



**Minbos**  
Resources  
Limited

**ENHANCING CABINDA**  
**PHOSPHATE ROCK**

ANGOLAN MINING CONFERENCE

November 2019

# ENHANCED PHOSPHATE ROCK (EPR)



## LOW-COST/HIGH-YIELD FERTILIZER

A small amount of WSP makes Phosphate Rock soluble.

## HIGH SOLUBILITY OPPORTUNITY

Suitable for crops and soils within Angola and the wider Congo Basin (Pop. 75M & 70% employed in agriculture)

## AGRONOMIC & ENGINEERING TRIALS

Greenhouse and granulation pilot trials completed in the USA. Field trials underway in Angola.

## SIMPLE MINING WITH SUBSTANTIAL RESOURCE


7Mt of Cacata ore can supply Angola for 30yrs

## COMMERCIAL EXPERIENCE

Minbos has invested more than \$20M on phosphate projects in the Congo Basin and will submit a tender for the Phosphate Rock concession in Cabinda.




# CABINDA PROJECT




**Phosphate Rock**  
Mined, stockpiled and dewatered at Cacata.



**Truck Transport** from Cacata to Porto de Caio granulation plant.



**Granulation Plant** mixing Phosphate Rock with WSP fertilizer and micronutrients



**Barge** to regional agricultural ports.



**Crop Nutrient** support services for local, farmers, soils and crops.



**NPK Blending Plants** mix EPR with nitrogen and potassium nutrients.

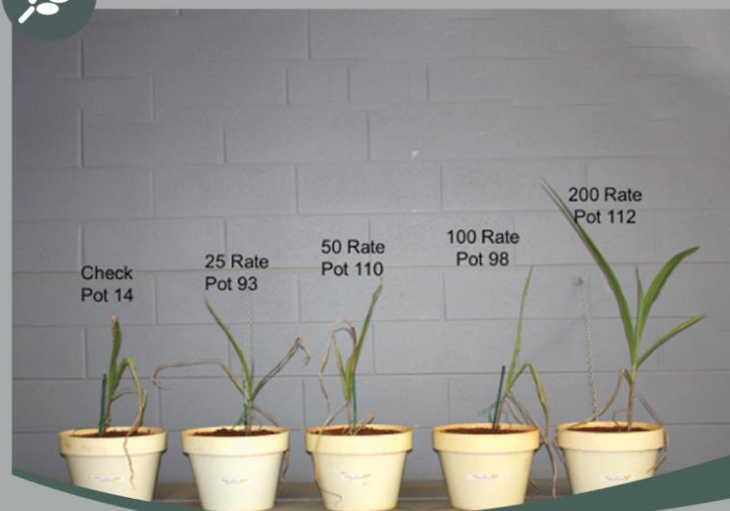
## Enhanced Phosphate Rock

## RAW CABINDA PHOSPHATE ROCK

- Raw phosphate rock
- Unsuitable for use in Angola or wider Congo Basin
- Low-cost
- Low-solubility
- Export-only



100% Phosphate Rock

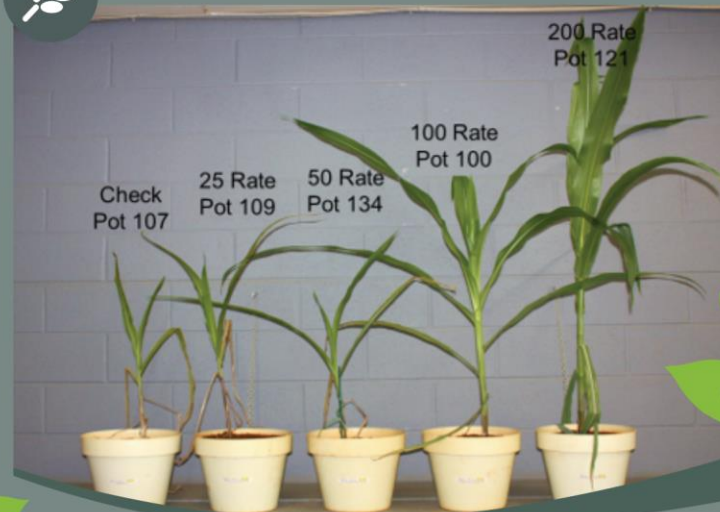


## IMPORTED FERTILIZER

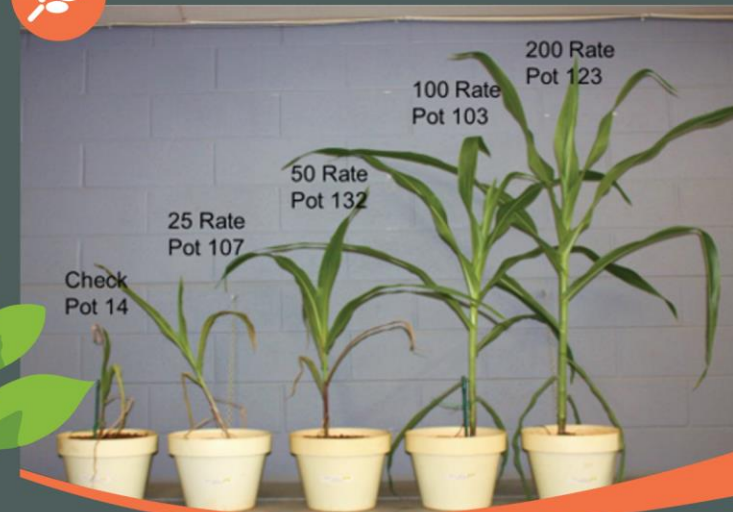
- 100% water soluble phosphate fertilizer
- Fast-release phosphate
- High-cost
- High-solubility



100% WSP Fertilizer



85% Phosphate Rock | 15% WSP Fertilizer



## ENHANCED CABINDA PHOSPHATE ROCK

- ✓ 85% local phosphate rock/15% water soluble phosphate blend
- ✓ Low-cost
- ✓ High-solubility
- ✓ Suitable for Angola and wider Congo Basin
- ✓ Combines fast release WSP which solubilises slow-release phosphate rock



# INNOVATION AND COLLABORATION

## CORNERSTONE PARTNER - IFDC

- International fertilizer development Center (IFDC) Founded in 1974
- An international non-profit organization focused on increasing and sustaining food security and agricultural productivity in over 100 developing countries
- Specialised research laboratories and Greenhouses
- Bench-scale and pilot-plant units used in studies such as beneficiation of ores, acidulation and granulation of fertilizers
- Training facilities and Technical library



From Left: IFDC Soil Modeller Dr. Upendra Singh and Minbos CEO Mr. Lindsay Reed at the IFDC Muscle Shoals Campus (Alabama USA)

# IFDC GREENHOUSE TRIALS

## IFDC GREENHOUSE TRIALS

- 20 months of trials
- 4 crops - Winter wheat, maize, residual maize (Completed), Sorghum (Ongoing)
- Various ph. soils - 4.8 to 7.8
- Trials are ongoing

## INTERIM RESULTS/FINDINGS

Angolan soils, crops and climate are ideally suited for Enhanced Phosphate Rock which prefers moist acidic (low-pH.) soils and staple crops such as cereals and legumes

IFDC Field trials in Nigeria and Kenya with the similar Phosphate Rock yielded similar results to the Cabinda greenhouse trial





# GRANULATION PLANT DESIGN

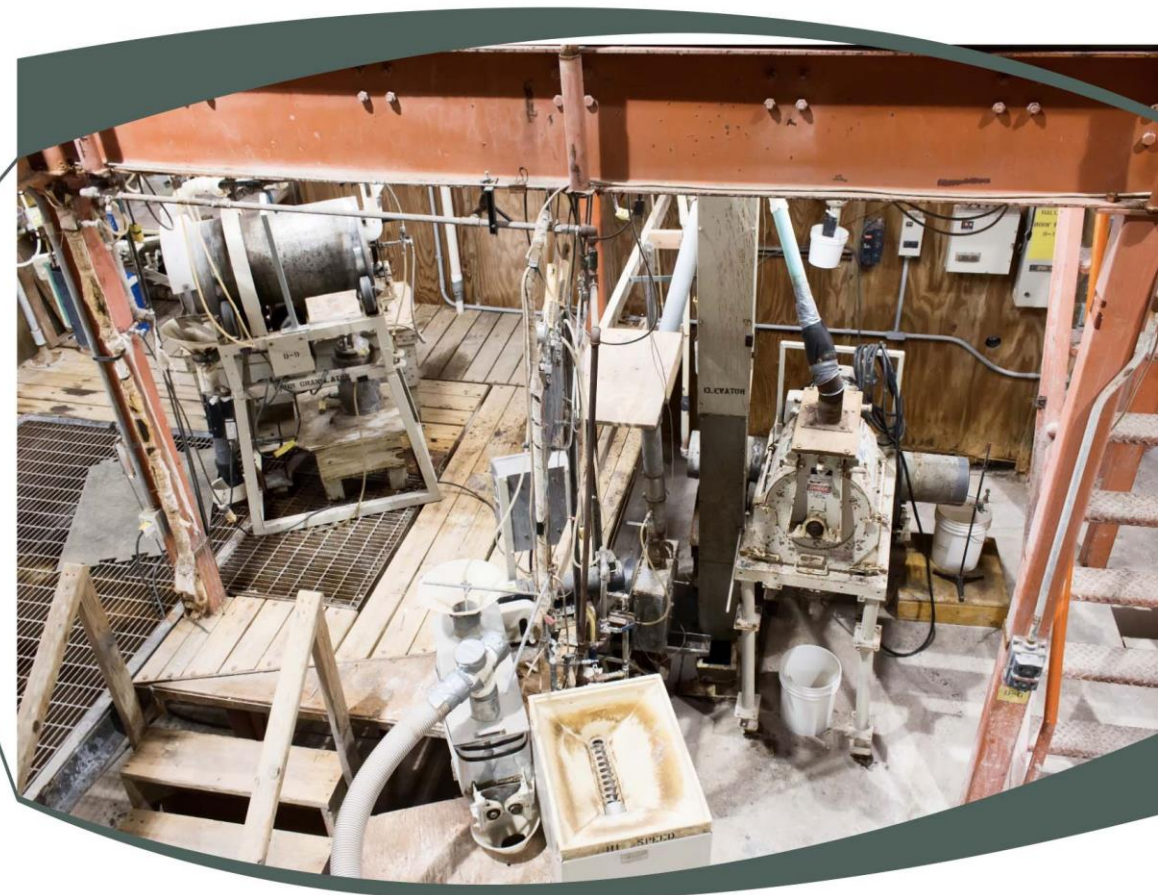
## SUCCESSFUL COMPLETION OF GRANULATION TRIALS

500kg's of Cabinda phosphate rock was successfully processed at the IFDC's world-class trial plant in Alabama (USA).

## PROCESSING AND PLANT DESIGN

Granulation testing to produce plant flow design including:

- Engineering drawings
- Operating inputs
- Water, power, gas and binding agent
- Product quality parameters to international standards



## ANGOLA FIELD TRIALS COMMENCING Q4 2019

500kg of Enhanced Phosphate Rock has been produced and will be used for field trials in Angola this year.

# ENHANCED PHOSPHATE ROCK IN ANGOLA

## RIGHT PRODUCT

Most effective in Angolan soils, climate and crops

## RIGHT PRICE

Cabinda Phosphate Fertilizer production cost advantage

## RIGHT PLACE

Angolan and regional Congo Basin markets

## RIGHT PROMOTION

Collaboration with IFDC and Government to grow Angolan agriculture

## VISION

To build a nutrient business that stimulates economic and policy development in agricultural inputs, farming and food markets, underpinning national food security for the next century.





# DISCLOSURES

## COMPETENT PERSON

The information in this presentation that relates to the Exploration Results and Phosphate Resources, Production Targets and Cost Estimation was extracted from Minbos's ASX announcement dated 6 June 2012, 16 October 2013 and 5 December 2013 respectively entitled "Cacata Project – Scoping Study Produces Positive Results" "Minbos announces resource upgrade for the Cabinda licenses in Angola" and "Cabinda Resource Additional Information" and the Minbos Annual Report for the years ended 30 June 2014 to 30 June 2016 and Half Year Reports for the periods ended 31 December 2014 and 31 December 2015 which are available to view on the Company's website at [www.minbos.com](http://www.minbos.com).

The information in the original ASX announcements and the Annual Report and Half Year Report that related to Exploration Results and Phosphate Resources is based on information compiled or reviewed by and approved for release by Ms Kathleen Body, Pr.Sci.Nat, who has over 20 years of experience in mineral exploration and mineral resource estimation. Ms Body is a Principal Consultant and Director of Redbush Geoservices (Pty) Ltd and contracted to Minbos. Ms Body is registered with the South African Council for Natural Scientific Professions (SACNASP) as a Professional Natural Scientist. She has sufficient experience in relation to the style of mineralisation and type of deposit under consideration to qualify as a Competent Person as defined by the "Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves" (The JORC Code 2012 Edition). Ms Body has consented to inclusion of this information in the form and context in which it appears.

Minbos confirms that: a) it is not aware of any new information or data that materially affects the information included in the original ASX announcements; 30 June 2016 Annual Report and 31 December 2015 Half Year Report b) all material assumptions and technical parameters underpinning the Phosphate Resource, Production Target and related financial information derived from the Production Target included in the ASX announcements, 30 June 2016 Annual Report and 31 December 2015 Half Year Report continue to apply and have not materially changed; and c) the form and context in which the relevant Competent Persons' findings are presented in this announcement have not been materially modified from the original ASX announcements, 30 June 2016 Annual Report and 31 December 2015 Half Year Report

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