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Economic Impact of Florida's Agricultural Chemical and Mining Industries[1]

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Introduction

Florida's highly capitalized agricultural and natural resource sector is dependent on agricultural inputs such as fertilizer. Mining activities and the agricultural and natural resource sector are interrelated because 90 percent of phosphate rock mined in Florida is converted into phosphatic fertilizer. The agricultural chemical and mining sector is part of a complex and integrated network of natural resource enterprises associated with the production, transportation, and processing of agricultural chemical products. As these products progress through different market channels, value is added from labor, capital, and management, which significantly impacts the economy. Rapid urbanization in Florida has left consumers and political leaders with a limited understanding of the agricultural chemical and mining industries and the issues surrounding their management. This document is intended to facilitate a better understanding of Florida's agricultural chemical and mining sector by reviewing historical economic trends and evaluating economic impacts associated with this industry.

Industries impact an economy in three primary ways. First, as direct effects, industries generate output and value added and provide employment and wages to employees. Second, as indirect effects, the purchase of goods and services such as inputs from other industries supports additional economic activity in these industries. Third, as induced effects, earnings by direct and indirect industry employees boost the local economy through personal consumption expenditures. The total economic impact is the sum of direct, indirect, and induced effects. Since exported goods introduce new money into the region (defined here as the state of Florida), commodity sales outside Florida are associated with greater economic impacts than sales to Florida customers. Also, inputs obtained from state firms rather than imported from outside Florida are associated with greater economic impacts because money is retained and circulated within the region.

Methodology

Economic impacts of the agricultural chemical and mining sector in Florida were estimated with economic multipliers developed using the *IMPLAN PRO*™ (*IMPLAN*) software and associated databases

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for Florida (MIG, Inc., Stillwater, MN). The *IMPLAN* system enables construction of regional input-output models for any county, group of counties, or state(s) in the United States based on a combination of county-level and national economic data. Industries are classified as 528 sectors corresponding to the US Department of Commerce's Standard Industrial Classification (SIC) System. Multipliers are available from *IMPLAN* for the economic indicators of output, value added, employment, employee compensation, labor income, other proprietary income, and indirect business taxes. Furthermore multipliers are provided for direct, indirect, and induced effects. Multipliers for employment, output, value added, and labor income are computed in this document to estimate the economic impacts of Florida's agricultural chemical and mining industries. Multipliers for output, value-added, and labor income represent of dollars-per-dollar of sales to final demand, and the employment multiplier represents jobs-per-million-dollars of sales to final demand.

Total economic impacts were computed by applying the economic multipliers as follows:

Total impact =

$Y^* M_{D(\text{Output, VA, Emp, Labor Income})}$

$+ E^* M_{I(\text{Output, VA, Emp, Labor Income})}$

$+ E^* M_{IN(\text{Output, VA, Emp, Labor Income})}$

where

E is export sales (all sales outside of Florida)

Y is value of output

$M_{D(\text{Output, VA, Emp, Labor Income})}$

is the direct effects multiplier for employment, output, value added, and labor income

$M_{I(\text{Output, VA, Emp, Labor Income})}$

is the indirect effects multiplier for employment, output, value added, and labor income

$M_{IN(\text{Output, VA, Emp, Labor Income})}$

is the induced effects multiplier for employment, output, value added, and labor income.

The base information on output and exports for each industry and the multipliers were provided by the *IMPLAN* system for 1998 (most recent available).

In addition to supplying information on economic impacts on Florida, this document also reviews historical economic information on product values and employment in these industries. Statistics were obtained from the US Department of Agriculture and Census Bureau. [Any data discrepancies between the *IMPLAN* database and other secondary data sources featured in this document are primarily due to differences in industry classifications and accounting measures.]

Agricultural Chemicals

The Florida agricultural chemical manufacturing sector produces fertilizers and pesticides. The value of shipments of these products nearly doubled between 1987 and 1999, to almost $3.3 billion (Figure 1), while employment in this sector declined to 5,400 persons in 1999 (Annual Survey of Manufactures). The value of fertilizer exports leaving Florida ports increased to $1.8 billion in 1998, with Asia representing the top export destination (65 percent), followed by South America (14 percent) and Australia/New Zealand (12 percent) [Census Bureau].

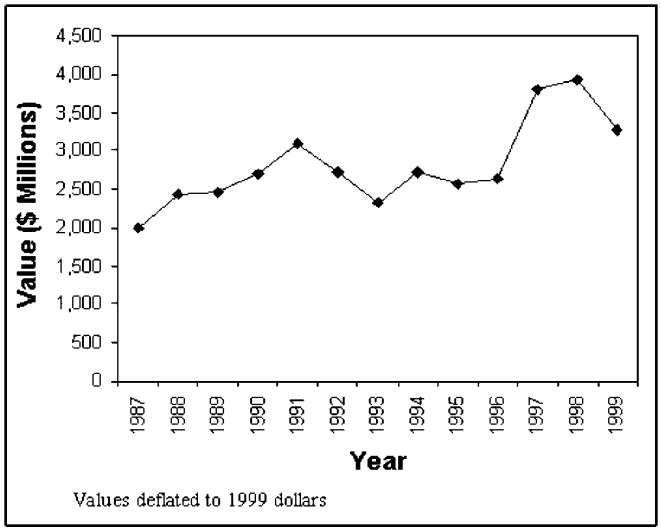

Figure 1. Value of shipments of Florida agricultural chemicals, 1987-99.

The total economic impacts of the Florida agricultural chemical industry include 37,672 jobs, $5.4 billion in output, $2.1 billion in value added, and $1.3 billion in labor income (Table 1).

Mining

Florida has a variety of rich mineral deposits and offshore petroleum reserves. It is one of the world's largest producers of phosphate rock, accounting for approximately 75 percent of the United States' supply and 25 percent of the world's supply (Florida Agricultural Statistics Service). The value of shipments of phosphate mines in Florida was $764 million in 1997, and the volume of phosphate rock mined was 32.8 million metric tons. However, mine output has fluctuated dramatically, dropping as low as 25 million metric tons in 1993 (Figure 2). Employment in phosphate mining decreased to about 3,000 employees in 1997.

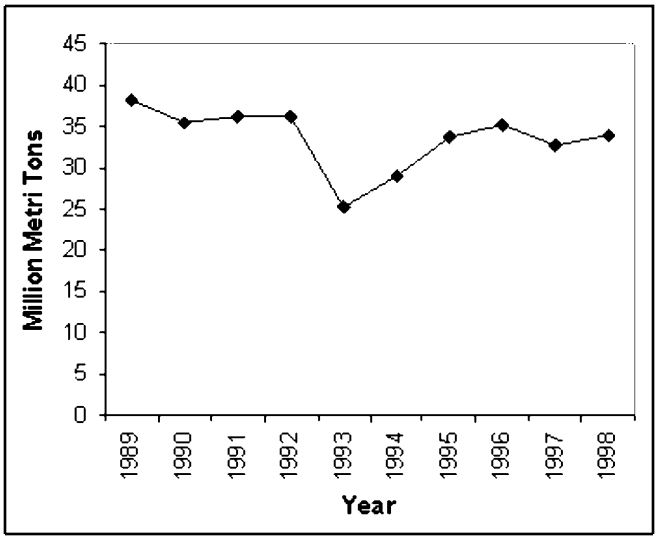

Figure 2. Phosphate rock mined in Florida, 1988-98.

The total economic impacts of the Florida mining industry include 22,885 jobs, $2.7 billion in output, $1.6 billion in value added, and $770 million in labor income (Table 1).

Table 1. Economic Impacts of Florida's agricultural inputs and services and mining industries, 1998.

	Direct Impacts*				Total Impacts*			
	Employ-ment (jobs)	*Industry Output* (m$)	*Value Added* (m$)	*Labor Income* (m$)	*Employ-ment (jobs)*	*Industry Output* (m$)	*Value Added* (m$)	*Labor Income* (m$)
Nitrogenous and Phosphatic Fertilizers	4,951	2,347.0	463.0	287.9	29,200	4,276.8	1,653.3	1,018.2
Fertilizers, Mixing Only	985	406.5	63.4	45.0	6,279	792.3	317.1	217.7
Agricultural Chemicals, N.E.C.	373	182.1	77.5	32.7	2,193	295	146.1	79.6
Total Agricultural Chemicals	**6,309**	**2,936**	**604**	**366**	**37,672**	**5,364**	**2,117**	**1,316**
Gold Ores	8	2	0.6	0.4	10	2	0.7	0.6
Metal Ores, Not Elsewhere Classified	193	27.2	10.2	9.2	513	54.1	26.3	19.5
Coal Mining	18	45.6	33	19.8	671	89.3	60.2	37.3
Natural Gas and Crude Petroleum	2,957	106.5	74.4	29.9	1,875	132.8	81	27.3
Natural Gas Liquids	1,419	161.1	65.7	12.2	1,359	200.8	83.6	29.4
Dimension Stone	1,757	227.9	152.4	70.7	4,704	449.3	284.6	162.9
Sand and Gravel	763	71.3	54.7	30.8	1,749	143.4	97.5	58.7
Clay, Ceramic, Refractory Minerals, N.E.C.	222	66.1	42.8	17.2	1,329	135.4	80.9	48.5
Phosphate Rock	3,142	1,016.1	649.1	156.9	9,986	1,434.4	849.8	363.4
Chemical, Fertilizer Mineral Mining, N.E.C.	6	0.5	0.4	0.3	10	0.8	0.6	0.4
Nonmetallic Minerals (except Fuels) Service	12	1.5	0.8	0.3	22	2.3	1.4	0.7
Miscellaneous Nonmetallic Minerals, N.E.C.	428	39.1	25.8	12.9	657	60.1	36.8	21.5
Total Mining	**10,925**	**1,765**	**1,110**	**361**	**22,885**	**2,705**	**1,603**	**770**

* Direct, indirect, and induced impacts estimated using economic multipliers.
Source: Minnesota IMPLAN Group, 2001.