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Applied Economic Research

Economic Assessment of the Development of a Phosphate Based Industry in Namibia

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Economic Assessment of the Development of a Phosphate Based Industry in Namibia

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13 August 2018

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Executive Summary

All plants and animals require phosphorus (P), an essential macronutrient. The major source of phosphorus is phosphate rock (PR), a phosphate- bearing mineral which is a finite and non-renewable natural resource. Some countries have abundant phosphate rock reserves and have benefited as a result. Morocco, the US state of Florida and Tunisia, to name a few, have employment in the tens of thousands and receive significant contributions to GDP from phosphate mining and beneficiation.

In Namibia there are known resources of phosphate rock lying on the ocean floor. This could benefit Namibia, just as it has benefited other countries with similar resources. This report sets out to analyse the economic benefits that could accrue to Namibia from opening the country to an incipient phosphate industry.

It is recognised that a complete industry is not setup over-night, it is a process which evolves over time. This would also be the case with a Namibian phosphate industry. The industry would expand in discrete steps as cost and market information becomes more certain within the Namibian context. First there would be the need for dredging and basic beneficiation. Firms would need to establish plants and secure markets. This could be followed by additional beneficiation which would also need additional expenditure on factories and securing of markets for these products. There is, finally, the option to expand into advanced levels of beneficiation.

The analysis includes:

1. The relevant Namibian policy environment. This was to ensure that the economic evaluation was done in the appropriate policy context. Vision 2030, related National Development Plan (NDP) documents and the Harambee Prosperity Plan were used for this purpose.

2. A time dimension to simulate the rolling out of the phosphate industry with increasing degrees of beneficiation. For this study, this was assumed to commence in 2012 and culminating in an integrated fertilizer industry by 2016. The purpose of making the analysis historic was to be able to base the economic estimates on known economic foundations.

3. The potential for improved agricultural productivity in subsistence farming because it is an important policy imperative.

The possible economic benefits to Namibia from a phosphate industry are set out in Tables ES1 and ES2. The first table gives the contribution to direct gross value added **(GVA)**, gross domestic product **(GDP)**, gross national income **(GNI)**, jobs and export revenues for the industry had it started in 2012 and reached full beneficiation by 2016.

Table ES1: Key Economic Benefits of Namibian Phosphate Industry (Financial Data: N$m 2016 prices)

Industry Macroeconomic Indicators	**2012**	**2014**	**2016**
Contribution to Direct GVA	3 280	5 170	7 963
Dredging	*293*	*403*	*549*
Concentrate	*2 089*	*2 749*	*3 585*
Beneficiated Products	*640*	*1 731*	*3 542*
Subsistence Farming Productivity	*258*	*287*	*287*
Contribution to GDP	5 813	9 318	14 774
Contribution to GNI	4 317	6 956	11 304
Contribution to Taxes	1 597	2 413	3 516
Total Jobs (Direct, Indirect & Induced)	18 025	30 441	51 593
Export Revenue	7 472	11 222	18 721
Net Forex Position	3 587	4 890	8 231

- Total direct GVA would have increased from **zero in 2010** to **N$3.3bn in 2012** and through industry integration to **N$8.0bn by 2016**. This would have been made up of an increase in:
  - Dredging from **zero in 2010** to **N$293m in 2012** and to **N$549m in 2016**;
  - Concentrate from **zero in 2010** to **N$2.1bn in 2012** and **to N$3.6bn in 2016**;
  - Further beneficiated products from zero in 2010 to **N$640m in 2012** and **to N$3.5bn in 2016**; and
  - Productivity gains in subsistence agriculture would have been boosted from 2010 levels by **N$258m in 2012 to N$287m in 2016**.
- The increase between 2012 and 2016 would have been:
  - GDP of N$5.8bn in 2012 **increasing to N$14.8bn in 2016**;
  - Gross National Income (GNI) of N$4.3bn in 2012 **increasing to N$11.3bn in 2016**;
  - Taxes from zero in 2010 to N$1.6bn in 2012 **increasing to N$3.5bn in 2016**;
  - New product exports worth N$7.5bn in 2012 **increasing to N$18.7bn in 2016**.

Arguably, in the Namibian context, job creation is critically important. In 2012, from a zero base, as this is a new industry, there would have been 18 000 more jobs created, **increasing to 51 600 by 2016**. The direct jobs in the phosphate industry would increase from 5 309 in 2012 to 18 109 by 2016. In 2016 these direct jobs would be distributed:

- 628 in dredging;

- 4 660 in beneficiation ore to concentrate, and
- 12 820 in manufacturing advanced products.

There would also be indirect jobs because of the backward and forward multiplier linkages. These would increase from 12 716 in 2012 **to 33 484 by 2016**.

Table ES2 shows these macroeconomic indicators relative to the actual Namibian economy in those years.

Table ES2: Relative Macroeconomic Performance

All amounts in 2016 Prices, N$ millions	2010	2012	2014	2016
Phosphate Industry Contribution to Namibian GDP	0	5 813	9 318	14 774
Namibian GDP	123 391	136 236	153 025	163 946
Phosphate Industry as % of Namibian GDP	0.0%	4.3%	6.1%	9.0%
Phosphate Industry Contribution to Mining GVA	0	293	403	549
Namibian Mining GVA	12 843	15 193	14 528	13 018
Phosphate Industry as % of Mining GVA	0.0%	1.9%	2.8%	4.2%
Phosphate Industry Contribution to Manufacturing GVA	0	2 729	4 480	7 127
Namibian Manufacturing GVA	15 396	15 159	15 812	15 597
Phosphate Industry as % of Manufacturing GVA	0.0%	18.0%	28.3%	45.7%
Subsistence Farming Productivity GVA (N$m)	0	258	287	287
Namibian Agriculture GVA (N$m)	6 295	6 877	6 164	5 564
% of Namibian Agriculture GVA	0.0%	3.8%	4.7%	5.2%
Total Jobs Created	0	18 025	30 441	51 593
Namibian Jobs	480 769	657 584	708 895	676 885
% of Namibian Jobs	0.0%	2.7%	4.3%	7.6%

The phosphate industry would have added, **from a zero contribution in 2010**:

- 4.3% to Namibian GDP in 2012 and **a notable 9.0% by 2016**;
- 1.9% to Mining GVA in 2012 and **4.2% by 2016**;
- 18.0% to Manufacturing GVA in 2012 and **45.7% by 2016**;
- 2.7% to employment in 2012 and **7.6% by 2016**.

Furthermore, increased productivity in subsistence farming would have added a further 3.8% to Agriculture GVA in 2012 and **5.2% in 2016**.

These results are presented in the figures below. Figure ES1 illustrates the potential phosphate industry contribution to real Namibian GDP, while Figure ES2 the employment opportunities.

Figure ES1: Phosphate Industry Contribution to GDP

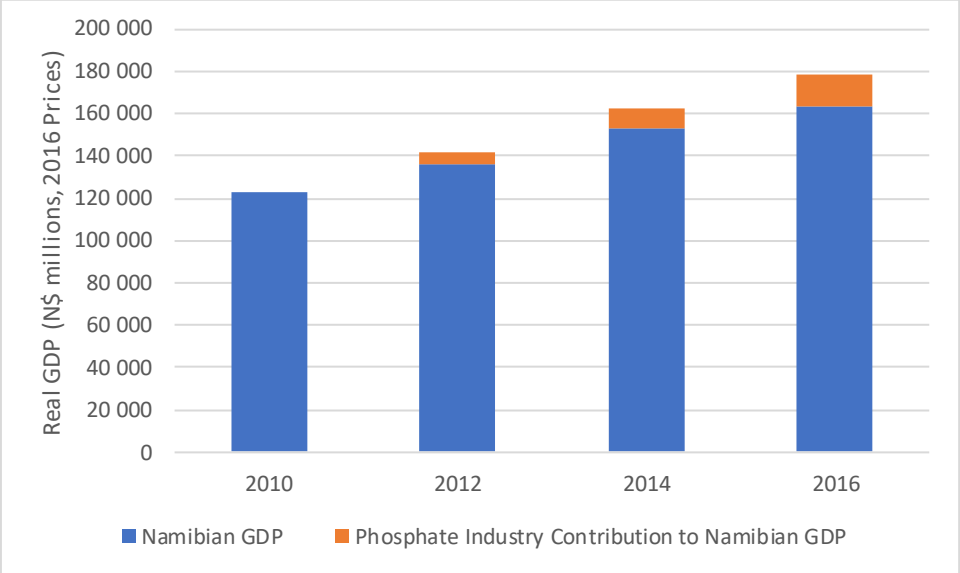
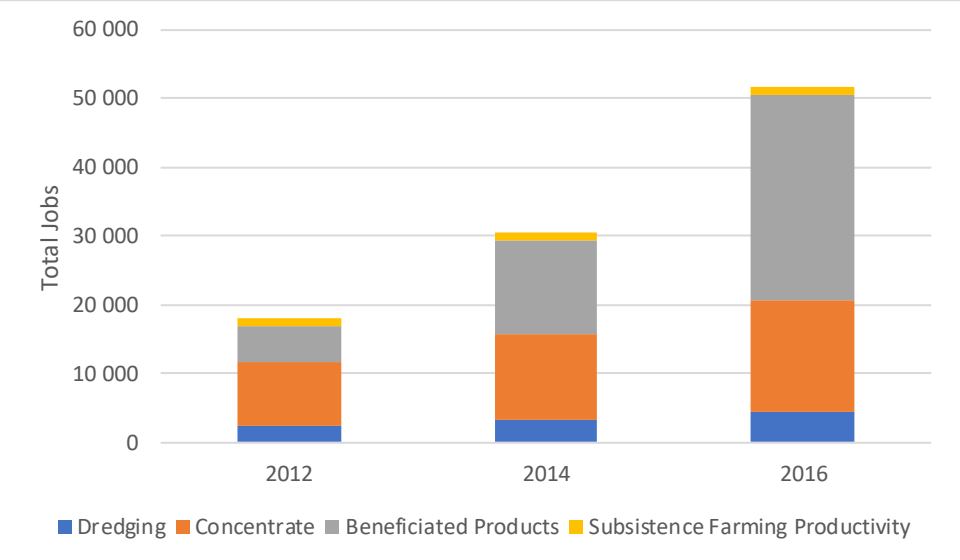


Figure ES2: Employment Potential



The results reported above are remarkable and are not out of line with the experiences of other phosphate producing countries. An **international comparison** shows:

- **Production levels**: In Florida 17Mtpa were mined in 2010. Jordan mined 8Mtpa in 2016; Tunisia 3.5Mtpa; Egypt 5.5Mtpa and Peru 4Mtpa in 2016. The proposed 8.5Mtpa in Namibia for basic beneficiation (increasing hypothetically to 16Mtpa to include advanced beneficiation) is in line with these levels of production.

- **Jobs**:
    - In Florida, part of a high wage and therefore more capital-intensive country, there were, in 2010, 387 direct jobs and 3 450 total jobs (including indirect and induced jobs) per million tons of mined and beneficiated phosphate
    - In Tunisia there were 1 574 direct jobs per million tons in 2010.
    - In Namibia there would be, per million tons:
        - 625 direct and 2 100 total jobs for dredging and basic beneficiation;
        - 900 direct and 2 900 total jobs for secondary beneficiation; and
        - 1 500 direct and 3 800 total jobs for dredging and advanced beneficiation.
- **Contribution to GDP**: the contribution to Namibian GDP would be well ahead of other countries because of the relatively small Namibian GDP compared to the other countries. The contribution to Jordanian GDP is 2.8% per ton of mined phosphate, for example, compared to Namibia which would be almost 9%. In contrast the mining (dredging) volumes are little different with Jordan, in 2011 mining 5Mtpa, and Namibian (with this analysis based on) 8.5Mtpa, in the first stage of beneficiation.

The final part of this executive summary is to reflect on the extent to which the phosphate industry could contribute to achieving the **goals of Vision 2030** and related **Harambee Plan for Prosperity (HPP)**.

- **Sector targets**: Four sectors are targeted in policy objectives: agriculture, manufacturing, tourism and logistics. NDP5 extends this by including mining that would "leverage natural resources". HPP further extents this by proposing "to support increased crop production, Government will establish fertilizer mixer plants in Namibia during year 2 of HPP to make fertilizers available to farmers at affordable prices" (Republic of Namibia, Harambee Plan for Prosperity, 2016, p. 39). A phosphate industry would promote mining that leverages natural resources, manufacturing through beneficiation and agriculture by making fertilizer.
- **Promote**: export development and competitiveness; efficient production because of the need to compete with imported fertilizer; skills development, import relevant skills to augment shortage; and help to achieve full employment.

There are five specified goals to which a phosphate industry would contribute:

1. **Make Namibia a high-income country**. A high-income country is one which has a per capita gross national income of US$12 236. In 2016 Namibia stood at US$4 607. The phosphate industry would have made a per capita contribution of US$304, increasing the total per capita income to US$4 911.

2. **Reduce unemployment to 5%.** A phosphate industry, as analysed in this study, could have increased employment by 2.7% in 2012 and 7.6% by 2016. This would have, in those years, have decreased unemployment from 27.5% to 25.5% and 34% to 29% respectively.
3. **Achieve a GDP growth of 6.2%.** In 2012 GDP growth was 5.1% and in 2016 it was 1.1%. A phosphate industry would have increased this growth to 9.5% and 4.2% respectively.
4. **Reduce the national trade deficit to 3.3% of GDP.** In 2012 the ratio of the trade deficit to GDP was 18% while in 2016 it was 19%. A phosphate industry would have reduced this ratio to 15% and 13% respectively.
5. **Reduce the government budget deficit to 1.5% of GDP.** In 2012 the ratio of the budget deficit to GDP was 7.3% and in 2016 it was 9.7%. A phosphate industry would have reduced this ratio to 6.1% and 7.6% respectively.

The overall conclusion is that a Namibian phosphate industry would have a major positive impact on the country. It could increase GDP by 9%. It could generate over 50 000 jobs from a fully integrated fertilizer industry. This would add 7.6% to 2016 employment levels. The industry would help the country achieve both general and specific Vision 2030 and Harambee PP policy goals.