

Humanitarian Technology: The SEED Planter



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DREXEL UNIVERSITY
College of
Engineering
Mechanical Engineering and Mechanics



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OSU: January 16, 2014

Outline

- Motivation
- Approach
 - The 4 P's of Sustainability
 - Technology Seeding
- SEED Planter
 - Progress
 - Current challenges


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NEW YORK TIMES BESTSELLER
WINNER OF THE PULITZER PRIZE
GUNS, GERMS, AND STEEL
The Fates of Human Societies
JARED DIAMOND
Source Link

The Tentacles of Progress
Technology Transfer in the Age of Imperialism, 1875-1914
Daniel R. Headrick
Source Link

THE END OF POVERTY
ECONOMIC POSSIBILITIES FOR OUR TIME
JEFFREY D. SACHS
FOREWORD BY BONO
Source Link

THE WHITE MAN'S BURDEN
WHY THE WEST'S EFFORTS TO AID THE REST OF THE WORLD HAVE FAILED, AND WHY THEY SHOULD
WILLIAM EASTERLY
Source Link

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“...the single most important reason why prosperity spread, and why it continues to spread, is the transmission of technology and the ideas underlying them.”

- Jeffrey Sachs
Director, UN Development Program
Director, Earth Institute,
Columbia University

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Sachs, J. 2005. The end of poverty : economic possibilities for our time. New York: Penguin Press.

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“The main hope for the poor is for them to be their own Searchers, borrowing ideas and technology from the West when it suits them to do so.”

- William Easterly
Co-Director, NYU Development Research Institute
Professor of Economics, NYU

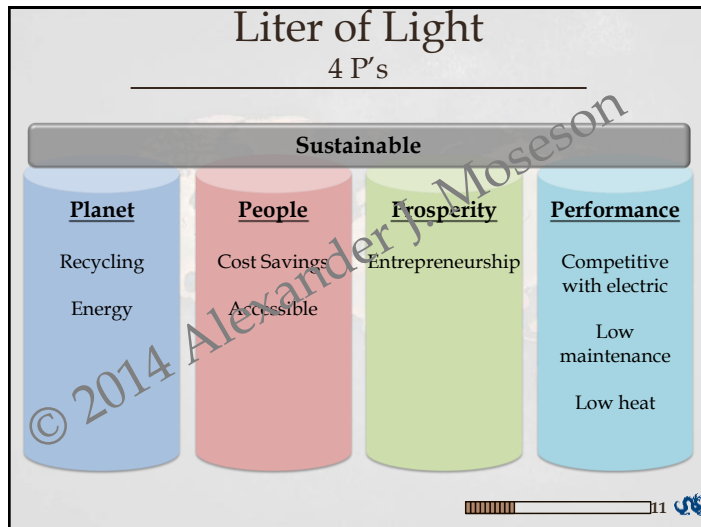
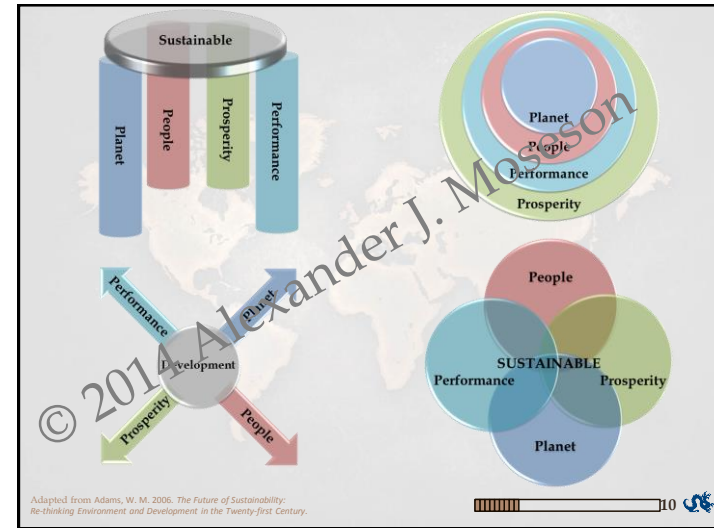
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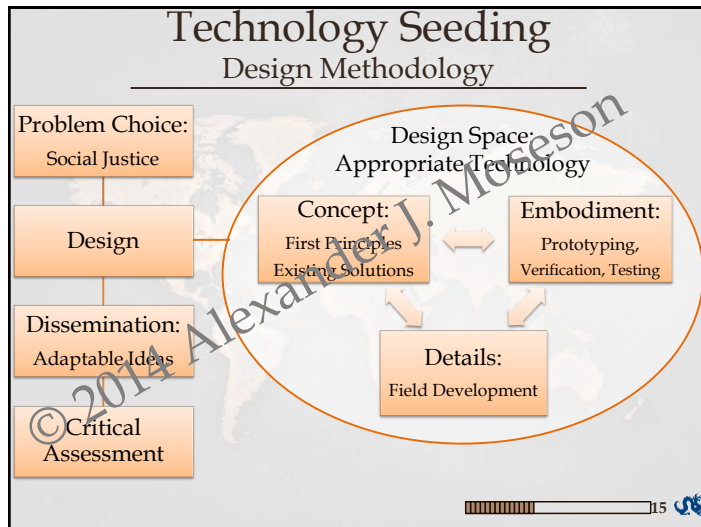
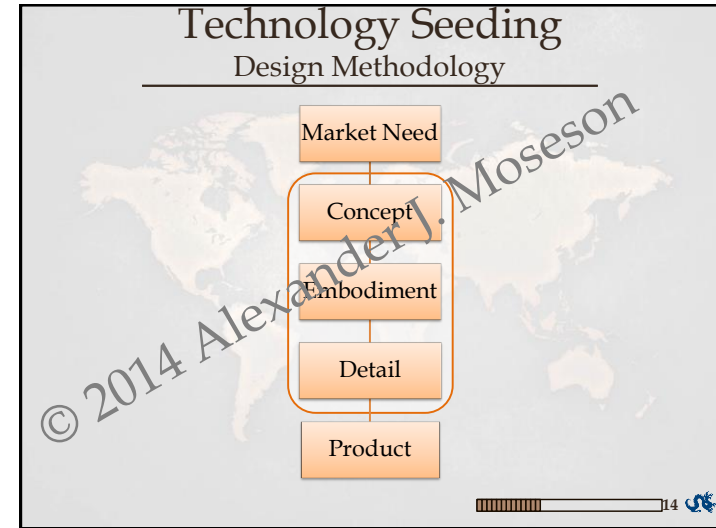
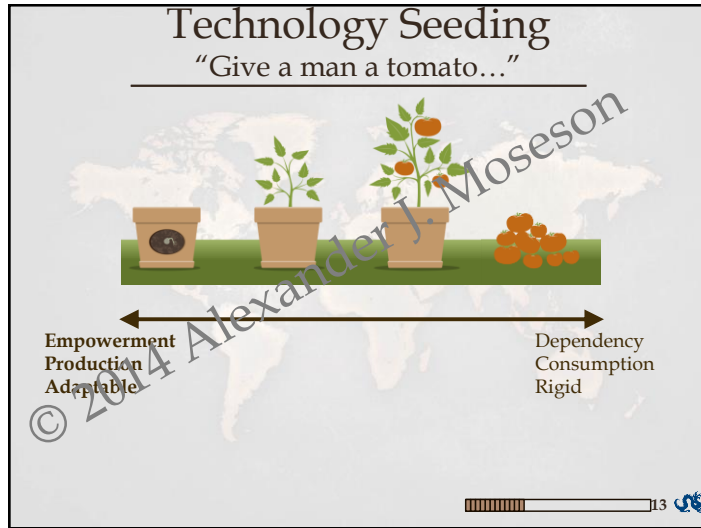
Easterly, W. 2006. The white man's burden : why the West's efforts to aid the rest have done so much ill and so little good. New York: Penguin Press.

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SEED Planter

IEEE GHTC Award-Winning Video

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SEED Planter

Beginnings

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SEED Planter

Beginnings

- Difficult agriculture
 - Chronic Pain
 - Time Consuming
 - Hunger
- Dirty water

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SEED Planter

Drexel Teams

- 2010 – 2011: Planter
- 2011 – 2012: Weeder
- 2012 – 2013: Planter + Water
- 2013 – 2014: Planter/Weeder + Water

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SEED Planter

Development: Iteration 1

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SEED Planter

Development: Iteration 1

- Concept Generation 1
 - All farming chores
 - Existing designs
 - Many complex

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SEED Planter

Development: Iteration 1

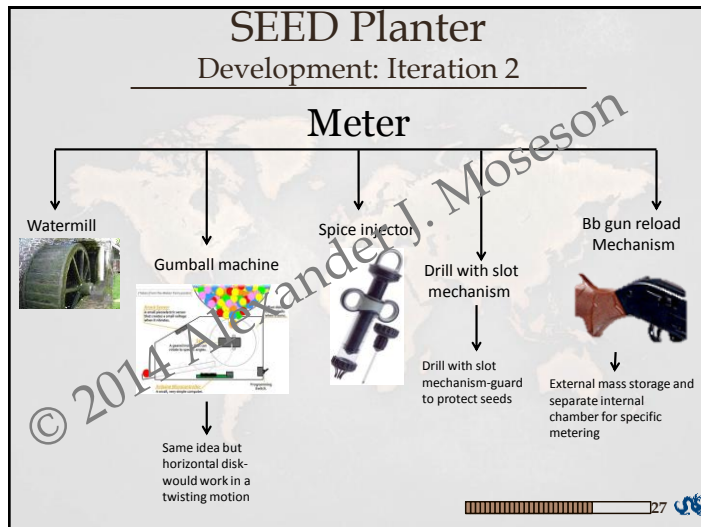
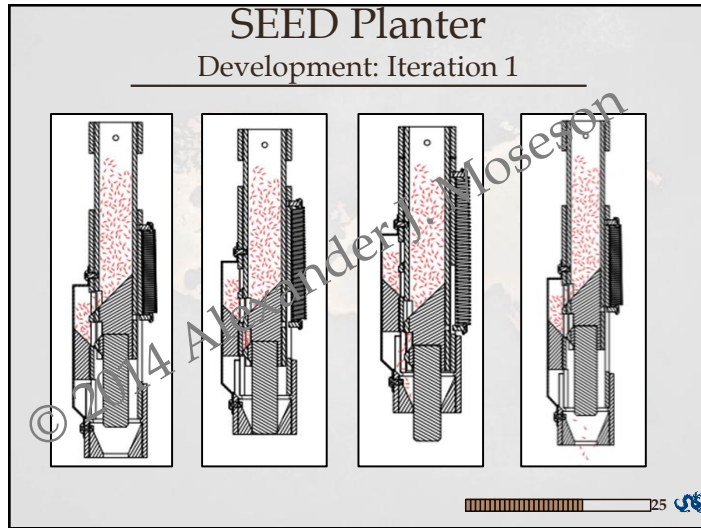
- Field Visit Feedback
 - Planting most critical
 - No wheels
 - Simple is better

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SEED Planter

Development: Iteration 1

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SEED Planter

Development: Iteration 2



Pros

- Simple
- Linear motion
- Low build time

Cons

- Durability
- Material availability

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SEED Planter

Development: Iteration 2



Pros

- No delay in lift of device for seeds to fall in hole
- Ability for accurate hole depth

Cons

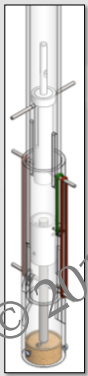
- Complexity
- Time to build

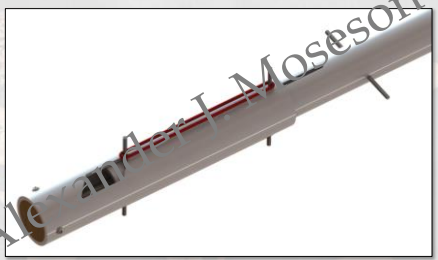
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SEED Planter

Development: Iteration 2







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B1

SEED Planter

Development: Iteration 2

LIVE DEMONSTRATION

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B2

SEED Planter

Challenges - Help!

- Actuation force too high
- Cycle time too high
- Metering imprecise. (10 +/- 4, not +/- 1)
- Mud pulled in by spear
- Jamming
- Seeds miss hole
- Beak would close too fast

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SEED Planter

Development: Iteration 3 (CURRENT)

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SEED Planter

Development: Iteration 3 (CURRENT)

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SEED Planter

Challenges - Help!

- Actuation force too high
- Cycle time too high
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- Mud pulled in by spear
- Jamming
- Seeds miss hole
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Acknowledgements

- *Hosts:* Randy Taylor, Bill Raun, and OSU
- *Funding:* Bill & Melinda Gates Foundation
- *Core Efforts:* 10+ Drexel Undergraduates
– Esp. team leader: Bill Bernhard
- *Drexel:* Michel Barsoum, James Tangorra, and many more
- *Consultant:* Tyler Valiquette



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 A world map graphic with a textured, brownish appearance.

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www.SEEDLaboratory.org

 A progress bar with a small blue logo to its right.