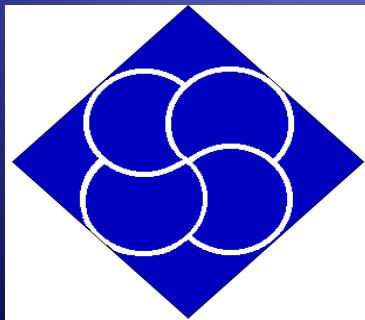
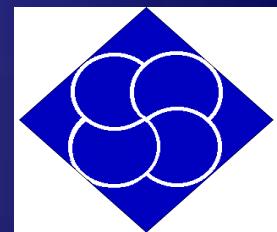
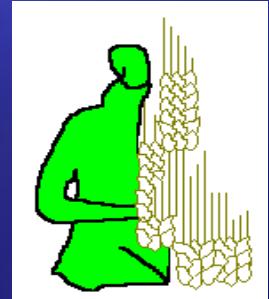


# THE TUNISIAN PHOSPHATE SECTOR



# The Tunisian Phosphate sector :

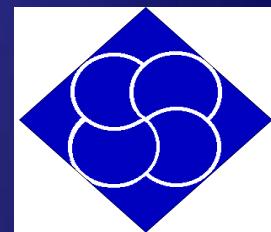
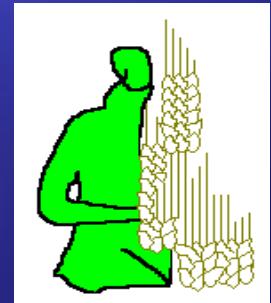
- Tunisia is a leading country, worldwide, as far as natural phosphate and mineral fertilizers are concerned. The phosphate sector, covering the mining, beneficiation and processing of the phosphate minerals, presents a vital interest to the country and plays a significant role in the national economy.
- This sector has an international reputation for the following reasons:
  1. More than hundred years of phosphate mining and beneficiation,
  2. More than sixty years of expertise in phosphate industry and processing.



# The Tunisian Phosphate sector profile:



- Comprising the main companies:
  - **Compagnie des Phosphates de Gafsa CPG,**
  - **Groupe Chimique Tunisien GCT,**
  - **Tuniso-Indian Fertilizers TIFERT,**
  - **Tunisie Engineering & Construction Industrielle TECI.**
- Number of employees: 15,000
- Phosphate rock production: 8 Million Tons
- Main products: MGA, DAP, MAP, TSP, AN
- Contribution to GDP: 2 %



Tunisia is a leading country, worldwide, as far as natural phosphate and mineral fertilizers are concerned. The phosphate sector presents a vital interest to the country and plays a significant role in the national economy. This sector benefits from a large geographical spread and its products are exported to nearly 50 countries in 5 continents.



The three producer pillars of the phosphate sector in Tunisia are the following:

❖ CPG



❖ GCT



❖ TIFERT



- \* Since 1897 and during the first fifty years of its activity **CPG** exported all its phosphate rock production.
- \* After this period, Tunisia successfully developed the activity of phosphoric acid and mineral fertilizer production by investing heavily into **GCT** and most recently **TIFERT**.

In 2010, the Tunisian phosphate industry was fifth among the international operators in the field.

And Natural phosphate and fertilizer derivatives (Phosphoric acid MGA, DAP, TSP, DCP...) are exported to nearly 50 countries in 5 continents.

The phosphate sector is currently holding an important position within the Tunisian economy both in labor level and in trade balance and contributes to nearly 2 % of the GDP of the country.

## Tunisia Phosphate sector main assets:

- Extensive reserves of phosphate rock (more than 800 million tons) 100 years,
- Phosphate rock mining experience of more than one century (113 years),
- Evolution of mining methods from underground to open cast,
- Very early development of local processing for more than 60 years (63 years),
- Modern technology and efficient plants,
- Diversified & balanced line of products,
- Research and development programs,
- Partnership and technical cooperation as a strategic policy for development.



COMPAGNIE DES PHOSPHATES DE GAFSA

# CPG Profile:

<b>Creation year</b>	<b>1897</b>
<b>Registered capital MDT</b>	<b>268</b>
<b>Employees</b>	<b>6796</b>
<b>Senior officers</b>	<b>423</b>
<b>Production capacity MT (2010)</b>	<b>8,5</b>
<b>Turnover M DT (2010)</b>	<b>783</b>
<b>International Producing Ranking (2010)</b>	<b>Fifth, 5<sup>th</sup></b>

## MAIN HISTORIC EVENTS:

- **1885**: Discovery of phosphate deposits by Philippe Thomas in the northern hill side of Jbel Thelja near Metlaoui
- **1897**: Compagnie des phosphates et de chemin de Fer de Gafsa was created
- **1899**: Opening of the first underground mine of Metlaoui,
- **1904**: Opening of the underground mine of Moulares,
- **1920**: Foundation of Compagnie tunisienne des phosphates de JBEL Mdhilla,
- **1969**: Merge between Compagnie des phosphates et de chemin de Fer de Gafsa and Compagnie tunisienne des phosphates de JBEL Mdhilla,
- **1976**: The merging of the different phosphate companies to form **THE COMPAGNIE DES PHOSPHATES DE GAFSA**
- **1978- 2002**: eight (08) opencast mines came on stream.

**CPG** is a state-owned company and has been active in Phosphate mining for more than a century.

CPG operates eight open cast quarries (08). Annual production of merchant phosphate in 2010 reached 8 millions tons, placing Tunisia the fifth in the world for phosphate production according to the US geological survey.

The activity of ore beneficiation and production is well developed and steadily improved.

Most of CPG production (90%) is transformed by GCT and recently TIFERT into phosphoric acid MGA and mineral fertilizer products.



**CPG works presently 8 opencast mines located in the following five phosphate fields:**

- ▲ Metlaoui Kef Schfaier
- ▲ Metlaoui Kef Eddour
- ▲ M'Dhilla
- ▲ Moulares
- ▲ Redeyef

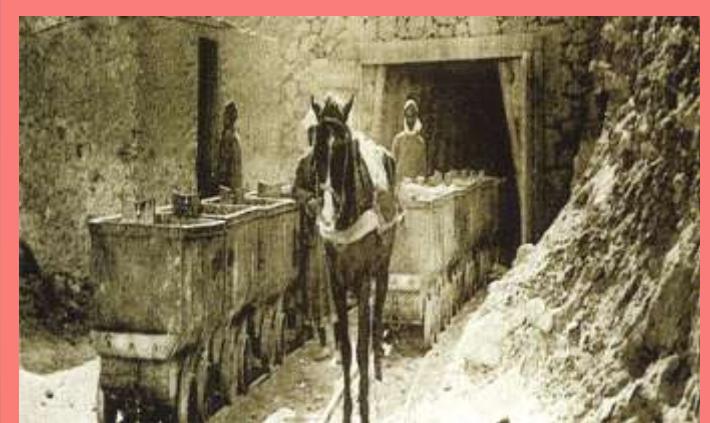
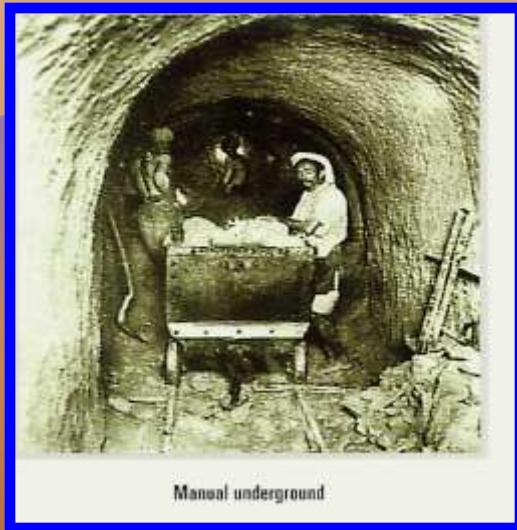
# Phosphate rock discovery



Philippe Thomas

- Phosphate Rock was discovered in the hillside of JEBEL THELJA in April 1885, in Metlaoui, South Western part of Tunisia in the arid pre-Saharan zone,
- Extensive geological explorations revealed the existence of intensive phosphate formations South and North West of the country.

# Phosphate Rock mining



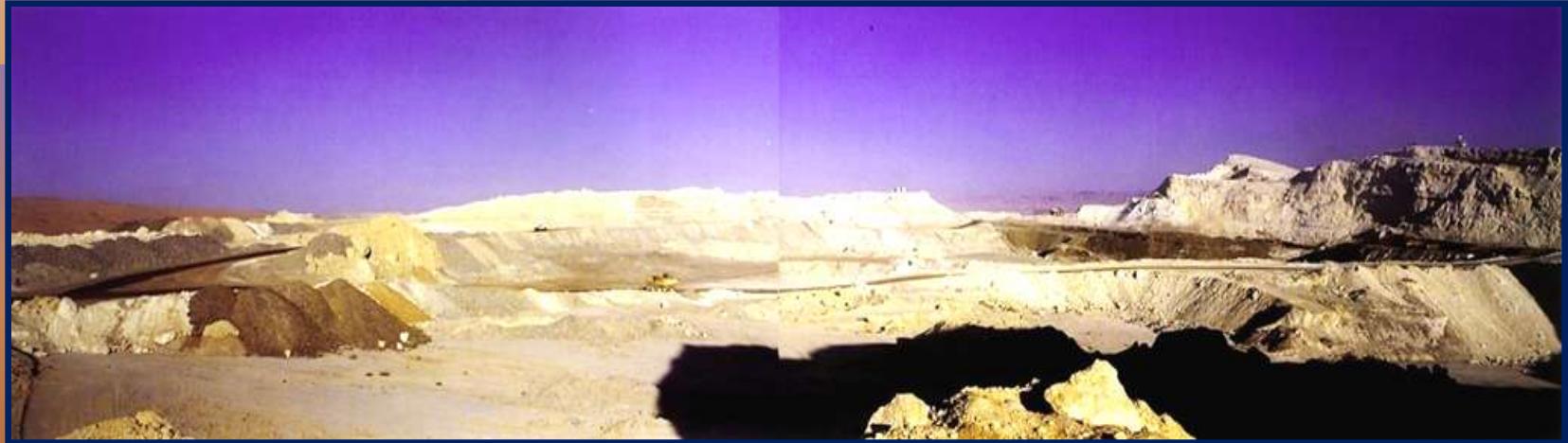
**1899 : First Underground Mine**

- ❖ In 1886 the first excavations took place in Metlaoui
- ❖ In 1899 the first underground mine was in production
- ❖ By year 1900 rock production reached a level of 200,000 tons.
- ❖ In 1930 with 3 million tons of production, Tunisia was the first world Phosphate Rock exporter.

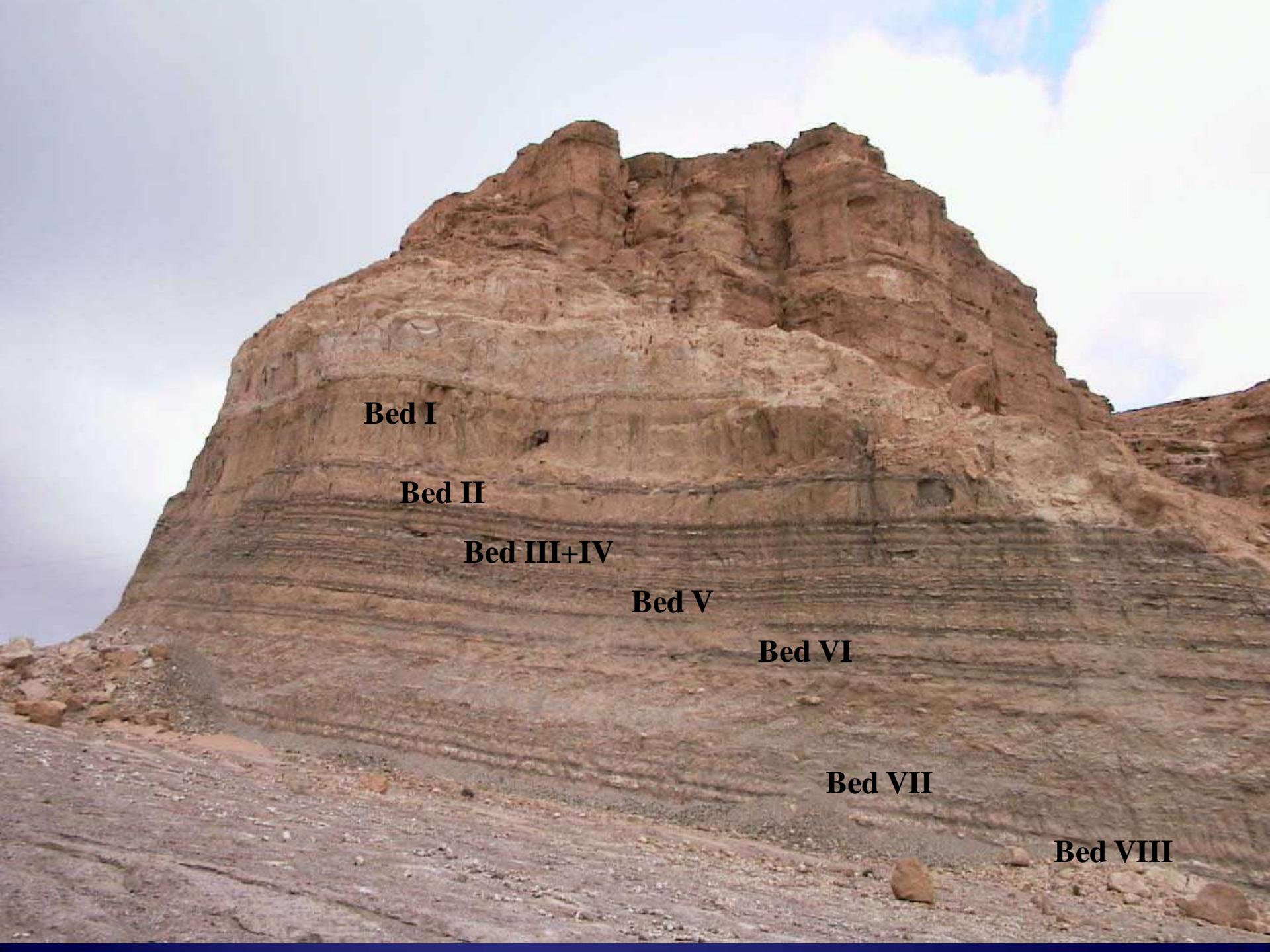


**1896 : Rail transport of phosphate**

# Opencast mine



- ❖ All the south Tunisian deposits are located at the same geological level, they are composed of 8 stratified layers.
- ❖ The total potential layer thickness varies from 8 to 12 meters.



**Bed I**

**Bed II**

**Bed III+IV**

**Bed V**

**Bed VI**

**Bed VII**

**Bed VIII**



**1978 : First Opencast Mine: removal of the upper layer covering phosphate rock deposits**

## **CPG works presently 8 opencast mines located at:**

Kef Schfaier, Tables of Metlaoui, Kef Eddour Central, Kef Eddour West, Jallabia, M'Zinda, Redeyef and Moulares.

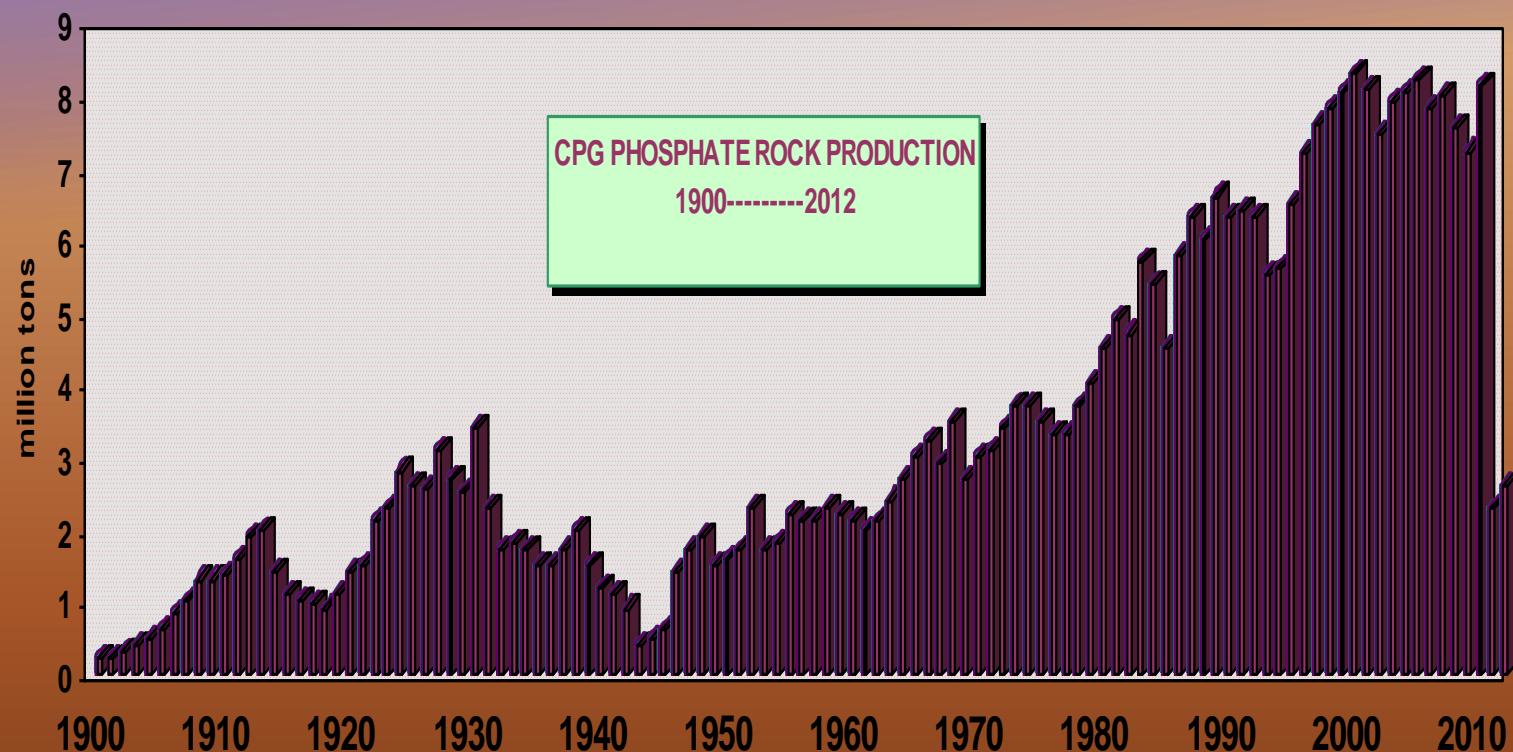
Merchant grade phosphate rock is produced by the following beneficiation plants:

- ❖ Metlaoui (4 plants) with nominal capacity of 2.8 million tons
- ❖ M'Dhilla (3 plants) with nominal capacity of 2.5 million tons
- ❖ Moulares (1 plant) with nominal capacity of 1 million tons
- ❖ Redeyef (1 plants) with nominal capacity of 0.9 million tons
- ❖ Kef Eddour (1 plant) with nominal capacity of 1.9 million tons



# CPG Beneficiation plants



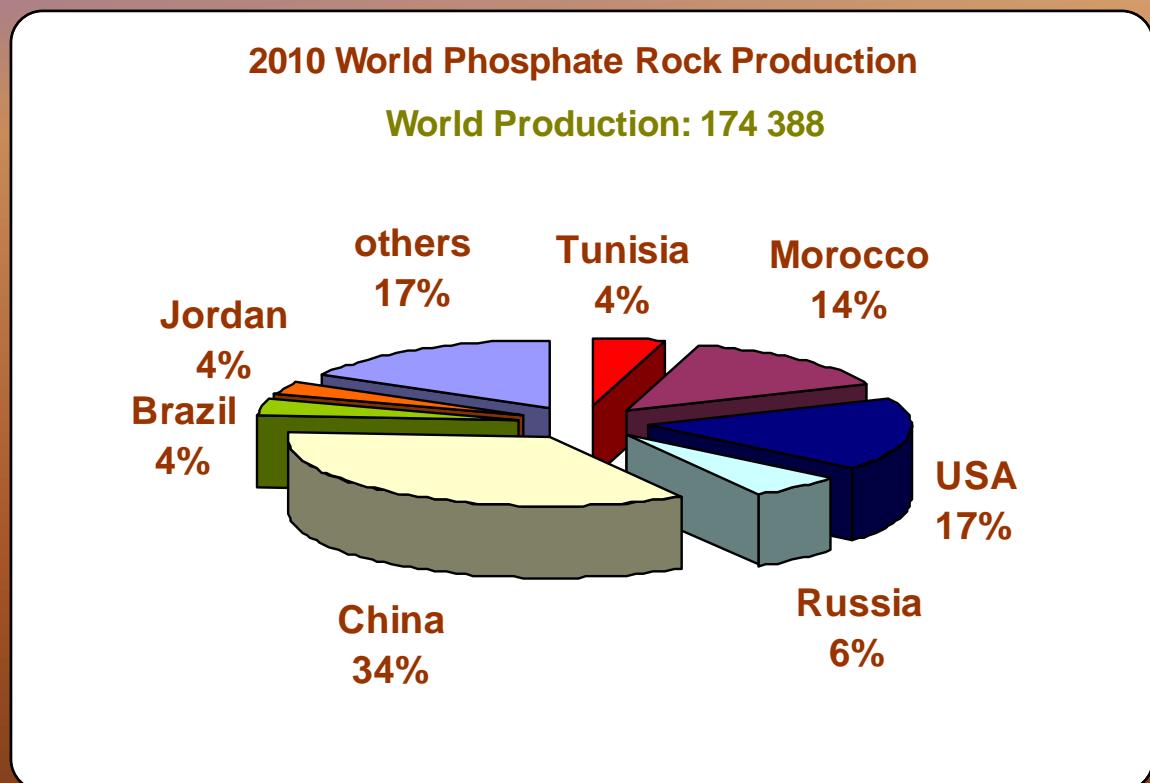


# CPG Production Overview (1900-2012)

# CPG World position

## Phosphate rock 2010

TUNISIA IS  
THE FIFTH  
WORLD  
PRODUCER  
OF PHOPHATE  
ROCK(4%)





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TELEFAX NO. 205-381-7408

## STATEMENT

### Potential of Gafsa (Tunisia) Phosphate Rock for Direct Application to Acid Soils

During 1994-95, the agronomic effectiveness of Gafsa phosphate rock (PR) as influenced by soil properties and crop species was studied by the International Fertilizer Development Center (IFDC) at IFDC Headquarters in Muscle Shoals, Alabama, U.S.A., on the basis of samples provided by Compagnie des Phosphates de Gafsa (CPG). The study included several greenhouse experiments involving different PR sources varying widely in reactivity.

The results of this study showed that among all the PR sources tested in the study, Gafsa PR was the most effective PR source in increasing crop yield for soils, crop species, and conditions of this study. The PR is a highly reactive material due to its high degree of carbonate substitution for phosphate in apatite structure. It was also found that finer grinding of Gafsa PR to -100 mesh did not significantly increase its agronomic effectiveness. Therefore, the unground Gafsa PR (48% -1.18+0.15 mm and 52% -0.15 mm) can be used in direct application to acid soils.

Gafsa PR, ground and unground, has been tested according to IFDC's chemical and agronomic assessments which allow the PR to be classified as a highly reactive and agronomically effective fertilizer for direct application to acid soils.

The results and conclusions related to this study are presented in the final report entitled "Evaluation of Gafsa (Tunisia) Phosphate Rock for Direct Application," issued by IFDC in September 1995.

  
Dr. Sen H. Chien  
Senior Scientist-Soil Chemistry  
Research and Development Division

9/21/95  
Date

  
Dr. Carlos A. Baamonde  
Director  
Research and Development Division

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During 1996-98, a greenhouse study was conducted by the International Fertilizer Development Center (IFDC) at its Headquarters in Muscle Shoals, Alabama, USA. The objective of this study was to investigate the effect of PR reactivity on NPK uptake and yield of different crops.

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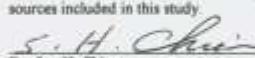
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Yield	N Uptake	P Uptake	K Uptake
5 to 29 fold-increase	5 to 22 fold-increase	7 to 66 fold-increase	6 to 33 fold-increase

Relative agronomic effectiveness (RAE %) of Gafsa PR and other PR sources

PR Source	Yield	N Uptake	P Uptake	K Uptake
Unground Gafsa PR	100	100	100	100
Less Reactive Ground PRs	21.77	32.78	23.64	24.81

These findings show that the highly-reactive Gafsa PR used as a direct application P fertilizer substantially increases NPK uptake and yield of the crops mentioned above. Its relative agronomic effectiveness (RAE) is significantly higher than that of the less reactive ground PR sources included in this study.

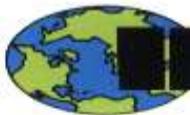
  
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IFDC statement reports illustrating the high reactivity and agronomical effectiveness of CPG phosphates as fertilizers for direct application.



# IFDC

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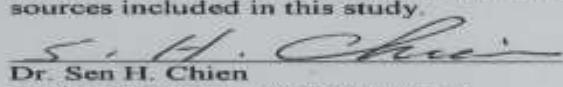
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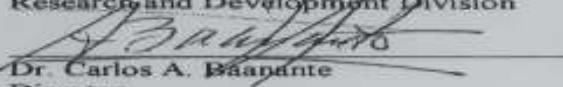
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# **Measures to protect the Environment:**

- ✓ Building dikes for liquid effluent accumulation and avoid diverting effluents in Oueds near the beneficiation plants
  - Period of achievement: **2004-2006**
- ✓ Collection, treatment and recycling of water from beneficiation plant effluents,
- ✓ Separation and storage of clays from plant effluents
  - Period of achievement: **1998-2005**
- ✓ Developing green areas
  - Period of achievement: **2004-2007**



# المجمع العربي-الصيحي التونسي

## GROUPE CHIMIQUE TUNISIEN



# GROUPE CHIMIQUE TUNISIEN