

Morocco, a top fertilizer producer, could hold a key to the world's food supply

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*Africa Market Share includes NPKs
Source: IFA preliminary aggregate statistics 9M 2020, excluding purified acid from China.

Image from the OCP's 2020 sustainability report.

Morocco has a large fertilizer industry with huge production capacity and international reach. It is one of the world's [top four](#) fertilizer exporters following Russia, China and Canada.

Fertilizers tend to divide into three main categories; nitrogen fertilizers, phosphorus fertilizers, potassium fertilizers. In 2020 the fertilizer market size [was about](#) US\$190 billion.

Morocco has distinct advantage in the production of phosphorus fertilizers. It possesses [over](#) 70% of the world's phosphate rock reserves, from which the phosphorus used in fertilizers is derived. And this makes Morocco a gatekeeper of global food supply chains because all [food crops](#) require the element phosphorus to grow. Indeed, so does all plant life. Unlike other finite resources, such as fossil fuels, there is no alternative to phosphorus.

In 2021, the global phosphorus fertilizer market amounted to [about](#) US\$59 billion. In Morocco, the sector's 2020 revenues amounted to [US\\$5.94 billion](#). Office Chérifien des Phosphates, the producer owned by the Moroccan state, accounted for [about 20%](#) of the kingdom's export revenues. It is also the country's largest employer, providing jobs for [21,000 people](#).

Morocco plans to produce an additional 8.2 million tons of phosphorus fertilizer by 2026. [Currently production](#) is at about 12 million tons.

The state company recently [announced](#) that it would increase its fertilizer production for the year by 10%. This would put an additional 1.2 million tons on the global market by the end of the year. This will significantly help markets.

But, as I argue in a [new report](#), Morocco faces new challenges. Its production of fertilizer is threatened by increasingly daunting environmental and economic challenges. They include the COVID pandemic and the severe supply chain disruptions that have followed.

The timing to address these is crucial.

Russia is currently the world's [largest](#) fertilizer exporter—15.1% of total exported fertilizers. And fertilizer represents one of the greatest vulnerabilities for both Europe and Africa. For instance, the EU27 (all of the 27 member state of the European Union) as a whole depends on Russia for [30%](#) of its fertilizer supply. Russia's advantageous position is amplified by its status as the world's second-largest [natural gas](#) producer. Gas is a main component of all phosphorus fertilizers as well as nitrogen fertilizers.

Because of this, Russia's invasion of Ukraine has serious implications for global food security. Both in terms of supply, and also because fertilizer can be used as an economic weapon or tool.

Morocco could therefore become central to the global fertilizer market and a gatekeeper of the world's food supply that could offset the attempt to use fertilizer as a weapon.

The journey

Morocco started to mine phosphorous in 1921. During the 1980s and 1990s it began to produce its own fertilizer. [Office Chérifien des Phosphates](#) built the world's largest fertilizer production hub in Jorf Lasfar on Morocco's Atlantic coast.

Before the outbreak of the Russia-Ukraine war, the company had more than 350 clients on five continents. [About](#) 54% of phosphate fertilizers bought in Africa come from Morocco. Moroccan fertilizers also account for major domestic market shares in India (50%), Brazil (40%) and Europe (41%). India and Brazil [have reached out](#) to Morocco to fill additional supply gaps.

Morocco's economy has reaped the benefits of the transformation into an international fertilizer exporting giant. And in sub-Saharan Africa in

particular, the combination of joint venture partnerships in local fertilizer production and [direct outreach](#) to farmers has resulted in a [remarkable boost](#) to African agricultural yields.

It's also expanded Morocco's soft power influence across the continent. For instance, Morocco [supplies over 90%](#) of Nigeria's annual fertilizer demand.

But, how well Morocco manages challenges to the industry will affect both its own economic development and the stability of food supplies across the world.

Water and energy constraints

Phosphate extraction and fertilizer production uses a lot of energy and water. Morocco's phosphate and fertilizer industry [consumes](#) about 7% of its annual energy output and 1% of its water.

But Morocco is among the countries [suffering the most](#) from water scarcity. This is [due to](#) a dry climate, high water demand, climate change and reservoir contamination and siltation.

Morocco is trying to address this through a [National Water Plan 2020–2050](#). It envisages building new dams and desalination plants and expanding irrigation networks, among other measures, to sustain agriculture and ecosystems. It's [estimated to cost](#) about US\$40 billion.

Natural gas costs

Nitrogen is the other basic fertilizer element that plants need. Diammonium phosphate, the most popular type of phosphorus fertilizer worldwide (and which Morocco makes along with monoammonium), is

[composed of](#) 46% phosphorus and 18% nitrogen. Natural gas accounts for [at least 80%](#) of the variable cost of nitrogen fertilizer.

This means the price of natural gas massively affects production costs. But Morocco has scant natural gas resources. And natural gas prices have been soaring.

How well Morocco manages the food-water-energy nexus will affect both its own economic development and the stability of food supplies across the world.

Some answers

The key is to expand its renewable energy sector. Morocco holds [considerable](#) solar and wind resources. Fertilizer manufacturing could become powered by renewable energy, and renewable energy could be used within the fertilizer itself.

In 2020, the state's fertilizer company covered [89%](#) of its energy needs by co-generation (producing two or more forms of energy from a single fuel source) and renewable energy sources. Its aim is to eventually cover 100% of its energy needs in this way.

Renewable energy could also be used within the fertilizer itself. Instead of importing ammonia derived from natural gas, Morocco could produce its own using hydrogen produced from its domestic renewable energy resources.

According to the state company, [31%](#) of its water needs are met with "unconventional" water resources, including treated wastewater and desalinated seawater.

Morocco's growing reliance on [desalination plants](#) to satisfy industrial,

agricultural and residential needs will require sizeable new investments in power generation from renewable energy sources. Desalination plants require [10 times the amount of energy](#) to produce the same volume of water as conventional surface water treatment.

To sustain operations and expand green ammonia production, Morocco will have to strike a careful balance between its fertilizer exports, its drive to expand its high-value agricultural exports and the provision of drinking water to its population.

Using its large solar energy resources to power green hydrogen and green ammonia production, along with desalination, Morocco could escape the vicious cycle of the upward spiraling of prices in the food-[energy](#)-water nexus.

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