Purdue Utility Project (PUP)

John Lumkes
Agricultural & Biological Engineering
PUP and MAPS

PUP
Purdue Utility Project

Students
MAPS “R&D”
- miniPUP
- ePUP
- FirePUP
- Maize grinder
- Thresher
- Water pump
- Tillage/Planting
- Harvesting
- Refrigeration

MAPS
Mobile Agricultural Power Solutions

Attachments
Implements
New Platforms
Design Process Summary

Modeling & Analysis
From the mechanical to the economics, the entire system is modeled and simulated:
• End-user needs and preferences
• Local materials and resources
• Driveline & Frame
• Ergonomics & Safety
• Manufacturing, Labor, Tools
• Operating Costs, Business plan

The Partnering Process
• Joint needs assessment
• Brainstorm possible solutions
• Refine solutions and find optimal design
• Analysis and modeling of entire system
• Build and test; use data to refine design
• Travel and collaborate with partners to build and test on-site for implementation and field studies
• Disseminate results
2012 Student Design Work
Attachments and Implements

- Multigrain Thresher
- Tillage and Planting
- Water Pumping / Irrigation
- Food Processing / Maize Grinder
Cameroon (2014)
2018/19 Tumaini Center, Kenya
Bob Godec, U.S. Ambassador to Kenya

Ambassador Bob Godec @BobGodec 13h
Awesome to test drive an all terrain vehicle built by the youth @TurnainiCenter in Eldoret! You can accomplish amazing things! pic.twitter.com/vxYS67uT

John Lumkes, Purdue University
Applications
Current Projects

• Data Monitoring and Collection System

• Development of Value Adding Attachments
  • Multi-grain Thresher

• High/Low (Road/Field) Transmission Option

• Electrification (exploratory)
Electric AgRover
Electric (ePUP) Motivation

• Address growing concerns with Green House Gas (GHG) emissions
• Support the movement to Electric Vehicles (EV)
• Introduce EV technology in agriculture
• Gain a better understanding of using electric power for agricultural mechanization
• Increase renewable energy based (climate-smart) agricultural practices