



Team Medextrous

Multipurpose Solar Powered
Agricultural Equipment

Project report

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Problems and its solutions

Technical and social Issues That Need To Be Solved

1. Large machines such as tractors are very costly for an ideal farmer.
2. In India still many villages aren't well provided with electricity. Therefore it is difficult to use non renewable energy sources at rural areas.
3. Old age farmers find it difficult to carry fertilizers to their farms.
4. Absence of multitasking equipment.

List of Technical and social problems that have been solved

- To design and fabricate affordable multipurpose equipment based on the requirements and needs of the farmers.
- To provide a more efficient and effective alternative to large machines such as tractors.
- To switch to eco-friendly, renewable and low maintenance source of energy.
- To fabricate equipment that is capable of performing numerous operations thereby reducing labor costs.

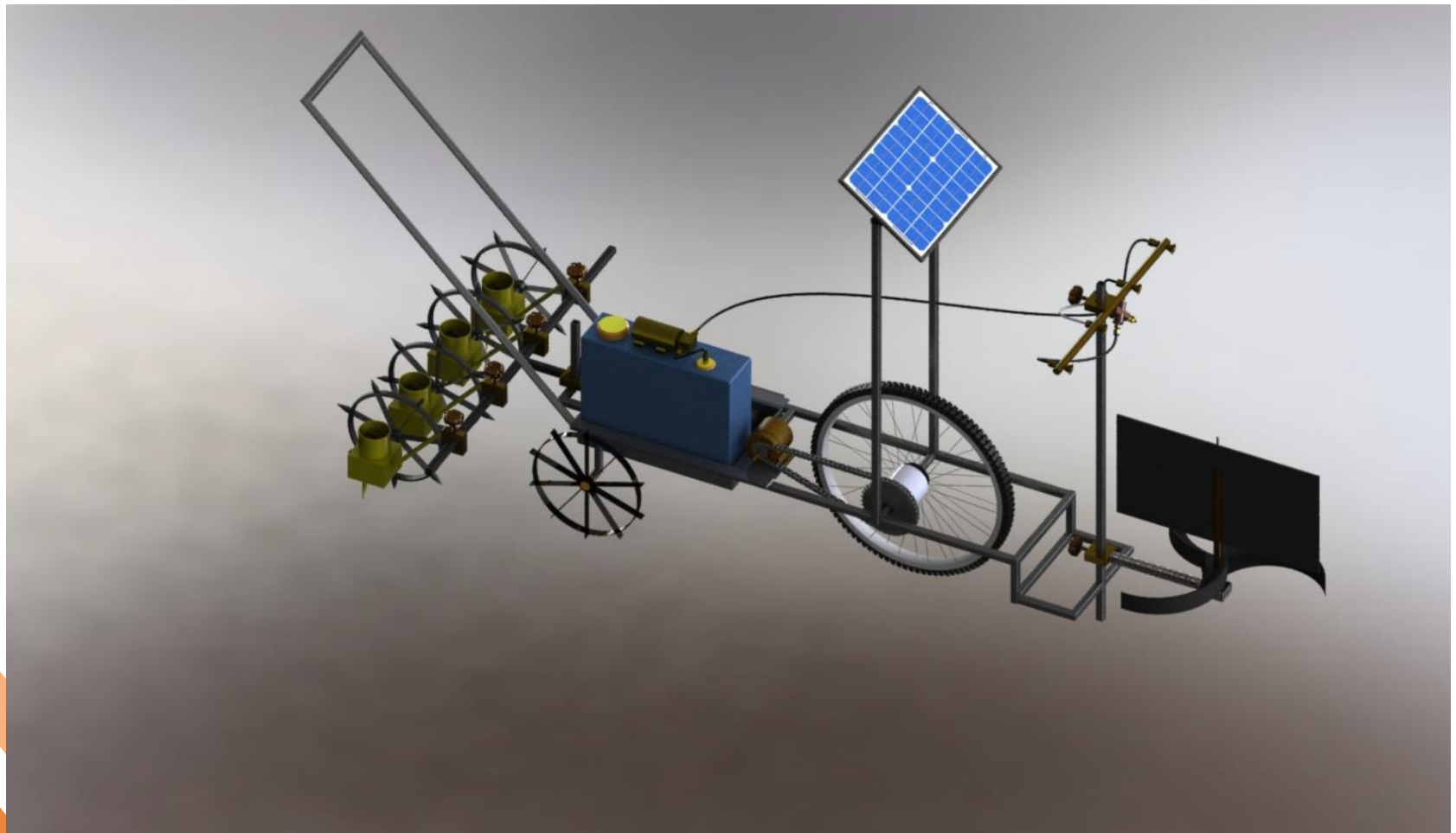
ABSTRACT

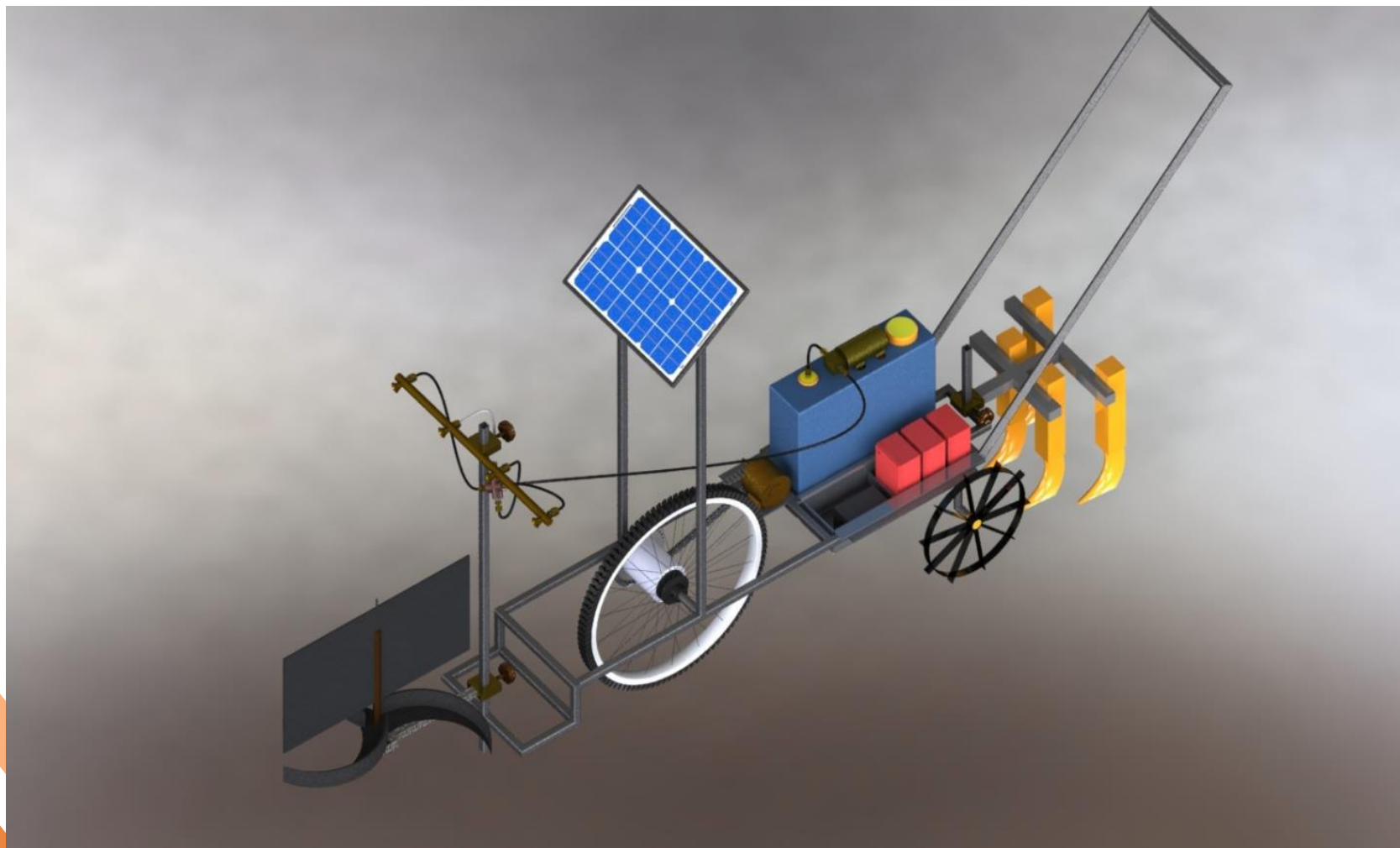
Agriculture has been the backbone of Indian Economy as it is the primary occupation of a vast population of citizens. The mechanization of agriculture will lead to expansion our country's economy.

		<h2>Insights of Our Project</h2>
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The Multipurpose Agriculture equipment will consist of a solar battery powered unicycle assembly that will work alongside different attachments namely seed sowing mechanism, chemical sprayer and an inter cultivation cutter attachment for performing tasks of sowing, spraying and cutting respectively.

Design





SPECIFICATIONS

Materials required

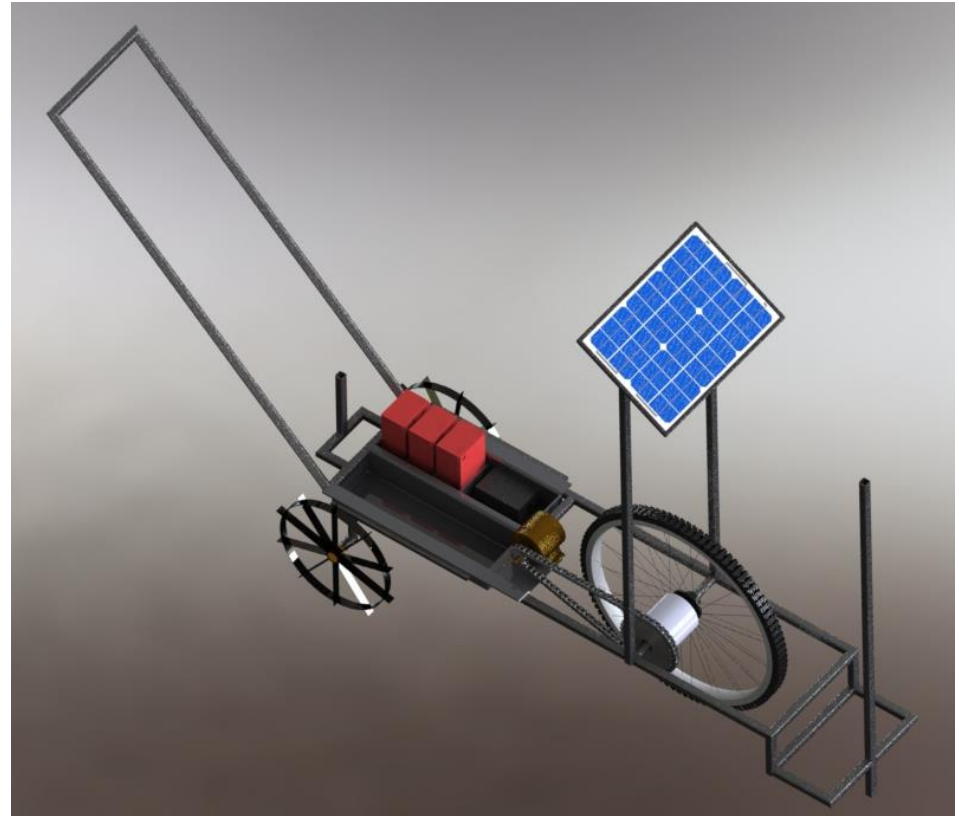
- **Motors:** We require 2 motors; one 24V, 350W motor to power the main wheel and another 12V motor to run the cutter attachment.
- **Solar panel:** A 12V, 50W solar panel will be attached to the machine. It will take roughly 9 hours to fully charge the three batteries.
- **Sprayer pump:** A battery operated 12V sprayer pump is connected to the tank.
- **Tank:** 18L tank is used to hold chemicals/water.
- **Batteries:** Three 12V, 10Ah batteries are required. Two of them power the main wheel while the single 12V battery will be connected to either the cutter motor or the spraying pump, as per the operation that is being performed.
- **Gears and Chains**
- **Square pipes**
- **Wheels**
- **Tubing**

SPECIFICATIONS

Main structure

- The basic structure will include:
- Body frame made using square pipes
- 24V motor
- Master wheel connected to motor via chain drive
- Sheet metal holder
- Batteries and Controller
- Gripper wheels

All the 4 attachments will be connected to the vertical pipes that are provided at the front and rear end of the frame.



Execution

- The equipment consists of a master wheel, along with two smaller gripping wheels at the rear end. The supporting wheels are used to lift the weight of the attachments & prevent tire skidding.
- The machine will be capable of performing operations such as sowing, ploughing, spraying and cultivating through various attachments that will be fitted depending on the need. The solar panel above the master wheel can be rotated depending on the direction of sunlight.

ATTACHMENT OPERATIONS SOWING

- This is done using 4 seeders that are held along the same horizontal pipe. The seeder structure includes a small wheel, a container, a plate with holes for the seeds to fit in, a small pipe, shafts, and a pair of bevel gears.
- As the wheel will rotate, the plate will also move about its axis, so passage is made for seed to drop. The seed will pass through a pipe and will be thereby sown in the soil
- The distance between the rows of the seeds as well as the gap between seeds sown in a row can be altered. Depending on the number of holes in the plate, the distance between two consecutive seeds can be varied. They are attached at the rear end of the equipment.



ATTACHMENT OPERATIONS

PLOUGHING

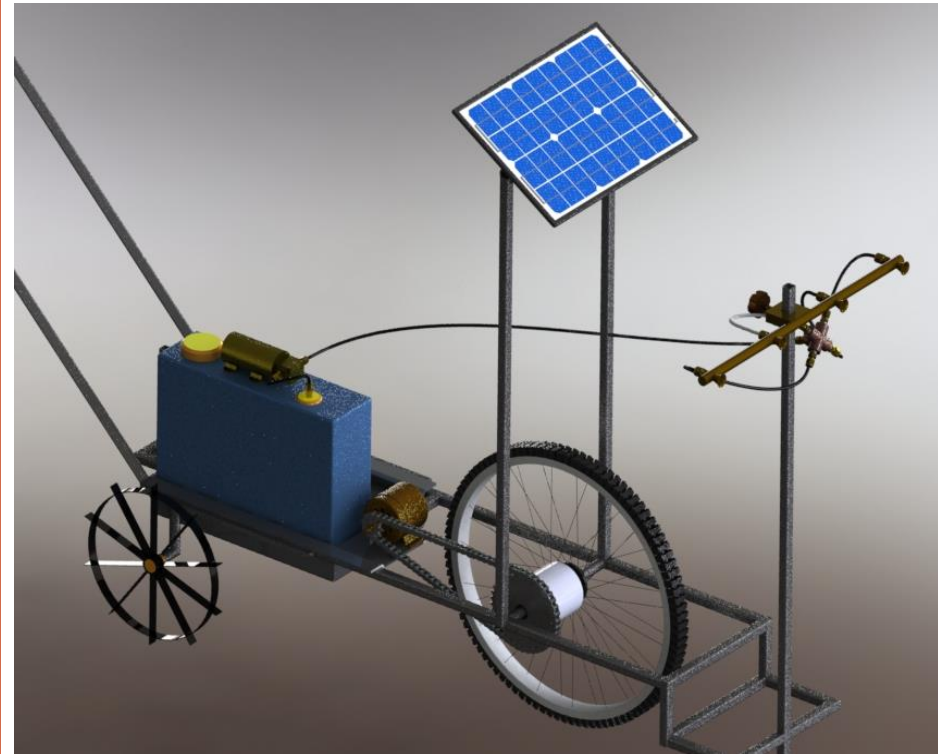
- This is done using a digging tool that is made up of pipes and metal angles. It is attached to the rear end of the equipment. Its height can be changed depending on the depth up to which the farmer wants the soil to be ploughed.



ATTACHMENT OPERATIONS

SPRAYING

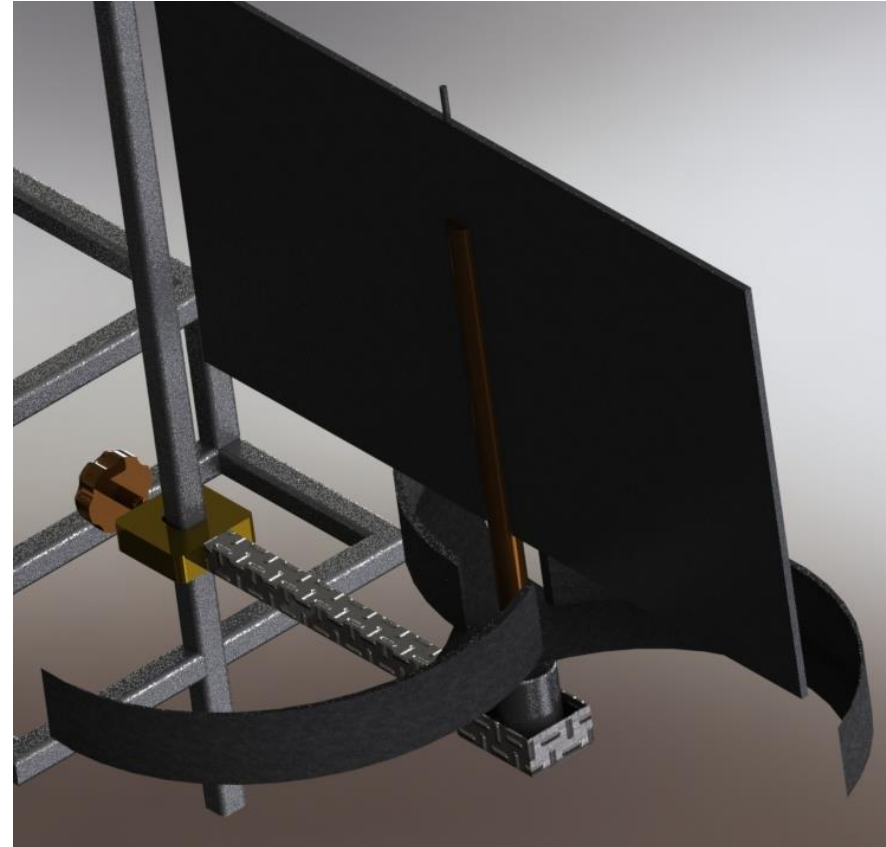
- The attachment consists of an 18L tank, a sprayer pump, tubes and nozzles. The nozzles are attached to the front vertical pipe while the tank is placed adjacent to the batteries. The height of the nozzles can be adjusted depending on the type of crop. The pump is powered by a single 12V battery.
- It can be used for chemical spraying and irrigation purposes.



ATTACHMENT OPERATIONS

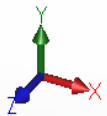
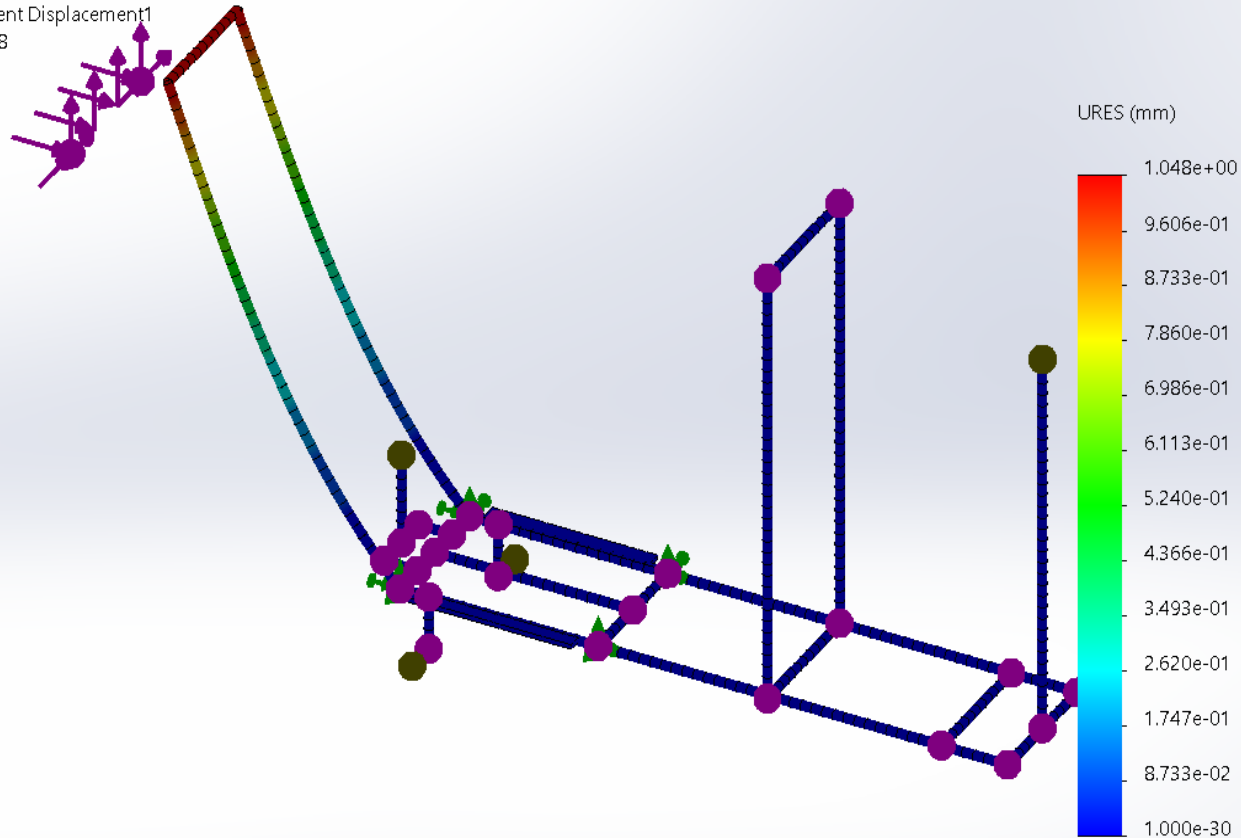
CUTTING

- Motor powered cutting blade which has extruded edges. A fixed plate like structure is fixed on the top of the cutter. This is done to ensure that the crops fall sideways so that the crops do not any hindrance to the equipment.
- The cutting blade is attached to the front vertical pipe and is also height adjustable

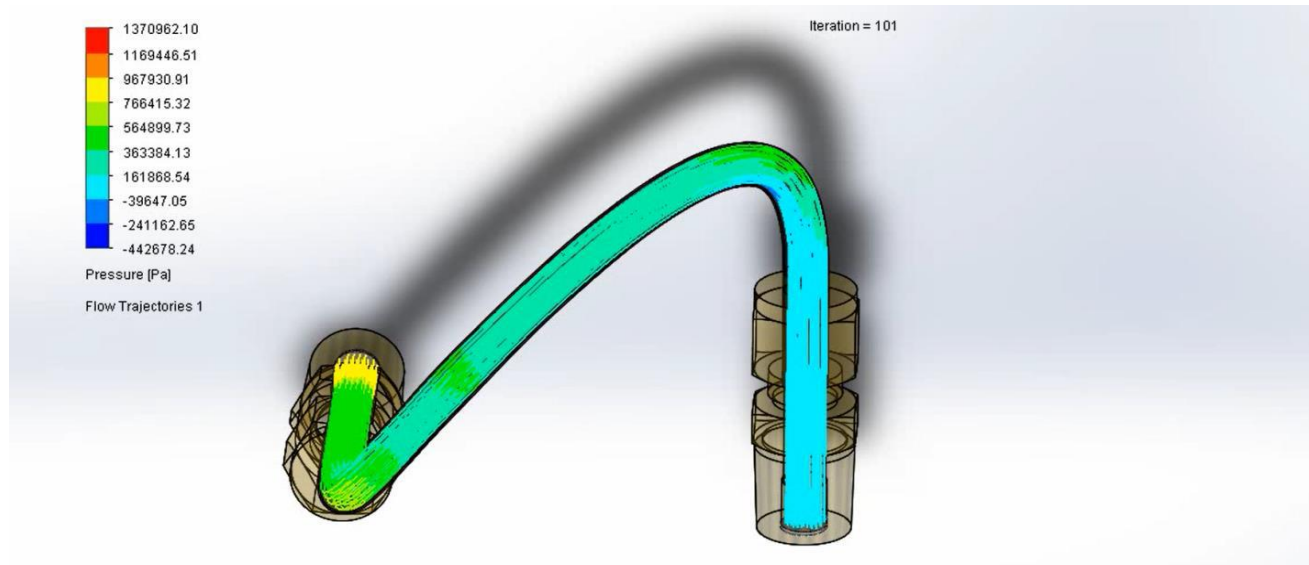


SIMULATION

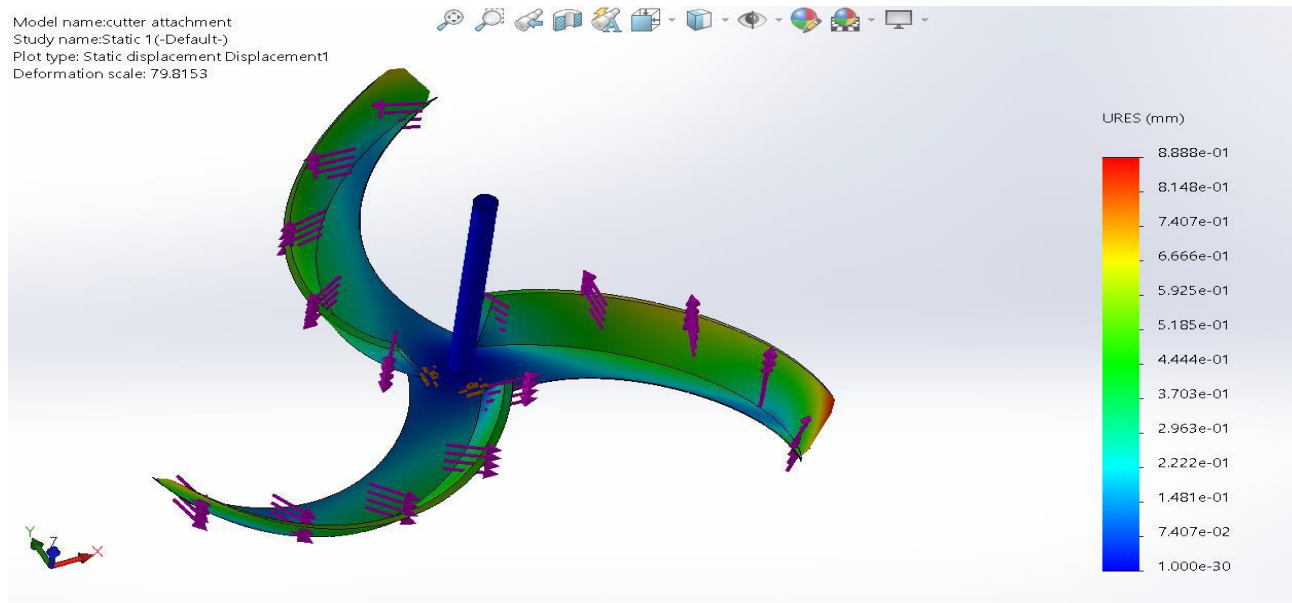
Model name: frame old
Study name: Static 1 (-Default<As Machined>-)
Plot type: Static displacement Displacement1
Deformation scale: 296.338



SIMULATION



Model name: cutter attachment
Study name: Static 1 (-Default-)
Plot type: Static displacement Displacement1
Deformation scale: 79.8153



PROJECT CONCLUSION

The main motive of the project is to mechanize agriculture.

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graph TD; A[The main motive of the project is to mechanize agriculture.] --> B[It requires less labour and time as compared to traditional methods, making farmer's life better.]; A --> C[As small or medium powered machines with optimum load are more economical and efficient than heavy machines, its highly beneficial for small scale farmers.]; A --> D[This machine will be highly useful wherever theres shortage of electricity.]; A --> E[It is eco friendly as it neither waste electricity nor burn fuels.];
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- It requires less labour and time as compared to traditional methods, making farmer's life better.

- As small or medium powered machines with optimum load are more economical and efficient than heavy machines, its highly beneficial for small scale farmers.

- This machine will be highly useful wherever theres shortage of electricity.

- It is eco friendly as it neither waste electricity nor burn fuels.



Thank You