

# MicroEssentials: What it Took – and Why it Worked

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# Forward Looking Statements

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*This document contains forward-looking statements within the meaning of the Private Securities Litigation Reform Act of 1995. Such statements include, but are not limited to, statements about our proposed acquisition of the global phosphate and potash operations of Vale S.A. ("Vale") conducted through Vale Fertilizantes S.A. (the "Transaction") and the anticipated benefits and synergies of the proposed Transaction, other proposed or pending future transactions or strategic plans and other statements about future financial and operating results. Such statements are based upon the current beliefs and expectations of The Mosaic Company's management and are subject to significant risks and uncertainties. These risks and uncertainties include but are not limited to risks and uncertainties arising from the possibility that the closing of the proposed Transaction may be delayed or may not occur, including delays or risks arising from any inability of Vale to achieve certain specified regulatory and operational milestones, and the ability to satisfy any of the other closing conditions; our ability to secure financing, or financing on satisfactory terms and in amounts sufficient to fund the cash portion of the purchase price without the need for additional funds from other liquidity sources; difficulties with realization of the benefits of the proposed Transaction, including the risks that the acquired business may not be integrated successfully or that the anticipated synergies or cost or capital expenditure savings from the Transaction may not be fully realized or may take longer to realize than expected, including because of political and economic instability in Brazil or changes in government policy in Brazil; the predictability and volatility of, and customer expectations about, agriculture, fertilizer, raw material, energy and transportation markets that are subject to competitive and other pressures and economic and credit market conditions; the level of inventories in the distribution channels for crop nutrients; the effect of future product innovations or development of new technologies on demand for our products; changes in foreign currency and exchange rates; international trade risks and other risks associated with Mosaic's international operations and those of joint ventures in which Mosaic participates, including the performance of the Wa'ad Al Shamal Phosphate Company (also known as MWSPC) and the entity operating the Miski Mayo mine, the risk that protests against natural resource companies in Peru extend to or impact the Miski Mayo mine, the ability of MWSPC to obtain additional planned funding in acceptable amounts and upon acceptable terms, the timely development and commencement of operations of production facilities in the Kingdom of Saudi Arabia, the future success of current plans for MWSPC and any future changes in those plans; difficulties with realization of the benefits of our long term natural gas based pricing ammonia supply agreement with CF Industries, Inc., including the risk that the cost savings initially anticipated from the agreement may not be fully realized over its term or that the price of natural gas or ammonia during the term are at levels at which the pricing is disadvantageous to Mosaic; customer defaults; the effects of Mosaic's decisions to exit business operations or locations; changes in government policy; changes in environmental and other governmental regulation, including expansion of the types and extent of water resources regulated under federal law, carbon taxes or other greenhouse gas regulation, implementation of numeric water quality standards for the discharge of nutrients into Florida waterways or efforts to reduce the flow of excess nutrients into the Mississippi River basin, the Gulf of Mexico or elsewhere; further developments in judicial or administrative proceedings, or complaints that Mosaic's operations are adversely impacting nearby farms, business operations or properties; difficulties or delays in receiving, increased costs of or challenges to necessary governmental permits or approvals or increased financial assurance requirements; resolution of global tax audit activity; the effectiveness of Mosaic's processes for managing its strategic priorities; adverse weather conditions affecting operations in Central Florida, the Mississippi River basin, the Gulf Coast of the United States or Canada, and including potential hurricanes, excess heat, cold, snow, rainfall or drought; actual costs of various items differing from management's current estimates, including, among others, asset retirement, environmental remediation, reclamation or other environmental regulation, Canadian resources taxes and royalties, or the costs of the MWSPC, its existing or future funding and Mosaic's commitments in support of such funding; reduction of Mosaic's available cash and liquidity, and increased leverage, due to its use of cash and/or available debt capacity to fund financial assurance requirements and strategic investments; brine inflows at Mosaic's Esterhazy, Saskatchewan, potash mine or other potash shaft mines; other accidents and disruptions involving Mosaic's operations, including potential mine fires, floods, explosions, seismic events, sinkholes or releases of hazardous or volatile chemicals; and risks associated with cyber security, including reputational loss, as well as other risks and uncertainties reported from time to time in The Mosaic Company's reports filed with the Securities and Exchange Commission. Actual results may differ from those set forth in the forward-looking statements.*

# Who We Are

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- Fortune 500 company incorporated March 2004, combination of IMC Global & Cargill's fertilizer businesses
  - 100 years of phosphate mining history in U.S.
  - 50 years of potash mining history in Canada
- Approximately 22 million tonnes of operational capacity, soon to be 27+ million tonnes
- \$7.2 billion in sales in calendar 2016
- Customers in approximately 40 countries
- Nearly 9,000 employees in operations and joint ventures (JVs) in:

United States  
Canada  
Brazil

Paraguay  
China  
India

Australia  
Peru (JV)  
Saudi Arabia (JV)

**Our Mission:** *We help the world grow the food it needs*



# A New Idea in *Fertilizer*?

- Genesis of an agronomic Idea
- Research at Pilot Plant to determine possible forms
- Initial Agronomic Research indicates value creation is possible

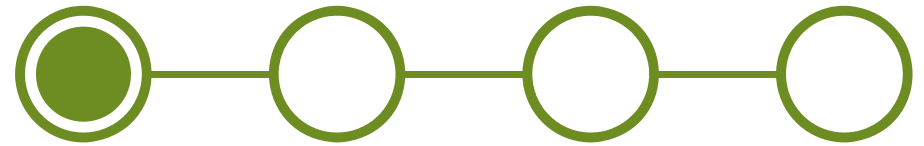
*“When we all think alike, no one is thinking.”*

Walter Lippman





# The Story of Sulfur Map



- Initially floundered implementing idea
- Sept 2000 we started with Stage Gate
- Feb 2001 had first trial run
- March 2001 signed MOU with customer for toll produced products
- Made adaptations to the plant
- Applied for preliminary patent protection
- Marketing trials planned for North America
- Begin name identification and research

## Innovation Process

### Stage-Gate® Idea-to-Launch Model

Stage-Gate® is a value-creating business process and risk model designed to quickly and profitably transform an organization's best new ideas into winning new products. When embraced by organizations, it creates a culture of product innovation excellence - product leadership, accountability, high-performance teams, customer and market focus, robust solutions, alignment, discipline, speed and quality.

#### Stage-Gate® Product Innovation Process



The Stage-Gate Product Innovation Process. Taken from *SG Navigator*

# Marketing = Capturing Value

- Prove the value created  
800 field trials per year
- Articulate the value created  
Measure yield improvements  
Funding credible 3<sup>rd</sup> party research
- Apportion the value created  
Finding the right partners to distribute

*“There are only two things in business which make money –  
Innovation and Marketing. Everything else is cost.”*

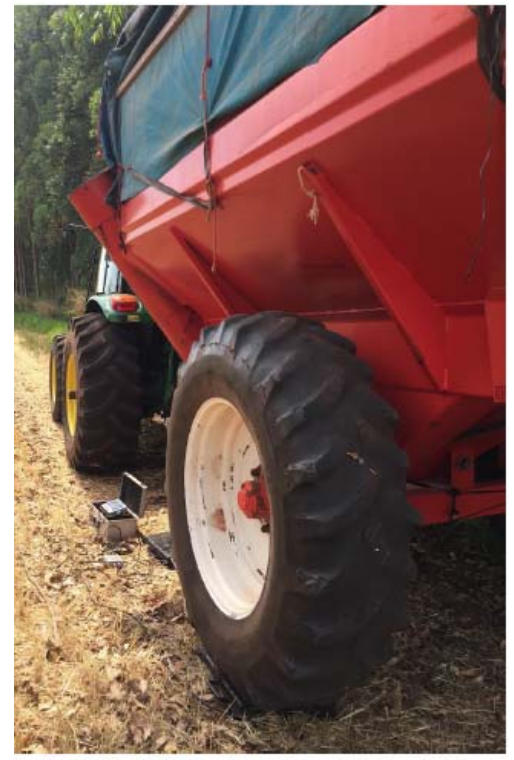


**Peter Drucker**  
Management Guru & Harvard Business School Professor



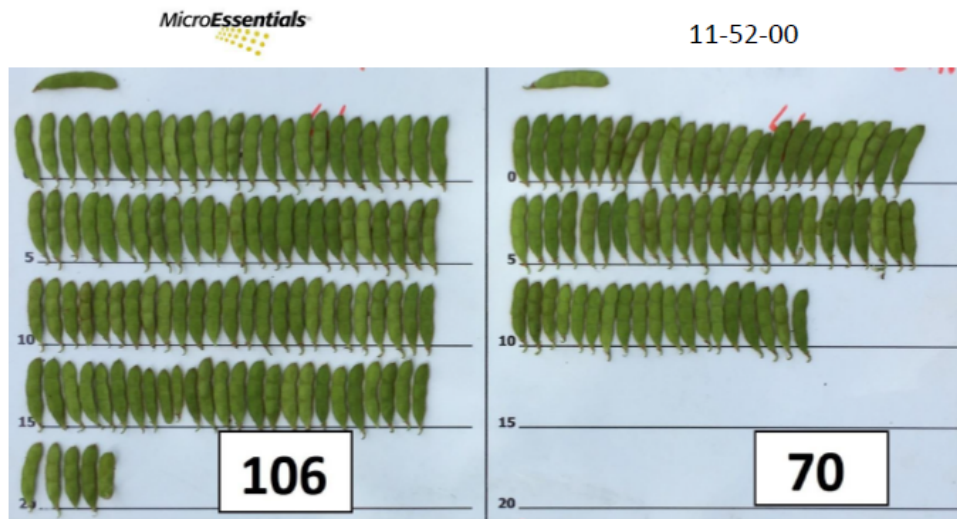


**Mosaic team follow up seeding, crop development and harvest of more than 800 demoplots per year with Premium Products on different crops and regions**



# Demoplots (side by side plots)

For each demoplot Mosaic team evaluate crop conditions and development, number of pods, root system, etc..etc.. In MicroEssentials and conventional products treatments







## “Field days” in Mato Grosso to show MicroEssentials results in soybeans



# Technical presentations to growers



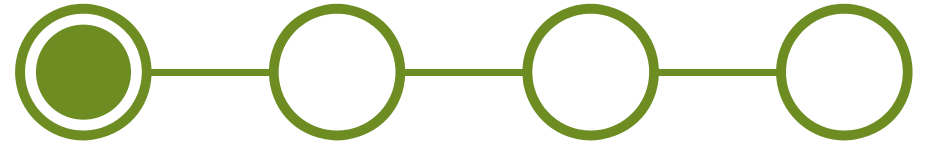


# “Mosaic Technology Meeting”

Meetings with growers to discuss agronomy knowledge and fertilization management as part of our value proposition for premium products



# Story of MicroEssentials

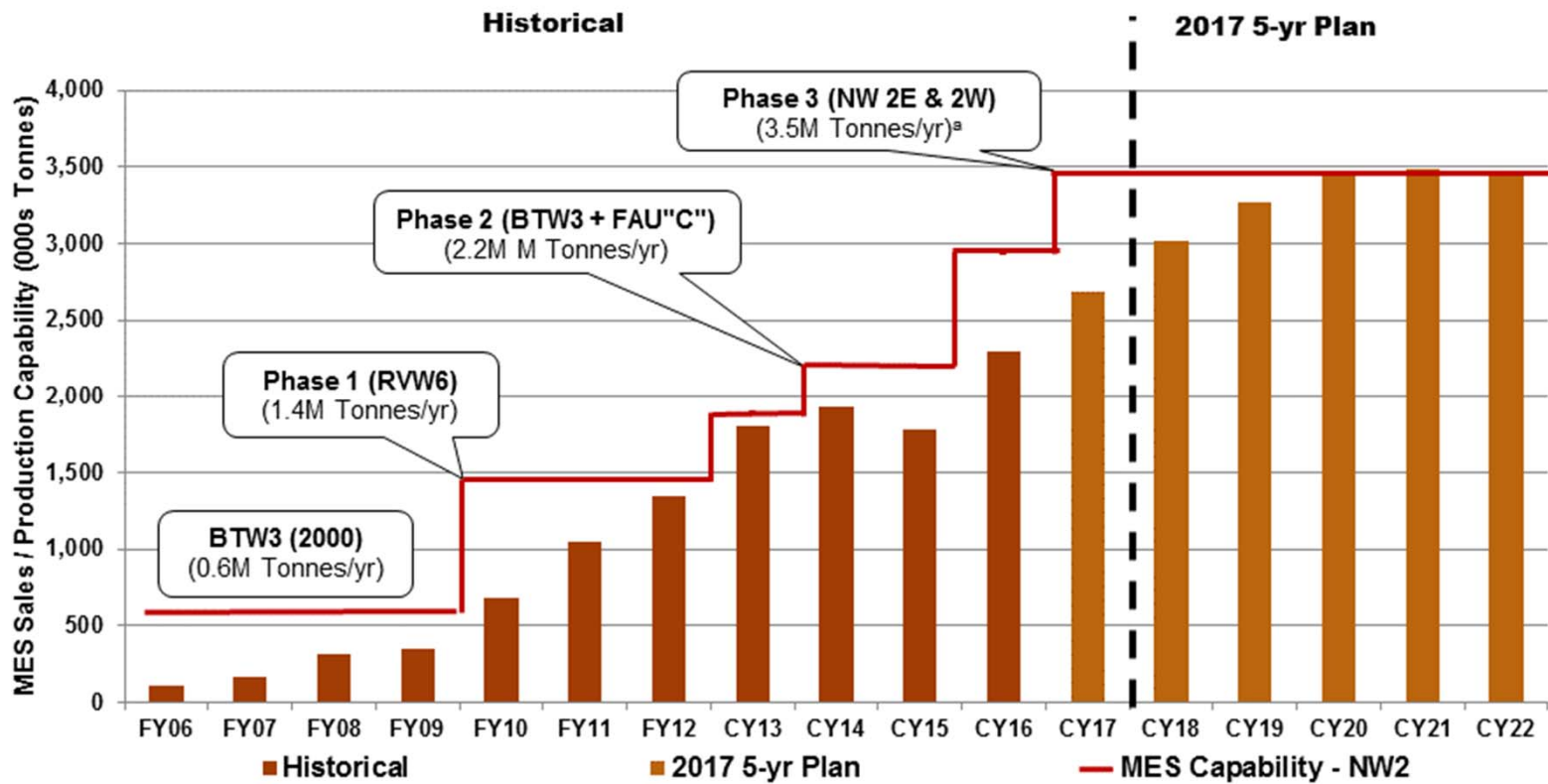


- A Name!
- First contracted volume October 2001
- Gate 4 commercial production Nov 2001
- Launch celebrations
- Extensive marketing roll out for North America

*"It's a slow process, but quitting won't speed it up!"*



# MicroEssentials History

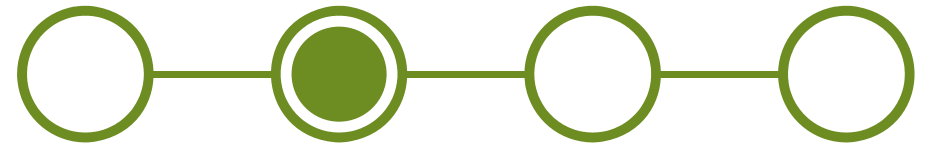


Source: Mosaic Product Management 5-Year Forecast (as of 10/04/17)





# Funny Failures



- Failed production run—1500 tons produced
- Celebrated Failure! (color, grade, operating rate, etc.)
- Pricing conflicts
- Storage challenges
- Operating rates and scheduling
- Copy cat products and patent fights
- Further engineering improvements

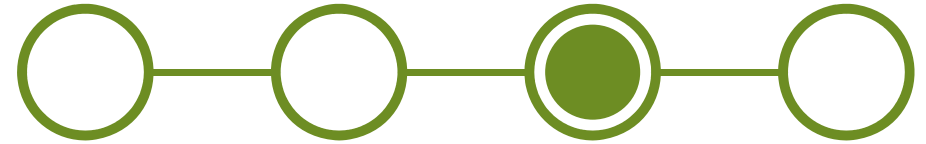
*“Failure is a part of innovation – perhaps the most important part.”*



**Curt Richardson**  
OtterBox founder and CEO



# Not so Funny Failures



- Dust
- Customer conflicts
- HPE's (High pressure excursions – Explosions)

*"I haven't failed – I've just found 10,000 ways that won't work."*

**Thomas Edison**  
American Inventor



# Lessons Learned

- Team lacked clear understanding of the *process* of innovation
- Team members not systematically chosen
  - No lab, logistics, Technical Sales
- Significantly under estimated operating difficulty
- Under estimated project costs tremendously
- Marketing came late in process, nearly missed value capture
- Agronomic research was under invested
- Underestimated the cultural shift required

***Even Stage Gate doesn't eliminate problems***





# Why it Worked?

- We protected our intellectual property
- We followed the Stage Gate process
- We focused on customer solutions rather than our capabilities
- We invested heavily in agronomic research to prove value creation
- We broke the commodity mindset and worked on specialized marketing, logistics, and training programs
- Targeted a premium pricing approach
- The power of aligned incentives

***Sheer determination by team members!***



# Exciting Recognition for our Innovation

> you are the key to innovation



meet the team

A Chairman's Innovation Award Winner: MicroEssentials™ Product Line, Cargill Phosphate Production

**Cargill**  
Sustaining Ideas. Sustaining People.™

**Mosaic**

# MicroEssentials Today?

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**3** PRODUCTION  
PLANTS

**Aspire**<sup>®</sup>

ANNUAL VOLUMES

**3M**  
**METRIC**  
**TONNES**



**3.5M**  
METRIC TONNES  
BY 2020





