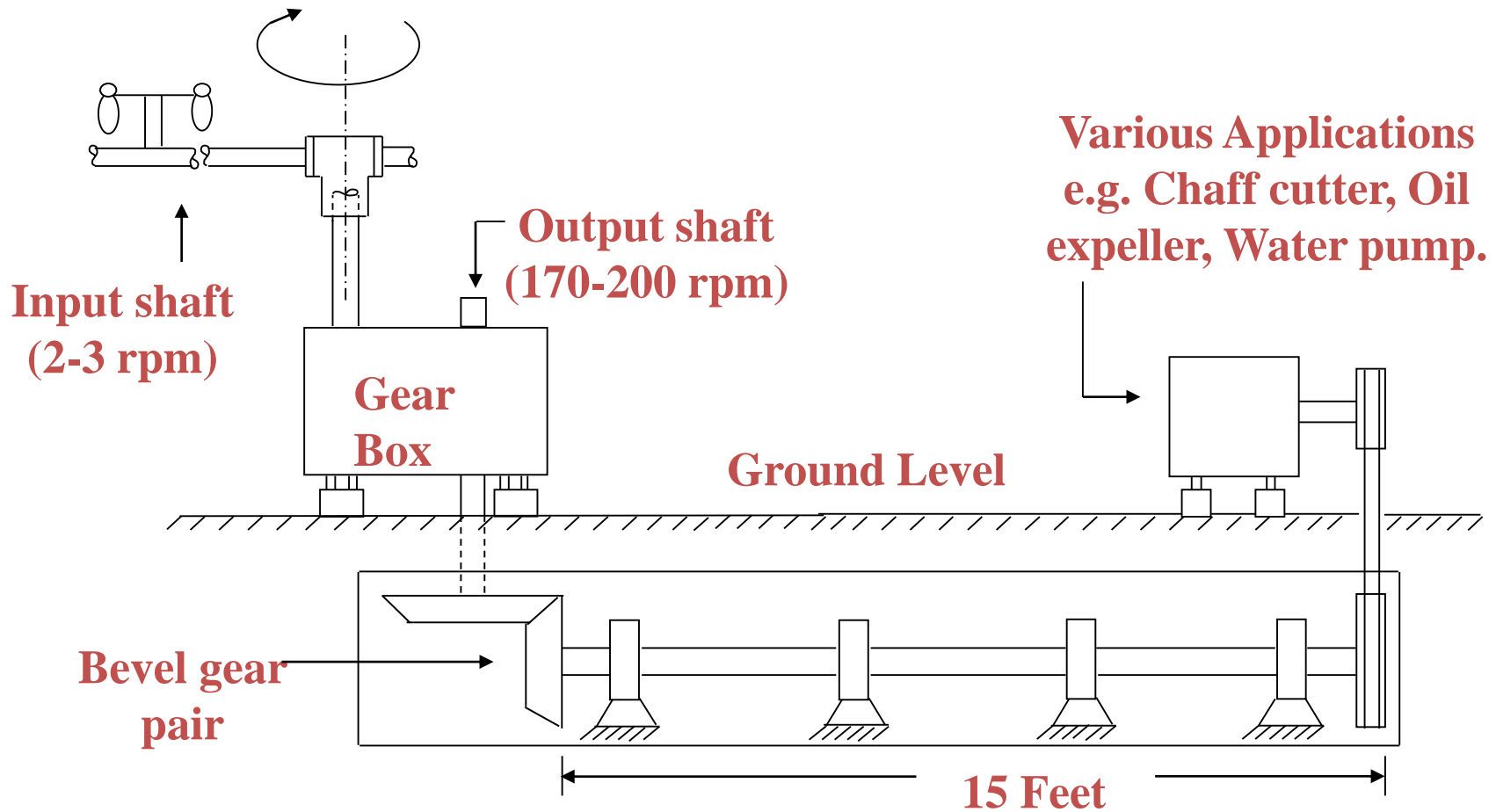
# An Overview of the Status of ADPM

- Alternative design of gear box and attachment of applications.
- Salient features of the work done by:
  - IIT Delhi
  - R. S. Singh, Varanasi
  - CIAE, Bhopal
  - Kanpur Gaushala Society, Kanpur
  - U. A. E., Raichur, and
  - Others



**Modified Gear Box**





## Installation of Modified Gear Box at Site

# Animal Driven Prime Mover Coupled With Application



# Applications Attached With ADPM

- **Chaff Cutter**
- **Water Pump**
- **Oil Expellers**
- **Flour Mills**
- **Agitator**

## Rotary Animal Driven Prime Mover for RI Application



### Salient Features:

- Rotational motion of animal is utilised.
- Clutch is used to control the speed.

### Specifications:

- Type: Step up Gear Box having Helical Gears
- Input rpm: 2-3 rpm
- Output rpm: 250 rpm @ 1.5 h.p.
- Gear Ratio: 1: 85
- Cost: Rs. 26000



**Site Demonstration**



# Bullock Drawn Generator Developed by Kanpur Goshala



# Comparison of the various ADPM Designs

<b>Comparison of the various designs available</b> Various prototypes available	Arrange ment of Shaft	Speed (rpm)	Power develop ed (h.p.)	Efficien- cy
Kanpur Goshala Society	Horizont al	600	N.A.	N.A.
IIT Delhi – by Mr. R.S.Singh	Vertical	750	1.0	66.66%
CIAE, Bhopal	Vertical	200-250	1.0	57.14%
UAE, Raichur	Vertical	300	0.41	34.16%

# Main Issues for Discussions

- Which design of gear box are robust, efficient and field worthy?
- What are the desirable system configurations of ADPM integrating various applications.
- Need for providing clutch, free wheel and other safety devices.
- Pros and cons of using mechanical power vis. a vis. electrical power as ADPM output.
- What are the obstacles in popularizing ADPM.

# About Animal Drawn Tractor

## Salient Features

### Designs Available:

1. **Bhartiya Cattle Resource Development Foundation (Kamdhenu BDT).**
2. **Kanpur Goshala Society (Shekhar BDT)**
3. **CIAE, Bhopal (Multi Purpose Tool)**

**What is the appropriate technology at present and how can it be promoted ?**





# Bullock Drawn Tractor (BDT)

## Salient Features

### 1. Designs Available:

1. **Bhartiya Cattle Resource Development Foundation (Kamdhenu BDT).**
2. **Kanpur Goshala Society (Shekhar BDT)**
3. **CIAE, Bhopal (Multi Purpose Tool)**
  - Three BDTs perform work equivalent to one 30 HP mechanical tractor and three traditional ploughs.
  - One BDT is sufficient for 15-20 acres of land.
  - BDT performs ploughing operations better leading to excellent uniform loosening of soil and combined with organic farming by use of bullock dung and urine, improves land fertility and brings 10% extra production in the first year itself.

# Contd...

- The depth of the ploughing and other operations can be easily adjusted, to suit the type of soil and its condition.
- No smoke and dust as well as noise and vibrations as in the case of a mechanical tractor.
- The attachments coming into contact with the soil will retain the sharp edge for a long time, since selected quality steel is used.

## 2. Totally eco-friendly

- Organic manure and herbicides can be made by the farmer from the dung and urine of the bullocks, leading to lower water consumption, increased microbial activity in the soil.
- Excellent crop sprays such as 'Amrit Pani' can be made with the urine of bullocks, using time tested formulations known to our farmers.
- Nation spends Rs 25 lakh crores on import of petroleum products every year. 1% saving in use of petroleum fuels like diesel will lead to a saving of many crores.

- Savings in foreign exchange for import of chemical fertilisers, pesticides is an additional benefit. Each mechanical tractor of 30 Hp consumes 4,500 litres of diesel fuel per year. Each BDT will therefore save 30,000 litres of diesel fuel in 20 years, which is only half its total life span.

### 3. Profitable and economical

- The mechanical tractor is very expensive compared to BDT.
- Like the tractor, BDT can be used for custom hiring. This will provide a livelihood and also benefit small farmers, who can then hire BDT.
- Maintenance and repair are easy and economical, compared to a mechanical tractor.
- By using BDT and resorting to organic farming, farmers will derive not only monetary benefits, but also the satisfaction which comes from being in harmony with nature.
- Use of BDT is therefore not just a question of a cheaper and more productive alternative - it is also a reaffirmation of the faith they had on their own wisdom.
- Suggestions from farmers and specialists have been incorporated to improve BDT for durability, ease of operation, safety and convenience of farmers. Constant efforts will be made to improve for greater durability and ease of operation, based on feedback from our farmer friends.

# 14 About Improved Carts and Cart Driven Gadgets

- What are the salient development to make animal carts more efficient and faster for rural transportation.
- Some innovations in developing cart driven gadgets such as battery charger, mobile milk chilling etc (e.g. Work done by Sudhakar, David and others).





# Release of Task Force Report on Production and Promotion of Organic and Bio Fertilisers with Special Focus on Improving Economic Viability of Gaushalas



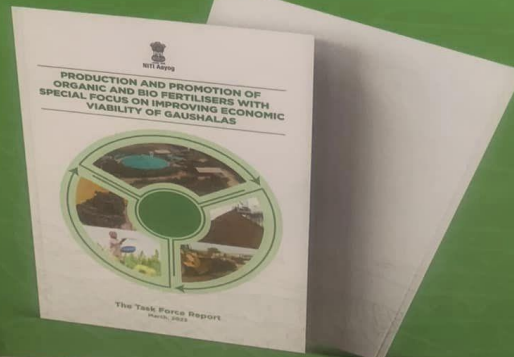
10 March 2023



From 4:00 PM to 5:30 PM



Room No. 122, NITI Aayog





# 1

## Constitution of the Task Force

The finance minister in the Budget speech of 2020 announced that the Government "shall encourage balanced use of all kinds of fertilisers including the traditional organic and other innovative fertilisers." This is a necessary step for improving fertiliser use efficiency, restoring and raising soil fertility and long-term sustainability of agriculture.

A slew of measures and support have been extended to agriculture over the years to raise income of the farmers and to promote sustainable agriculture for supply of adequate, safe and nutritious food to our population. Organic waste and biomass produced from crops and livestock present an opportunity to supplement farm incomes and ensure sustainable agriculture. Biomass, by-products and waste generated by livestock can be utilised to produce organic/bio fertilisers and bio-energy to reap large benefits. By-products of cow, like dung and urine, are known for several usages including Ayurveda medicines and other formulations since ancient times. Thus, channelizing livestock by products and waste has the potential to improve profitability of livestock, and can help to ease the burden on the state exchequer spent on subsidies and imports of inorganic fertilisers besides improving soil fertility.

NITI Aayog received several representations, from various Gaushalas and Institutions involved in the upkeep and maintenance of cattle, to suggest suitable mechanism for improving economic viability of Gaushalas by making productive use of by-products of cattle, capacity enhancement of Gaushalas and government policy support to run these Institutions.

Therefore, an initiative was taken by the NITI Aayog to examine and suggest the possibilities for effective utilization, production, processing, quality standards, infrastructure and marketing of products developed from cattle waste especially in Gaushalas and scope for income generation by Gaushalas. Accordingly, a task force was constituted by NITI Aayog vide OM no Q-11/2/2021-Agri under the chairmanship of Prof. Ramesh Chand, Member, NITI Aayog. The composition of the task force is as under:

Sl. No.	Name and Designation	Role
1.	Prof. Ramesh Chand, Member, NITI Aayog	Chairman
2.	Dr. Yogesh Suri, Senior Adviser, NITI Aayog	Member
3.	Smt. Rajni Taneja, Deputy Secretary (NRM), MoA&FW	Member
4.	Prof. Virendra Kumar Vijay, Professor, CRDT, IIT Delhi	Member
5.	Dr SK Dutta, Joint Commissioner (NLM), Ministry of Fisheries, Animal Husbandry and Dairying	Member
6.	Dr. Gagnesh Sharma, Director I/c, National Centre of Organic Farming	Member
7.	Shri Ujjwal Kumar, Deputy Secretary, Department of Fertilisers	Member





# Help cow shelters market dung-based formulations for farming: NITI Aayog

2 11.3.23

**The Hindu Bureau**  
NEW DELHI

*Gaushalas* (cow shelters) can become major suppliers of inputs for natural farming in the country through concerted efforts of the government, private players and entrepreneurs, says a report prepared by the NITI Aayog.

Titled "Production and promotion of organic and bio fertilizers with special focus on improving economic viability of *gaushalas*", the report recommended that the Centre help such cow shelters with capital assistance so that they could market cow dung and cow urine-based formulations for applications in agriculture.

The report, authored by a task force headed by NITI Aayog member Ramesh Chand, was released here on Friday.

Releasing the report, Professor Chand said integration of crop and livestock was essential for sustainability of agriculture.

"The agriculture in India was based on this integrated approach. But after the green revolution, we could not maintain this balance," he said and added that the use of chemical fertilizers brought imbalance in the soil nutrients.



Cow shelters can address the problem of wandering cattle that feed on or damage crops in many parts of the country. FILE PHOTO

"Of late, realisation has been growing to reduce or replace agro chemicals, serving as plant nutrients and plant protection, for economic, health, environment and sustainability reasons. Accordingly, there is a trend towards natural farming and organic farming where inorganic fertilizer and agro chemicals are replaced by livestock manure, plant-based products, bio inputs, and products made from cow urine and cow dung. The task force felt that *gaushalas* can be of great help in promoting natural farming and organic farming. Thus, complementarity can be built to promote *gaushalas* and natural farming," he said.

The report also suggested that cow shelters could address the problem of

stray cattle that damaged crops in many parts of the country. It said the number of stray and abandoned cattle had risen to a level beyond the resources available with existing *gaushalas* for their upkeep and sustenance, and suggested channelling the potential of such cattle wealth for promoting natural and sustainable farming. The population of stray cattle, according to the report, is estimated at 53 lakh.

The report said cow dung-based organic fertilizers would have a huge impact in fulfilling the constitutional mandate under Article 48 that the State shall take steps for preserving and improving cattle breeds, and prohibiting the slaughter of cows and calves, and other milch and draught cattle.

## More cour in U.S

**The Hindu B**  
NEW DELHI

Prime Minister Modi on Friday announced the implementation of girl technology, and maths (S is at 43% today in countries U.S., the U.K. ny. He also picorns in self for women.

The number dying up to and beyond her the past decades fields such as sports, business, not only participation of women but they are from the front post-Budget economic empowerment of women.

"The reflection we can take forward with half of the population and how to increase the women power is Budget," he said.

Observing the past nine years, the country has moved from a state of women-empowerment, he said the results of women's empowerment were visible as a feeling of respect and change in the country.

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SCAN TO PLAY

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**THANK YOU**