

DEFINE PHASE

PALM HARVESTER

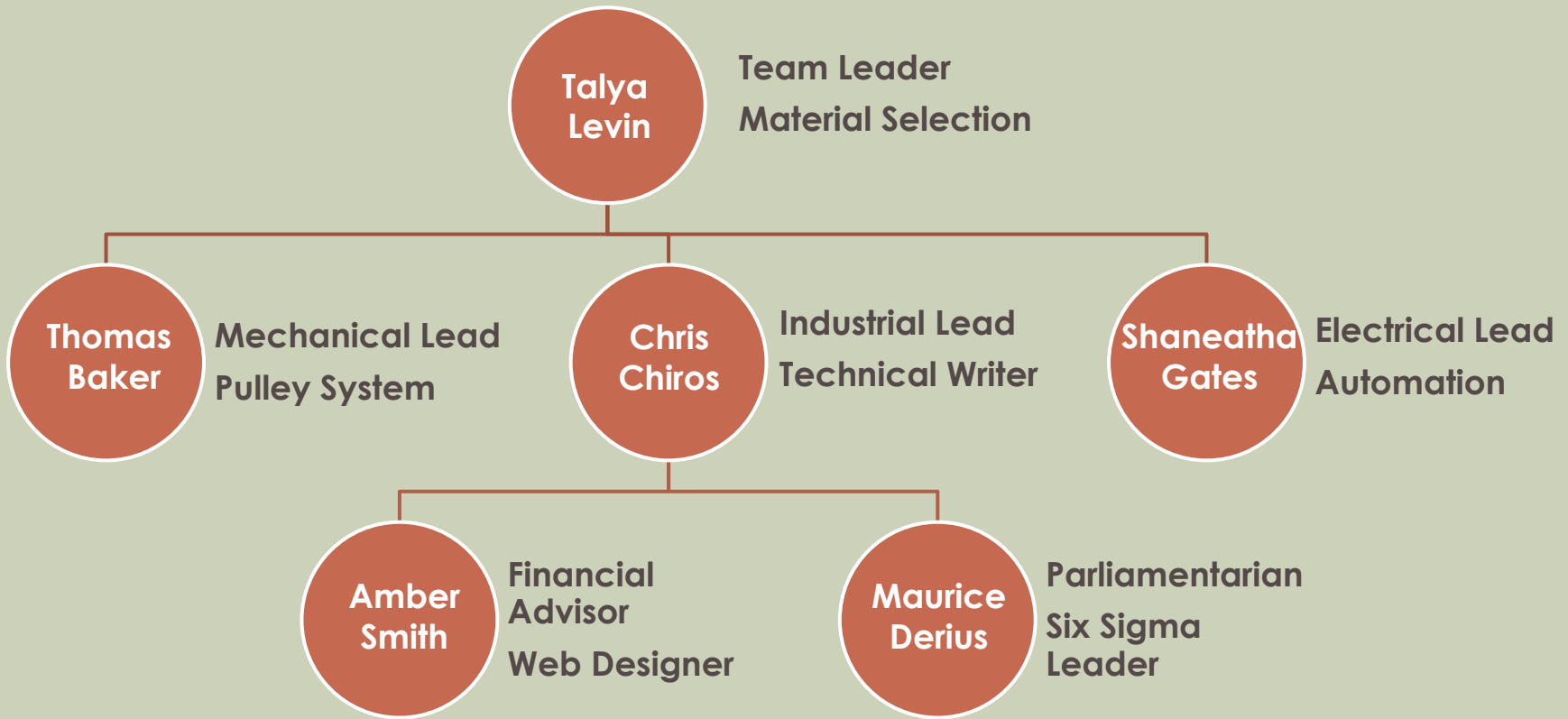
Sponsor: Dr. Okoli

Advisors: Dr. Chuy Dr. Frank

Team: Talya Levin Thomas Baker
Shaneatha Gates Maurice Derius
Amber Smith Christopher Chiros



TEAM ORGANIZATION



SPONSOR

Dr. Okenwa Okoli

- Chair of the Department of Industrial and Manufacturing Engineering
- Professor and Associate Director of HPMI
- Received his PhD. at the University of Warwick [3]



DELIVERABLES

Name	Due Date
Define Phase Report	October 21 st , 2014
Define Phase Presentation	October 21 st , 2014
Initial Website Design	October 24 th , 2014
Final Website Design	November 25 th , 2014
Peer Evaluation	November 25 th , 2014
Measure Phase Report	December 2 nd , 2014
Measure Phase Presentation	December 4 th , 2014
Peer Evaluation	December 5 th , 2014

PRESENTATION AGENDA

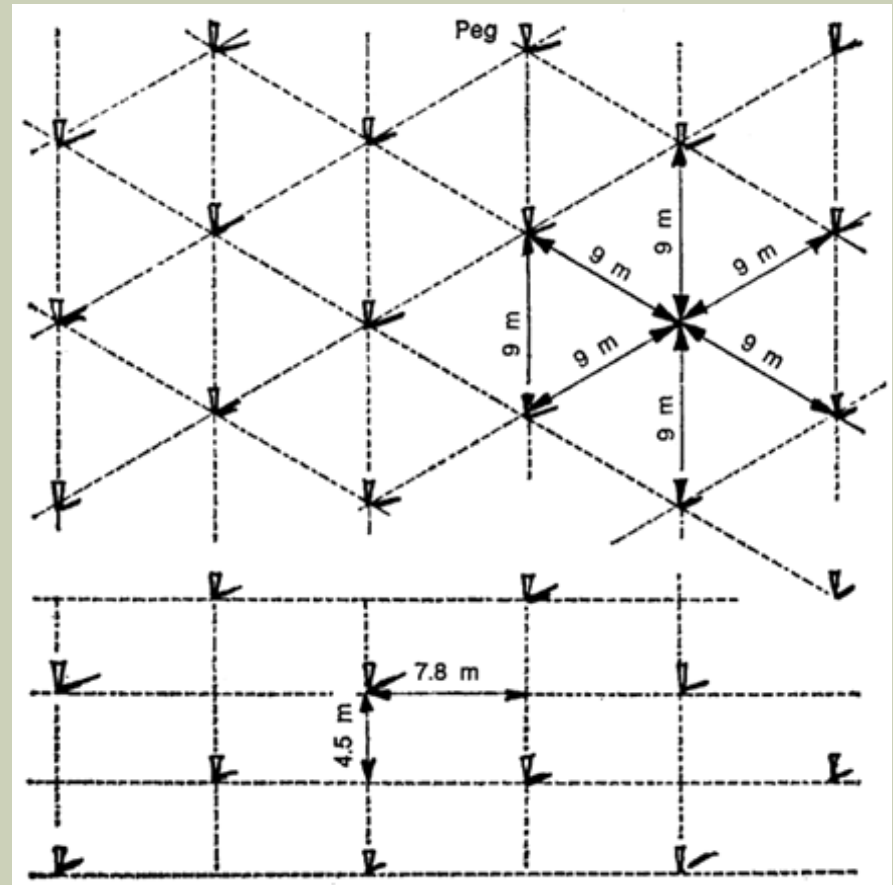
- Introduction
- Background Research
- Business Case
- Needs Statement
- Project Scope
- Project Plan
- Fishbone
- House of Quality
- Conclusion

INTRODUCTION

- **What is an Oil Palm Tree?**
 - Typically 40ft tall Palm Tree[4]
 - Grows in tropical environments
- **What is the significance of an Oil Palm Tree?**
 - Contains fruit that produces high demand products
- **What are some of the applications of Palm Oil?[4]**
 - Soap
 - Vegetable oil
 - Biofuels
 - Chocolate
 - Ice Cream
 - Lotion
 - Processed Foods

BACKGROUND RESEARCH

- **Oil Palm Tree Specifications [5]**
 - Tree height: 40ft
 - Tree diameter: 0.75ft-2.5ft
 - Fruit Bunch Weight: 40-55lbs
 - Number of fruit/bunch: 200
 - Tree Life: 20-30 years
- **Climate specs [4]**
 - Temperature: 77-82°F
 - Humidity: 75%
 - Sunlight: 4-5 hours a day
 - Rainfall: Year-round



BACKGROUND RESEARCH

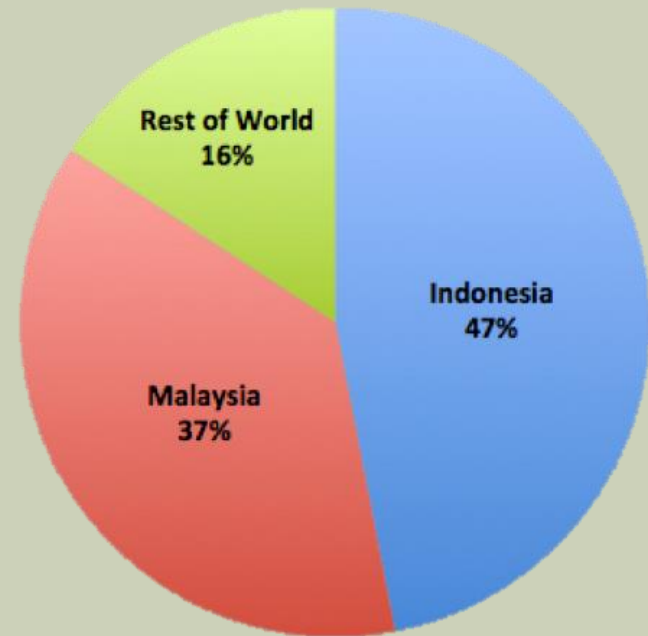
- **Safety issues**
 - Climbing methods are risky [6]
 - Bunches of fruit hitting worker
- **Customers**
 - Plantation owners
 - Service Industries



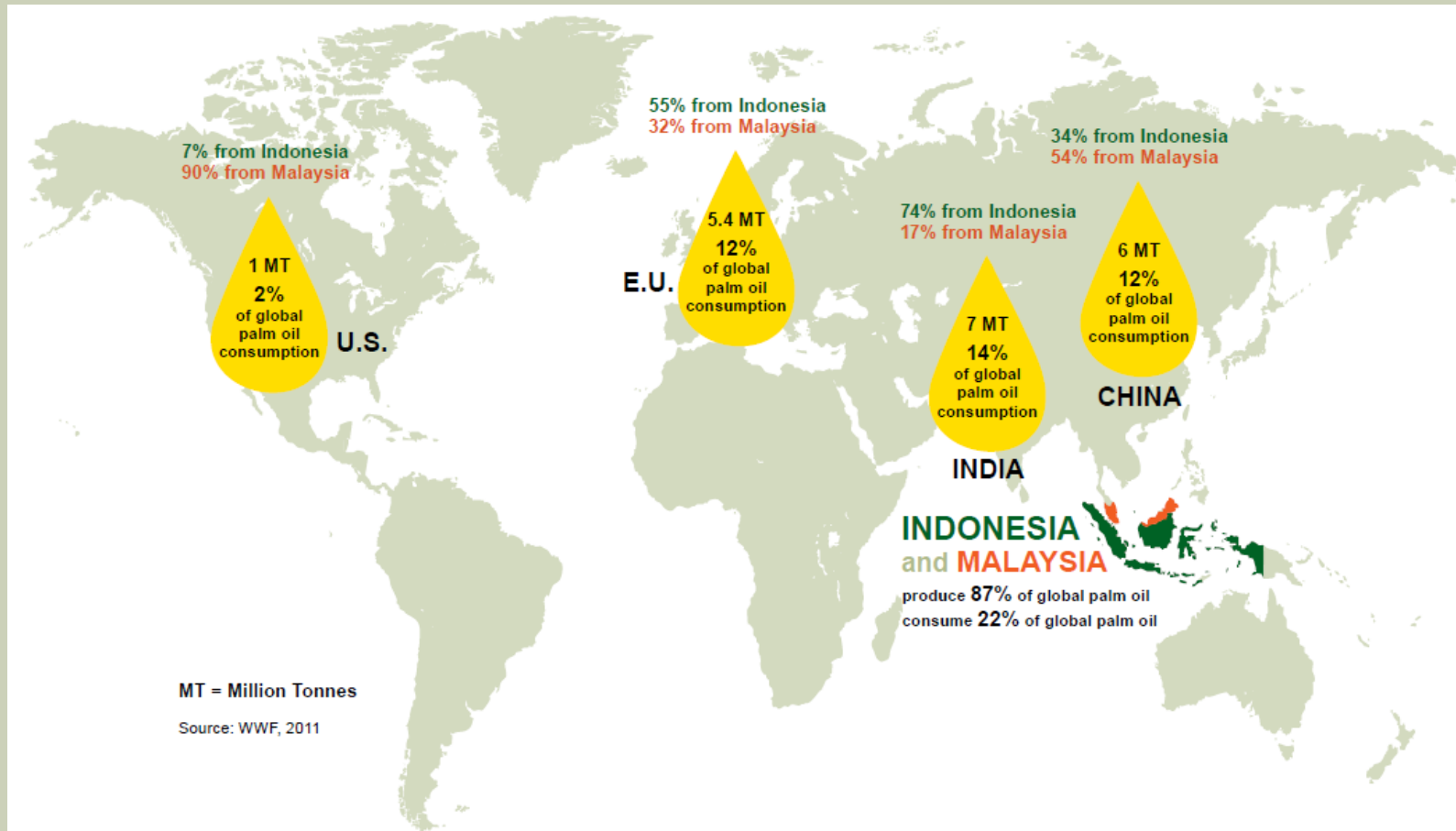
BUSINESS CASE

- Main exporters Indonesia and Malaysia [7]
- 590,000 workers Malaysia
- 3.7m people linked to Palm Oil Industry in Indonesia

Palm Oil Production (2012)



BUSINESS CASE



[8]

Background Research

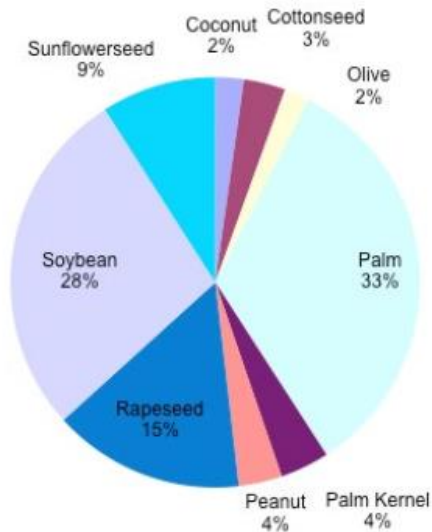
Business Case

Project Scope

BUSINESS CASE

- Palm oil is the top contender in edible oil production [9]

2012/13 World Edible Oil Production



Source: USDA
June 2012

CBOT Soybean Oil vs BMD Crude Palm Oil
Nearby Futures



Background Research

Business Case

Project Scope

NEEDS STATEMENT

- Needs for mechanism:
 - Safe
 - Inexpensive
 - Competitive
 - Reliable

PROJECT SCOPE

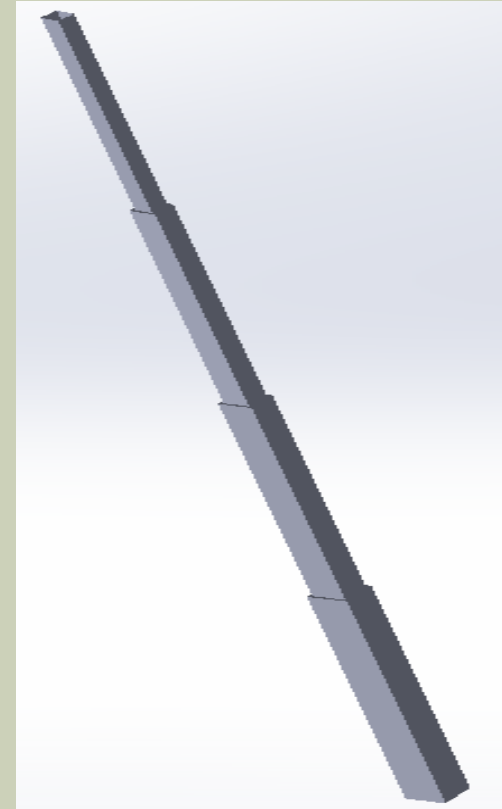
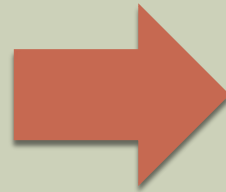
- **Goal**
 - Improve the existing Palm Harvester mechanism
- **Budget**
 - \$2,500
- **Improvements**
 - Mobility
 - Materials
 - Pulley System

PROJECT PLAN

- Improve mobility
- Incorporate automation
- Change telescoping poles material and shape
- Redesign pulley system

PROJECT PLAN

- Improve previous year's mechanism



Project Plan

Project Plan

Project Plan

PROJECT PLAN

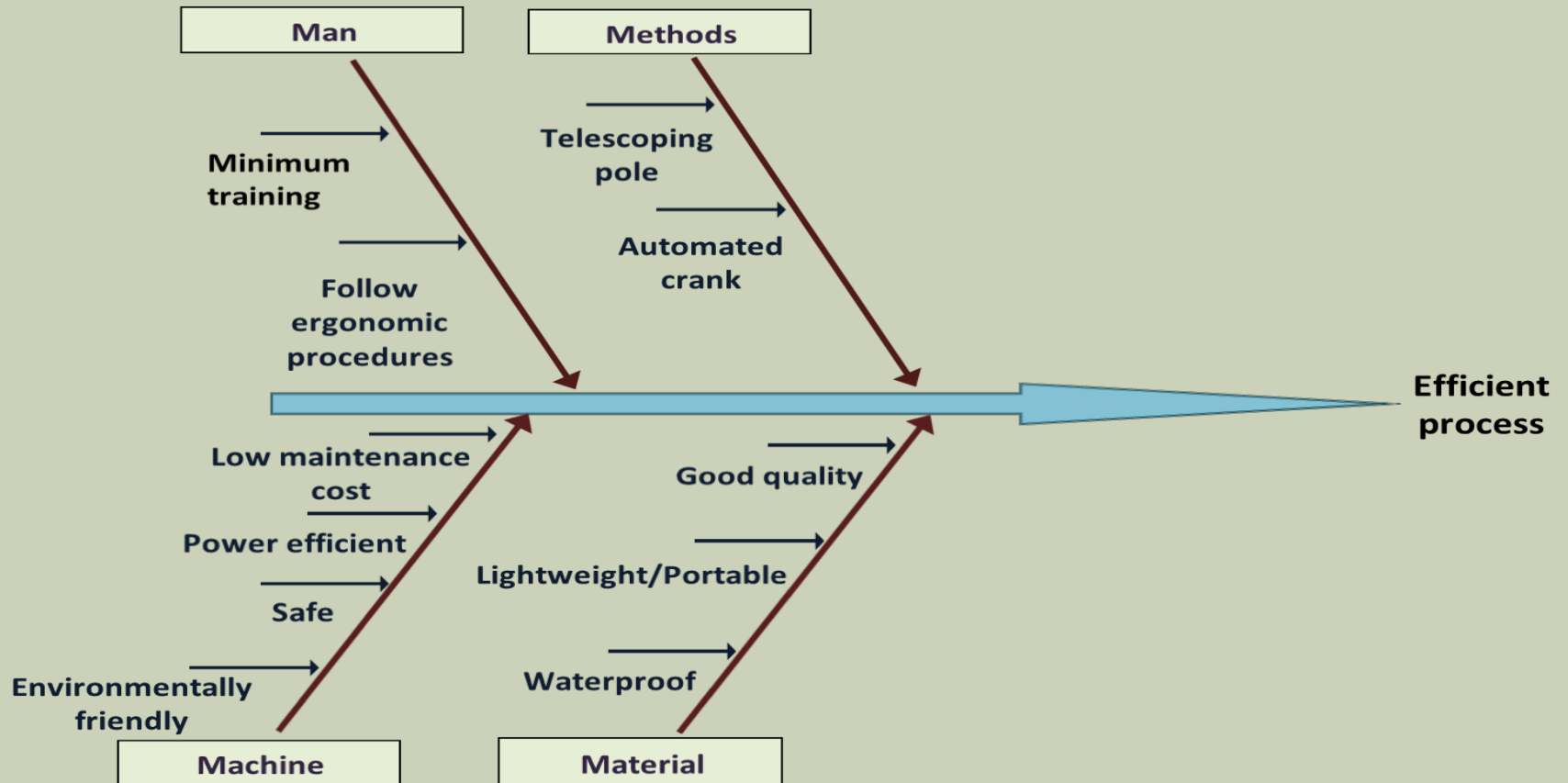
Improvement Area	Maximum Cost
Mobility	\$100.00
Telescoping Pole Material	\$1,300.00
Pulley System	\$100.00
Automation	\$500.00
Total	\$2,000.00

Needs Statement

Project Plan

Fishbone

FISHBONE



Project Plan

Fishbone

House of Quality

HOUSE OF QUALITY

Legend	
○	Strong Relationship 9
○	Moderate Relationship 3
○	Weak Relationship 1
+	Strong Positive Correlation
+	Positive Correlation
-	Negative Correlation
-	Strong Negative Correlation
▼	Objective is To Minimize
▲	Objective is To Maximize
X	Objective is To Hit Target

Row #	Max Relationship Value in Row	Relative Weight	Weight Importance	Demanded Quality (a.k.a. "Customer Requirements" or "Wishes")
4	3	7.3	6.0	Water proof

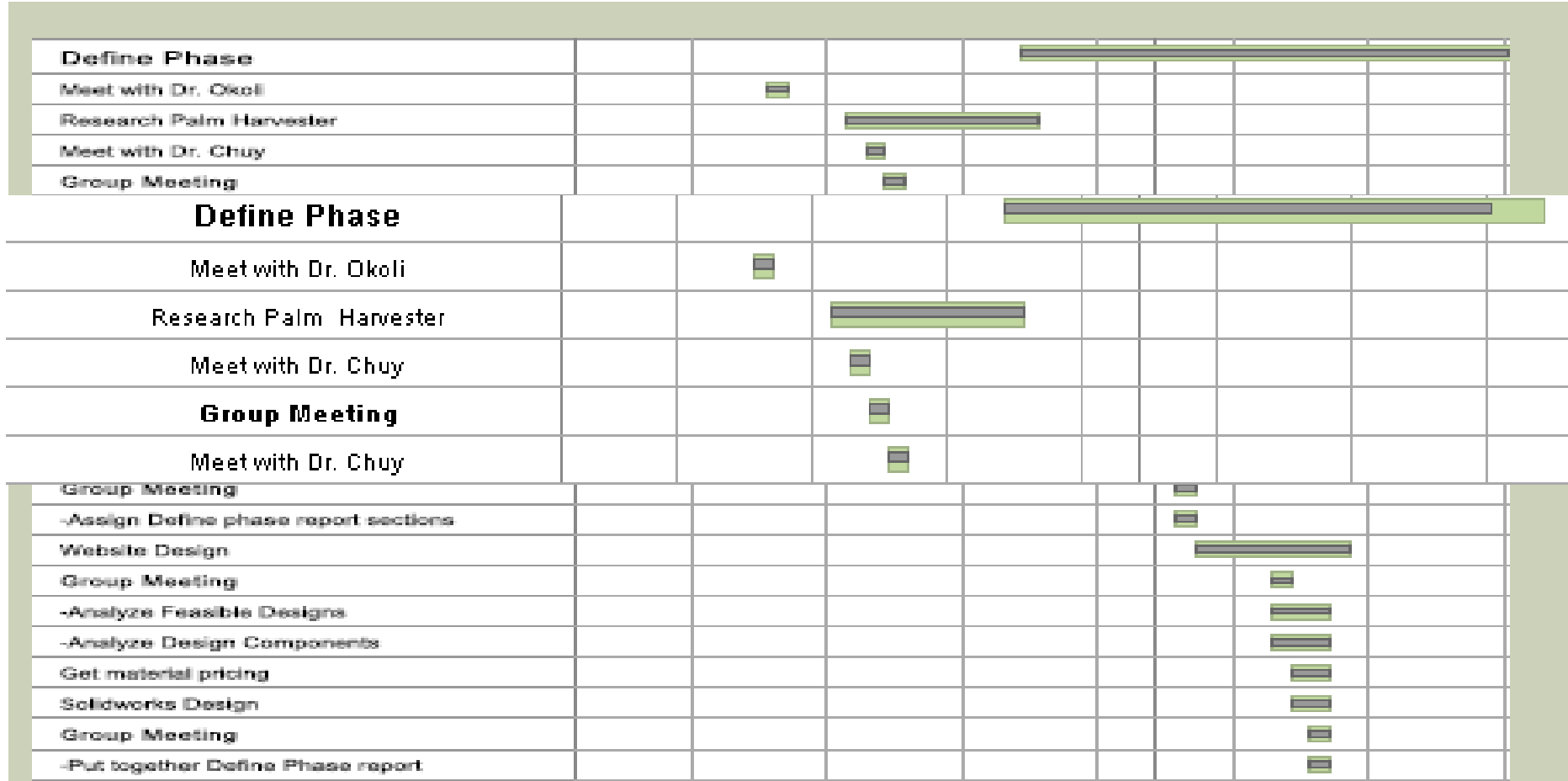
	▼	▲	▲	▲	▼	▲	▼
Weight of materials							
Quality of materials							
Speed of climb							
Battery capacity/Durability							
Size of cart							
Size of wheels							
Complexity of design							
7		○		○	▲	○	○
8	○	○	▲	▲	○	○	▲
9	○	○	○	○	○	○	○
10			○	○		○	○

Fishbone

House of Quality

Gantt Chart

GANTT CHART

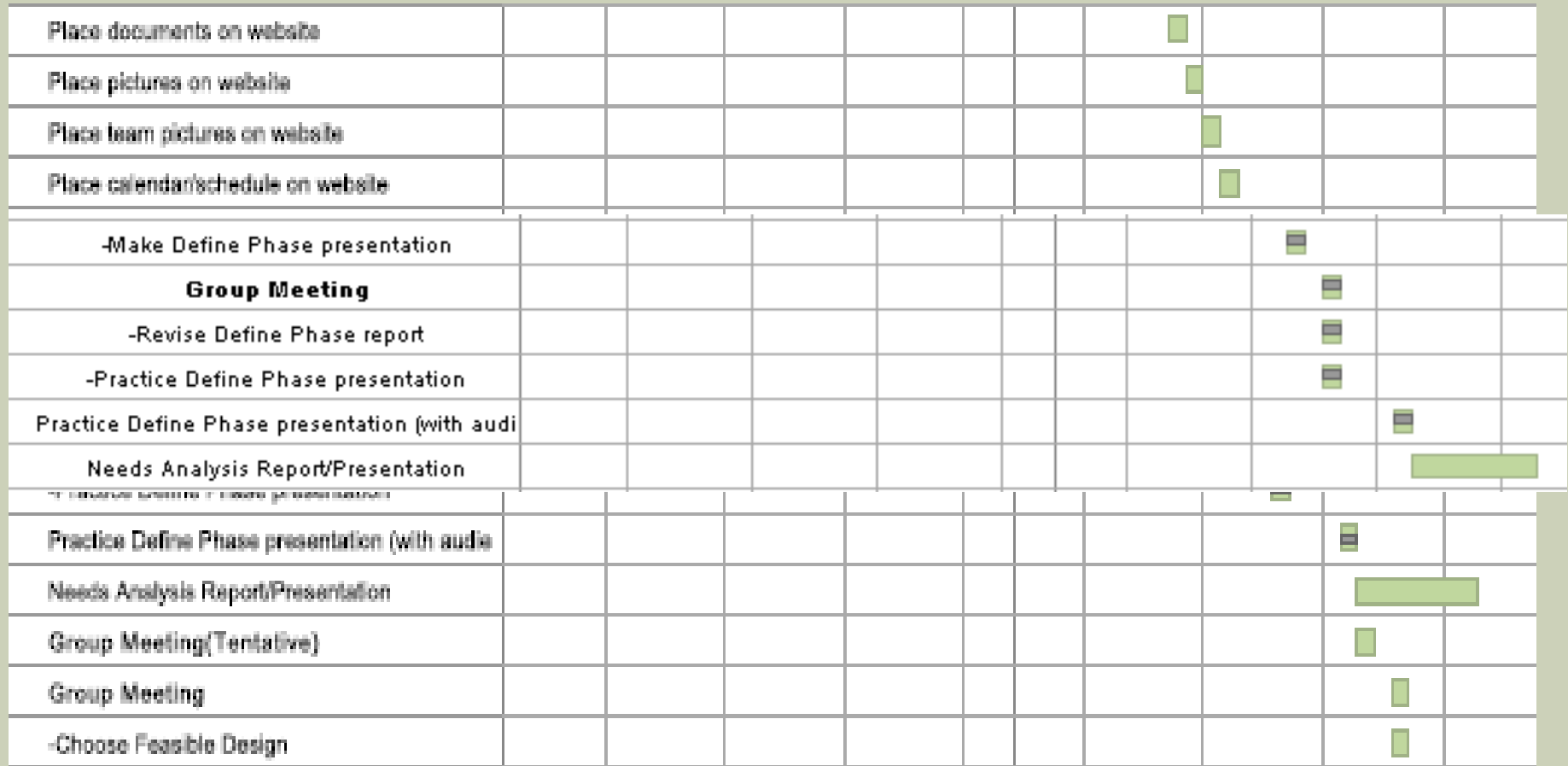


House of Quality

Gantt Chart

Conclusion

GANTT CHART

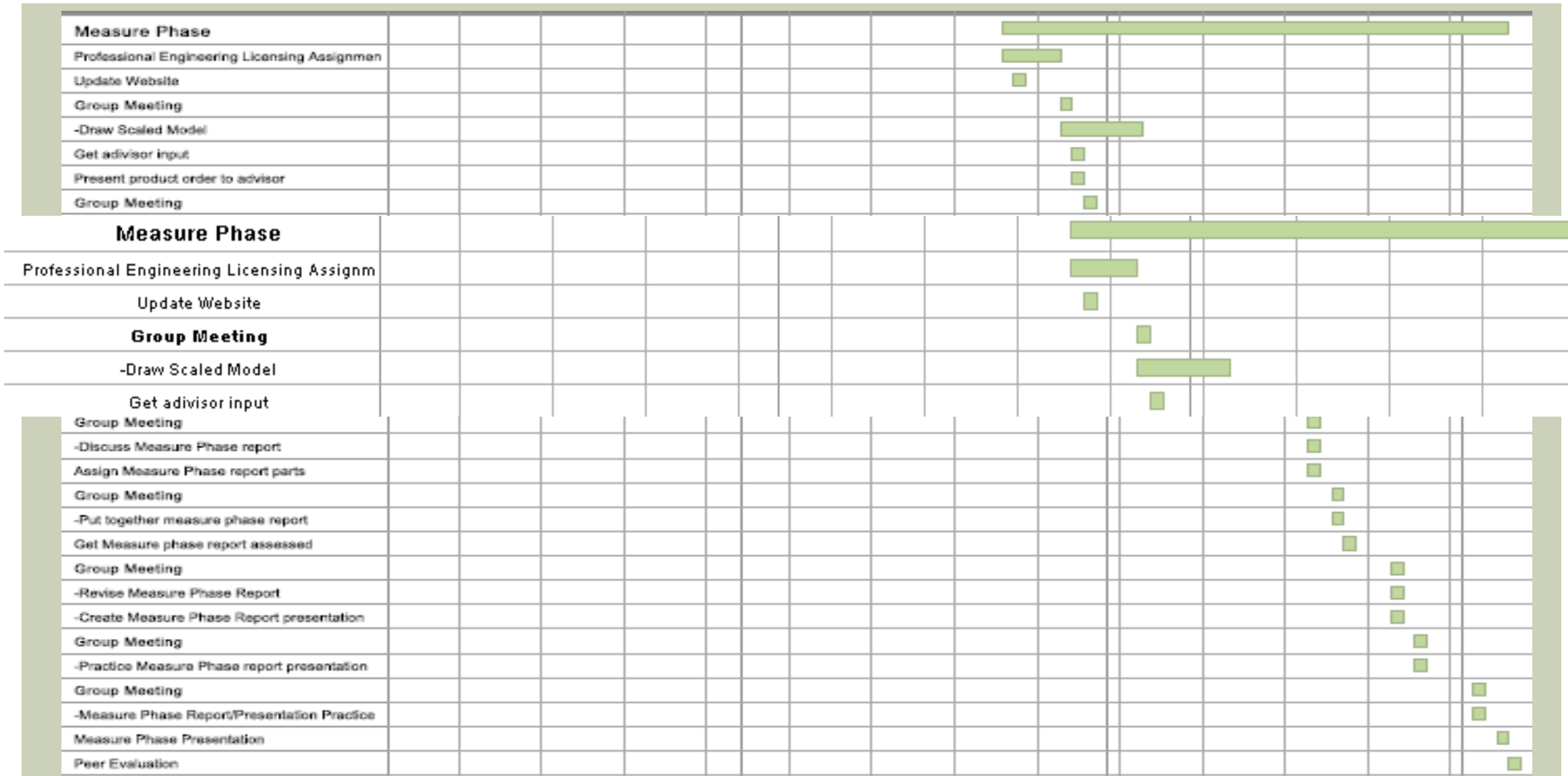


House of Quality

Gantt Chart

Conclusion

GANTT CHART



House of Quality

Gantt Chart

Conclusion

CONCLUSION

■ Need:

- Efficient Palm Harvesting
- Improve safety conditions
- Lower overall harvesting costs

■ Plan:

- Improve mobility
- Incorporate automation
- Change material & shape of telescoping poles
- Enhance pulley system

QUESTIONS



REFERENCES

- [1](Cover Picture)<http://www.soapqueen.com/business/on-palm-oil/>
- [2](Logos)https://www.eng.fsu.edu/cms/multimedia_services/image_archive.html
- [3]<https://www.eng.fsu.edu/faculty/ime/okoli.html>
- [4] <http://www.fao.org/docrep/006/t0309e/t0309e01.htm>
- [5]<http://www.nzdl.org/gsdImod?e=d-00000-00---off-0hdl--00-0----0-10-0---0---0direct-10---4-----0-11—11-en-50---20about---00-0-1-00-0-0-11-1-0utfZz-8-00&cl=CL3.15&d=HASH936656e63006dc59370f5e.4.3>=1>
- [6]<http://www.congo-pages.org/livingbdd.htm>
- [7]<http://thebreakthrough.org/index.php/programs/conservation-and-development/can-palm-oil-deforestation-be-stopped>
- [8]WWF Report- Profitability and Sustainability in Palm Oil Production
- [9]<http://www.cmegroup.com/trading/agricultural/files/spreading-cbot-soybean-oil-and-bmd-crude-palm-oil.pdf>