

Research and Development Call for projects for Phosphate

Conscious about the role of promoting the national scientific research in general and that of phosphate in particular, the Ministry of Higher Education, Scientific Research and Professional Training (MESRSFC) and OCP Foundation jointly launch, research and development call for projects for phosphate where the implementation, the evaluation and the scientific follow-up, are confined to the National Center for Scientific and Technical Research (CNRST) and OCP Foundation. An envelope of 90 million DHs will be dedicated to funding the accepted projects within the framework of this call for projects.

This call for projects, benefit from the financial assistance of OCP Group and aim at funding research projects focusing on priority themes that were identified during the first national conference on Research and Development for phosphates. These themes include the following:

1- Geology of Phosphates:

- Sedimentology, mineralogy, geochemistry and sequential stratigraphy of phosphates.
- Mapping (Cartography) and recognition of the phosphate related cases outside of the four main already identified ponds.
- Exploration of raw materials used in the phosphate industry (sulfur, potassium hydroxide, clays)
- New exploration technologies: geophysics ...
- Study of fossil bodies associated with phosphates (phylogeny, Evolution, biostratigraphy, paleogeography, paleoecology, correlations).

2- Extraction:

- Mining optimization.
- New extraction methods (discovered / underground passage).

3- Treatment and enrichment of phosphates:

- Development of new technologies / processes for phosphates enrichment.
- Valuation of the mining discharges
- Development of new reactives / additives for phosphates enrichment.
- Thickening and filtration of muds
- On-line Analyses
- Modeling, simulation and optimization of processes.

4- Valuation and chemical transformation of phosphates (processes and products, acids, fertilizer):

- Development of valuation processes of phosphate ores (phosphoric acid, fertilizer)
- Development of valuation processes of the co-products (phosphogypse, Fluorine)

- Valuation of elements presenting a potential
- Thermodynamics and kinetics of transformation operations
- Thermodynamics and kinetics of crystallization
- Speciation and reactivity of the impurities contained in the industrial phosphoric acid
- Processing and purification of the phosphoric acid
- Development of new fertilizer formulas.
- Development of manufacturing processes of ammonia (outside of conventional processes: biomass)
- Modeling, simulation and optimization of processes.

5- Fertilization:

- Interactions of fertilizer, soil and plants in the Moroccan soil.
- Development of tools and approaches for phosphate fertilization for agricultural purposes
- Phosphate based fertilization in roads and forest zones.

6- Biotechnology:

- Development of biotechnological processes to improve the bioavailability of natural phosphates as well as the agronomic efficiency of fertilizers.
- Genetic interaction of plants – need in fertilizer.

7- Water:

- Development of new processes for waste water treatment (bio-flocculants and bioreactors with membranes), sea water and manufacturers.
- Integration of renewable energies in the processes relevant to the treatment and desalination of waters.
- Modeling and simulation.

8- Energy and energy efficiency:

- Integration of renewable energies in the processes relevant to the treatment and valuation of phosphates.
- Cogeneration and recovery of heat

9- Materials:

- Valuation of byproducts of phosphates industry in the field of construction material and civil engineering.
- Materials and phosphate based nano- materials intended for energy, photonic and magnetic applications.
- Materials and phosphate based nano-materials intended for medical and biological applications.
- Materials and phosphate based nano-materials intended for environmental applications.

10- Corrosion:

- Modeling of corrosion processes in the phosphate industry.
- Development of new protection solutions/means against corrosion and corrosion-abrasion.
- Development of non-destructive means of control as well as means for on-line monitoring of corrosion and the state of materials and equipments.
- Study of wear phenomena: by abrasion, and corrosion-abrasion.
- Anodic and cathodic protection systems and industrial paint.

11- Fine chemicals:

- Development of manufacturing processes of organic and inorganic phosphorous compounds with a market value.
- Application of phosphate and byproducts in industrial catalysis field.
- Application of phosphate and its byproducts in water and effluents treatment.

12- Humanities and Social Sciences:

- Economy of phosphate at the national and international level.
- **Sociology** of mining companies.
- Social and environmental responsibility of the company (enterprise).
- Construction and dynamics of territories (Geography and territory planning)

The following specific themes will be the main priority:

- a) Commercial strategy of the international mining companies (enterprises) in the phosphate field.
- b) The young people of a mining city (Khouribga and Benguerir).
- c) A city after a mining experience (Jerrada).

The call for projects will be organized the following way:

- Submission of pre-proposals (maximum 5 pages)
- Evaluation of the pre-proposals by the scientific committee of evaluation.
- Submission of detailed projects by the accepted pre-proposals.
- Evaluation of submitted projects by the same scientific committee of evaluation.
- Meeting of the steering committee that will compare the evaluations' results and decide the eligible projects and the funding granted.
- Announcement of the list of accepted projects.

The scientific evaluation and the selection of the submitted research projects in this call for projects will be done by a scientific committee of evaluation composed of national and

international experts. This evaluation will take into account the scientific interest and quality of the proposed projects, their innovative nature, their technological and/or socio-economic contribution and the scientific and technical skills and competences of the teams and participating laboratories.

After the project is accepted /selected, the steering committee will also examine the demanded equipments by the different research structures. The principle of mutualization of heavy equipments will be applied and the committee will decide whether to set the equipments locally, regionally or nationally.

The different partners will have to formalize their partnership by signing a cooperation agreement where the following aspects will be determined: the objectives of the project, the tasks that will be carried by each partner within the consortium, the budget granted to every entity and the transfer of knowledge as well as the results' publication and diffusion system. This will take into account the contract that will be established with OCP Foundation, OCP Group and CNRST.