

**Figure 4.** Phosphate rock production (1981 to 2012) for the world and selected countries (Source: USBM and USGS).

reserves for the top 10 holders. Morocco is estimated to have about 75% of the world's PR reserves, while China is a distant second with 6%. The United States is estimated to hold about 2% of world PR reserves. Based on data found in the IFDC report, the United States was thought to hold about 76% of the world's recoverable phosphate product (~30%  $P_2O_5$ ) in the late 1970s. As the 2010 IFDC report indicated, world phosphate rock reserves and resources are dynamic due to a wide variety of factors.

**Figure 4** shows PR production for the world and selected countries from 1981 to 2012. World PR production varies considerably over this time frame, but is trending upward in recent years. Production has increased sharply since 2009 and

according to the latest USGS report is at 210 million t. This same report suggests that within the next year, world PR production capacity could go from 220 to 256 million t, with the largest expansion project occurring in Morocco.

A simple calculation of PR reserve longevity using current reserve and production figures indicates that the world has over 300 years of reserves and over 1,400 years of resources. Thus the world will not soon face a PR crisis. It should again be emphasized that estimates for PR reserves are subject to change with updated information and discovery, and with changes in economics and technology. In the last 5 years, several new deposits have been discovered and the resources of previously located deposits are being studied to quantify more reserves. As mining and processing technology develops and improves, today's resources can become tomorrow's reserves. Nonetheless, PR is a non-renewable natural resource and, from production to end use, should be stewarded as efficiently as possible. **DC**

*Mr. Van Kauwenbergh is Geologist and Principal Scientist, Research and Development Division IFDC, Muscle Shoals, Alabama; e-mail: svankauwenbergh@ifdc.org. Dr. Stewart is IPNI Director, South and Central Great Plains, San Antonio, TX. Dr. Mikkelsen is IPNI Director, Western North America, Merced, CA.*

## References

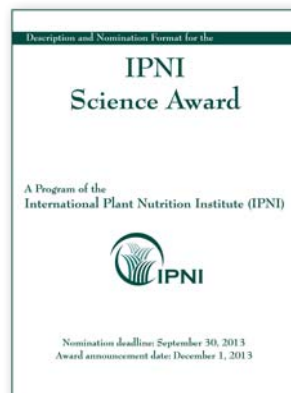
- Cordell, D., Jan-Olof Drangert, and S. White. 2009. Global Environmental Change. 19:292-305.
- Institute of Ecology. 1971. Man in the living environment. Report of the 1971 Workshop on Global Ecological Problems. The Institute of Ecology, Chicago, IL.
- Jacob, K.D. 1964. *In Superphosphate: Its History, Chemistry, and Manufacture.* Dep. Of Agric. And TVA, U.S. Govt. Printing Office, Washington, D.C.
- Van Kauwenbergh, S.J. 2010. IFDC. Muscle Shoals, AL, USA, [www.ifdc.org](http://www.ifdc.org)
- USGS. Mineral commodity summaries. [Online]. Available at [http://minerals.usgs.gov/minerals/pubs/commodity/phosphate\\_rock/index.html#mcs](http://minerals.usgs.gov/minerals/pubs/commodity/phosphate_rock/index.html#mcs) (verified 19 April 2013).

## Nominations for IPNI Science Award Close September 30

Each year, IPNI offers its Science Award to recognize and promote distinguished contributions by scientists involved with global ecological intensification—defined as development of high-yield crop production systems that protect soil and environmental quality and conserve natural resources. Characteristics of ecological intensification include yields near their potential, high efficiency of nutrient use, and appropriate management of soil nutrient stocks and organic matter. Such systems improve net returns, lower unit costs of production, and maintain or improve environmental quality.

The Award is to be presented each year to one agronomic scientist. The recipient receives a plaque and a monetary award of US\$5,000.

Nominations must be submitted in English and completed nomination forms (no self-nominations) including all support



letters must be received at IPNI headquarters by September 30, 2013 to be eligible. Announcement of Award recipient will be on December 1, 2013.

Nomination forms are available from the IPNI Award website [www.ipni.net/awards](http://www.ipni.net/awards)

**Send completed nomination, including attachments, to:**  
 IPNI Science Award Committee  
 International Plant Nutrition Institute  
 3500 Parkway Lane, Suite 550  
 Norcross, Georgia 30092-2844

### Past Winners

- 2012:** Mr. A.E. Johnston, Rothamsted Research
- 2011:** Dr. M.J. McLaughlin, Commonwealth Scientific and Industrial Research Organisation (CSIRO)
- 2010:** Dr. A.N. Sharpley, University of Arkansas
- 2009:** Dr. J.K. Ladha, International Rice Research Institute (IRRI)
- 2008:** Dr. John Ryan, International Center for Agricultural Research in Dry Areas (ICARDA)
- 2007:** Dr. Milkha Singh Aulakh, Punjab Agricultural University (PAU)