

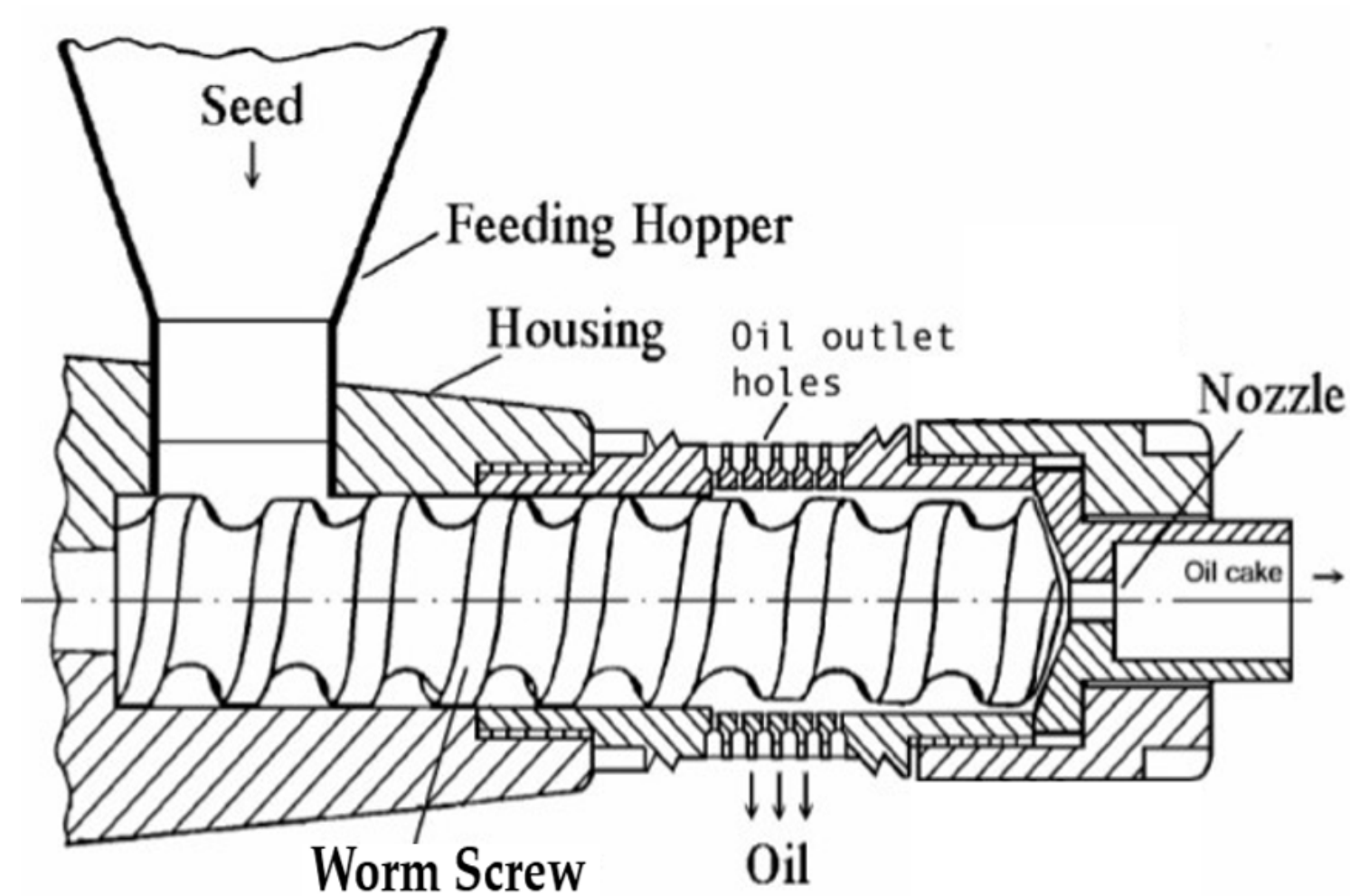


INTRODUCTION

Due to lack of infrastructure and split from Sudan, South Sudan is unable to capitalize on its abundant natural resources. Sesame seed oil production continues to be limited due to inefficient manual oil extraction processes.

Our solution is a mechanical oil expeller system to extract oil from sesame seeds in an efficient, sustainable, and affordable way. Our customer is James Tor Monybuny, the Governor of the Upper Nile State of South Sudan. This design will be implemented in October 2018 for use on a farming co-op outside the city of Malakal.

OUR SOLUTION



Schematic of oil screw expeller

Efficient

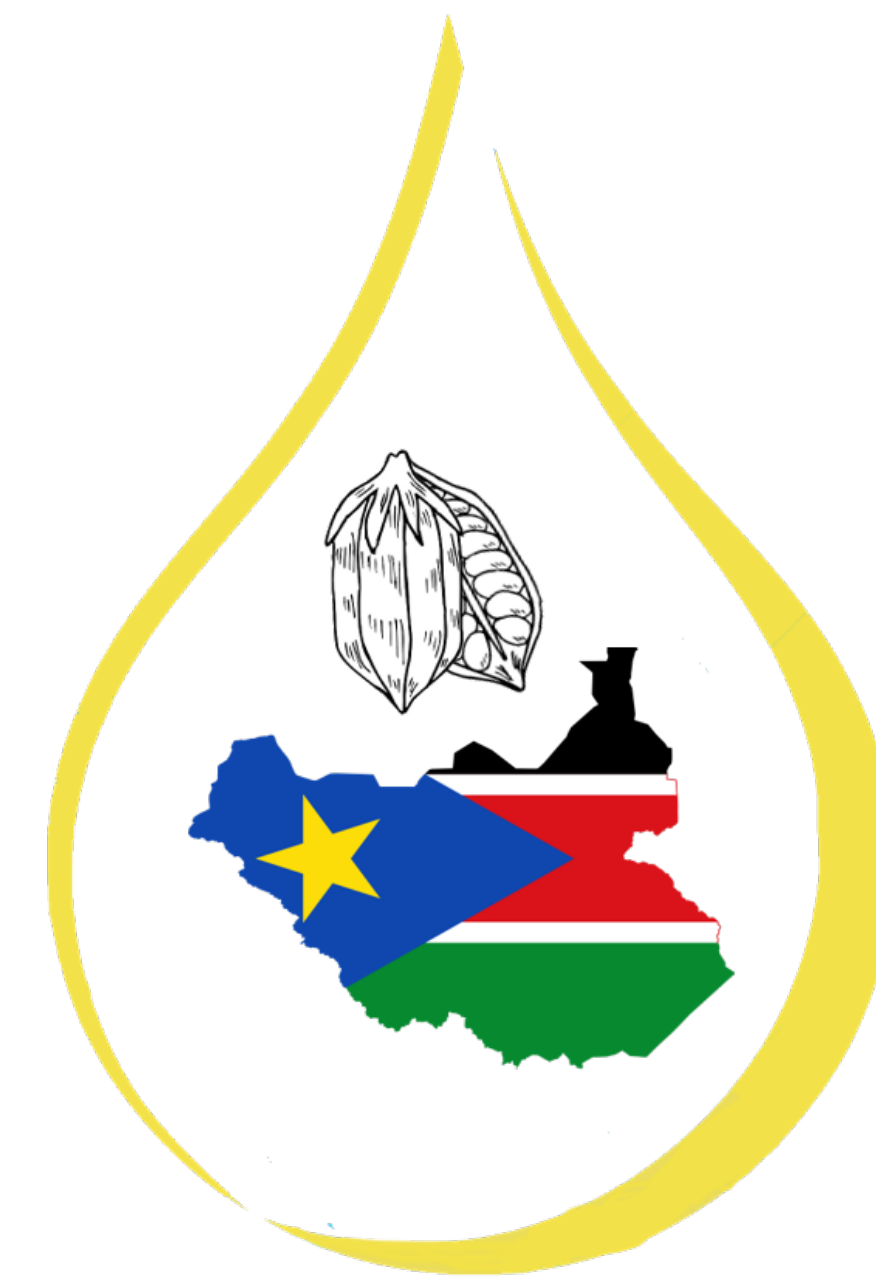
- Flow process, as opposed to batch process
- Waste as animal feed
- Uses available diesel tractor as power source

Sustainable

- Completely mechanical system (no electrical components, computers, motors, etc.)
- Built in metric system with simple design

Affordable

- Start-up cost breakeven point within two harvests
- First machine, seeds, land, and tractors to be donated by The Fröolja Project and the UN

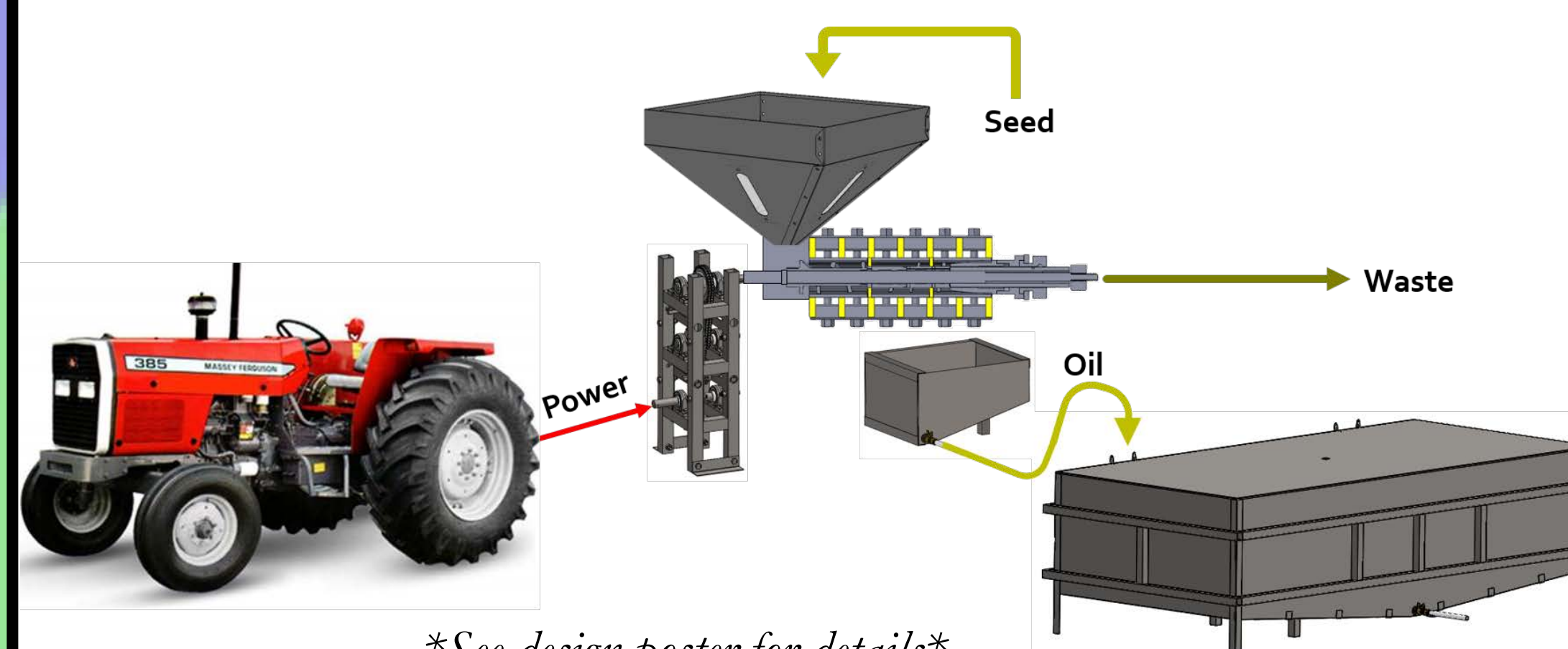


The Fröolja Project



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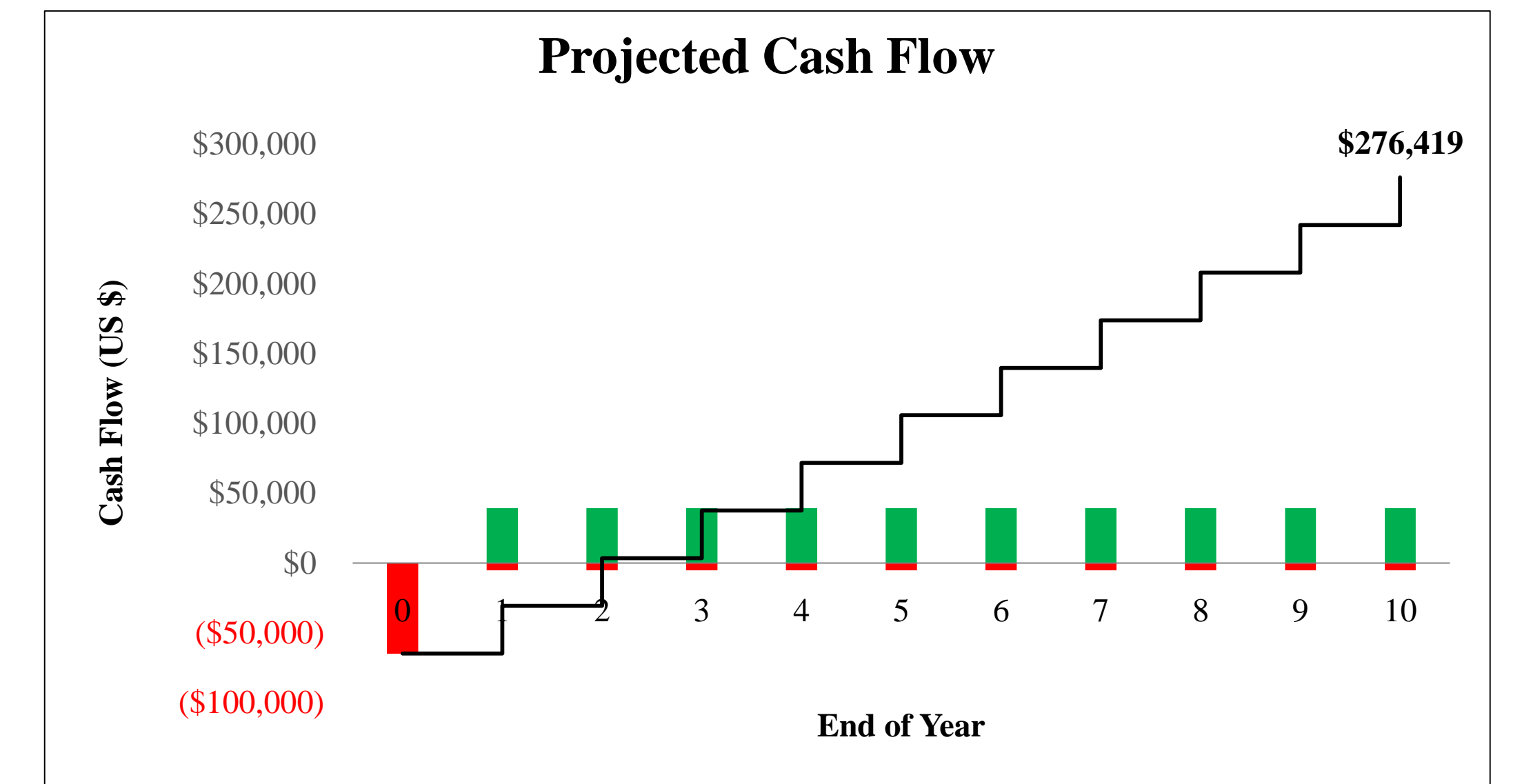
DESIGN



See design poster for details

- | | |
|-------------|-------------------------------------|
| Tractor: | Power source |
| Drivetrain: | Step down RPM from 540 to 120 |
| Hopper: | Funnel seed into worm shaft housing |
| Worm screw: | Crush seed |
| Collection: | Catch and store oil temporarily |

ECONOMIC FEASIBILITY



- Increased annual profit of approximately \$7,140 (27%) more than profit from directly selling harvested seed
- 40 hectare farm (~100 acres)
- Expeller processes 2400 kg of seed per day (~5300 lbs), which translates to 990 L of oil extracted daily (~260 gal)
- Cost of expeller: \$9,700

CONCLUSION

Through research, design, building, and testing, we assert that this expeller is feasible for its intended use and implementation by October 2018.

In addition, Governor Monybuny says that as the situation in South Sudan becomes more stable, he desires an avenue to unite the tribes of the Upper Nile. It is his goal and ours to have this expeller be a catalyst for unity on a small yet practical scale.

ACKNOWLEDGEMENTS

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|-----------------------|-------------------|
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For more information on the project, visit:

engr.calvinblogs.org/17-18/srdesign18/
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