

# DESIGN & DEVELOPMENT OF CROP CUTTING MACHINE



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# OUTLINE

- ❖ Introduction
- ❖ Principle of manual operated crop cutting machine
- ❖ Objectives
- ❖ Methodology
- ❖ Material selection
- ❖ Experimental set up
- ❖ References

# INTRODUCTION

- Mechanized agriculture is the process of using agricultural machinery to mechanize the work of agriculture, greatly increasing farm worker productivity.
- In modern times, powered machinery has replaced many jobs formerly carried out by manual labour or by working animals such as oxen, horses and mules.
- Mechanization involves the use of an intermediate device between the power source and the work.
- This intermediate device usually transforms motion, such as rotary to linear, or provides some mechanical advantage, such as speed increase or decrease

# INTRODUCTION

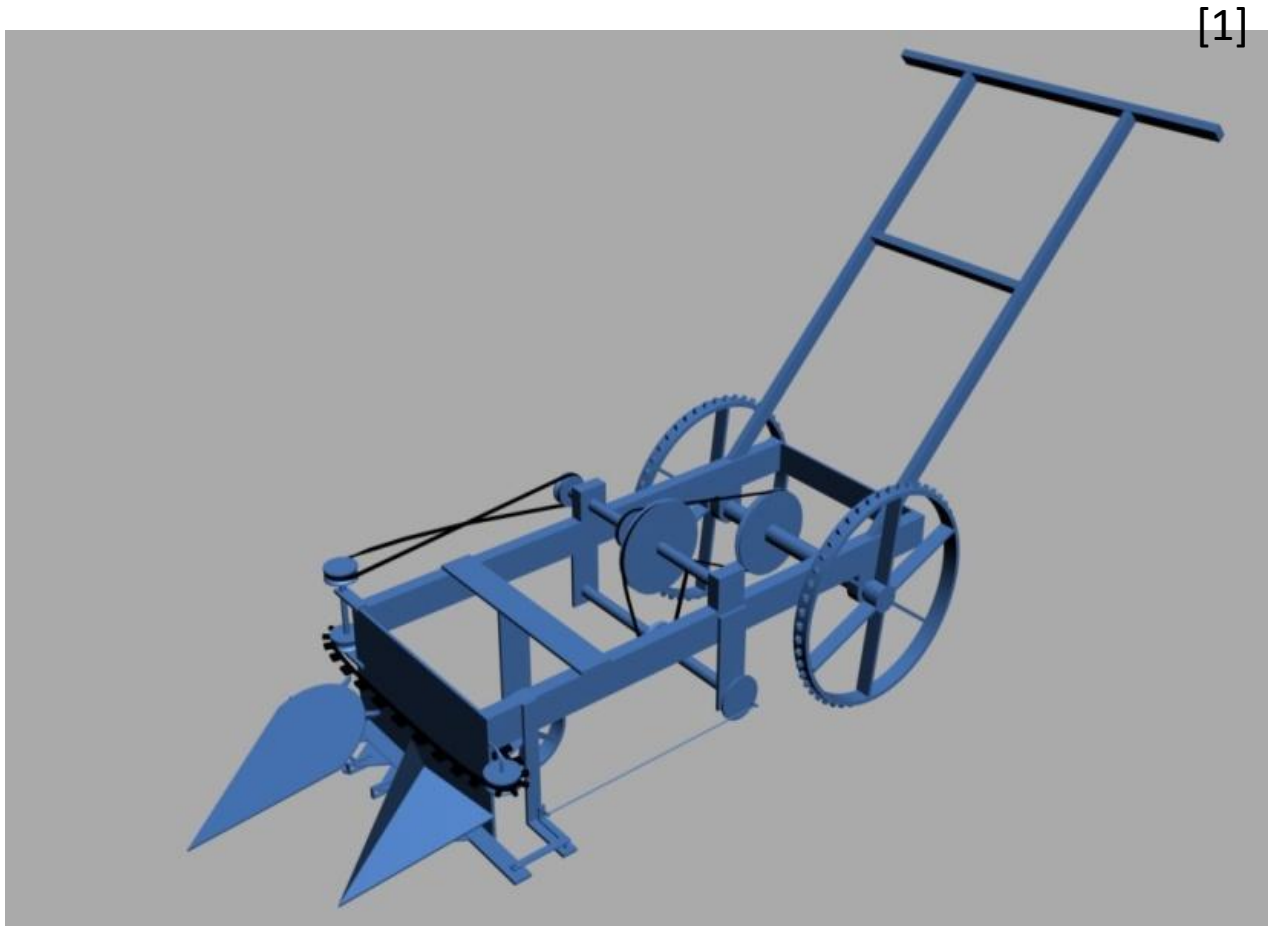
- This intermediate device usually transforms motion, such as rotary to linear, or provides some mechanical advantage, such as speed increase or decrease
- Crop cutter are used for harvesting of crops mostly at ground level.
- As the population of India increases day by day, there is increment of food, vegetables so need of farm mechanization also increases, machineries provides more operations in less time, but the machineries are very costly for the common man, it is not affordable for them ,so manually operated machineries, equipment's are also the most important factor.<sup>4</sup>

# INTRODUCTION

[1]



# PRINCIPLE OF MANUAL OPERATED CROP CUTTING MACHINE



# OBJECTIVES

- To modify the manually operated crop. [2]
- To evaluate the performance of modified manually operated Reaper.
- The focus of this project is to make a combined harvesting and collecting machine for the small scale farmers of India who have land holdings less than two acres, to harvest grains more efficiently.

# WHY SELECTION OF CROP CUTTING MACHINE



➤ Crop is generally selected on the land holding of the farmer, greater the land holding, tractor operated vertical conveyer reaper is choose, for medium land holding power tiller mounted vertical conveyer reapers are preferred.

# METHODOLOGY

Selection and study about related work



Material Selection



Design of experiment



Experimental set up



Design analysis



Conclusion



End

# Manual operated crop cutting machine



## Advantage:-

- Easily operated.
- Skilled & unskilled farmers are also operated.
- No pollution.
- Easily adjustable the height of cutter.

## Disadvantage:-

- Consuming more man power.
- More time consuming.
- Less efficient due to engine operated machine.

# MATERIAL SELECTION

sr.no	Component	no. of. Comp.	used material
1	Frame	1	Mild steel
2	Ground wheel	4	wood&rubber
3	Rotating Disc(cutter)	1	Mild steel
4	Shafts	3	Mild steel
5	bevel gear	1 pair	High carbon steel
6	cycle:		
	chain	1	High carbon steel
	large chucker	1	High carbon steel
	small chucker	1	High carbon steel
7	bearing	6	High carbon steel

# COMPONENT SPECIFICATION

# Ground wheel



Inner dia.=25 mm  
Outer dia.=20 cm

# Cycle parts



Big chucker teeth=44

Small chucker teeth=18

Gear ratio=2.44



# bearing



bearing number	nominal bearing dimensions					
	d		D		B	
	mm	in	mm	in	mm	in
6205	25	0.984	52	2.047	15	0.591

# SHAFT



<b>sr.no.</b>	<b>Material</b>	<b>Yield strength (MPa)</b>	<b>Ultimate tensile strength (MPa)</b>
1	mild Steel	247	841

Length of shaft=45 cm

Dia. of shaft=25 cm

# Bevel gear



Gear ratio=1.6

Model  
no.=1L01 &  
1L03

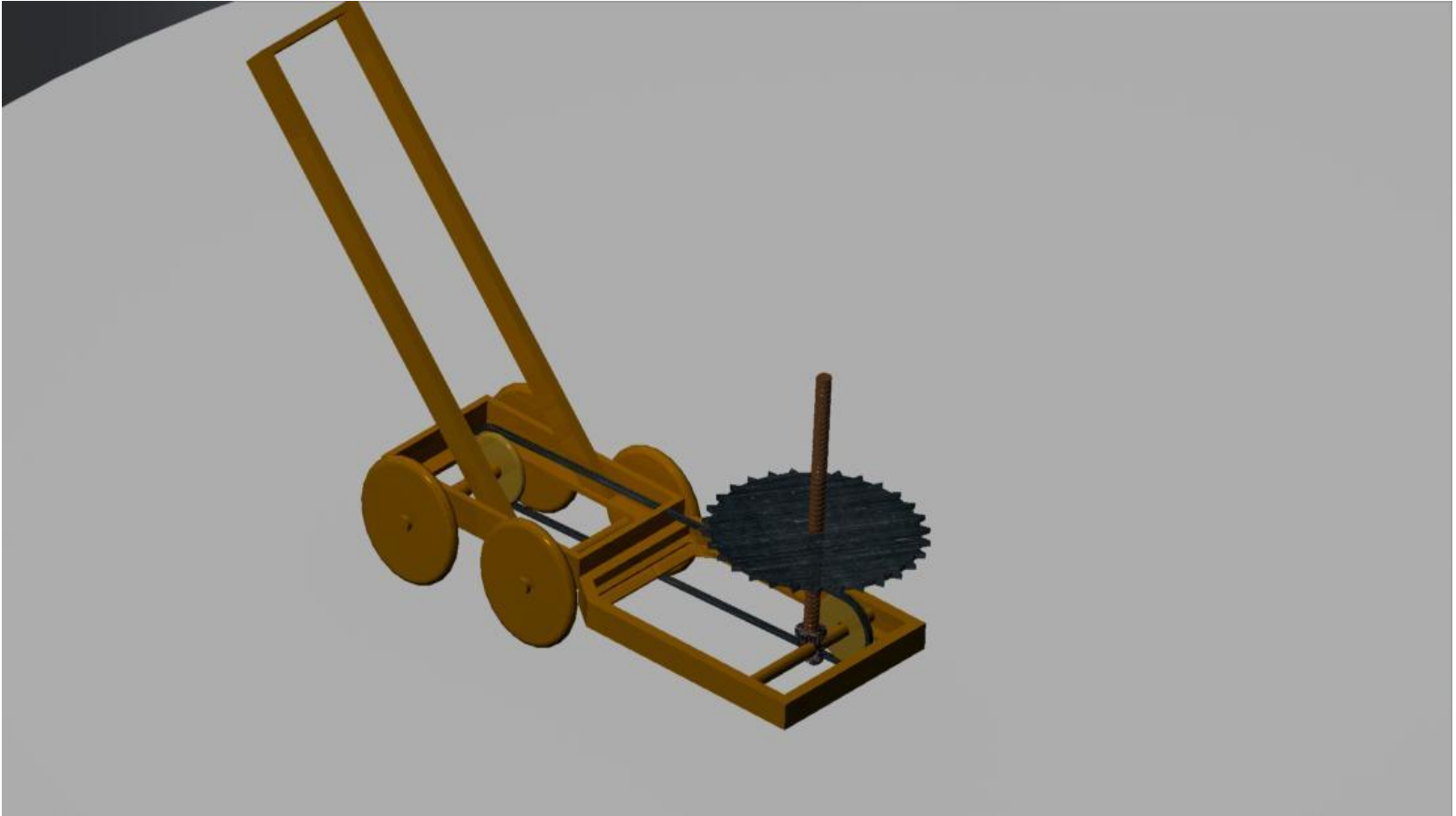


Pinion teeth:-16

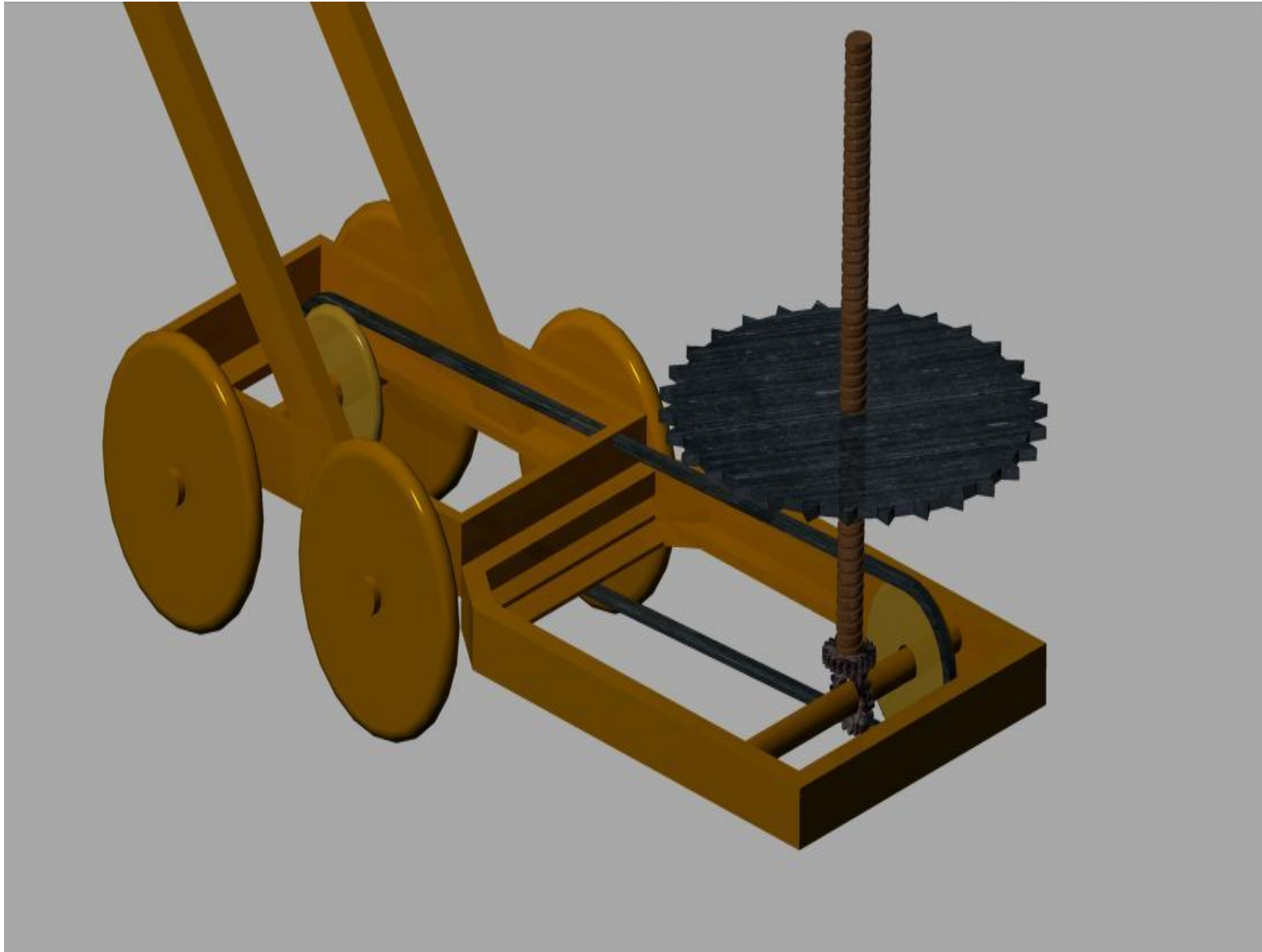
Gear teeth:-10

Gear ratio:-1.6

# PHOTOS OF MACHINE







# ASSEMBLY



# CONCLUSION

- Crop Cutting Machine which is available in market is very costly. We can make Crop Cutting Machine our self and we can used it for small-scale farmer. This machine is more efficient for small-scale farmer.
- After modification of manually operated reaper it work continuously and gives more efficiency than the machine before modify. Conveying mechanism now help to stop clogging and decreases the cutting losses. Continuous working leads to harvest crop in less time with minimum man power.



- This machine is able to run of field effortlessly and the efforts of farmers are reduced.
- The cost of harvesting using this machine is considerably less as compare to manual harvesting.
- All the components and subsystems of the reaper which included, the cutting system , transmission from motor to the cutting system and main frame have been fabricated successfully.

- The primary objective of the present work was to develop a reaper which is simple and cost effective. The objective has been successfully met, simple and cost effective reaper was developed.
- It makes the harvesting process faster hence reduces the time required to harvest the same amount of yield manually which will ultimately reduce the labour required leading to reduction in labour cost, thus leading to the economic development of farmers. This machine can be used by a large number of farmers as it is small, compact and is easily available.

# REFERENCES

- [1] Design of Small-Scale Grain Harvester: A tool for Urban and Pre-urban Growers; Christopher Boyle, Ian Jutras, Christopher Molica, Earl Ziegler.
- [2] Relationship between Stalk Shear Strength and Morphological Traits of Stalk Crops, by Li Liang and YumingGuo.
- [3] Farm power sources, their availability and future requirements to sustain agricultural production, by N. S. L. Srivastava.
- [4] Mechanization of Agriculture - Indian Scenario Dr. S.D. Kulkarni, Central Institute of Agricultural Engineering (CIAE) Bhopal - 462 038, India

[5] <http://india.gov.in/topics/agriculture> .

[6]Laukik P. Raut et al., ‘Design, development and fabrication of agricultural pesticides sprayer with weeder’, ‘International Journal of Applied Research and Studies’, ISSN: 2278-9480, Volume 2, Issue 11 (Nov - 2013).

[7] INTERNATIONAL JOURNAL FOR ENGINEERING APPLICATIONS AND TECHNOLOGY, DESIGN AND FABRICATION OF CROP REAPER.

[8] “Mechanization of agriculture - Indian scenario”, Dr. S.D. Kulakarni, Central Institute of Agricultural Engineering (CIAE) Bhopal. Vol. 2, Issue 10, 2014 | ISSN (online): 2321-0613.

- [9] “Relationship between Stalk Shear Strength and Morphological Traits of Stalk Crops”, Li Liang, Yuming Guo. Luoyang Institute of Science and Technology, Shanxi Agricultural University. 2011 International Conference on Agricultural and Biosystems Engineering Advances in Biomedical Engineering Vols. 1-2.
- [10] Albert, W.W. and L.E. Stephens. 1969. Stalklage silage harvested with a converted combine. ASAE Paper No. 69-313. ASAE, St. Joseph, MI.
- [11] Shinnars, K.J., G.C. Boettcher, J.T. Munk, M.F. Digman, G.S. Adsit, R.E. Muck, and P.J. Weimer. 2006. Single-pass, split-stream harvest of corn grain and stover using three machine configurations. ASABE Paper No. 061015.

- [12] *International Research Journal of Environment Sciences* Vol. 1(5), 27-34, December (2012) ,*Int. Res. J. Environment Sci. ISSN 2319–1414*.
- [13] Lashgari, M., Mobli, H., Omid, M., Alimardani, R., & Mohtasebi, S. (2008). Qualitative Analysis of Wheat Grain Damage During Harvesting with John Deere Combine Harvester. *Int J Agric Biol*, 10(2), 201-204.
- [14] Juraimi A. S., Uddin M. K., Anwar M. P., Mohamed M. T. M., Ismail M. R. and Azmi, M. 2013. Sustainable weed management in direct seeded rice culture . *Australia Journal of Crop Science*, 7:989-1002.
- [15] Hunt, D. 1973. Farm Power and Machinery Management, Laboratory Manual and Work book, Iowa State University press, Ames, Iowa, USA.

**THANK  
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