#SWITCHTODIGITAL

2017 ANNUAL REPORT

OCP GROUP

His Majesty King Mohammed VI may God glorify Him

Contents

Preparing for the future

Message from the Chairman & Chief Executive Officer Mostafa Terrab

Year after year, OCP Group supports the world in its progress toward more prosperous, more sustainable, and more resilient agriculture. OCP is striving to bring innovative solutions to the fertilizer industry in order to adapt products to the needs of farmers, and our clients, while ensuring the sustainability of resources and preserving the environment.

Year 2017 was marked by the completion of the first phase of OCP Group's industrial development plan. The investments made focused on strengthening production capacity, aimed at doubling mining capacities and tripling processing capacities. These investments were also geared toward transforming the logistics chain through the use of the slurry pipeline technology, as well as toward achieving industrial and environmental excellence. This program led OCP Group to become the world leader among phosphate fertilizer-producing companies and demonstrated the Group's commitment to farmers by producing the right fertilizers, tailored to specific soils and crops. From 2018, OCP will be producing close to 12 million metric tons of phosphate fertilizers per year.

The Group also focused on its human capital and worked on developing talent and skills. All of the Group's innovation and R&D programs are concentrated at the Mohammed VI Polytechnic University, which is rising as the new hub for the Group's R&D, innovation, breakthroughs, incubation, industrial excellence, and the training of our resources through partnerships with the best academic and research institutions in the world.

Year 2017 was also a year of transition toward the industry of the future. The core of our business is changing and now incorporates a digital vision reinforced by the introduction of artificial intelligence, big data, and data analytics in industrial processes (remote controlling of machines through automation, predictive maintenance, etc.).

This digital revolution will enable the Group to boost performance, optimize costs, and offer high-quality and competitive products. It will also create value through new technology by creating innovative production and organization models in a perfect fit with our business lines.

All these transformations were echoed when we take a look at our consolidated positions in the market, particularly in the export market. This has strengthened the Group's positions in both mature and growing markets such as India or Sub-Saharan Africa. We have also doubled our market share in the fertilizer segment, up from 11% to 22% over the past 10 years. Overall, our revenues grew by 14%, supported by a 40% growth in rock revenues and 24% in fertilizer revenues. These figures reflected an increase in sales volumes offsetting the decline in prices and price volatility in general. In 2017, demand remained strong in key regions, in particular in Latin America and North America, and, especially, in Africa, where our exports increased by nearly 50%,

up from 1.7 million metric tons in 2016 to 2.5 million metric tons in 2017.

Our strong growth on our continent confirms our ambition to be the partner of African agricultural development through a differentiation strategy for OCP and its African subsidiary, OCP Africa. This strategy is resulting in a fertilizer product offer that is increasingly diversified and better suited to local soils and crops. We have tapped most of the growth in the Nigerian and Ethiopian markets. Other countries are also showing promising demand. Guinea, for example, has increased its average fertilizer consumption fivefold by working to make better use of fertilizers through the promotion of appropriate fertilization of its land in partnership with OCP.

Being aware of the need to apply best practices, and beyond the supply aspect, the Group is multiplying on-the-ground initiatives by using agronomy experts and supporting small farmers. Our strategic strengths and solid industry fundamentals will certainly support our innovation and development capabilities and optimize our margins in line with the growth in global demand. Together with our employees and many partners, we are transforming OCP and continuing to consolidate its position as a leader. We are preparing for the future and sparing no effort to build an agile and innovative company, capable of reinventing its production methods and ways of working together by placing people and digital technology at the very heart of its transformation. We truly believe that the success of this transformation will depend on harnessing every employee's potential in an environment where workplace well-being is conducive to everyone's development.

> We work at all levels to build an agile and innovative company, capable of reinventing its production methods and ways of working together by placing people and digital technology at the very heart of its transformation.
>
> *Mostafa Terrab, Chairman & Chief Executive Officer*

OCP, a committed Group

1

A Group committed to developing global agriculture

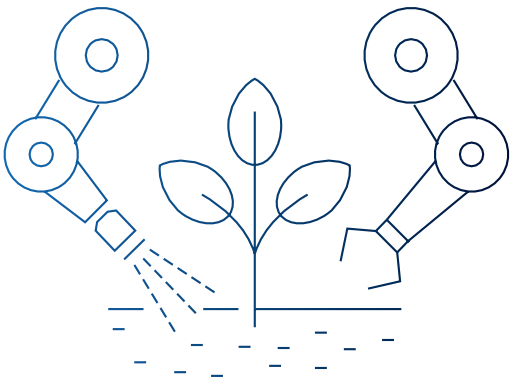
Fully committed, OCP Group offers a wide range of fertilizers adapted to different soil types and crops, which contribute to feeding a growing world population. Committed to serving agriculture around the world in the best possible way with a stronger presence in Africa, OCP places innovation at the heart of its strategy to support and foster progress for sustainable and resilient agriculture.

Vertical integration, cost control, diversification of the product portfolio toward high value-added fertilizers, industrial flexibility, commercial agility, and a transition to digital technology well under way: all these essential assets enable sustainable growth and create value for all stakeholders and regions where our Group operates.

With over 160 clients and an international presence, OCP Group holds 31% of the global market share of phosphate in all its forms and consolidates strong positions in the global market in terms of capacity and profitability.

One of the Group's strategic priorities is to continue to optimize its product portfolio, in particular by developing higher value-added, premium products to allow greater geographical diversification and gain access to growing markets, such as Africa. With the first wave of the Group's investment program delivered in 2017, the completion of many projects by 2027 will transform the Group's activities and consolidate OCP's leadership in the global fertilizer market.

> "OCP Group is entering the second wave of its capacity expansion plan and continues to develop its range of premium products specifically tailored to its markets."
>
> *Mostafa Terrab, Chairman & CEO*



14%

Consolidated revenues of MAD 48.5 billion, up 14% compared to the previous year, with a solid performance across all segments.

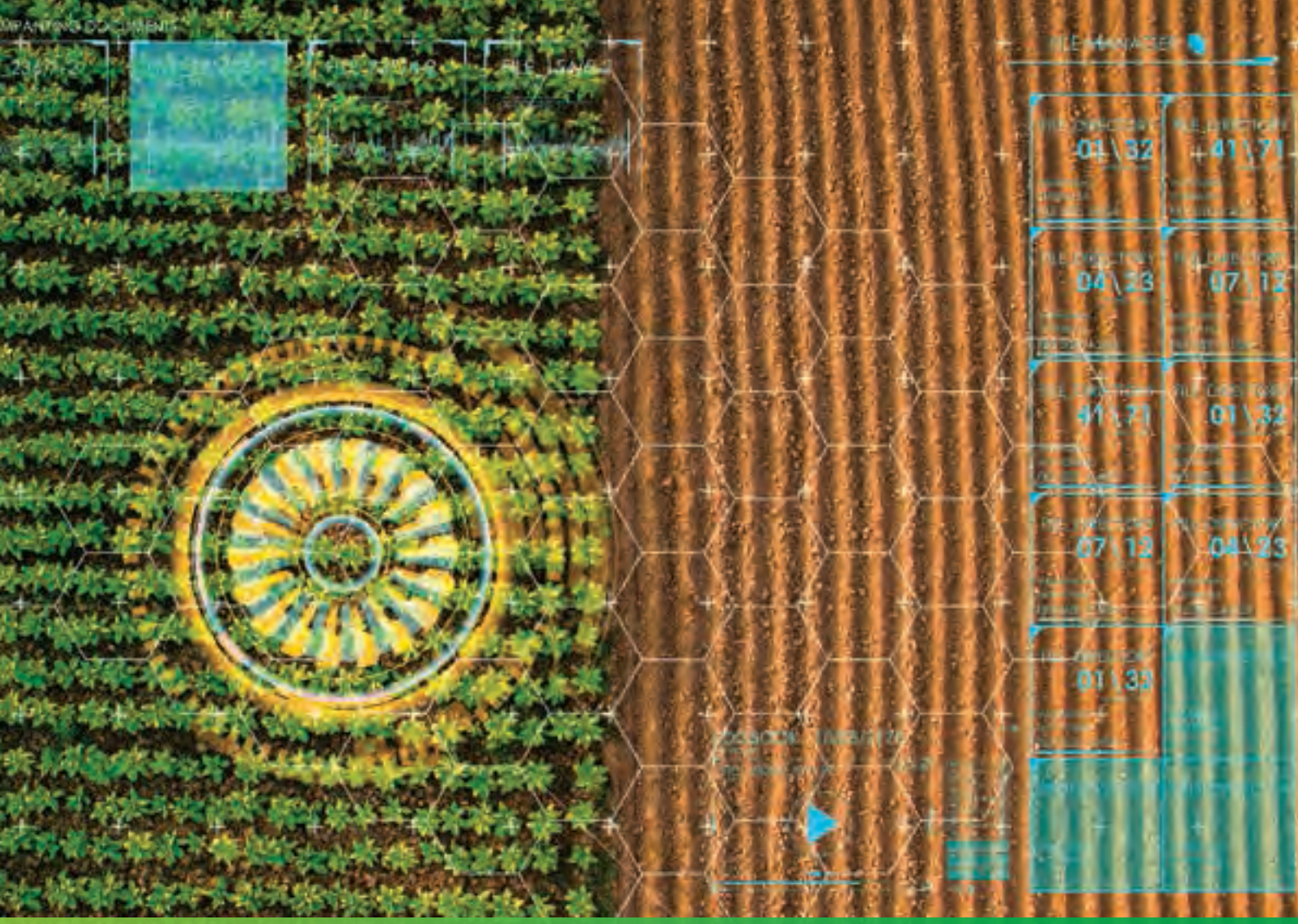
31%

Of the global phosphate market share*. Strengthened positions increasing production capacity throughout the value chain and diversifying the portfolio toward high value-added products, while maintaining margin levels among the highest in the sector.

50%

The Group's positioning will enable it to secure 50% of the incremental demand in the fertilizer market through targeted investments.

*In all its forms - IFA, 2017 preliminary statistics.



Strong resilience and consolidated positions

The Group's growth and resilience through the cycles are underpinned by its competitive advantages and the ambitious investment program in OCP's upstream and downstream activities between 2008 and 2027.

OCP has a unique position in the industry through a strong presence in the three stages of the value chain: phosphate rock, phosphoric acid and phosphate fertilizers. The ability to quickly adapt its product mix to produce different volumes of ore, acid, and fertilizers, and to adapt to market volatility and seasonality is a strong competitive advantage.

Diversification of the product/region/client portfolio, strengthening of industrial capacities, and the Group's sales force result in maximum agility and flexibility and reaffirm the Group's leadership.

Our ambition

Doubling mining capacity and tripling processing capacity

The first wave of achievements reinforces our vision and our confidence in the future, which is open to even greater development.

2017

Strengthened capacities with the commissioning of the third JFC III fertilizer production unit in 2017 and the launch of the fourth one planned for 2018.

> The ability to quickly adapt its product mix to produce different volumes of ore, phosphoric acid and fertilizers, and to adapt to market volatility and seasonality is a strong competitive advantage for our Group.

Consolidated revenues
48.5 billion MAD

EBITDA margin
26%

Nearly **200** billion MAD
in CAPEX (2008-2027)

More than **160** clients
across 5 continents

More than **30** subsidiaries
and joint ventures

Major achievements by **2027**

The agricultural industry's sound fundamentals and an ambitious and progressive investment program of nearly 200 billion dirhams between 2008 and 2027 offer prospects for value creation and controlled growth.

Fundamental assets

High quality reserves

The Group has one of the world's largest portfolios of varied and high-quality resources and reserves of up to 50 billion metric tons, representing more than 71%* of global reserves.

Vertical integration

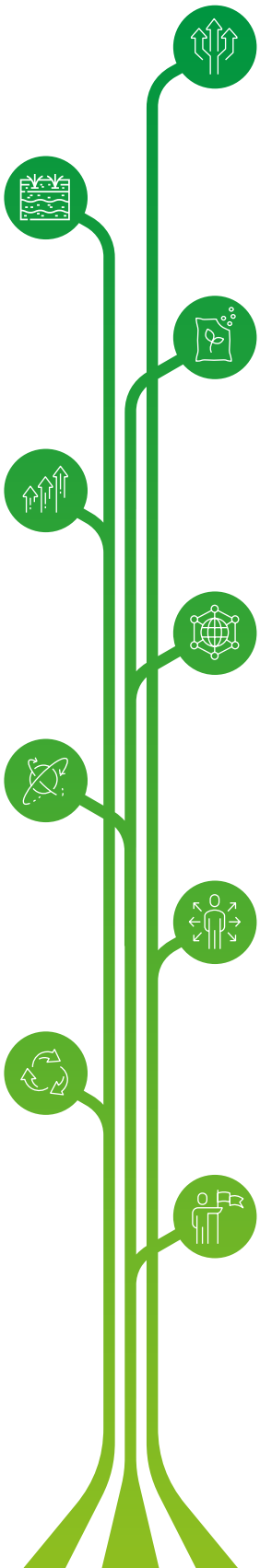
OCP is integrated throughout the value chain and has cutting edge industrial and technological facilities. This vertical integration enables industrial flexibility and the ability to adapt the product mix to meet demand levels in the three segments: rock, phosphoric acid, and fertilizers.

Industrial flexibility & commercial agility

This flexibility allows the Group to gear its production as well as sales to higher value-added products. OCP is therefore developing business models that are better adapted to the specific needs of certain regions, such as Africa where the Group, through its dedicated subsidiary, OCP Africa, is expanding its presence in the downstream value chain.

An optimal cost structure

A unique positioning procuring greater competitive benefits. The combination of an optimal cost structure, a diversified product portfolio, and a global presence serve to strengthen the Group's leadership.



A diversified portfolio

Strong positions in phosphate rock, phosphoric acid, and fertilizers. OCP plans to double its mining capacity and triple its processing capacity to 12 Mt by 2018, positioning the Group as a leader in all three segments of the value chain.

Premium products

The Group continues to develop innovative finished products to meet the needs of farmers with the production and export of more than 40 formulas in 2017.

Global reach

Thanks to its well-established industrial and commercial presence, the Group is present in all major markets and closer to the needs of producers and farmers, with more than 160 clients around the world.

Expertise & know-how

With nearly a century of expertise, OCP's employees constitute a pool of talent with technical and very specialized expertise in all areas related to mining and processing activities.

Governance

OCP's goal is to become the industry leader, ensuring long-term performance and acting in a responsible manner. Effective and transparent governance principles are essential to ensure stakeholders' confidence.

* Known to date according to the U.S. Geological Survey, January 2018.

Appropriate responses to the planet's major challenges

01 Population growth

The world's population has quickly grown to over 7 billion people and will exceed 10 billion by 2050*. Feeding a growing world population is one of the main challenges facing the world. However, this challenge is compounded by the threat of climate change, an increasing shortage of water, reduced arable land, etc. In this context, the Group works every day to improve soil fertility by using appropriate fertilizers and helping farmers increase their yields. A fair balance between better crop productivity and social and environmental objectives is now a prerequisite for a lasting response to global demand.

02 Price volatility

Sustained population growth during the next decades will increase demand for food. Climate change and the degradation of natural resources will hamper supply in terms of average production and production volatility. Upward pressure on prices could be the main problem for global food markets. Given these challenges, the use of better tailored and more effective fertilizers, while implementing management tools and precision agriculture, should help to reduce dosages, and, therefore, costs, and improve productivity while minimizing the environmental impact.

03 Soil productivity

Intensive farming has a direct impact on soil fertility. Soil erosion and the loss of topsoil lowers soil nutrient content and contributes directly to reducing crop yields. In this context, only the reasoned use of fertilizers, based on the principle of proper nutrient dosage, or the right fertilizer at the right place and time, can improve soil fertility and make it possible to attain productivity, profitability, and sustainability goals and maintain a productive natural environment. Another major challenge is the demand for agricultural water in most countries that is set to increase to over 70% of current levels if land productivity and water use are not improved.

04 Change in consumer habits

The demand for food will continue to increase not only due to population growth, but also to rising incomes and changing eating habits in relatively more prosperous economies, with increased consumption of meat, meat derivatives, and dairy products.

05 Development of bioenergy

Combating climate change is spurring research for new sources of renewable energy that emit less greenhouse gases. Demand for biomass energy is increasing and its use for non-food purposes is creating tensions regarding the environmental impact associated with their use. The development of bioenergy leads to changes in soil use and has an impact on fertilizer demand.

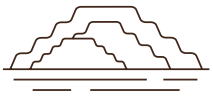
06 Climate change

Climate change increases pressure on the agricultural production system. There is a stark increase in the frequency and intensity of droughts and floods in certain regions of the world. This has an impact on the extent and productivity of irrigated and non-irrigated crops, and, in turn, on food prices and price volatility.

*Source : FAO

Key Figures

PHOSPHATE ROCK



Production
32.8 Mt*

Exports
11.1 Mt

Market share**
37%

PHOSPHORIC ACID

Production
5.7 Mt (P_2O_5)

Exports
1.9 Mt (P_2O_5)

Market share**
47%

PHOSPHATE FERTILIZERS

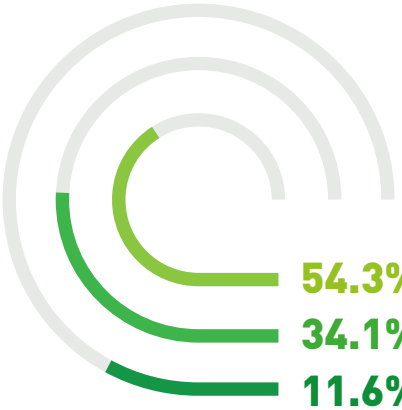
Production
8.6 Mt

Exports
8.1 Mt

Market share**
22%

Organic growth and a strong performance across all three segments.

* Million metric tons
** IFA 2017, Preliminary statistics (excluding purified and technical grade acid from China)



20,450
EMPLOYEES

EMPLOYEE BREAKDOWN
BY CATEGORY

54.3% Industrial Laborers and Office Workers

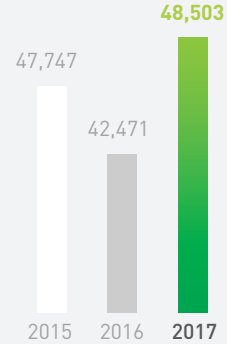
34.1% Technicians, Line Managers & Administrative Staff

11.6% Middle and Senior Management

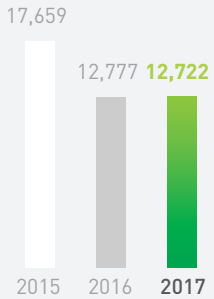
Revenues
have increased by nearly **50%**
for exports to Africa.

48,503 BILLION MAD
CONSOLIDATED REVENUES***

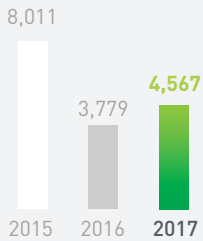
CONSOLIDATED REVENUES***
(IN MILLION MAD)



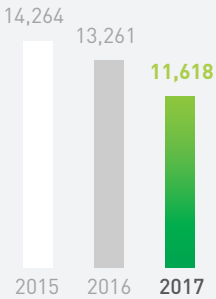
EBITDA***
(IN MILLION MAD)



NET PROFIT GROUP SHARE***
(IN MILLION MAD)



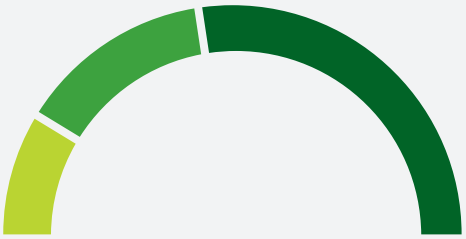
OPERATIONAL INVESTMENT***
(IN MILLION MAD)



*** IFRS-based figures.

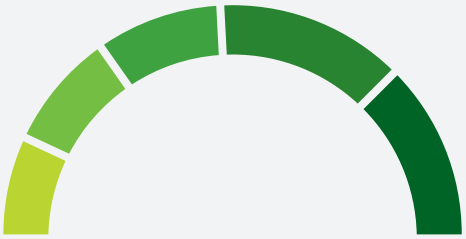
EXPORT REVENUES BREAKDOWN*

BY PRODUCT



- **19%** Phosphate rock
- **24%** Phosphoric acid
- **57%** Phosphate fertilizers

BY REGION



- **15%** Africa
- **16%** North America
- **17%** Latin America
- **27%** Europe
- **25%** Asia/Oceania

GLOBAL REACH

*FY2017 revenues - non consolidated FOB exports.

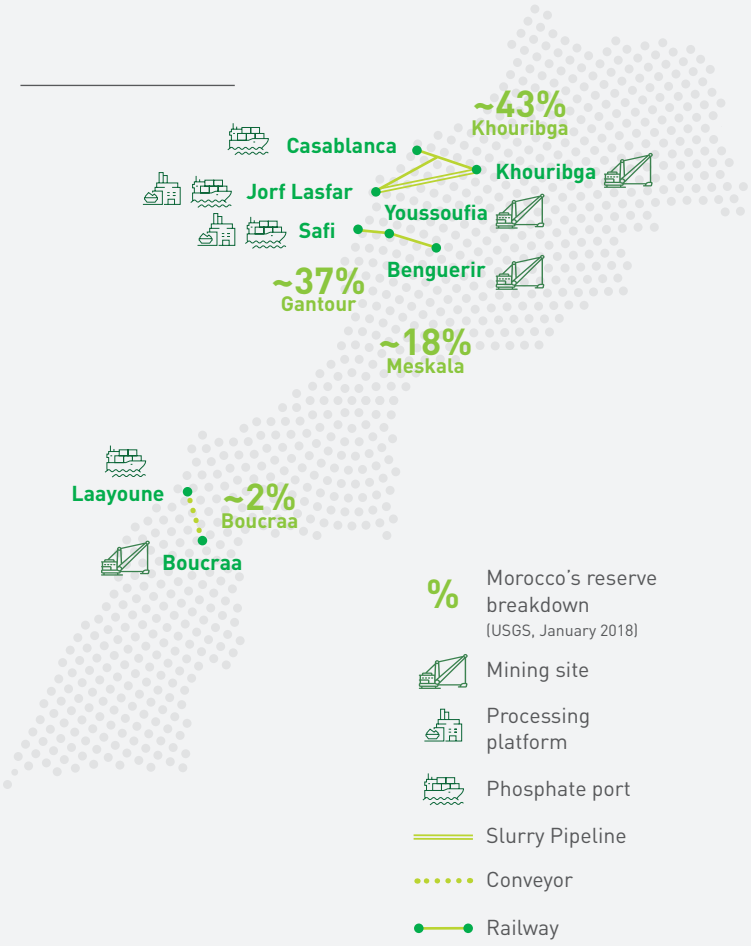
PRESENCE IN MOROCCO

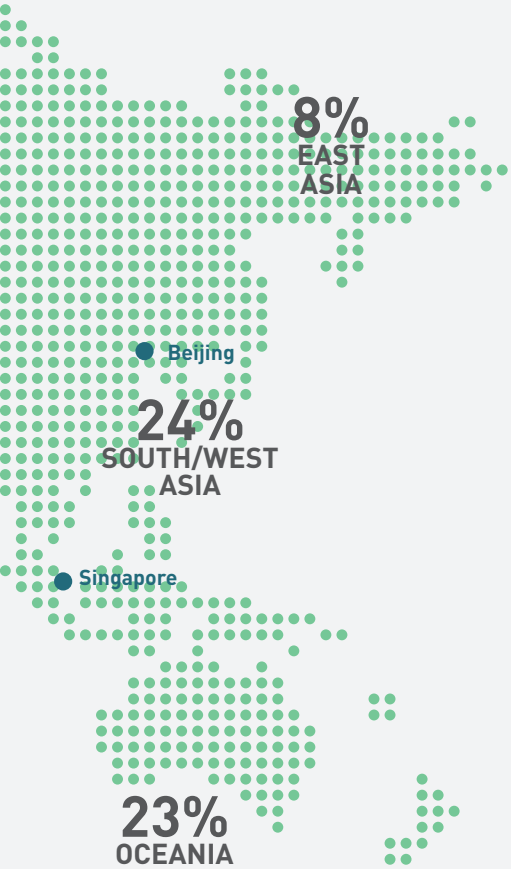
An **integrated group** throughout the value chain

4 mining sites

2 processing sites

4 phosphate ports





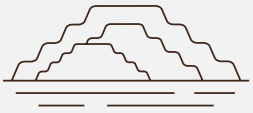
OCP further strengthened its **finished products'** positioning in 2017 while increasing its presence, particularly in **Africa**, **North America**, and **Latin America**.

The Group's **industrial flexibility** and **commercial agility** underpin the increasingly diversified product and region portfolios.

Overview of the industrial program for 2008 - 2027

In 2017, the Group continued to implement its industrial transformation plan. Launched in 2008, this strategy will mobilize a total of nearly MAD 200 billion of investment, and aims, from rock extraction to its transport and processing into fertilizer, to promote sustainable agriculture by doubling the Group's mining capacity and tripling its processing capacity by 2027, while reducing its environmental footprint.
A number of flagship projects were commissioned in 2017, and ongoing development projects progressed according to plan.

MINING & BENEFICIATION



KHOURIBGA – JORF LASFAR

- 2 new mines
- 2 new washing plants
- Adaptation of two existing washing plants to the Slurry Pipeline
- 1 new downstream plant for drying of phosphate rock at Jorf Lasfar (export)
- Extension of existing mines and washing plants

GANTOUR – SAFI

- Increased mining capacity in Gantour
- Construction of new beneficiation units in Gantour
- Adaptation of the Youssoufia washing plant to the Slurry Pipeline

BOUCRAA – LAAYOUNE

- New storage and handling capacities
- New washing plant with integrated flotation unit
- New drying plant dedicated to exports

DOUBLING OF CAPACITIES

TRANSPORT & UTILITIES

- Slurry Pipeline of 38 Mt per year capacity

- Slurry Pipeline
- Phosphoric acid pipeline

INCREASED INDUSTRIAL EFFICIENCY

PROCESSING

- 4 new integrated fertilizer production units (1 Mt DAP each) including Africa Fertilizer Complex
- 2 new granulation units (0.85 Mt DAP each)
- 4 new sulfuric acid lines
- 3 new phosphoric acid lines (JFC eq.)
- 4 new granulation units (1 Mt DAP each)

- New sulfuric acid and phosphoric acid lines on the Gantour - Safi axis
- Construction of new granulation (fertilizer) lines near the new port of Safi

- New processing complex
- New fertilizer plant (1 Mt DAP equivalent)

TRIPLING OF FERTILIZER CAPACITIES

PORT INFRASTRUCTURE

- New docks 1.5 km in length
- Rehabilitation and deepening of existing docks
- Installation of new loading/unloading equipment

- Construction of new docks with 8 loading berths
- Installation of new loading/unloading equipment

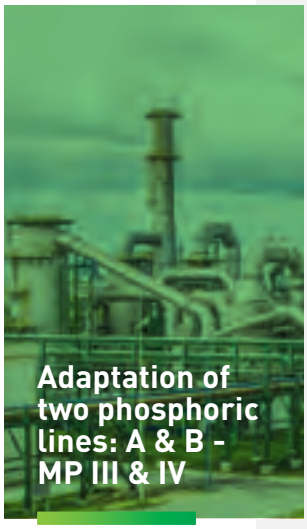
- New port adapted to processing operations

ENHANCEMENT OF LOGISTICS CAPACITIES

Industrial program - 2017 key achievements

Jorf Fertilizer Company III

CAPACITY
1 Mt/year



Adaptation of two phosphoric lines: A & B - MP III & IV

CAPACITY
0.5 Mt/year

Beni Amir Mine hopper

CAPACITY
5.5 Mt/year

Second downstream drying line

CAPACITY
10.5 Mt/year

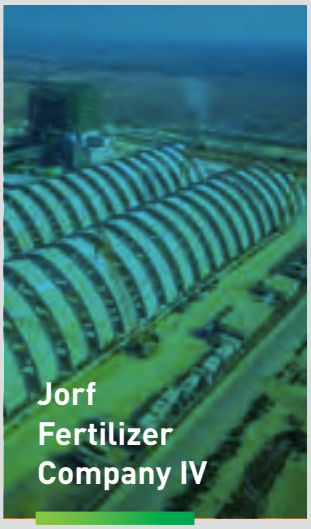
Expansion of the Laayoune Mine storage area

CAPACITY
125 kt/year

Rehabilitation of the Jorf Lasfar port infrastructure

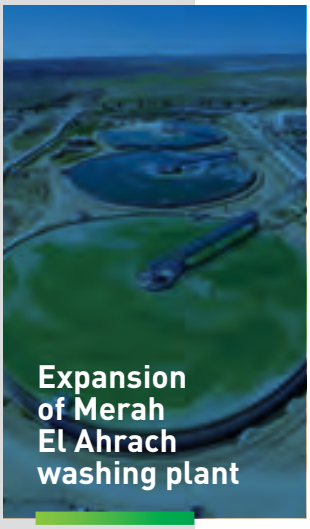
CAPACITY
37 Mt/year

Industrial projects planned for 2018



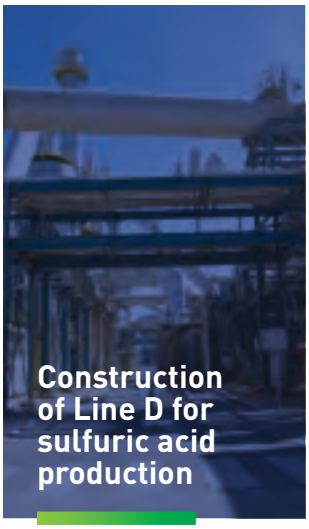
Jorf Fertilizer Company IV

CAPACITY
1 Mt/year



Expansion of Merah El Ahrach washing plant

CAPACITY
3 Mt/year



Construction of Line D for sulfuric acid production

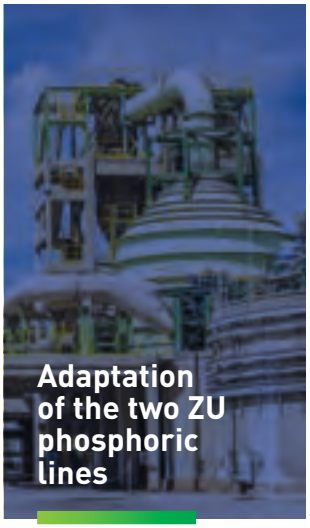
CAPACITY
1.5 mt/year

MAP Crystalline

CAPACITY
100 kt/year

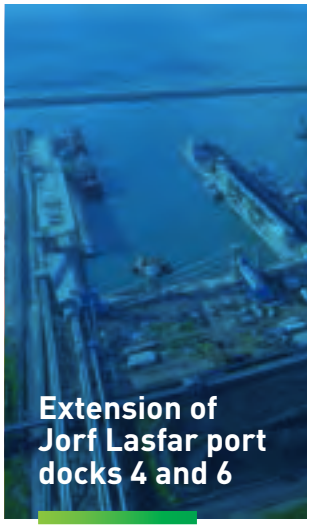
Construction of four phosphoric acid concentration units

CAPACITY
72 kt/year



Adaptation of the two ZU phosphoric lines

CAPACITY
0.5 Mt/year



Extension of Jorf Lasfar port docks 4 and 6

CAPACITY
37 Mt/year

Key Facts

Royal inauguration of Mohammed VI Polytechnic University in Benguerir

On January 12, his Majesty the King Mohammed VI inaugurated the Mohammed VI Polytechnic University in Benguerir. This historic event highlights the Group's vision to foster human development in Morocco and Africa through progress and innovation. Aimed to be the city of knwoledge, Mohammed VI Polytechnic University is research-focused and will serve as a catalyst for training a new generation of African researchers, entrepreneurs, and leaders, in addition to facilitating learning. This new generation is already committed to addressing the key issues that the continent is facing. The University applies a learning model based on innovation and experimentation, using its living labs to transform ideas into practical applications. Located in the heart of the Benguerir Green City, in an environment that fully respects applied sustainable development principles, Mohammed VI Polytechnic University aims to create a center of excellence in research, innovation, and incubation serving Africa.

A center of excellence in research, innovation, and incubation serving Africa.

Agreement with the Guinean government for fertilizer procurement

On February 24, 2017, in Conakry, OCP Group signed an agreement with the Guinean Government to supply the country with fertilizers adapted to local soils and growing conditions. The objective is to ensure the supply of all the Republic of Guinea's fertilizer needs, estimated at 100,000 metric tons for 2017, of which 20,000 metric tons to donate.

100,000 tons of fertilizer delivered in 2017

Certification of OCP Group's carbon footprint

OCP Group's carbon footprint, certified by GUTcert, an AFNOR (French Standardization Association) Group member and an accredited certification body, was calculated with the ISO 14064 standard on the entirety of OCP Group's activities (totaling 387,053 metric tons of CO_2 emissions in 2016: i.e. approximately 3% of Morocco's emissions) and has been audited for the third consecutive year. In particular, this assessment makes it possible to track KPIs and define adequate solutions in line with OCP Group's strategies for the circular economy. This will reduce the emissions recorded for each source, namely by using cogeneration and wind power for electricity needs, abolishing the drying stage thanks to the technological leap of hydraulically transporting phosphate, optimizing the specific consumption of facilities, etc.

OCP and IBM create a joint venture to accelerate the Group's digitalization

On December 6, 2017, OCP Group and IBM joined forces to form a joint venture aimed at providing a digital and IT services to African businesses in all sectors, from agriculture to industry. The new joint venture, called TEAL Technology Services™, will initially help OCP accelerate its digitalization and improve the efficiency of its operations. TEAL Technology Services will implement cutting-edge technologies such as analytics, cognitive computing, and the Internet of Things, and will develop innovative services by banking on the expertise of the OCP and IBM teams. It will also launch educational, social, and R&D programs, thereby strengthening both groups' commitment to encourage innovation and develop talent on the continent.

CO_2 The Group's carbon footprint has been certified since 2014

Key Facts

Stronger positions for premium products

OCP has strengthened its positioning in the market with a strategic focus on the three segments — phosphate rock, phosphoric acid, and phosphate fertilizers. For the rock, the Group has increased its exports by nearly 40%, totaling more than 11 million metric tons in volume. OCP has maintained its leadership in phosphoric acid, especially in India and Europe. For fertilizer, the Group achieved a new record for exports while strengthening its positions in Africa, North America, and South America, totaling 8.1 million metric tons at year end.

OCP's strategy focused on industrial flexibility and increased business agility has a great impact on its product and region portfolios. The OCP product offer is also increasingly diversified with more adapted and higher value-added products. The strategy has particularly materialized through the production and exportation of more than 40 formulas in 2017. In Asia, OCP has instead bolstered its leadership in phosphoric acid. In the fertilizer segment, exports increased in all regions: Africa, North America, South America, and Europe. Exports to Africa grew by nearly 50% in 2017 compared to 2016, totaling 2.5 million metric tons, i.e. almost a third of its total fertilizer exports. Thus, the Group has distinguished itself in the specialty products segment through pursuing the development of high value-added niche products.

8.1 million metric tons of fertilizer exported in 2017

Nearly 50% increase in exported volumes to Africa

Strenghtened international partnerships

OCP continues to grow internationally by developing partnerships in Africa's most promising markets. These links lead to agricultural development and capacity-building initiatives. They will make it possible to put forward offers adapted to African issues and make investments in storage units near the continent's major consumption areas and main ports.

OCP is also working to strengthen commercial partnerships, specifically those related to raw materials. The strategic partnership with Navigator Gas covers the lease of gas vessels specialized in transporting ammonia. Navigator Gas is a British shipowner owning and operating the largest liquefied gas transport fleet in the world. It is set to transport the necessary amounts of this raw material for the Group and reduce freight costs on ammonia imports.

The phosphate market in 2017

The phosphate market was marked in 2017 by another year of surplus in the fertilizer market, maintaining price levels around $340 per ton and a growth in farmers' demand for phosphate fertilizers, particularly in Africa and the Atlantic Basin (Europe, Americas).

Three major factors marked 2017 compared to 2016, affecting both operations and prices: the high volatility of raw materials (ammonia in the 1st quarter and sulfur in the 4th quarter), a more disciplined Chinese export supply as well as some logistical constraints due to bad weather affecting global supply.

On the macroeconomic front, 2017 was marked by the weakness of the U.S. dollar. The greenback depreciated by more than 7%, achieving its worst annual performance in 10 years, while the euro performed better, benefiting from the improved economy in the euro area. For the second consecutive year, grain harvests remained high, weighing on the grain markets. Thus, soybean, maize, and wheat prices remained globally stable. Eastern European wheat producers benefited both from the weakness of the euro against the dollar and the effects of the drought in Australia to boost their exports. In this context, through its competitive assets, new capacities, and diverse portfolio, OCP was able to strengthen its position on all finished fertilizers while increasing its share in raw phosphate.

OCP launches its “community service” program

The vision of Community Service was adopted in July 2017 during an internal meeting for senior management and employees. This vision announced the launch of an innovative social project. A new volunteering concept emerged in November: Community Service. Thus, OCP employees can now take four weeks of their working time per year to volunteer for their communities. They can now create or recreate links with their environment (support for entrepreneurship, support to associations and cooperatives, and identification of projects that deserve OCP Foundation funding), in all regions where the Group operates. This initiative is already generating great excitement among OCP Group employees.

Four weeks of work time per year
for volunteering

MyOCP: a one-stop shop for employees

Administrative applications, report downloads, consultation of medical records, hotel bookings, meeting room bookings, etc. MyOCP, the new self-service portal, offers a range of useful services to employees for their daily operations. The Group is thus modernizing its HR and facility management resources to offer a unique platform that serves as a one-stop shop for employees for all what they need to request or process. Still in the development phase, the digital platform promises a pleasant user experience thanks to its continually evolving embedded features. It can also be consulted on mobile phones.

The hackathonians generate a collective and positive spiral

The Industrial Hackathon hosted by OCP Group on July 20 and 21, 2017, was a great opportunity to boost innovation internally, transfer skills, develop agile techniques with design thinking approaches, etc. By bringing together teams with time limits, collective intelligence was mobilized around a goal. Everyone left their comfort zones and was ready to take on new challenges. A tour of all OCP sites was held to meet all the Group's project leaders and include them in this new and unprecedented adventure. No less than 2,300 registrations have been recorded with more than 1,800 new ideas put forward. Ultimately, 180 participants were selected to pitch their project ideas.

2,300 participants
in the industrial Hackathon with 180 participants selected.

Key Facts

OCP Foundation integrated agricultural development projects in Morocco: Four targeted activities in 2017

FIG TREES

- Planting of 300 additional hectares out of a total of 570 ha
- Inauguration of the fig development unit, including a drying unit with a capacity of 5 t/day and a packing unit with a capacity of 20 t/day

1,000 farmers
3 cooperatives
6 villages in rural municipalities in El Jadida
3 years (2016-2018)

SNAIL FARMING

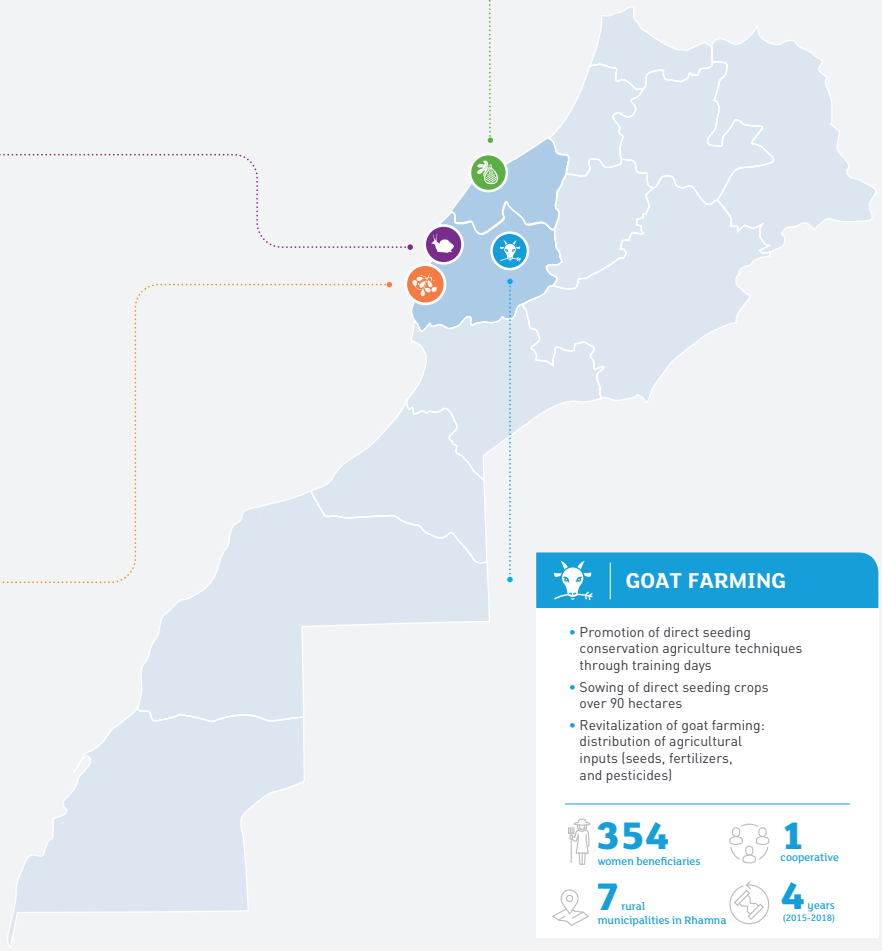
- Technical capacity building through training and on-the-ground technical support
- Support in the marketing and promotion of products abroad
- Installation of snail pens

54 producers
3 cooperatives
2 2 snail pens of 500 m²
2 rural municipalities in Safi
3 years (2016-2018)

CAPERS

- Strengthening technical capacity through training and test demonstrations
- Bringing the premises of two cooperatives up to standard and obtaining EACCE export approval for capers
- Award for best regional product assigned to the AL KHADRA cooperative at the Social and Solidarity Economy Show

277 participants
5 cooperatives
3 rural municipalities in Safi
3 years (2016-2018)



GOAT FARMING

- Promotion of direct seeding conservation agriculture techniques through training days
- Sowing of direct seeding crops over 90 hectares
- Revitalization of goat farming: distribution of agricultural inputs (seeds, fertilizers, and pesticides)

354 women beneficiaries
1 cooperative
7 rural municipalities in Rhamna
4 years (2015-2018)

Enhanced support of agricultural activities in Africa

- Six beneficiary countries: Guinea, Togo, Madagascar, Burkina Faso, Ethiopia, and Rwanda
- Capacity building in the field of soil fertility
- Soil analysis laboratory equipment
- Organization of the agricultural caravan
- Development of a soil fertility map

66 senior agronomists benefited from several training sessions.

2 agricultural caravans (Togo and Madagascar)

20,804 beneficiary farmers

242,000 ha mapped

1,120 soil analyses

4 equipped laboratories (fixed and mobile)

3 mobile analysis laboratories acquired

An integrated agricultural development program in Ethiopia

Through the OCP Foundation, OCP Group drove many initiatives for Ethiopia in 2017. A large number of farmers were trained in good agricultural practices. In addition, special efforts were made to connect research institutions with farmers in order to better introduce new technologies in the growing season. In addition, the Group made a sustained effort to promote agricultural automation.

16,248 beneficiary farmers

1,848 demonstration plots

4% improvement in teff production

5,824 seeders developed to grow teff distributed to farmers

33% improvement in the use of agricultural inputs

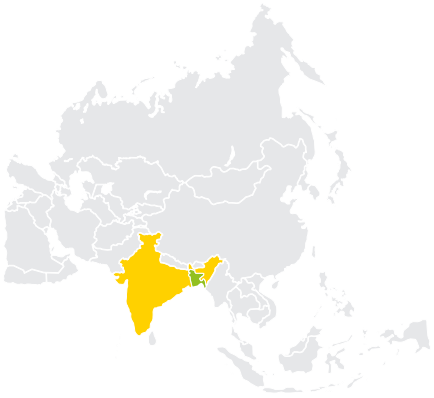
Key Facts

An agricultural development program for India

As an integral part of the South-South cooperation program in the agricultural sector, the Group, through the OCP Foundation, has been very active on the Indian continent. OCP initiated awareness-raising programs regarding sustainable fertilization and training in good agricultural practices for farmers. Soil analyses were made on no less than 3,000 plots. The Group has also undertaken support initiatives with 34 cooperatives generating performance increases of approximately 30% with incomes increased by between 40 and 70%. Three agribusiness and human development centers specializing in seed production, bee-keeping, horticulture, and goat farming have been created. The year 2017 was also marked by the creation of a professional agricultural federation involving 10,000 farmers. Thanks to digital technology, India's call center capacity has increased. A mobile application has been implemented to provide agricultural advice to farmers.

16,000 beneficiary farmers

5,275 soil analyses



Sixth OCP agricultural caravan

8,709 farmers benefited from the workshops held as part of the sixth OCP Caravan, which traveled across the Kingdom. Organized by the OCP Foundation in different regions, the OCP Agricultural Caravan aims to raise farmers' awareness of good agricultural practices. Two caravans crossed the regions in 2017, with a total of eight stages:

- **Market Gardening & Arboriculture Caravan:**
  Four market gardening and arboreal areas, four stages of three days each
- **Grain and Legume Caravan:**
  Four grain areas, four stages of two or three days each

The Caravan workshops were prepared as part of a learning program aimed at farmers and focused on their needs in terms of reasoned fertilization and soil requirement as well as their activity's sustainability. A truly local resource that has proven its effectiveness in terms of organization and capacity to mobilize, support, and supervise farmers, the OCP Agricultural Caravan has been organized, since its launch in 2012, in partnership with the Ministry of Agriculture and Maritime Fisheries, Rural Development, Water, and Forests and the Group's fertilizer distribution partners. It reached nearly 31,400 farmers in total. New technologies were at the heart of the system for this edition, particularly through digital versions of the Soil Fertility Map - which now covers more than 8.9 million hectares of agricultural land - that cover the entire useful agricultural surface and can now be used in the mobile soil analysis laboratory system.

Sustainable soil management to boost farmers' productivity in Bangladesh

In line with the development ambitions of African agriculture, OCP Group is extending its initiatives to the fertilizer market in Bangladesh, in particular by carrying out a baseline study and a study of the fertilizer sector. These initiatives, led by the OCP Foundation, are supported throughout the year by training courses for more than 900 farmers and Ministry of Agriculture officials. Fourteen agronomic tests were also conducted in northern Bangladesh.

900 farmers and Ministry officers trained

14 trials of a new fertilizer formula carried out

15 training sessions held

2 regions reached: Rajshahi and Rangpur

Second Phosboucraa agricultural caravan

In 2017, the Phosboucraa Foundation agricultural caravan made a stop in Es-Smara before reaching Bir Gandouz. During this second caravan, after the one in Laayoune, Guelmim, and Dakhla in 2015, national and international experts provided advice and assistance to more than 700 small livestock breeders and farmers in the Southern Regions and trained them in best camel breeding and health practices. Organized in partnership with the Ministry of Agriculture, the "wilayas" and provinces, the chambers of agriculture and professional organizations of the three Southern Regions*, the Caravan focused on three areas of intervention: animal health, feeding, and genetic improvement for the benefit of livestock farmers in the region.

First soil and water analysis laboratory for the Southern Regions

The Phosboucraa Foundation, in partnership with the National Institute for Agricultural Research (INRA) and the International Center for Biosaline Agriculture (ICBA), inaugurated the new analysis laboratory, located in the INRA station in Foum El Oued. This laboratory is intended to provide farmers in the three Southern Regions* with the information they need to cope with the natural and technical constraints affecting the productivity of their crops. It will also help them adopt sustainable fertilization of local crops.

Entrepreneurs in the spotlight

The fifth Junior Entrepreneur Breath held in the Laayoune Learning Center this year hosted 24 projects. This initiative is part of the Learning Center's skills development program aimed at improving young graduates' chances of finding a job in the Region.

Through the partnership with the Laayoune Moubadara association, 54 loans have been awarded. This initiative supports project leaders and the creation of Very Small Enterprises (VSEs) in the province of Laayoune through support, sponsorship, and interest-free and non-guaranteed funding. Finally, an alliance has been concluded with Microsoft for the digital inclusion of young people in the Southern Regions, with the aim of promoting young people's employability, supporting startups, project leaders and strengthening the digital capacities of NGOs.

3,750 young people certified in the IT Skills course in partnership with Microsoft

9,000 students initiated to coding

Opening of the second learning center in Dakhla

Education was central to priority actions for the year 2017. These actions took shape through the opening of the second Learning Center in Dakhla, enhancing the Learning Centers' platform, and the inclusion of 84 women enrolled in the Women Innovation Circle program. 159 academic excellence scholarships were awarded, and 280 students who had dropped out of school were reintegrated. The Phosboucraa Foundation also established a partnership with the International Youth Foundation to support 36 schools in order to improve the quality of education, student performance, and teacher skills through the acquisition of new teaching practices.

13,000 students benefited from the Support for School Success Program

36 Schools and Learning institutions helped

* Laayoune-Sakia El Hamra, Dakhla-Oued Ed-Dahab, Guelmim-Oued Noun.

OCP, digitalization in progress

For OCP, being competitive in a highly competitive environment and a constantly changing market is a major issue. Thanks to the ongoing digital transformation, the Group can meet these challenges and direct its leadership strategy toward sustainable agriculture. Digital will help OCP to seize opportunities, maintain its commercial agility by offering new innovative products, and increase its value-creating industrial flexibility to face all forms of competition. Digital is critical to the future of the Group. OCP has developed a roadmap for its digital industrial transformation. OCP is on track to taking the industrial transformation to the next level.

2

Toward operational excellence with digital

With almost 100 years of history, OCP Group has acquired solid expertise in the field of phosphates. From extraction to processing to the final product, OCP has consolidated its position as world market leader thanks to its unique positioning and presence throughout the entire value chain. In response to its global strategic challenges, OCP Group has, since 2008, initiated several transformation

> Digitalization is a strategic opportunity that has transformed many activities. The business model that is emerging today with the digital trend is revolutionizing all traditional models.
>
> *Mohamed Laklalech, Chief Digital Officer, OCP Group.*

phases to strengthen its leadership, which aim to increase its production capacity while responding to market fluctuations thanks to its industrial flexibility and commercial agility. In the midst of a major transformation with the rise of digital technology, the Group is pursuing its ambitions while facing new challenges. How do we succeed in our profound transformation with the digital revolution and an all-out digitalization? How do we involve the new generation of employees in these future changes? How can we get closer to farmers to better anticipate their needs? Doing these things is what will inject yet more competitiveness, quality, and productivity in the future.

Digital technology, a catalyst for innovation

OCP has seized a strategic opportunity: that of digital transformation, a catalyst for innovation and a new impetus for the Company. The Group sees a paradigm shift in this. Meeting the challenge of digital transformation requires a change in mindset as well as in working methods: it is not only a matter of technology.

In an increasingly competitive phosphate industry, mining has become a high-tech industry and market requirements are such that yields and cost reductions must be taken into account, or production costs will increase. But how, under these conditions, can we remain the market leader? How can we succeed in our deep transformation in order to develop the 4.0 plant? This is where digitalization comes into play. Taking advantage of new technologies to redesign internal processes and reinvent the relationship with external stakeholders is the challenge that OCP has given itself the means to meet.

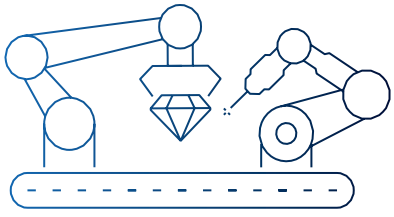
From extraction to marketing of the finished product, from farmer services to employee services to enable better synergy between OCP and our various stakeholders in the Group's business ecosystems, digitalization has been fully leveraged for the good of the Group. It has provided many leads for transforming the way we work and improving our competitive edge.

All the ingredients are there to make this digital shift a success: OCP Group is focusing its action on industrial digitalization, similar to the experimental mine already in place in Benguerir, from value creation for clients and farmers, to the adaptation of products to the soils and growing conditions of each region, or the digitalization of the supplier relationship, which will, among other things, bring greater transparency in relations with all suppliers.

The Group also promotes innovation and change management, which are inherent to this transition to new working methods. The employee experience, therefore, is essential, and must be as personalized as possible, with digital services that make it possible to better manage talent and performance, as well as facilitate daily life within the company. Cross-disciplinary by nature, digitalization makes it possible to unite teams, inspire managers, renew the organization, and innovate.

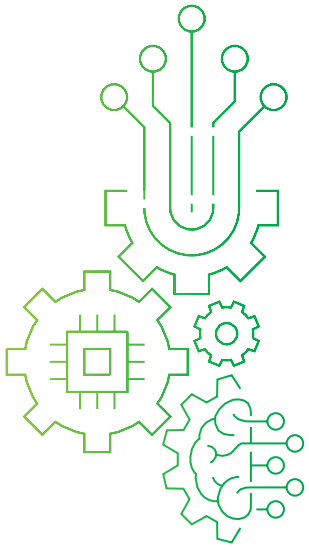
Creating value

We may imagine that every company has a digital vision with objectives similar to ours. But, this is not the case. Where an industrial company would undertake its digitalization in order to remain competitive, or another would want to rebuild a dilapidated industrial fabric through decades of subcontracting outside its borders, OCP's vision of digitalization is mainly focused on value creation. Offering high value-added services is where OCP's digitalization is directed. Today, production facilities are no longer sufficient to ensure sustainable industrial activity. Offering services, being as close as possible to end customers, knowing their needs even before they expresses them, knowing their environment perfectly: these assets are what give the Group its position as one of the world's largest groups. Value creation goes completely in this direction. Of course, extracting and transforming phosphate rock into fertilizer to feed the planet will always be the Group's main focus. However, integrating services that are entirely focused on the customer experience thanks to digital technology, will enable OCP Group to consolidate its position as a major player on the international scene. Moreover, this value creation will bring much more than a "customizable" customer approach. It will reduce costs and provide an integrated platform connecting clients, distributors, and producers. It will foster collective intelligence through agility, innovation, and continuous learning. And, above all, it will offer the Y and Z generations ease of sharing and synergy between employees, encouraging initiative and innovation.



Generations Y and Z

OCP is defined by more than its production and profitability requirements. Many of the company's employees are members of Generations Y and Z, for whom a work-life balance is essential. For them, the line between professional and personal life is quite fluid, and harshly switching from one to the other on a daily basis could be detrimental to their focus and productivity. Outdated management models no longer have their place; mindsets have evolved, and "being connected" is now a priority. This new generation of employees is more open to discussion and sharing. They are willing to circulate, foster, and develop new ideas through innovative projects. They are well-versed on the latest technologies and readily use them in their work. This context has given rise to the Movement at OCP. It gives each employee the freedom to speak up and develop his or her own project for the benefit of the Group and provides OCP with a true digital vision. The Movement has led to our digital transformation, which is now moving ahead at full speed. The next step is for our many talents to express themselves, and they are doing so.



A new approach to the industry

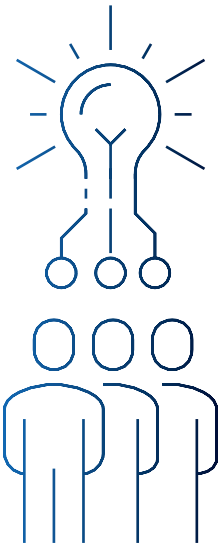
The entire phosphate industry has deeply changed; it now places digital technology at the heart of production processes. This fourth industrial revolution has given rise to a new generation of plants. These are sometimes referred to as digital plants, cyber-factories, or industry 4.0. They offer an immense potential for innovation, progress, and growth.

Industry 4.0 can be described as a fusion of the virtual world, a decentralized Internet, and real-world industrial facilities. It is quickly becoming the reference for industrial production.

The Group is committed to supporting its partners and all its stakeholders through this phenomenal innovative movement. Digital technology and artificial intelligence are more than an overhaul of conventional plants. In fact, they are advancing work methods and helping to create more elaborate and higher quality finished products.

The entire Group will thus benefit from industrial digitalization, which will reduce costs and optimize the value chain, especially through smart analysis of industrial data. This data is essential for developing models that optimize the value chain. Finally, industrial digitalization is already becoming a reality—entire production units are going digital, from physical sensors to automated dashboards for optimal site supervision.

This digital transformation will take place not only in facilities, but also in the Group's financial planning, its skills and human capital management, its global market forecasting abilities, and more. It will also help to comply with standards. The main challenge with all technological changes is to keep the Group positioned as a global leader.



The movement, or how to create a strong collective dynamic

In April 2016, OCP launched a new outlook for its entire workforce, called "The Movement". It aims to place the company and all its contributors on the same wavelength, to create a true group dynamic and drive innovative reflection and action to fuel the Company's success. The Movement encourages employees to think creatively and move away from conventional methods in favor of a collaborative, creative, and exchange-oriented way of working. Thanks to the Movement, each employee can suggest a new idea, form a team to build the project, propose it, and, if it is deemed relevant, be given the means to make it a reality.

Why the Movement? Because the Group strives to be a modern and innovative company, ready to take on the many challenges of our time. Faced with these challenges, OCP must rise up as a globalized digital community of learners. The Movement will help OCP continue to have international success by incorporating new technologies into its industrial and managerial processes.

Furthermore, it will contribute to developing its employees' skills through continuing education. The Movement gathers employees into working groups to focus on global business, digital technology, and learning, through sharing and discussion of strategic topics for the Group.

The Group's new outlook is based on the premise of no obligations, no imposed deadlines, and no predefined topics. All that matters is the synergy created by employees who willfully join a group to work together on a project. If the project is deemed viable and in line with the Group's strategy, it is upgraded to the "Situation" status, which involves a working group that is given the necessary means and governance to carry out the mission. This is the establishment phase. Since the Movement was launched, nearly 8,000 employees have participated in the initiative, and over 60 Situations were developed, 10 of which are currently in the establishment phase.

Digital technology to serve value chain

A new means of production. How can we reinvent ourselves? How can we strike the right balance between performance, reduced mining costs, and a long-lasting competitive edge? How can we add value to a market-leading product? Since 2016, OCP Group has built on the industrial transformation it launched in 2008 by initiating a digital transformation to change its means of production. We are headed toward industry 4.0.

3

From industrial transformation to digital transformation

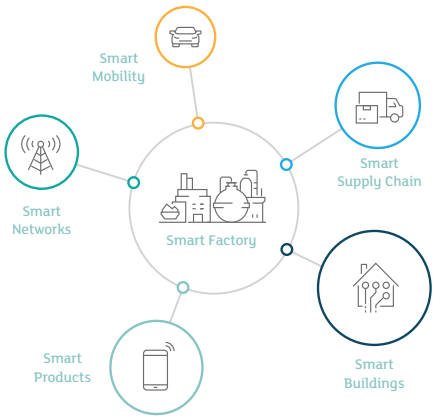
Digitalization started to make its way into OCP's operations in 2016, at a time when artificial intelligence, big data, and the Internet of Things (IoT) were thriving. New algorithms were developed. The impossible became possible, and much more was achieved. The digital shift is coming, and OCP must take advantage of this opportunity. How will digital technology change the value chain and industrial operations? How far can automation go without dehumanizing the Group's main strength, in other words, its women and its men? All the projects started these past few years, and those evolving since the Movement's launch, have placed the Group at the forefront of a digital transformation that will energize its operational excellence.

A digital vision

Introducing such a broad topic is a challenge in itself. How must we address the digital shift? Which methods or processes should we adopt? The first step was to analyze our existing setup and determine which kind of digital vision OCP was after. Would our approach focus on competition? Performance? Maintaining our proven global leadership? The industrial transformation had already addressed these aspects. It became clear that we had to switch from a volume-centric approach to one focused on service, while capitalizing on the achievements and progress brought about by the industrial transformation. In our comprehensive operational excellence approach, which has already brought great achievements with the Iqlaa program and the OCP Production System, industrial digitalization ensures continuity while providing real breakthroughs in operational methods and performance. Thus, the Group's operational excellence was given new impetus.

OCP's digital vision is centered on improving the entire value chain using digital technology and putting this technology to good use for sustainable agriculture. Digitalization had to be adapted to OCP, its processes, and its employees.

INDUSTRY 4.0 THE PLANT OF THE FUTURE



> By making our operations digital and introducing innovative technologies and tools, we will make our work easier and more efficient. However, the challenge is more cultural and human than technological.
>
> *Iliass El Fali, Executive Vice President, Industrial Operations, OCP Group.*

Operational excellence, the smart way

The primary goal of industrial digitalization is to introduce innovative technologies and tools that will make employees' work easier and more efficient. By making mining extraction digital, for example, operators can have a comprehensive, real-time view of their entire fleet of machinery, helping to better allocate resources and improve performance.

Digitalization also provides a significant amount of data that today's technology can store and analyze to improve performance and explore new valuable deposits. For example, in the case of digitalized extraction, mining machinery data can be used to build models to predict failures and increase facility availability.

Digitalization is a powerful catalyst for the transformation of our operations and processes. It is an important driver of cross-functional cohesion, collaborative work, and collective intelligence. The Knowledge Management platform and flow management tools are prime examples.

At the end of 2017, a three-year roadmap (2018 to 2020) was implemented to set industrial goals and ultimately meet our challenge.

STRENGTHENING OUR LEADERSHIP

Digital technology as a driver to increase capacity and control costs.

A flexible and agile integrated supply chain to support market dynamics.

CREATING VALUE FOR OUR CLIENTS AND FOR FARMERS

Strengthening our knowledge of farmers and the market in order to provide customized and adapted products and services.

MODERNIZING OUR BUSINESS ECOSYSTEM

Providing an integrated platform connecting clients, distributors, and producers.

SUPPORTING GROUP DYNAMICS

Fostering collective intelligence through agility, innovation, and continuous learning.

Facilitating data sharing and decision making.

Designed by employees, for employees

Many actions were taken to develop the industrial digitalization roadmap. Employees were systematically involved in the process. It was clear that a successful transformation would require employees' participation on the field, not only for involvement and learning purposes, but also for skills development. After all, no one understands daily issues better than an employee working in the field. The teams could choose from a vast range of technologies, then adapt them to OCP's reality.

Employee involvement accelerates the work and allows for effective feedback. Each employee becomes a project originator, director, and user. This experience-based approach to teaching is gaining in popularity and has proven its worth. Academic courses are a thing of the past, as they can only deal with part of what real work is like and rarely correspond to the real world.

This new mode of operation is also beneficial in a psychological sense. Getting people to accept any type of change is never simple. Many will resist. When employees take ownership of the initiatives through

Three pillars on which to build the industrial digitalization

All these varied yet complementary industrial digitalization initiatives support the Group's operations with a significant amount of innovation and agility, which paves the way to the industry 4.0. As for deployment, industrial digitalization has three main drivers.

> We offer real solutions to employees' everyday challenges, and the benefits are tangible when they experiment with them in their work. This is why employees are embracing the change. Digital technology brings solutions and added value to their work.
>
> *Hicham Guellaf, Head of Industrial Digitalization, OCP Group.*

experimentation, their attitudes change faster. Each employee must develop their own opinion of digital technology and what advantages it can provide on a daily basis.

Three critical areas

At the industrial level, digital transformation encompasses three critical areas: production, maintenance, and the supply chain. Thanks to digital advancements, each of these areas has ever-more possibilities. For instance, digital tools can control production inputs with utmost precision, which helps ensure perfect compliance of the finished product. Maintenance teams are no longer taken by surprise by breakdowns and accidents. Digital technology helps predict the likelihood of a breakdown in a certain timeframe and forecast facility lifespans.

The supply chain, which covers all of production and makes it possible to coordinate all production workflows, becomes exponentially more efficient thanks to the comprehensive view of the entire production chain. It operates at the levels of transport optimization, inventory management, and workflow, and it makes it possible to optimize product quality. Thus, the Group can create industrial supervision models and control each aspect of production to better manage volumes and cost prices.

Advanced automation

The goal is to integrate AI in stationary or mobile installations. Examples include self-driving trucks, automated boat loaders, new management techniques, in particular in digitalized control rooms or towers, and even remote maintenance. Mine planning and processing projects are good examples of integrated supply chain management.

Advanced analytics

We can compare this to manufacturing plants. An artificial intelligence (AI) software produces industrial designs using data collected in other areas, then implements those designs in the two other pillars. Of course, AI cannot do anything without human expertise. For example, the new OCP Advanced Analytics (O2A) platform generates predictive models and simplifies statistical modeling with user-friendly modules designed for industrial operations. It can also help create a dispersion model for atmospheric effluents in real time: a prime example of digital technology supporting sustainable development.

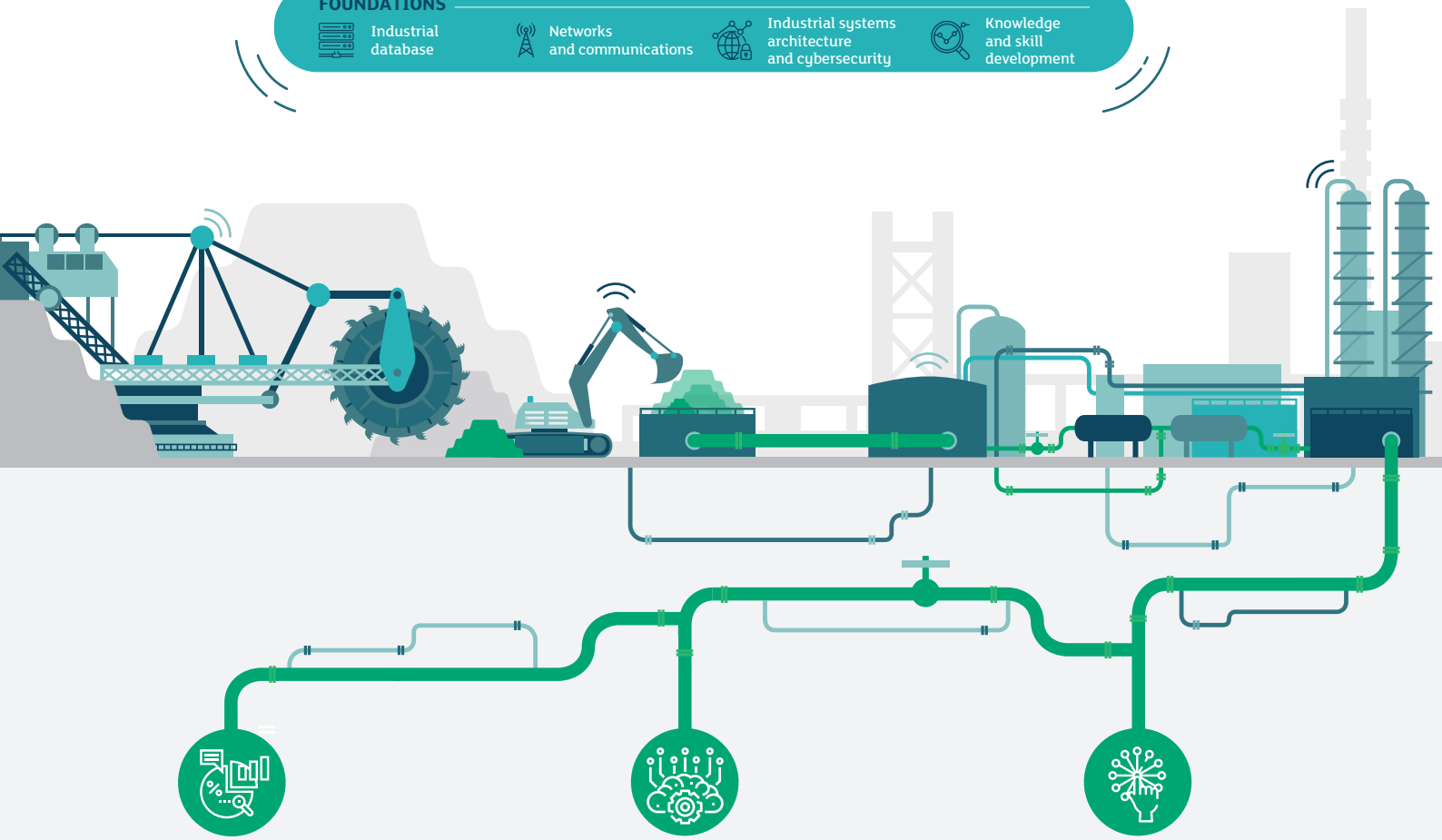
Digital services

These technologies make end-to-end processes paperless by implementing Lean and Agile methodologies to eliminate anything that does not create value and help manage production, maintenance, and the supply chain. Examples include the collaborative Knowledge Management tool and the mobile services integration project that integrate devices such as industrial tablets on worksites. There is also OPM Extraction, which enables us to monitor, in real time, all production activity from drilling to transport.

INDUSTRIAL DIGITAL TECHNOLOGY: DRIVERS AND FIELDS OF INITIATIVE

FOUNDATIONS

- Industrial database
- Networks and communications
- Industrial systems architecture and cybersecurity
- Knowledge and skill development



ADVANCED ANALYTICS

Process efficiency

Increasing the efficiency of production, maintenance and supply chain processes

FIELDS OF INITIATIVE

- **Supply chain:** Integrated planning models
- **Processes:** Optimization and prediction models
- **Maintenance:** Models for predicting breakdowns and equipment service life

ADVANCED AUTOMATION & AI

Reliability and productivity

Increasing equipment productivity and efficiency with automated equipment and facility management

FIELDS OF INITIATIVE

- **Automated fixed installations**
- **Automated mobile equipment**
- **Remote maintenance**
- **Integrated control rooms**
- **Supply chain :** Automated handling and transfer activities

DIGITAL SERVICES

Paperless support processes

Improving work methods and performance management with digital tools

FIELDS OF INITIATIVE

- **Performance management systems and tools**
- **Maintenance and procurement management systems and tools**
- **Remote maintenance**
- **Community management and capitalization**

Cybersecurity and the digital plant

Manufacturing plants of the future are vulnerable in terms of cybersecurity. By encouraging the development of connected industrial objects, remote control of installations, automated robots, etc., data is more exposed, which implies a significant risk of dispersion and loss of control.

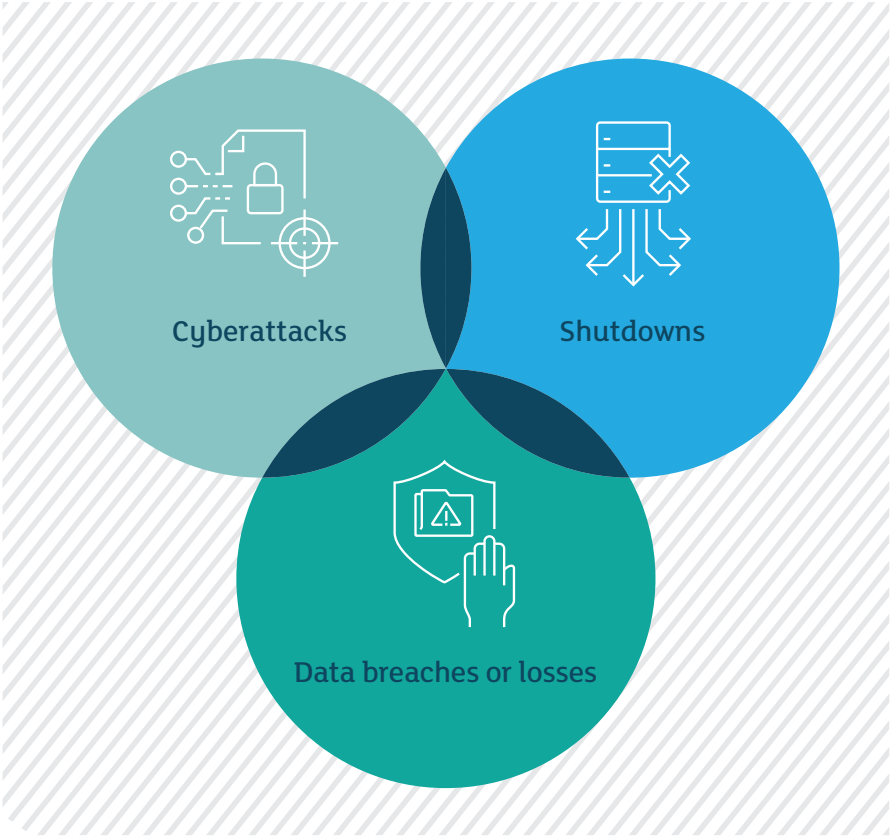
In terms of connected objects, it is not so much computer or physical failures that can have an impact on daily operations. Tomorrow's industrial sites will be characterized by a permanent connection between the objects produced. With the industrial Internet of Things, the final product will have a persistent link with its production site, which is why it is necessary to implement a new approach to cybersecurity based on surveillance and prevention.

Still in the pilot phase, the project to set up an industrial and cybersecurity systems architecture adapted to the operation of the Group's integrated plants was initiated in November 2017. Its development will continue throughout 2018. In line with regulations, the Group complies with legal requirements by following the applicable guidelines in the National Directive on Information Systems Security (DNSSI) for the industrial sector. With this in mind, OCP will deploy a proprietary IS risk management methodology to identify and assess risks, measure their impact on the Group's activities, and suggest appropriate actions. This unified approach will protect the Group's information assets and follow international best practices regarding industrial IS management.

A twofold purpose:

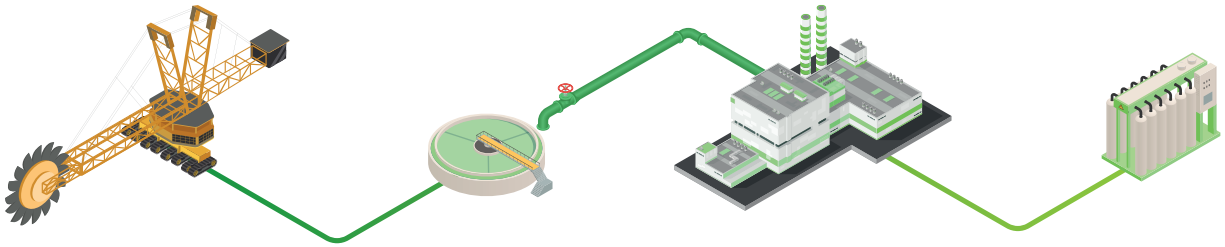
- Protecting user privacy (employees, customers, suppliers)
- Protecting industrial property to ensure the company's continued existence

ANTICIPATING RISKS BEYOND CYBERATTACKS



Other risks			
Extortion	Manipulation errors	Violation of personal data
Cyber crimes and theft	System malfunctions	Regulatory action
Network reliability	Regulatory requirements	Security of all customer data
Restoring data and hacked systems		
Damage to reputation		

DIGITAL MINING:
A COMMON VISION FOR ALL ACTIVITIES



	MINES	WASHING PLANTS AND SLURRY PIPELINE	FACTORIES AND FIXED INSTALLATIONS	UTILITIES
ACTIVITIES	Drilling • Dragline and bulldozer stripping • Loading • Transport	Destoning • Handling • Scrubbing • Screening • Washing • Flotation • Grinding • Transport		Water • Energy • Wastewater treatment plant

R&D projects carried out make it possible to develop an entrepreneurial ecosystem through the implementation of R&D results, innovation, and the involvement of innovative companies.

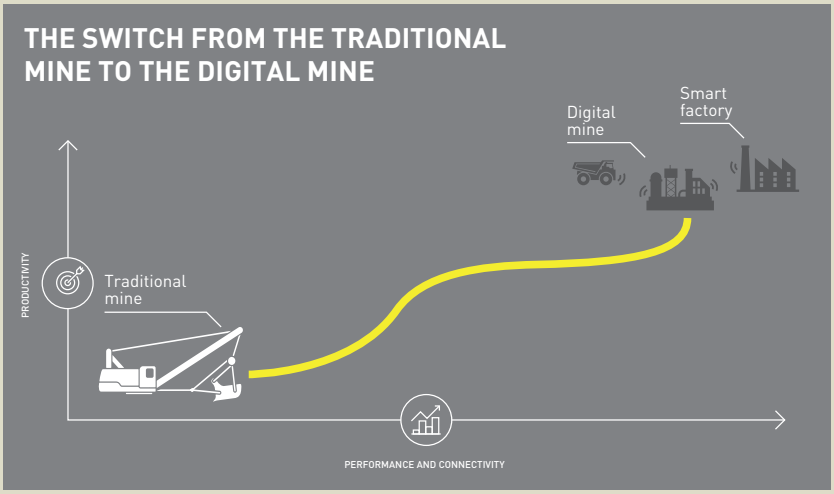
A Digital Mine in Benguerir

Benguerir's experimental open-pit mine is a significant step forward in OCP's transition to industry 4.0. This mine is one of the experimental sites central to research programs at Mohammed VI Polytechnic University. Open to the scientific community, these sites make it possible for partner university researchers to test solutions in real-world situations in key areas. Called the "Advanced Mining Technology Platform," this pilot mine has many purposes. The first step is to place the Group at the forefront of technological progress in mining and management, to attract equipment/technology suppliers and researchers to enable them to carry out full-scale trials in industrial environments, and to create real expertise at Mohammed VI Polytechnic University based on learning by doing. Especially since the R&D projects carried out make it possible to develop an entrepreneurial ecosystem through the implementation of R&D results, innovation, and the involvement of innovative companies.

The mining project became a reality in August 2017, along with some twenty other projects mainly focused on industrial digitalization: these focus on industrial management, artificial intelligence, automation, and maintenance. All these innovative projects aim to improve extraction or automation processes. Many of them place great emphasis on real-time facility control to improve yields and decision making. Other automation projects will reduce risks for human operators, ensure better security, and boost performance.

Beyond the ongoing projects, the experimental mine also showcases OCP's digitalization expertise and makes it possible for the entire R&D ecosystem to benefit from cutting-edge innovation and experimentation.

> Benguerir's experimental open-pit mine is a significant step forward in OCP's transition to industry 4.0.
>
> *Sidi Mohamed Ouabba, Director of Mine Production at Benguerir*



3 LEVELS OF DEVELOPMENT

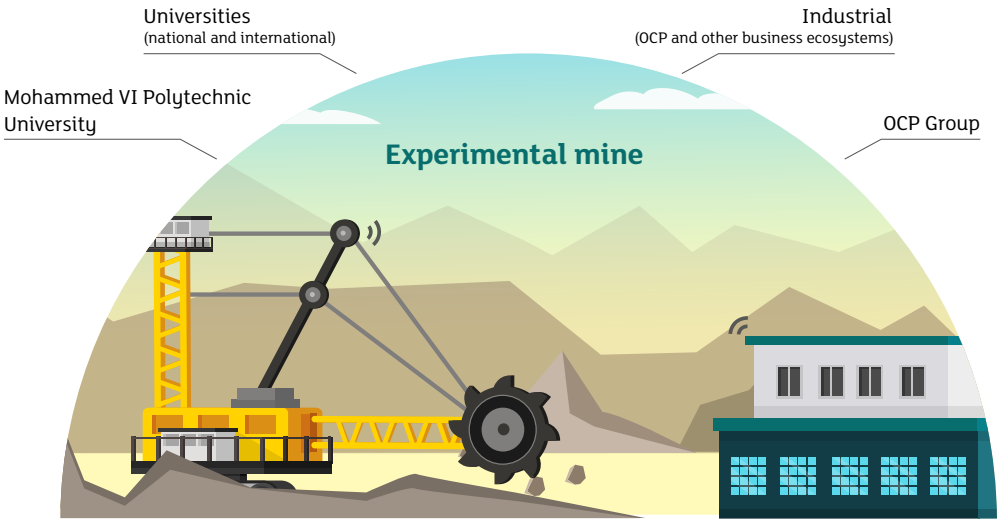
Supervised mine
Digitized, supervised, and controlled activity.

Integrated mine
Connected fleet, dynamic planning, remote operation.

Smart facilities and utilities
On-board technology, autonomous operation, dynamic capitalization and learning models.

Essential infrastructures and personalized employee training are required to "go smart," especially in terms of networks, datacenters, information and communications systems, and agile managerial culture.

THE DIGITAL MINE: AN INNOVATIVE PRODUCTION ECOSYSTEM FURTHERING KNOWLEDGE AND THE INDUSTRY



The Beni Amir automatic washing plant

Digital technology drives industrial performance and offers a new way to work, communicate, and share information. It was, therefore, quite natural that the Beni Amir washing plant, the largest of its kind in the world, made the digital shift, making this plant a pioneering entity in digital transformation at OCP Group.

The Beni Amir washing plant, one of the Group's major projects, is designed to boost beneficiation capacities at the Khouribga site up to 12 million additional metric tons annually. The washing plant serves a dual industrial purpose: enriching phosphate rock and preparing it for pipeline transportation to the Jorf Lasfar processing complex.

The Beni Amir washing plant's significant digital potential will help increase efficiency throughout the different stages of its process. This potential is realized through many process sensors (for pressure, density, flow, etc.) and maintenance sensors (for temperature, vibration, etc.) as well as through an industrial database containing a variety of information about the washing plant's operation.

Highly integrated and automated beneficiation operations ensure the quality and availability of the right product, at the right time. For instance, automated control loops regulate pressure, dilution, automatic sampling, automation of bucket wheels, and more. This example of automated bucket wheels is a testament to the benefits of integrated and automated operations. Thanks to sensors installed with a collision warning system, combined to an automated bucket wheel driving system and remote controls, digitalization boosts bucket wheel yields through improved flow control, failure anticipation, and real-time tracking of operational parameters.

Finally, digitalization of the Beni Amir washing plant provided benefits not only for operations, but also for employees, such as:

1. **Increased competence in digital expertise;**
2. **Opened initiative and fulfilled potential;**
3. **Changed focus to high value-added analysis and reflection tasks;**
4. **Advanced information sharing in real time.**

Highly integrated and automated beneficiation operations ensure the quality and availability of the right product, at the right time.

Self-driving bulldozers in Khouribga, or the industry's robotic shift

The mining industry has paved the way for remote-controlled facilities, which not only boost operational efficiency, but also contribute to operator security. The site in Khouribga is testing automated bulldozers and is ready to use driverless heavy trucks. Thanks to this advancement, still in the pilot phase, remote-controlled mining machinery will become a reality. The operator-driver will drive the bulldozer remotely and control each of its settings from the control room, while keeping an eye on the surroundings via multiple onboard cameras.

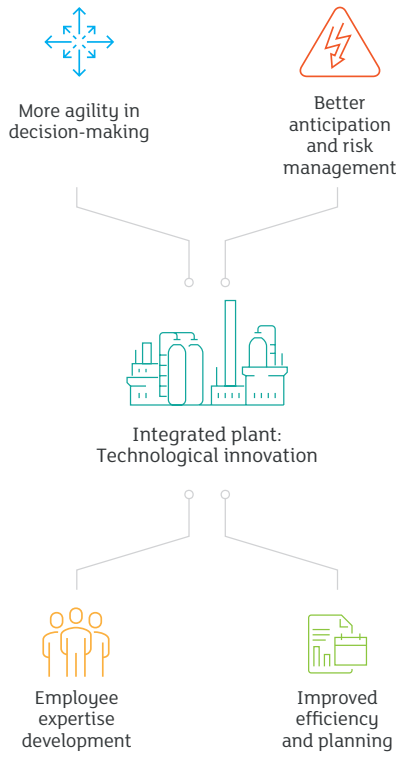
Integrated control rooms at the Merah El Ahrach and Benguerir mines

First implemented on a beta testing site at the Merah El Ahrach mine, then in Benguerir, these control rooms are an integral part of the Group's experimental mining projects and provide an overall view of operations within the mines. Everything is done from these rooms, from monitoring the geographical position of the mining machinery and their on-site activity to their optimal allocation and dispatching to different tasks. The control rooms make it possible to pull up any facility information in real time, which helps to make timely and informed decisions and improves end-to-end visibility of the chain. Two major technologies were integrated in the control rooms: fleet management (OPM Extraction) and mine planning. The digitalized control room has two screen walls, which allow the operator to monitor mining machinery activity on one screen (cycles, stops, positions, etc.) and the status of stationary installations on the other. In addition, accessing information is much quicker thanks to the new technology added to each level of production, which includes onboard sensors, surveillance cameras, collision warning systems, wireless networks, etc.

Setting a course toward increased performance for fertilizer Line 107A and phosphoric acid Line E

Other pilot projects include performance optimization of two phosphoric acid production for fertilizer lines, using an integrated, automated approach to provide operators with accurate information in a timely manner, which simplifies decision making. The approach allows operators to be mobile by managing and controlling systems remotely from centralized and "mobile worker" control rooms, and enables online tracking and measurement of process parameters, valve automation, and, last but not least, it provides predictive modeling software. During the attack and filtration step of the phosphoric acid process, this software serves to model different outputs based on the slurry's or the by-products' physicochemical properties. It also enables modeling of optimal operation parameters to improve performance via optimization algorithms. When used for fertilizers, the predictive model focuses more on particle size in order to directly impact product quality. In addition to predictive modeling, digitalization enables optimized interventions at the process and supply chain levels, thanks to the automation of the transfer and switching system of the finished product storage process, real-time supervision of the condition of storage facilities, and increased reliability of flow equipment for raw materials and finished products.

INTEGRATED PLANTS:
FOUR MAJOR BENEFITS



The JFC II integrated plant: a mosaic of technologies

Initiated at the end of 2017, the integrated plant's beta testing site at Jorf Fertilizer Company II is sometimes described by listing the current technological innovations and their potential for improving the value chain. Portrayed in this way, the innovations can seem like isolated technological implements. However, the opposite is true with all the programs and software implemented in the plant of the future that are meticulously coordinated and controlled. Many projects are carried out using different core technologies that improve the value chain's performance, responsiveness, and profitability. This results in smart production, greater asset and employee productivity, appropriate responses to the status of critical facilities, demand-driven planning, and reduced energy consumption and industrial waste.

Maintenance in Safi

OCP Maintenance Solutions, a flagship digital maintenance project originating from several of the Group's innovation initiatives, was managed by a project team at the Safi site and led to the creation of a new business unit in 2017. This successful initiative proves how digital technology helps create high value-added services. Smart technology makes it possible to anticipate failures, which improves performance throughout production facilities. Sensors and data are at the heart of preventive maintenance. Such an approach contrasts with conventional maintenance, which involved replacing machinery parts based on assumed operating conditions. Now, predictive maintenance is done through analysis of a constant data stream from the sensors, which indicate the parts' real-life operating conditions. These sensors are placed in strategic locations and are foundational to smart solutions for preventative maintenance. They help optimize costs and analyze data in real time. The sensors also make it possible to control production flows within facilities. The streamed data is used to analyze facility conditions in depth and predict failures. When combined, parameter analyses and historical data from facilities make it possible to plan rather than endure production shutdowns. Alert thresholds are defined, servicing is planned, and parts are replaced with a just-in-time approach. Preventative maintenance is a first step toward a zero shutdown, zero failure goal, as it streamlines the replacement parts inventory, reduces the number of uncontrolled shutdowns, increases performance, and boosts production facilities' lifespan. OCP Maintenance Solutions will be deployed progressively across all installations, at the industrial site in Safi and elsewhere.

Smart technology makes it possible to anticipate failures, which improves performance throughout production facilities.

Augmented quality

OCP constantly strives to be one of the best companies in terms of product quality. The Group applies the strictest international standards. Doing so results in compliant fertilizers that undergo no additional processing during transportation and storage. Thanks to their physical and chemical properties, OCP products guarantee outstanding performance and yields. Physical fertilizer properties such as density, particle size, moisture content, and dust play a decisive role in performance and precise application, which, in turn, have an impact on crop quality and yields. For illustrative purposes, particle sizes influence flight paths, and an increased mixing efficiency allows for consistent application.

Industrial digitalization comes in to speed up this quest for performance, with smart solutions designed to control production in real time. A beta testing site has been created at the Jorf Lasfar site. The goal here was to control particle sizes and molar ratios during fertilizer manufacturing processes. Process optimization is ensured through online analysis systems built into facilities, which constantly monitor critical manufacturing parameters in order to provide real-time data (particle size, moisture, molar ratio, etc.). Hence, advanced analytics models are developed to help predict fertilizers' physical and chemical properties, an in turn, contributes to maximizing performance.

Process optimization is ensured through online analyzers built into facilities, which constantly monitor critical manufacturing parameters in order to provide data in real time.

Planned, automated logistics at the Jorf phosphate hub (JFH)

The logistics beta testing site at the JFH is geared toward the automation of handling chains, stock management, ship loading, and more. In other words, one plan is all it takes to run all operations automatically. Standardization and comprehensive logistics automation make it possible to manage production and maintenance in an integrated manner, while organizing and optimizing resources. Operators can then focus on value-added work, analysis, and performance improvement.

On import operations sites, the goal is to speed up sulfur melting and filtration units by automating them and adapting their operation to the quality of the raw material, and to better use the centralized controls and a digital processes within the ammonia storage unit by implementing a highly secured interface technology (API Safety) and applying the strictest security standards. These projects will also focus on automating the loading of fertilizer and phosphates to be exported using automatic trippers and online inventory tracking.

OCP'S INDUSTRIAL DIGITALIZATION ROADMAP FOR 2018-2020

2018: During this experimental year, beta testing sites are being implemented throughout the value chain in order to focus efforts and get the model approved before its implementation in every unit starting in 2019.

2018

Jorf Lasfar — North:
Line 107 A: Fertilizer Particle Size Line E: Phosphoric Acid Attack And Filtration

Jorf Lasfar — South:
JFC II: Integrated Plant JFC V: Phosphoric Acid Concentration

JFH:
Imports, Exports and Utilities

Control Tower:
Control Room and Integrated Planning

2019 - 2020

Replication years

Toward a digital ecosystem

The Group is reinventing learning models, re-appropriating human relationships through digital tools, creating new synergies in its business ecosystem, and more. Digitalization will not take the human out of human resources, but rather offer new tools and opportunities to help develop and strengthen employees' skills, help them gain new knowledge, and thus contribute to OCP's distinctive leadership and strategy.

4

UM6P: Accelerating digitalization

Digitalization at Mohammed VI Polytechnic University offers an entirely new approach to higher education. We are no longer in a classroom setting where students and teachers are gathered in a lecture hall. The student experience now takes center stage, with paperless classes as well as new ideas and methods. This innovative teaching model goes far beyond conventional learning.

Global competition

In a context of fierce global competition, the industry of the future must capitalize on learning. In a world where digital technology makes information more readily accessible than ever, companies mainly compete on the field of knowledge and skills.

Added value no longer depends solely on a company's existing assets or knowledge. It depends on its ability to constantly learn about its environment and turn this newly learned information into groundbreaking products or services. Focused on this reality where everything is moving faster as innovation cycles shorten, OCP Group has chosen agility to continue innovating in an environment where the possibilities of 3.0 and 4.0 technologies are immense. How? OCP prioritizes collaboration and co-creation through partnerships and innovative links with its business ecosystem, and by involving employees in a novel way. This approach gathers multiple external contributors: SMEs, startups, research centers, innovation communities, etc.

This open approach leads to great synergies fueled by shared expertise, with the goal to gain in speed and competitiveness.

The student experience

This may seem simple to provide at first, but it requires a tremendous amount of administrative skills. At UM6P, the student experience starts with a web portal, which students can sign into and use to manage their student life from the first day they register until they graduate. This mobile device- and PC-friendly online hub makes it possible to follow online classes and programs, view grades, and much more, all in one place.

Student management systems and learning management systems are developed in order to provide students with a single interface. This is where the Digital Learning Lab comes in—a place entirely dedicated to teaching. It includes Massive Online Open Courses (MOOC) recording studios, where teachers can create new courses or convert their existing courses to an e-learning format. In this way, content can be created in class and subsequently uploaded online.

Courses are available online, and students can log in as desired to perfect their skills. Online classes also enable faculty to reach students in a new way, outside the conventional classroom. The digitalization of teaching has thus made it possible to introduce a method of learning known as the reverse course, better known as the "flipped classroom" concept. Students are provided with the entire course content, which they can read and study at home. Lecture-based classrooms turn into debate environments fostering dialogue between students and teachers. This method is increasingly being adopted in prestigious universities and schools worldwide.

With digital tech and e-learning, it is now possible to reach audiences beyond borders, whether it be for academic training or for executive education programs. Thanks to MOOCs, programs are widened in scope and adapted to African students. They focus on continent-specific issues for a true added value in comparison with other MOOCs.

Just like the customer and user experience, two concepts arising from the digital revolution, the "student experience" is an important component of digital transformation. This experience is all about what the student or learner goes through. The Mohammed VI Polytechnic University (UM6P) understands the student experience and has made it a keystone of its strategy. Beyond its mission to share knowledge, UM6P strives to be a hub of research, high-level education, and innovation and build bridges between Morocco, Africa, and the world. Along with its teams, infrastructure, and laboratories, UM6P also acts as the digitalization task force, not only within the OCP network, but also for the rest of Morocco and Africa.

> UM6P strives to position itself as a digital powerhouse to support the business network and research projects, for OCP, Morocco, and the rest of Africa.
>
> *Rafiq El Alami, Head of Digitization, Mohammed VI Polytechnic University.*

SAP - Management with a single platform

Daily University management was also planned from a digital perspective. Human resources, purchases, recruitment, and other administrative processes have been centralized into a single SAP tool.

Rather than simply using the tool, UM6P conducted hands-on beta tests for a system that the Group could deploy throughout its structures. The University became more than a user and developed significant expertise in deploying the tool, putting it to use, and training third parties, in particular on SAP. The Technological Expertise Centers were developed in this optic, especially to provide users with SAP training and help the University become a leading SAP expert in Africa.

Knowing how to use SAP is a good start, but leveraging it for OCP's and UM6P's needs is even better. In addition to managing all the University's internal processes, SAP enables collaboration, project management, and communication between users.

> Originally, OCP was an incubator for the University, but the roles are being reversed, with the University incubating a new OCP increasingly focused on digital tech, industrial experience, and value creation.
>
> *Hicham El Habti, Secretary General, Mohammed VI Polytechnic University*

A digital task force

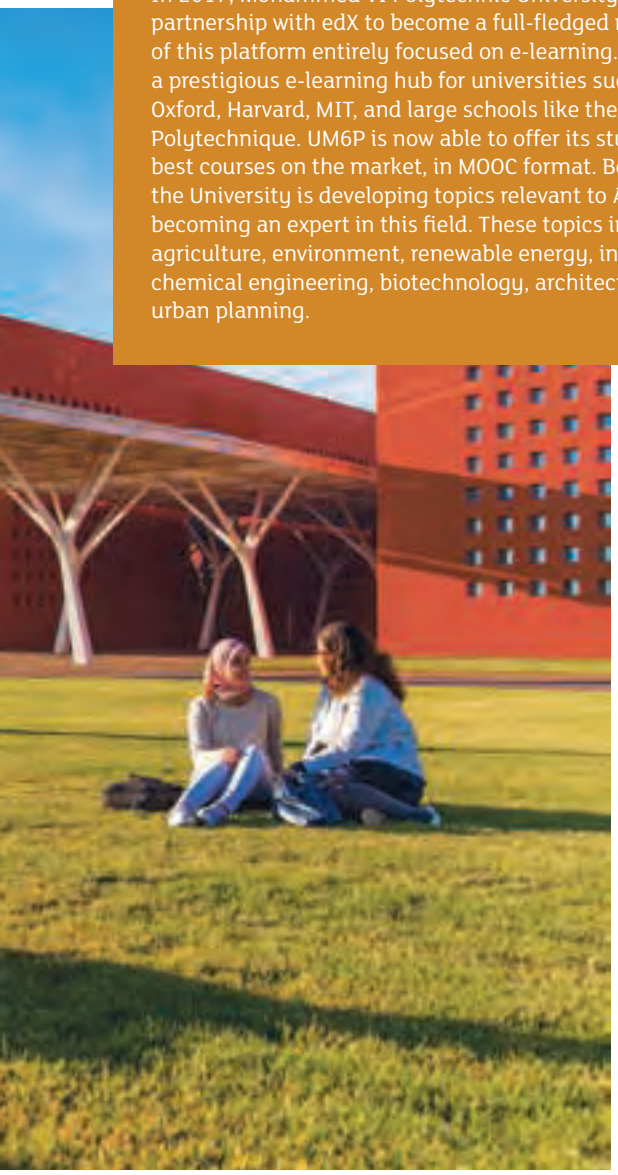
By deploying smart platforms, Mohammed VI Polytechnic University can unlock its greatest innovative potential. Beyond education and knowledge, the University also serves as an incubator for startups looking to launch new industrial prototypes using the FabLab, or new services and apps based on skills from UM6P's IT Lab.

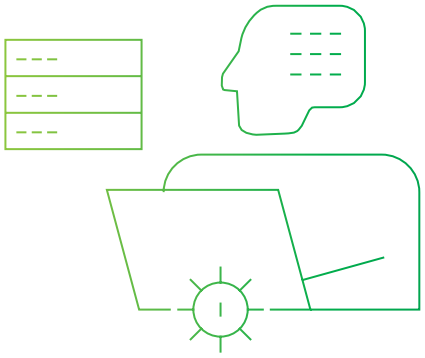
The rationale here is to position UM6P as an accelerator, which will leverage software tools, skills and know-how for the benefit of OCP's business environment and to better serve African countries. UM6P is striving to become a digital powerhouse to support projects. Are you looking for a tool to create industrial models, or a new farming experience? UM6P can help you in your endeavor and has you covered, thanks to its expertise and existing AI systems. Its expertise spans data processing and retrieval for use in models, as well as innovative platform creation to serve African farmers, OCP's business lines, and others.

It's a virtuous circle. As an incubator, UM6P guides and accelerates innovative systems stemming from the Group's resources, or from Moroccan and African startups. Originally, OCP Group was an incubator for the University, but the roles are being reversed, with the University incubating a new OCP, increasingly focused on digital tech, industrial experience, and value creation.

UM6P's and edX.org's new teaching approach

In 2017, Mohammed VI Polytechnic University signed a partnership with edX to become a full-fledged member of this platform entirely focused on e-learning. edX is a prestigious e-learning hub for universities such as Oxford, Harvard, MIT, and large schools like the École Polytechnique. UM6P is now able to offer its students the best courses on the market, in MOOC format. Better yet, the University is developing topics relevant to Africa, thus becoming an expert in this field. These topics include water, agriculture, environment, renewable energy, industrial and chemical engineering, biotechnology, architecture, and urban planning.





> UM6P's Open Innovation hub serves as an integrator for research topics in many academic programs. The platform is also a catalyst for entrepreneurship projects, and, above all, makes it possible to build a training offer according to a learning by doing approach.
>
> *Laurent Deshayes, Head of Innovation Lab for Operations, Mohammed VI Polytechnic University.*

R&D at the UM6P: Acceleration through connection

Bridging the gaps between Morocco, Africa, and the entire world, the Mohammed VI Polytechnic University strives to be a bastion of training for the next generation of African researchers, entrepreneurs, and leaders. Founded for applied research, Mohammed VI Polytechnic University aspires to make Morocco a launching pad for world-class research and innovation in the service of Africa's sustainable development. Its research themes have been planned and designed to address the challenges facing the continent.

OCP and Mohammed VI Polytechnic University endeavor to create cooperation opportunities for students, teachers, and researchers in Moroccan and international universities and research centers.

This involves the development of joint research projects, shared infrastructure, teacher and student exchanges, open training programs, shared resource materials, and calls for proposals.

In an increasingly competitive market, innovation and responsiveness are key factors for success. R&D is entering a new era where connection fosters acceleration. This realm of activity is moving more and more toward connectivity, in several phases of product or manufacturing process development. The goal is to minimize time to market. In this respect, levers such as the Internet of Things coupled with other digital advancements (simulation, virtual and augmented reality, etc.) used as early as the design phase accelerate the prototyping and testing phases. By connecting products or testing facilities, testing phases are optimized thanks to real-time data analysis. However, this connectivity brings another challenge: agility within an iterative improvement loop, in which innovations can be quickly tested.
Efficient collaboration between business lines (R&D, digital, IT, marketing, production, etc.) and quick decision making are now crucial to reap the full potential of technology. Digital tools such as collaborative platforms, virtual obeyas, and rapid design are also highly recommended to increase agility within OCP Group's R&D activities.

Knowledge factories

UM6P has a true springboard for research, innovation, and prototyping: the Innovation Lab for Operations, commonly called the FabLab. The prototyping facility truly supports OCP and other Moroccan

> The Innovation Lab for Operations is a prototyping factory that truly supports OCP and other industrialists in Morocco and Africa in improving their competitiveness through industrial digitalization and encourages innovation within the entire UM6P network.
>
> *Laurent Deshayes, Head of Innovation Lab for Operations, Mohammed VI Polytechnic University.*

and African industrialists in improving their competitiveness through industrial digitalization. The FabLab also supports innovation within UM6P's entire network. This is achieved through the development of an Open Innovation platform for the design and production of scientific prototypes.

To meet these objectives, the FabLab is providing itself with the means to achieve its ambitions by gradually acquiring the necessary skills and infrastructure. This has not stopped it from already getting involved on numerous projects. Its researchers are working on many projects, including developing a new management model for the ports at the JPH, a prototype for a smart greenhouse and chemical unit surveillance drones, as well as studies and management of the experimental mine in Benguerir. The latter project alone includes some twenty subprojects in the development stage. This living lab model will be extended to other sites, in particular the one at Safi.

Conceptualization and prototyping are done at the FabLab, while all necessary calculations for process modeling and digitalization take place at the SimLab. Researchers use mathematical modeling tools to build simulations with their computers. They then use these models to find ways to optimize existing industrial chemical processing systems or invent new ones. Using this method, the FabLab has already set the goal to work on three specific processes in the next three years: studying manufacturing processes for phosphoric acid, fertilizer production, and ore flotation.

> In practice, we use mathematical modeling tools to build computer models. We then use these models to find ways of optimizing existing industrial chemical processing systems or to invent new ones.
>
> *Saad Benjelloun, Head of the SimLab, Mohammed VI Polytechnic University.*

The innovation lab, a one-of-a-kind demonstrator

The Innovation Lab for Operation (ILO) contributes to the study, development, and management of Innovation Centers for Operations, or ICOs, with the end goal of building life-sized industry 4.0 facilities. The Group is considering three ICOs: one at the experimental mine in Benguerir, one in the Living Lab in Safi, and one currently being studied that will include two production lines typical to other Moroccan industries: one for assembly, and the other for agri-food processes. These systems provide a visual representation of industry 4.0 advanced technology, which encompasses augmented reality, intelligent robotics, 3D printing, the IoT, data analytics, and additive manufacturing. In other words, they provide the high-tech digital means that industrialists and academics use for research and development. Ultimately, the ILO will house one of the greatest production systems in Africa, and in the world, dedicated to research, advanced engineering, and training. The Innovation Lab serves as an innovation showcase and gateway for Mohammed VI Polytechnic University, as well as for Morocco. It helps recruit students, tech partners, eminent scientists, and others.

Thanks to the digital replication feature, teams can validate their decisions and accomplish their project more efficiently, from the original idea to realization. Viewing a digital replication is very simple in virtual reality systems. It helps experiment with new approaches and create industrial designs that will give rise to new processes, facilities, and installations.

To do so, a total paradigm shift is required, as well as an innovative way of raising awareness and training employees. This is what is meant by "learning by doing." End users are called to participate in the same way as engineers and technicians; they offer their expertise and help adapt solutions to real-life processes.

FIELDS OF ACTIVITY AND EXCELLENCE

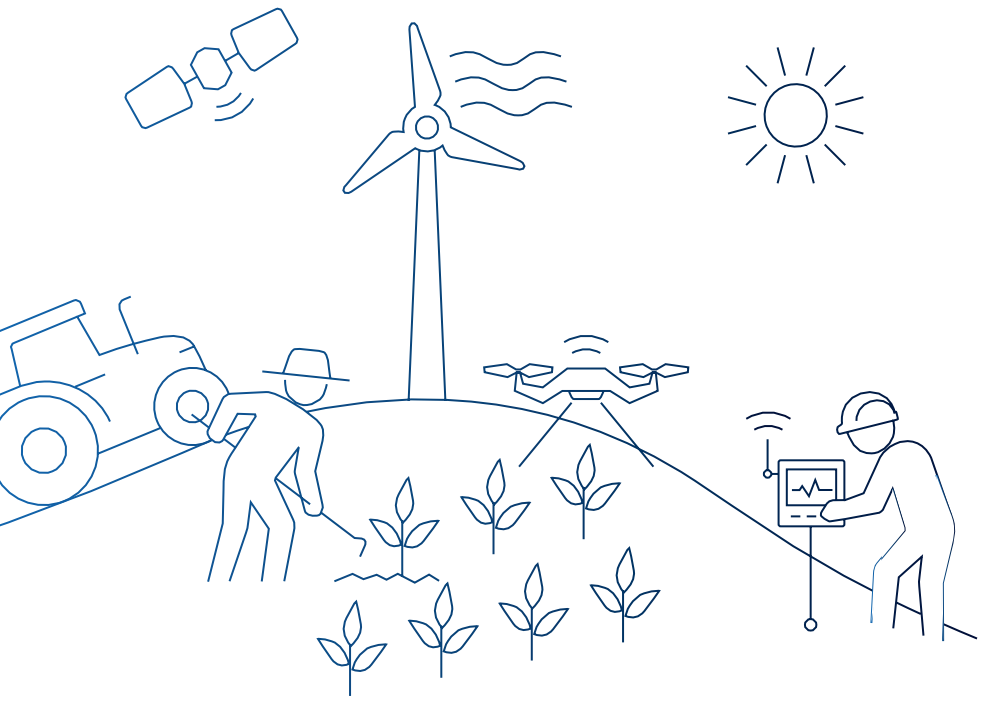
	1	2
Activities	Demonstration Raising awareness/Training Support/Expertise Testing/Experimentation	Prototyping/Industrialization Design/Production Support/Expertise
Main Infrastructure	**ICO** (Industry 4.0 facility designed to demonstrate new technology and production methods)	**FABLAB** (Design and production workshop for facility prototypes)

- Advanced process controls
- Advanced maintenance and smart sensors
- Industrial simulators
- Systems engineering and chemical fields
- Mining port facilities
- Industrial beneficiation
- Systems engineering and mining fields
- New phosphoric acid processes

Innovative joint development

The Open innovation platforms at Mohammed VI Polytechnic University have inspired the initiative to examine existing facilities and directly call upon builders to collaboratively build new specialized facilities, adapted to the changes introduced into the Group's industrial chain. This is what co-development is. Together, it's easier to respond to the demand. And that's not all; Mohammed VI Polytechnic University is also becoming a true breeding ground for talent that can serve Moroccan and African industry. By establishing training programs for students, researchers, and companies, OCP's R&D team is developing an research ecosystem capable of handling a large number of projects. The University also makes it possible to adopt industrial best practices and best practices in other areas connected with the Group's activities.

Unlike a research center, the Innovation Lab manages research programs and experimental development, while ensuring the transfer of technology with advanced engineering services.

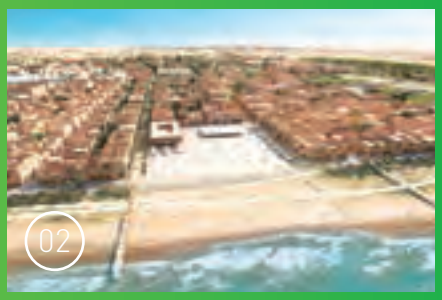


Living labs

The Living Lab testing sites are at the core of the University's research program. Open to the scientific community, these sites make it possible for partner university researchers to test solutions in real-world situations in several key areas.

By breaking the boundaries between research disciplines and relying on its living laboratories to transform ideas into practical solutions, the university aspires to support the current and future generations of Africans to become entrepreneurs and world leaders. With its teams, infrastructure, and laboratories, Mohammed VI Polytechnic University is enriching the country's knowledge economy through the creation of strong synergies between higher education, R&D, and startup incubation. This also drives economic activity, job creation, and business opportunities.

Living labs, at the heart of innovation



01 **Advanced mining technology platform in Benguerir**:
This experimental open-pit mine provides many opportunities to researchers in the mining sector, particularly with respect to ore mining and processing.

02 **Laayoune blue water park**:
Located on the Foum El Oued site in Laayoune, this future laboratory will pave the way for research work oriented toward the development and appropriate use of natural resources, including water, renewable energy, and, in particular, wind power.

03 **Green energy park**:
This is the result of a collaboration between IRESEN and the Mohammed VI Polytechnic University, and it houses a solar farm that makes it possible to experiment with different photovoltaic panel technologies as part of Morocco's National Energy Plan.

---

04 **Safi chemical hub:**
The Safi logistics center is a life-size plant that has been transformed into a test lab for new fertilizer manufacturing and processing techniques.

05 **Agri-tech platforms:**
These experimental farms develop models and techniques for cropping plans and for the use of innovative fertilizers, in addition to conducting planting trials in different biological and mineral environments.

06 **Benguerir green city:**
A one-of-a-kind project on the African continent. The project's urban development and waste management, energy conservation, and water treatment models are setting the stage for numerous studies and research projects for cities of the future.

Benguerir Tech Park, a space for exchange and innovation

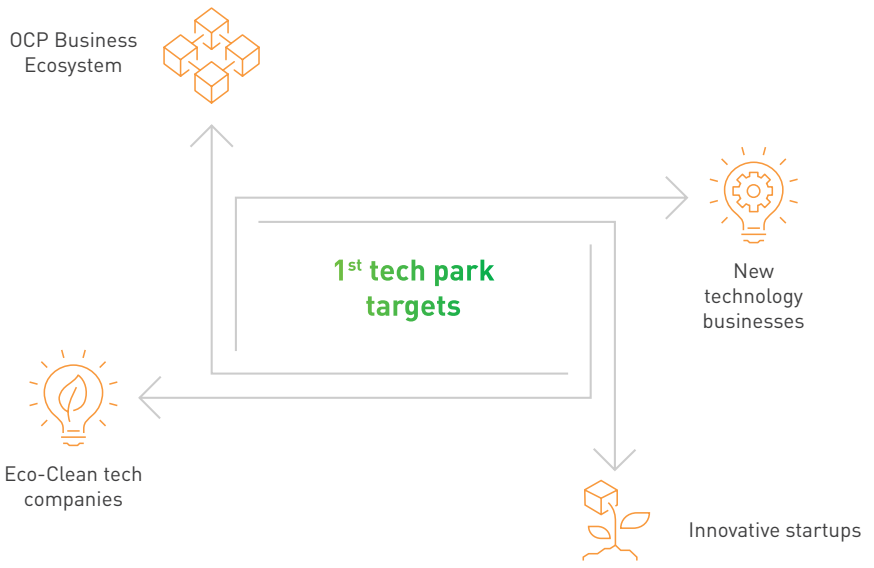
The Benguerir Tech Park project, located close to Mohammed VI Polytechnic University, is an ambitious project led by the Green Urban Planning and Company (SADV), an OCP subsidiary specialized in green development. The idea is simple: Why not benefit from the proximity of UM6P, the Industrial Skills Center, the Green Energy Park, and the Green City to establish an R&D and technology hotspot and create an innovation space entirely dedicated to research and incubation for the OCP business ecosystem and others? The approach behind the establishment of the Tech Park was to bring together startups, researchers, and industrialists in one place to create a sustainable and high value-creating synergy.

Everything has been designed to facilitate the achievement of these objectives. The Tech Park is set up on a rental basis, where startups can get set up, rent the various spaces (offices, production facilities, warehouses, etc., all available on demand), and benefit from various high value-added services. Startups can also benefit from UM6P's R&D partnerships, continuing education programs, and the FabLab design and manufacturing workshops to successfully implement their projects. In addition, a consulting service for project leaders is also available in association with OCP's partners and academic ecosystem.

This incubation space fits in perfectly with the Group's digital transformation strategy, with ecosystem management being one of its major areas of focus. The relationships that the Group has built and continues to build with startups are an essential part of the open innovation approach. This is a long-term partnership-based approach aimed at accelerating innovation. Working with startups and niche experts provides agility, creativity, and customization of solutions that boost the ability to design innovative offers for the factories of the future. Everything possible is done to minimize time to market and thus introduce new products and services much faster than would be possible in a normal process. These young startups benefit from the incubator's network of industrial partners and their startup ecosystems. They also benefit from OCP's expertise and that of all its industrial and research partners.

Clearly, the Tech Park is establishing itself as an accelerator. A talent, production, and innovation accelerator that creates a space where no effort is being spared to promote skills and exchanges between the academic world and the business world, with the goal of developing other Tech Parks in Morocco and Africa.

WHO IS THE TECH PARK FOR?



> We are sparing no effort in order to make Morocco the hub of technology development in Africa.
>
> *Hicham El Habti, Secretary General, Mohammed VI Polytechnic University.*

The emergence of the digital twin

Digital twins are part of the innovations that are currently taking the mining industry by storm. This technology, which makes it possible to design and virtually test machines and production processes, consists in creating a 3D digital image of a machine, production line, or even an entire plant. This in turn allows OCP to consider parameter changes, simulate different actions, or review configurations without having to make real prototypes or physical models. The technology can then collect data from sensors on the devices in operation and constantly adapt to real changes, while also allowing for new tests. These models will eventually make it possible to better plan maintenance operations, predict equipment failure, and improve existing products. The digital twins' goal is threefold: bringing more reliability, more efficiency, and more services.

Digital procurement: rethinking purchasing

To improve its competitiveness, OCP Group must make sustained productivity efforts. This competitive pressure leads to intense pressure to contain supplier costs and maintain quality and procurement lead times. This same pressure forces OCP to be agile and anticipate in order to adapt to shortened product and industrial life cycles.

Cost reduction remains the priority of the Group's Purchasing Department. With new technologies, the role is becoming increasingly strategic and intense, further integrating the concept of big data. The management of suppliers and sourcing is also evolving.

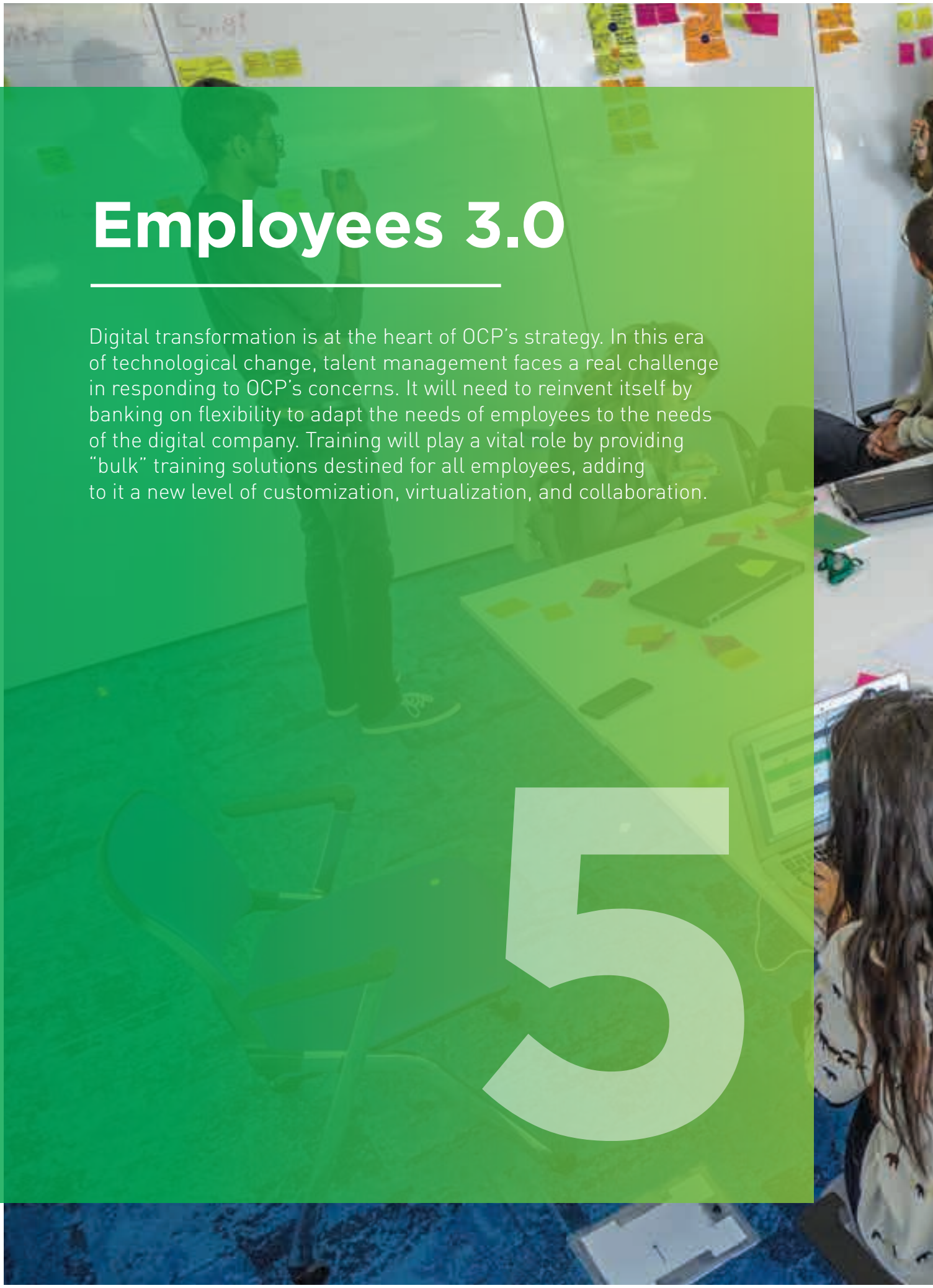
The "cost-killer" era is over, making room for the "Business Partner" era. Resolutely oriented toward business lines and the user experience, the Digital Procurement project OCP implemented in 2017 is being deployed in "agile" mode in accordance with a comprehensive road map.

We cannot simply implement a system and evaluate the results the following year. Rather, we need to push it forward by providing, over short periods of time, new versions of the platform that users can use while collecting useful information to improve the system.

Digital Procurement represents a new direction that guarantees improved performance, improved capacities resulting from real-time control, and better quality and risk management. The Business Partner buyer model is based on an integrated platform of digital solutions that can help to identify the best suppliers, their performance, compliance with contracts, and, above all, budget allocations. The model also includes going paperless and automating processes to make them quickly adaptable to organizational changes.
By improving the efficiency, agility, and the resulting Purchasing Department's performance, Digital Procurement effectively combines IT and the Purchasing Department's expertise. It is a business approach that takes into account user appropriation of software. The purchaser can thus leave low value-added tasks behind and focus on value-creating tasks. He or she can then acts as a true business partner in support of decision-making. Digital Procurment platforms also play a role in sharing and enriching data, because it generates large amounts of data through multiple sources. The importance of this data takes on its full meaning in the context of the digitalization of purchasing. Data analysis makes it possible to be proactive in may areas and make quick decisions, especially with the rise of predictive analytics for supplier risk. As a result, the right choice can be made at the right time.

This makes the Purchasing Department an essential partner that transforms quantity into quality through better collaboration and visibility over the entire the value chain.

This development is part of OCP's digital strategy, and it calls for a major overhaul of the Group's entire supplier network.



Employees 3.0

Digital transformation is at the heart of OCP's strategy. In this era of technological change, talent management faces a real challenge in responding to OCP's concerns. It will need to reinvent itself by banking on flexibility to adapt the needs of employees to the needs of the digital company. Training will play a vital role by providing "bulk" training solutions destined for all employees, adding to it a new level of customization, virtualization, and collaboration.

5


Example
Sketch
+
Headline
+
Caption

Digital technology and talent management: a win-win combination

In an increasingly complex industrial environment, OCP's Learning entities, namely the Industrial Skills Center and the Learning Institute, in close collaboration with Mohammed VI Polytechnic University, are supporting both the transformation of the Group's founding principles and OCP's proximity with its business lines. Beyond the management and development of employee talent and the optimization of individual and collective performance, this paradigm shift also aims at providing education in compliance with the highest international standards.

OCP's Learning Programs were created in partnership with the largest national and international academic institutions, and also with our internal expertise. The educational offer is continuing to grow and being enriched by proposing more and more services and innovative solutions. These solutions are digitalized to support OCP's digital transformation and be adaptable to the needs of employees.

Supporting change

In this era of business 4.0, employees must be able to use new systems, whether they are virtual or physical, and quickly make the right decisions in complex situations related to the quality and safety of data. With the rise of collaborative work, they must also be more versatile by venturing out of their area of expertise and interacting more with their work ecosystem. In the context of this wide spectrum of skills, new professions are emerging: product owner, business partner, cyber-security engineer, scrum master, etc., all are becoming new business lines supporting OCP in its development and growth. As a result, the learning offer is expanding to cover all these new business lines.

Thus, the offer has been adapted to meet the requirements of OCP learning employees. They want more digital technology, and fun, high-impact training. By using new pedagogical approaches, teaching formats, and technological innovations, the Learning Institute has been able to meet the high expectations of employees. Teaching is changing with digital technology: increased communication and new tools are being incorporated to training approaches.

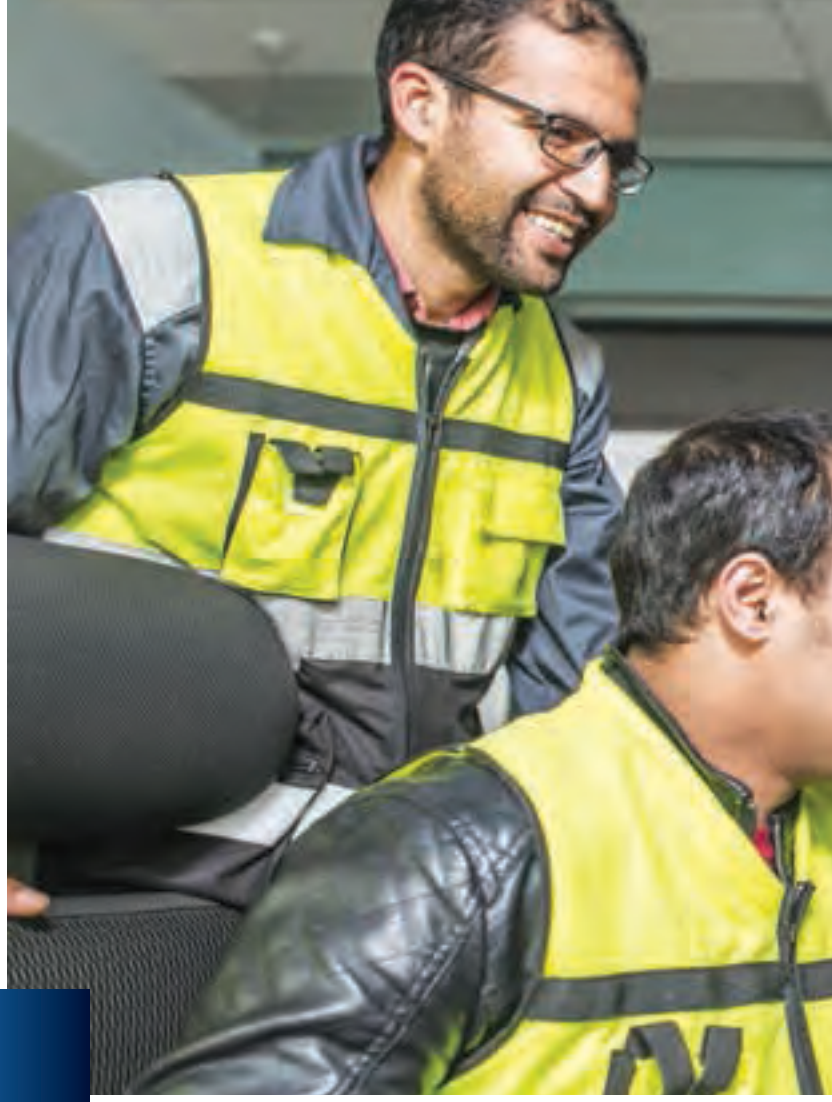
One of the major approach changes is, without a doubt, the decompartmentalization of training and work times. Some training programs should be available whenever the employee wants, at work or at home. In the context of these new practices, a tailor-made format "for the right person, at the right place and the right time," has been made available to all. Virtualization, fun approaches, and "Learn'in time" are all teaching methods aimed at accelerating OCP's digital transformation. OCP's recently created Digital Office has played a major support role in this change of mindset from conventional learning to digital learning. It will continue to support everyone in their daily digital lives throughout the coming months. In 2017, many digital initiatives were carried out along these lines, leading to the creation of significant synergy between OCP's different entities.

New practices

Before going completely digital, it became immediately clear that it was necessary to support each employee in acquiring the new mindset imposed by the changing technology, whether in the context of training or business line support. Many actions have been taken in this direction to help employees adjust to the digital company that OCP is aiming to become, whether the employees are Gen Ys or part of the preceding generation. In 2017, the NetExplo platform was deployed for a good part of the year to enable everyone to become familiar with the language of the digital world. This initiatory course made it possible for everyone to become acquainted with the terminology associated with the new technology and take ownership of this knowledge to better face the future changes. Once better armed for the technological changes, employees were better able to appreciate the new online training platforms. They also acquired a better understanding of the business lines through the VIT (Virtual Immersive Tour), which helps newcomers understand the Group's industrial environment through a virtual 360° tour.

Among the digital initiatives for the modernization of HRM tools or the facilitation of business line communities, the Group launched a digital platform called "MyOCP," which is also available as a mobile app. The platform is designed to be a single portal combining all employee interaction channels (HR, social, medical, day-to-day, career, etc.). OCP is also launching the Digital Workplace, a kind of internal social media called "Connect," which will reinvent the work code. This tool gives OCP employees a way to work together in an agile and transparent manner. The launch phase started at the end of 2017, with the goal of gradually generalizing the Digital Workplace by 2018.

New agile methods are also being tested, offering a learning approach with a new collaborative angle. A "learning from peers" approach involves the provision of operational excellence or HSE training, making it possible to promote and share OCP's internal business line expertise. Many employees got involved by proposing content or by co-hosting and hosting training modules, making it possible for them to contribute their expertise and experience to the Group's reality and facilitate the transfer of OCP knowledge.



We need to decompartmentalize training time and work time. Some training must be available when employees need it, at home or at work.

The VIT, virtual tour of the OCP world

Though it is quite fun, the Virtual Immersive Tour isn't the latest hit theme park attraction. Rather, it is a virtual tour of OCP's business. It allows new employees to become familiar with the Group's business lines and activities by exploring in the VIT, putting the industrial processes that make OCP a phosphate world leader at their fingertips. With one touch of the screen, the visitor can travel to one of the operating sites and learn everything about OCP's mining and transformation processes, or be teleported to Jorf Lasfar to see how OCP products are loaded on boats and transported to the rest of the world.

Customer centricity

User experience is at the heart of the new digital platform's features. Designed to simplify employees' daily lives, My OCP is a portal with a modern design and fluid ergonomics. Offering a one-stop-shop for all the services employees need every day, including administrative requests, report downloads, medical record consultation, hotel bookings, and meeting room bookings, the features will continually evolve to meet everyone's needs. The portal is accessible to employees from their computer, smartphone, or tablet.

Responsible together

The advent of digital technology in a Group like OCP necessarily goes hand in hand with security concerns that cannot be overlooked. The IS department very naturally established a series of initiatives to raise awareness about the greater responsibility that comes with the freedom offered by digital technology. A guide was also distributed to the whole Group to raise awareness about computer security and the best practices to adopt.

With the creation of the Community Managers, we were able to help employees transition to digital technology by involving them more than would have been possible had they faced the changes alone.

Strong synergy created with UM6P

The Learning Institute is bolstering the synergy with Mohammed VI Polytechnic University, the preferred partner that the Learning Institute entrusts with many training programs. The University's academic body has been mobilized to design and host programs tailored to OCP and its business ecosystem's needs. In 2017, many high-impact initiatives were launched with different departments at the University (the Africa Business School, the Public Policy School, and the School of Agricultural Sciences, Fertilizers, and Environment, etc.). For example, a new degree, the Master of Science in the Geopolitics and Geo-Economy of Emerging Africa, was created as part of a partnership between the Public Policy School and HEC Paris in support of OCP's African strategy.

Learnin'time, the online academy

Employees now have access to Learnin'Time, a new online training software developed by CrossKnowkledge, world leader in digital learning software. Learnin'Time is a real online academy accessible anywhere, anytime, on computers, tablets, and smartphones. It has more than 80 training courses focused on management, leadership, soft skills, and business skills.

These courses, which feature innovative approaches and varied teaching resources, are designed and facilitated by world-renowned experts from the most prestigious academic institutions, including Harvard, Cambridge, IMD Lausanne, HEC, CEIBS Shanghai, ESSEC, and others.

KEY FIGURES

11,000
Person-days of training for executives

230
Training activities for executives

1,440
Executives trained

650
Days provided for executives

102,914
Person-days of training provided for technicians/line managers and laborers/office workers

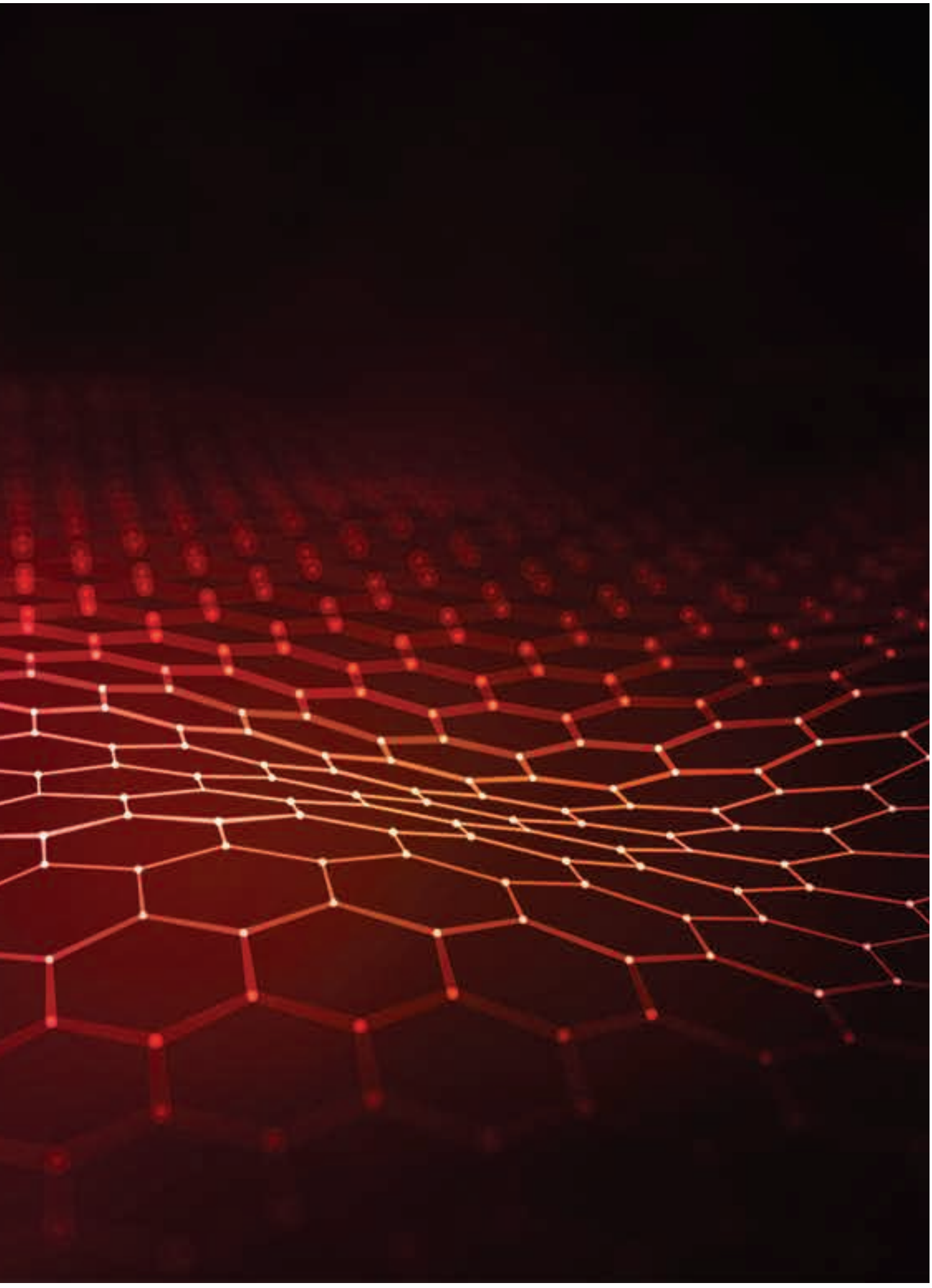
4,610
Training activities for technicians/line managers and laboreres/office workers

15,720
Technicians/line managers and laborers/office workers trained

Africa, new ways to innovate

Through its commitment and solidarity with the African continent, OCP is promoting the sharing of knowledge and experience, better cooperation, the creation of partnerships, and the implementation of innovative solutions to the African agriculture sector's funding and investment needs.
OCP is reaffirming its commitment through concrete actions in Africa. The Group's approach is comprehensive and affects the entire value chain.

6

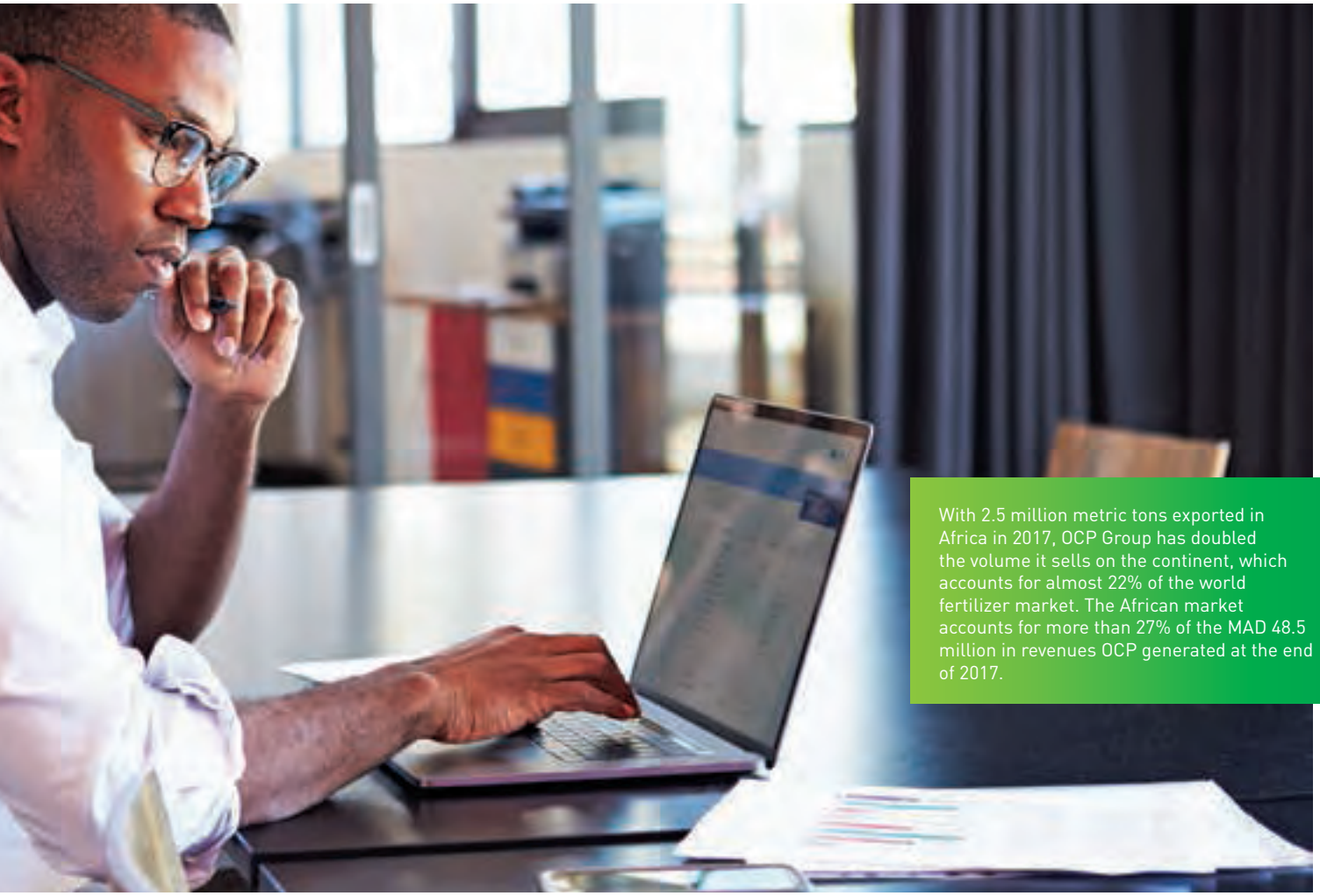


Digital Africa

The African continent has great development potential. While there are many challenges, the opportunities are also many. For OCP, there is a wide range of opportunities for developing the potential of African agriculture that will bring significant socio-economic gains. The continent's abundant farmland, water, and other resources are all factors that contribute to the development of prosperous agriculture. OCP is looking to support and train farmers, increase land productivity, preserve soils, and combine human and agricultural development, all while developing new technologies. OCP sees new paths for innovation, growth, and value creation herein.

With the establishment of OCP Africa in 2016, OCP Group gave itself ambitious means for action. This subsidiary dedicated to Africa works actively to ensure competitive fertilizer production near important agricultural areas, in addition to boosting existing logistical capacities and contributing to the development of new outreach distribution networks, with the goal of serving the entire agricultural sector. In addition to the continent's huge potential for growth, Africa is also at the heart of Morocco's new strategy for South-South cooperation. This partnership approach opens up multiple synergies in the agriculture sector. OCP is strongly contributing to it, thus working toward the development of a modern and resilient agricultural ecosystem. To fulfill its mission, OCP Africa has established a dozen subsidiaries on the continent.

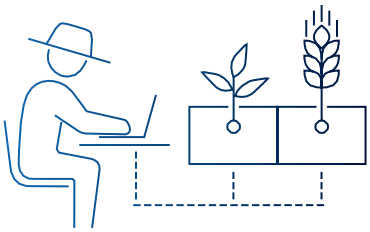
From the Agribooster to the School Labs, OCP Africa develops carefully designed programs to get even closer to farmers. At the core of this new entity's approach is the desire to better understand and respond to the needs of farmers while creating a



With 2.5 million metric tons exported in Africa in 2017, OCP Group has doubled the volume it sells on the continent, which accounts for almost 22% of the world fertilizer market. The African market accounts for more than 27% of the MAD 48.5 million in revenues OCP generated at the end of 2017.

synergy that combines advice, support, and good agricultural practices.

OCP Africa is also demonstrating its commitment to innovative agriculture by introducing new technologies, a concrete testament to the entity's desire to help farmers adopt good agricultural practices using digital tools. With the introduction of new customized formulas that are increasingly specific (thanks to soil and fertility map analyses), OCP Africa has shown that R&D is also an important part of its approach.



OCP Africa: The means to a winning south-south strategy

With Africa having 60% of the planet's arable land and being resposible for a considerable surge in fertilizer demand and consumption, the growth opportunities for African markets are significant. OCP is responding by establishing a continental strategy driven by OCP Africa. For the subsidiary, improving farmer productivity is no longer enough. What is most important is facilitating their access to the market. To meet the challenge, OCP Africa has deployed many initiatives in the field and developed partnerships with local governments, startups, private companies, and, naturally, farmers.

Production is also one of the fundamental areas of focus. Africa imports almost all its inputs, seeds, and fertilizers. For farmers, the cost of these imports is prohibitive. One way to boost regional production would be to support local blending operators, which would, in turn, lead to cost reductions. To make prices more attractive and open the market to African farmers, fertilizers need to be locally produced. High-quality products must be available on short notice and meet the specific needs of each farm. The most revealing example of this approach is the partnership established in 2017 with Ethiopia. Based on the complementarity of the two countries' natural resources, the goal of the partnership is twofold. Boost fertilizer production in Ethiopia using the country's many resources and ensure the country's fertilizer autonomy. This would make Ethiopia self-sufficient, even allowing it to supply fertilizers outside its borders.

The Nigerian partnership has been just as significant. The goal in Nigeria is to support the development of the country's fertilizer industry by building operator capacity. In 2017, this cooperation led to the renovation

of nine blending units by these same operators and the installation of new units.

The same type of inter-country joint investment is underway or under negotiation in other African countries, such as Guinea and Angola.

As part of its strategy, OCP Africa is also investing in logistics and distribution. In order to transition from subsistence agriculture to value-creating and business-oriented agriculture, farmers must have access to the right fertilizer, at the right time and place, and at a fair price. Today, fertilizers are three to six times more expensive for African farmers. By giving farmers access to storage space and improving coordination throughout the supply chain, the logistical costs are substantially reduced and products can be delivered on time. The last area of focus is marketing and support. OCP Africa brings its expertise directly to farmers in the field through dedicated caravans. Traveling from village to village, they provide advice and soil analyses to famers. OCP Africa is reaching out to African farmers and supporting them throughout their growing season. Best practices, soil analyses, advice on the best fertilizers for different seed types, training, networking between farmers and final buyers– many actions have been taken since 2016 and they are starting to bear fruit. Centered on making African farmers independent business leaders, this is a socially responsible approach.

The Agribooster program and the OCP School Lab are examples of this desire to support the continent's development.

4 PILLARS OF THE OCP AFRICA APPROACH

R&D and agronomy

New customized formula tests (adapted to soils and crops).

Production

Investing in fertilizer production capacity and fertilizer blending facilities (blending units) close to consumption areas to ensure the availability of our tailored products.

Distribution & logistics

As a result of this proximity, we want to guarantee farmers the availability of the right products, at the right time, in sufficient quantities, and at the right price.

Marketing & sales

We want to make every effort to offer stakeholders in various agricultural industries products, networks, and services that are tailored to their needs.

Digital technology, a lever for african development

The continent has a range of particularities that must be taken into account, including the inaccessibility of certain regions, language differences, geographic challenges, and cultural specificities. Digital technology can play an important role in addressing these issues. How can we provide support to farmers throughout their growing season without the mobile apps used to deliver advice? How can we make fertilizer recommendations without quick and extensive soil analyses on farms? How can we respond to their need to know market prices for any given crop without quick access to national and international data? All this advice, these actions, and approaches are made possible by the digitalization of OCP Africa's initiatives. Through many initiatives, including the Agribooster program, the Market Place, and the OCP School Lab, it is now possible to advise and support a large number of farmers regardless of their region or its inaccessibility.

Digital technology has made the impossible possible through smartphone voice messages, AI capable of analyzing soil and making fertilizer recommendations, and the provision of technical information directly on farmers' phones.

Ethiopia-Morocco: investing in a future link

The general context of the joint investment between Ethiopia and Morocco is the development of production facilities that are as close as possible to consumer basins. In 2016, OCP Group and the Ethiopian Ministry of Industry signed a strategic partnership to build a world-class plant in the Dire Dawa region, a perfect example of the South-South partnership model. With a production capacity of 2.5 million metric tons per year, the plant is projected to produce 3.8 million metric tons annually and will allow the country to be fertilizer self-sufficient and create export opportunities.

Based on the complementarity of Morocco and Ethiopia's resources, the Dawa Fertilizer Complex platform will produce fertilizers using Ethiopian potash and gas and OCP phosphoric acid. The unit will create 1,200 jobs in its construction phase and 500 permanent jobs in its operational phase.

100% of the country's fertilizer demand covered

2.5 million metric tons produced per year (3.8 million for phase 2)

1,200 direct jobs (during construction)

500 permanent jobs during the operational phase

> From the Agribooster program to the School Labs, OCP Africa develops carefully designed programs to get even closer to farmers. We want to better understand and respond to the needs of farmers while creating a synergy that combines advice, support, and agricultural best practices: this is the foundation of our approach.
>
> *Karim Lotfi Senhadji, Executive Vice President Africa - General Manager of OCP Africa.*

Nigeria: Bringing the blenders back to life

In 2016, our Group signed a draft agreement with the Fertilizer Producers and Suppliers Association of Nigeria (FEPSAN) as part of the Presidential Fertilizer Initiative.

This collaboration between the two parties extends to the entire agricultural value chain, from the introduction of fertilizer solutions adapted to the Nigerian soils and crops, to the availability of these fertilizers on the local market at competitive prices, and the implementation of support measures among local farmers.

The fertilizers were marketed at prices lower than those that were previously offered. The agreement goes even further because it aims to promote local fertilizer production and develop the Nigerian industrial fabric. In the long run, the agreement will facilitate job creation in Nigeria by promoting high value-added products.

Operator capacity building, facility revamping, technical renovation of equipment, significant price decreases, etc. All these achievements are proof of the partners' commitments and illustrate the fruits of a public-private collaboration (National Sovereign Investment Authority, FEPSAN, logistics operators, etc.) that makes it possible to deliver fertilizers closer to farmers at an optimized cost.

In 2017, nine blending units were renovated and other now fully operational units were installed.

More units will be added in 2018. With the support of the State, railway lines that have been inoperative for over 20 years were used to transport raw materials to the various blending units. Even more importantly, according to FEPSAN, this partnership has created over 50,000 direct jobs and 140,000 indirect jobs in all sectors of the Nigerian fertilizer value chain.

50,000 direct jobs

140,000 indirect jobs

9 refurbished blending units

1 North-South axis rail network recommissioned

Tanzania: Enhancing rice and maize production

In Tanzania, close to 70% of agricultural production is done by hand and is characterized by low yields compared to international standards. Tanzanian agriculture faces many challenges related to climate change, a lack of infrastructure, and the inaccessibility of new technologies. However, the country has great potential, both as an important agricultural center and regional transshipment hub. Its fertilizer needs are expected to grow in the coming years. One of the main issues is securing quality fertilizer sources that can deliver within agreed-upon timeframes and at prices affordable to Tanzanian farmers. It is in this context that OCP Africa has developed a strategic partnership with the Tanzanian Fertilizer Company (TFC), the Tanzania Fertilizer Regulatory Authority, and the Mlingano Agricultural Research Institute.

Using a joint construction approach, OCP's subsidiary is aiming to develop a sustainable agricultural ecosystem in Tanzania that can develop solutions adapted to the needs of Tanzanian farmers. The goal of the partnership between OCP Africa and the Mlingano Agricultural Research Institute is to develop specific formulas that will enhance the production of rice and maize in all the country's ecological zones.

More than 800 plots were analyzed in the first phase of the project, and their number is set to increase to 1,400 for the second phase. OCP is also studying the possibility of developing local production units in order to be as close as possible to the main agricultural regions. The goal is to provide a stable, fairly priced supply of products made locally using the country's natural resources.

Since September 2017, OCP Africa has delivered a total of 32,000 tons of DAP fertilizer to the United Republic of Tanzania and wants to double that volume in early 2018.

Guinea:
A logistical challenge

The partnership between Guinea and OCP, which has existed since 2014 and focuses on soil knowledge and the training of Guinean farmers in agicultural best practices, reached a new key milestone in 2017.

In February, an important fertilizer supply agreement for this country was signed, a testament to the Guinean government's desire to guarantee food self-sufficiency for its population. The agreement will also generate income by exporting agricultural products and attracting investors. As a result of the partnership, annual fertilizer consumption rose fivefold from 20 Kt in 2016 to 100 Kt in 2017.

The operation was made a success through the mobilization of the Guinean Government and local partners. Guinea has also established local control and monitoring entities to ensure the smooth running of operations. All the Guinean Ministry of Agriculture's storage areas have been used (116 in the country's 33 regions). Private logistics services providers and carriers have also been involved in cost optimization efforts.

In the field, support measures for local farmers were strengthened through the mobilization of research and agricultural consulting institutions and agencies. Many field school programs also were conducted in different regions of the country in order to educate farmers about the importance of fertilizer use and agicultural best practices.

15 field schools
organized

100,000 metric tons of fertilizer
consumed for the 2017/2018 season (5 times more than the previous year)

70,000 trips
between the port and the served areas

THE AGRIBOOSTER:
Getting closer to farmers

After the success of the pilot Agribooster support program with 50 maize producers in the Korhogo region of Côte d'Ivoire in 2016, OCP Africa extended the model to Kaduna State in Nigeria. The success of the pilot phase with the maize farms confirmed the model's scalability and sustainability.
In Kaduna, maize producers have increased their productivity by more than 25%.

OCP Africa's mission is to contribute to the productivity of the continent's agricultural ecosystem, and it does so through a number of initiatives in the field. With the Agribooster program, which helps African farmers access value-creating agriculture, this model has found its full expression. Thanks to a well-designed offer, OCP Africa's Agribooster program helps a large number of African farms and makes it possible to develop larger scale agriculture in areas where only subsistence farming was previously practiced.

A complete package

What is the Agribooster program, anyway? The Agribooster is a complete package that includes everything farmers need for a successful growing season. The offer includes inputs (seeds, fertilizers, phytosanitary products), financing, a crop buyback guarantee, and support in the form of counseling to help farmers better prepare their seeds and harvests.

The Agribooster program is a solution that works at many levels. First, it provides fertilizers that are adapted to specific crops. As a result, farmers have access to the best products at affordable prices, thus allowing them to boost their yields. Financing also serves this purpose. One of the big challenges in Africa is the insolvency of farmers who do not qualify for loans without guarantees. As a result, OCP Africa worked with microfinance institutions to encourage their involvement in remote African areas. The Agribooster program also involves the effective management of aggregators to ensure crop buybacks. Farmers are guaranteed both buyers for their harvests and fair prices, thus giving them sufficient means to live and reinvest in the next year's growing season. Last but not least, there is the technical support aspect. Focused mainly on training in agricultural best practices and management that help farmers increase their yields and incomes, this technical support makes it possible to get close to farmers to provide advice, encouragement, and the opportunity to ensure the profitability of their activities. Beyond the sales and market aspect, the Agribooster contributes to one of OCP Africa's main missions: developing African agriculture and making it into a force for wealth creation.

THE AGRIBOOSTER PROGRAM

“You have a message...”

Although the Agribooster program has been successful in generating agricultural ecosystems with growth potential, the program also faces difficulties related to geography and the inaccessibility of farmers. Often, targeted farmers are in hard-to-reach places and direct contact with them is very expensive and difficult. In this context, digital technology can play a big role. What is the best way to reach these thousands of farmers spread out across often huge areas in order to provide them with advice and offers? Much remains to be done in Africa, making it a great testing ground for technological innovation. Digital experiments have the potential to provide many solutions. It is with this goal in mind that OCP Africa signed a partnership with a startup that has developed a Market Place system, a fully digital platform and offers product and service packages. This way, farmers don't need to travel to receive advice on fertilizers, seeds, or agricultural best practices. Everything is done via voice messages and mobile apps. The technology was first introduced in Kenya in the potato farming value chain, making it possible to develop and test the concept. Through their mobile phones, farmers receive push messages or voice messages, thus allowing them to access valuable information without having to travel. With their mobile phones, they can order their inputs directly, inquire about market prices, and receive quick answers to questions about certain agricultural practices. This first application of the technology led to a 30% increase in yields.

The pilot program, which was implemented in Kenya for all of 2017, clearly demonstrates the power of digital technology in the agricultural sector. The model was made possible by the very nature of African issues and is a purveyor of hope for all African farmers, who will now be able to access a global agricultural market using new technologies.

> Digital innovations can be seen as a way to reduce the distance of farmers through the use of new technologies.
>
> *Jihan Ajijti, Head of the Agribooster Program, OCP Africa.*

The agribooster program in Côte d'Ivoire: Assessing the impact on yields

The first Agribooster pilot program took place in 2016 in the Korhogo region of Côte d'Ivoire, a region well-known for its maize production. The initiative was conducted with 50 farmers in order to assess the impact on crop yields. OCP Africa covered nearly 100% of the input costs and distributed them free of charge to participating farmers. Agreements have also been made with different buyers to set minimum prices for their harvest purchases, subject to contract-stipulated quality. Throughout the entire growing season, OCP Africa teams supported farmers by providing them with advice and teaching them best practices. On average, yields tripled by the end of the program.

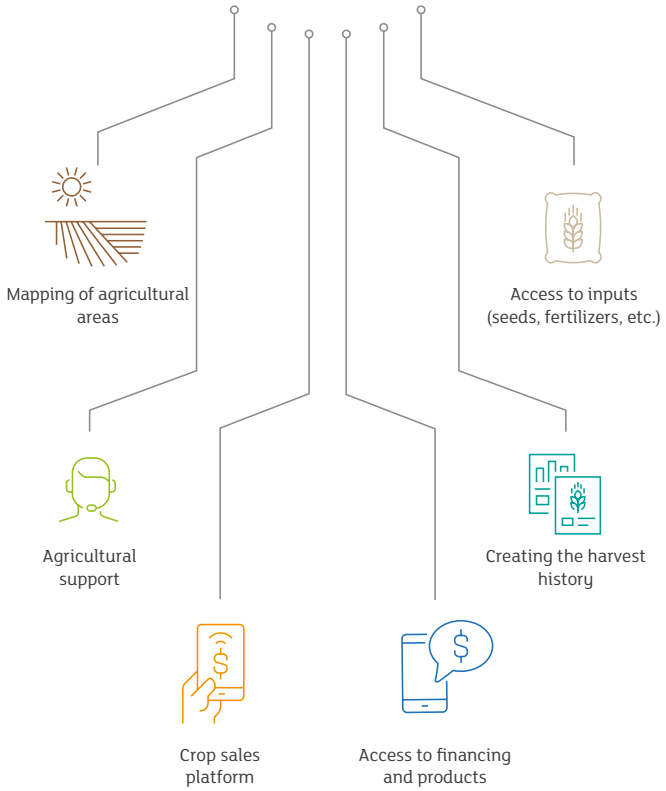
The best results have been observed following the use of the Agribooster Plus formula, which combines OCP fertilizer, hybrid seeds, phytosanitary products, and training. Farmers' incomes have also increased significantly.

In Côte d'Ivoire, imports are still weighing on the country's economy. The country imports 50% of its rice when it could be producing a surplus. It is difficult for small farmers to find their place.

The goal of the pilot program was to have a positive impact on yields through a combination of many components, including quality inputs and the implementation of agricultural best practices.

The mobile phone Market Places allow small producers to connect with input suppliers, micro-credit and insurance institutions, and potential harvest buyers. The technology promotes the inclusion of farmers on financial markets and channels at a lower cost.

DIGITAL TECHNOLOGY SERVING FARMERS



> This program is a turnkey solution that supports farmers from the planting stage to the harvest sale stage. In this manner, we are contributing to increased yields and revenues for small farmers, helping them to transition from subsistence farming to owning real farming businesses.
>
> *Mehdi Oukach, Agribooster Program Manager, OCP Africa.*

A sustainable and fair agricultural ecosystem for nigerian farmers

In 2017, a second Agribooster pilot program was launched to benefit 5,000 Nigerian farmers. The goal was to contribute to the emergence of a sustainable and fair agricultural ecosystem for small farms. OCP Africa teamed up with several partners including: AFEX Commodities Exchange Limited and LAPO Microfinance Bank Limited. This partnership has allowed each partner to share their expertise in their field of specialization. For example, OCP Africa provided fertilizers and training and dissemination services to the 5,000 identified farmers in collaboration with the International Fertilizer Development Center (IFDC). As a trade and commodities platform, AFEX ensured both the purchase of harvested crops and storage services, while LAPO provided loans for the acquisition of inputs.

The financing issues facing small farmers in Nigeria are linked to their low capacity for high-quality input purchases. Partnerships with credit agencies have thus been designed to address this problem. After this successful first stage in Nigeria, the Agribooster team intends to reach out to between 30,000 and 50,000 Nigerian farmers in 2018. Other African regions will gradually be added to the program.

OCP SCHOOL LAB, best practices for better agriculture

Ocp Africa truly believes that supporting farmers and teaching appropriate fertilization must also involve long-term projects that mobilize local resources and talent. To this end, OCP Africa works hand in hand with farmers, in particular through training, agronomic tests, soil analyses, and fertilizer recommendations tailored to crops and soils. Over time, farmers will increase their yields and incomes.

Among the developed initiatives, the OCP School Lab stands out by its innovation as a mobile school that raises farmers' awareness about agricultural best practices. Each training is adapted to the main crops in the visited regions, like cocoa in Côte d'Ivoire or maize in Kenya. A mobile soil analysis laboratory with the latest technology also supports these schools, making it possible to analyze soil fertility in real time.

Action backed by understanding

OCP School Lab is an initiative that offers a customized solution to each mobilized farmer. The initiative is structured around a package that includes training, agricultural best practices, soil analyses, and fertilizer recommendations. By getting close to small farmers and farms, the OCP School Lab creates lasting bonds and strongly contributes to developing agriculture on the continent.

These awareness campaigns travel to a number of regions in different African countries over a period of three to five months. Going from village to village, the OCP School Lab Caravan also includes OCP agronomists and a mobile laboratory to perform soil analyses. This a complete package that provides training and the necessary counseling to farmers. The OCP School Lab's agronomists can train farmers using videos and illustrated documents, and provide them with advice and teach them best practices. At the same time, farmers can have their soil samples analyzed in order to obtain fertilizer application recommendations.

OCP School Lab is an outreach initiative that leads to close connections with farmers, which in turn make it possible to better understand their practices and problems. It also gives farmers crucial access to soil analysis information, allowing agronomists to recommend fertilizers adapted to the country's soils and crops. Finally, the program has a human dimension that fully expresses one of OCP Africa's missions: to provide African farmers with sufficient independence to transition from subsistence farming to value-creating agriculture.

Technical innovation serving farmers

Although the human dimension is important in OCP School Lab campaigns, technological innovations are equally crucial. With respect to soil analysis, for example, farmers had no options before the OCP School Lab. If farmers wanted to get a clear idea of the best fertilizer to use, they had to travel to a nearby city to have a soil sample analyzed. This could take several days and often be very expensive. Today, thanks to the OCP School Labs, a soil analysis laboratory is available locally. Using innovative spectral soil analysis technology, OCP School Labs provide farmers with a fertilizer recommendation in a few hours! The time and money savings are very significant, with each analysis costing no more than 3 or 4 dollars, as compared to 30 dollars previously. For farmers, the analyses are free. In addition to soil analysis, OCP Africa has formed a partnership with a world-renowned research Institute, the International Plant Nutrition Institute (IPNI).

The Institute created the Nutrient Expert tablet software, which generates a fertilizer recommendation for farmers through a 30-item questionnaire. Through either soil analysis or the IPNI questionnaire, nearly 70% of farmers who participated in the first OCP School Lab campaigns got a very clear idea of the right fertilizers to use for their crops. The pilot program, launched in 2016 in Côte d'Ivoire, has been a great success with farmers. In total, about 35,000 farmers were trained in 2017 through the School Labs. More OCP School Lab campaigns have already been scheduled for next year in order to reach more small farms in other regions and countries, including Senegal.

> Human contact with farmers is essential for an OCP School Lab campaign to work, but the profiling dimension is equally important. Thanks to the soil analysis data, we can offer better fertilizers that are better suited to African soils and crops.
>
> *Imane Saroute, Head of the OCP School Lab Program, OCP Africa.*

A traveling school combining training and technical support thanks to a mobile laboratory with the latest on-board soil technology allowing for on-site demonstrations.

35,000 farmers educated and trained

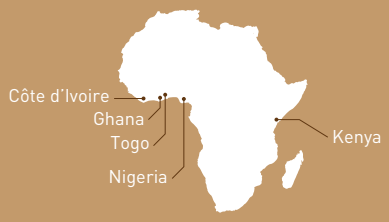
- Substantial increases in crop yields for strategic crops
- Appropriate good practices

30 to **50** soil tests per day
(with spectral analysis technology)

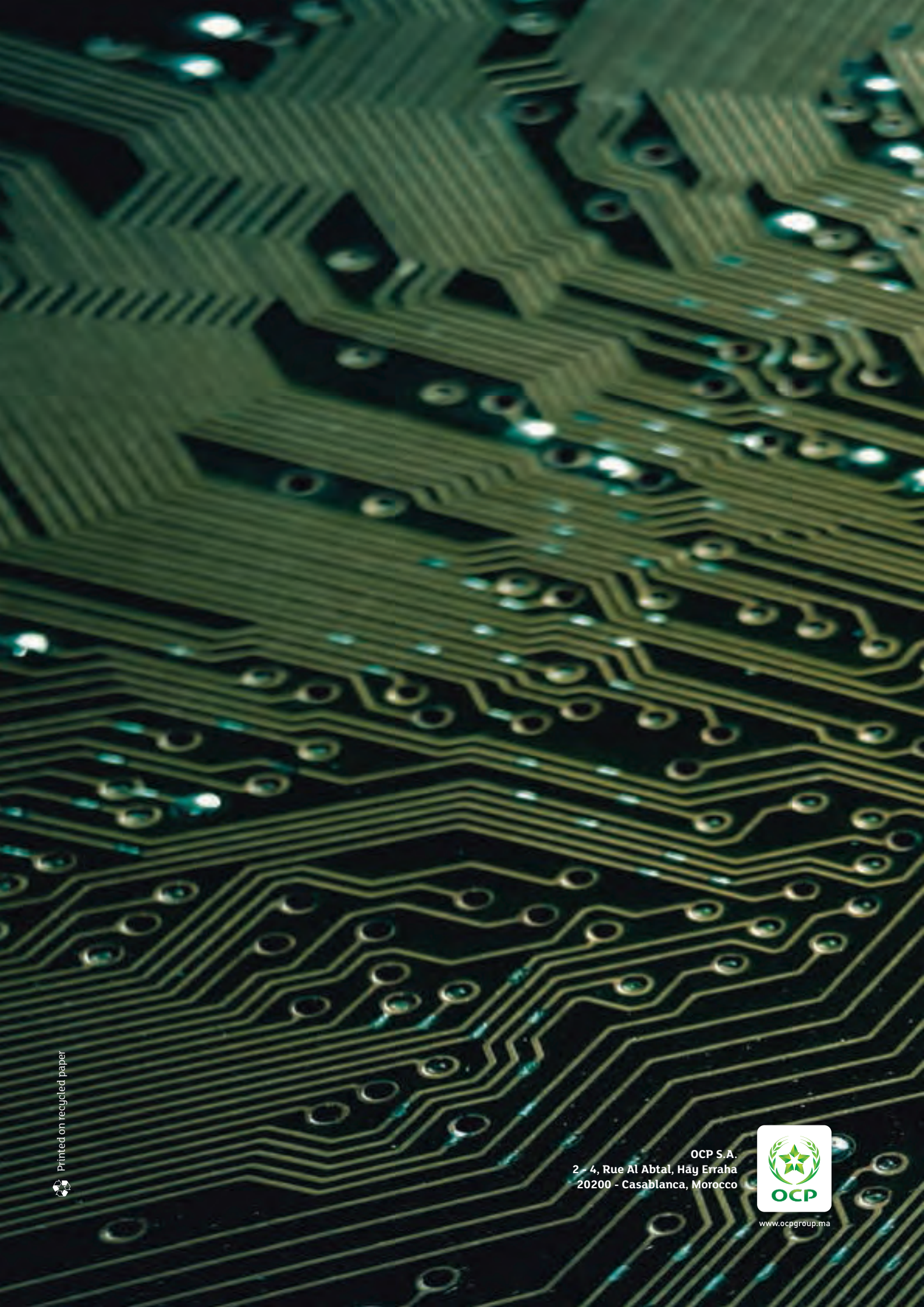
11 languages
used in training materials provided by School Labs
(English, French, Ewe, Hausa, Kirundi, Swahili, Portuguese, Wolof, Dagbani, Gonja, and Sisaala)

5 strategic crops
Corn - Cocoa - Rice
Tea - Potato

5 countries



40 summaries
reports per day with personalized fertilizer use recommendations



Printed on recycled paper

OCP S.A.
2 - 4, Rue Al Abtal, Hay Erraha
20200 - Casablanca, Morocco

www.ocpgroup.ma