

# **Towards a More Productive Agriculture: A Review of the Policies Affecting the Philippine Fertilizer Industry**

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## **ABSTRACT**

*The important contribution of fertilizers in achieving agricultural productivity to ensure food security is highlighted in this paper. State of the two sub-sectors of the Philippine fertilizer industry, the inorganic fertilizer and bio-fertilizer, was discussed. The inorganic fertilizer industry is private sector-led and operates in a free market while the bio-fertilizer industry is influenced by government programs and initiatives. Landmark policies in the country were enacted that affected the fertilizer industry. These policies included the creation of policy-making bodies or government agencies supporting the operation of the fertilizer industry in the country; policies gearing toward environmental sustainability, hence, supporting the bio-fertilizer sub-industry and policies advocating for quality standards. The Philippines has provided a policy environment that supports the twin goal of improving productivity and protecting the environment from degradation.*

Key words: inorganic fertilizers, bio-fertilizers, organic agriculture, fertilizer policies

## **INTRODUCTION**

Prior to 1972, the fertilizer industry in the Philippines was free from control. Fertilizer importation, distribution and marketing were in the hands of the private sector while government restrictions, tariffs and subsidies were lacking. However, with the increasing recognition of fertilizer as one of the important inputs in improving agricultural productivity and ensuring food security for the Filipinos, the country realized the need for policies governing the development of the fertilizer industry.

The growing food production to meet the ever increasing demand for food, especially for grains and cereals, has driven the global growth of the fertilizer industry. World demand for total fertilizer nutrients, nitrogen (N), phosphorus (P) and potassium (K) is estimated to reach an annual growth rate of 1.8% from 2014 to 2018. Moreover, the demand for N, P, K is projected to grow annually by 1.4%, 2.2% and 2.6%, respectively. Forecasts over the next five years also showed increase in global capacity of fertilizer products, intermediaries and raw materials (FAO, 2015).

In the case of the Philippines, its goal of achieving self-sufficiency especially in two of the major staples in the country, rice and corn, was considered one of the major factors driving the policy environment for fertilizers. On average, rice and corn used about 38% and 21% of the total fertilizer supply in the country, respectively (How, 2015). Meanwhile, extent and rate of fertilizer utilization, which were mainly nitrogenous fertilizers, ranged from 93% to 94%. Given this very crucial role of fertilizers, many of the agricultural programs in the country included the provision and usage of fertilizers as one of the major program components.

In 1973, regulation and control of the fertilizer industry was realized in the country through the establishment of a regulatory board, the Fertilizer Industry Authority (FIA). The government completely changed its policy from non-intervention to rigid and all-encompassing control over fertilizer prices, mark up, distribution channels, promotion, importation, exportation, and production (Alcala, 2012). FIA also provides for the outright tax exemption of the importation of all kinds of fertilizers. By 1986, in line with trade liberalization, government's control was relegated and limited to issuance of fertilizer handler licenses, compilation of national statics (statistics?), and monitoring and assurance of good quality fertilizers.

This paper presents the state of the fertilizer industry in the Philippines and its sub-sectors, the inorganic and bio-fertilizers industries. It highlights the significant policies that govern fertilizer production, utilization, and trade as well as their implications in achieving food sufficiency and/or security and environmental sustainability.

## PHILIPPINE FERTILIZER INDUSTRY

The fertilizer industry can be subdivided into two sub-industries, inorganic and bio-fertilizers. The inorganic fertilizer industry operates in a free market while the bio-fertilizer industry is generally driven by government policies. A discussion on supply, demand and prices, specifically for inorganic fertilizers, is also presented in this section.

### Inorganic sub-industry

In the Philippines, the marketing, distribution, and prices of inorganic fertilizers are largely dictated by the private sector. Marketing, as shown in Fig. 1 is done in four main levels: (1) indentors/traders; (2) importers/manufacturers; (3) distributors; and (4) dealers (How, 2015). Fertilizers enter the country in the form of raw materials and finished products or the ready to use fertilizers. Both are distributed through the indentors or traders, the finished products though can be directly provided to importers also. End users such as the plantation, industrial users and cooperatives have various sources or suppliers of fertilizer which can be from domestic manufacturers, importers/producers and distributors. On the other hand, fertilizer suppliers of farmers are limited to local dealers or cooperatives. Key players for the domestic production of fertilizers involve five major fertilizer producers manufacturing mainly nitrogen (N) and nitrogen-phosphorus-potassium (NPK) grades, namely: (1) Philphos; (2) AFC Fertilizer & Chemical Inc. (AFC); (3) International Chemical Corp. (INCHEM); (4) Farmix Fertilizer Corp.; and (5) Soiltech Agricultural Products Corp. (Chupungco, 2003 as cited by Aquino et al., 2010).

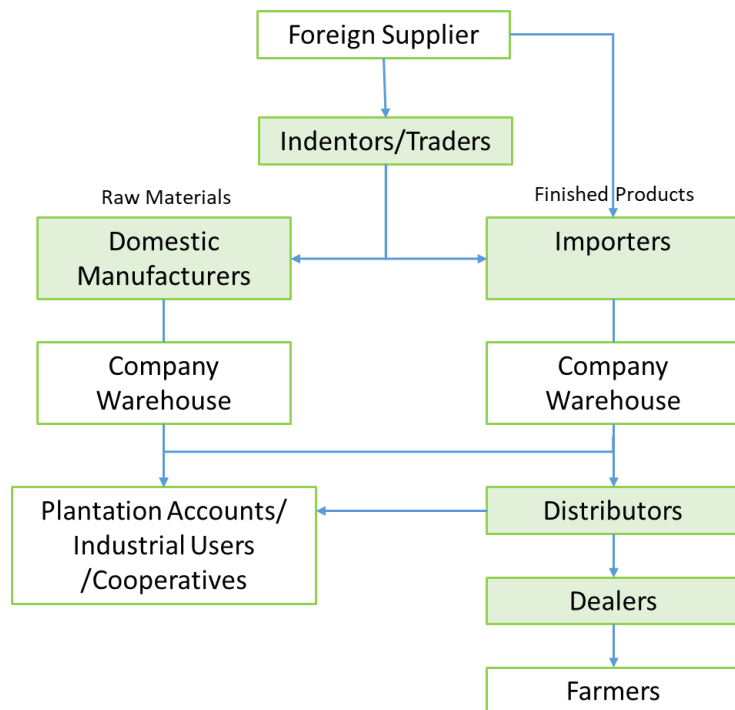


Fig. 1. Distribution channels of fertilizer in the Philippines (Source: Food and Agriculture Organization, Fertilizer and Pesticide Authority as cited by How, 2015)

In 2016, there were 218 registered fertilizer distributors in the Philippines (Table 1). Majority (80%) of these distributors were located in Luzon, of which 44% were located in the National Capital Region (NCR). The other distributors were located in the Visayas (16%), while very small number of distributors can be found in Mindanao (5%). On the other hand, the dealers, who are directly connected to the farmers were widely distributed all over the country. There were 4,755 registered fertilizer dealers in the country in 2016, majority (86%) of which were selling both fertilizers and pesticides while 14% were solely dealing fertilizers only (FPA, 2018).

REGION	NUMBER	PERCENT
Luzon		
National Capital Region (NCR)	95	44
Cordillera Administrative Region (CAR)	4	2
Region I	9	4
Region II	7	3
Region III	25	11
Region IV	30	14
Region V	4	2
<b>Sub-total</b>	<b>174</b>	<b>80</b>
Visayas		
Region VI	20	9
Region VII	13	6
Region VIII	1	0
<b>Sub-total</b>	<b>34</b>	<b>16</b>
Mindanao		
Region IX	0	0
Region X	1	0
Region XI	7	3
Region XII	1	0
Region XIII	1	0
ARMM	0	0
<b>Sub-total</b>	<b>10</b>	<b>4</b>
<b>Total for the Philippines</b>	<b>218</b>	<b>100</b>
Source: Fertilizer and Pesticide Authority (FPA), 2018		

### *Supply of inorganic fertilizers*

There are six major inorganic fertilizer grades available in the market, namely: Urea (46-0-0); Ammonium Sulfate (21-0-0); Ammonium Phosphate (16-20-0); Diammonium Phosphate (18-46-0); Complete (14-14-14), and Muriate of Potash (0-0-60). Inorganic fertilizers were sourced from importation (69%) and domestic production (31%) (Table 2). In general, total supply increased at annual growth rate of 4.68%. Fluctuations were observed in both domestic supply and imports (Fig. 2). However, domestic supply showed dramatic reduction of 25% annual average from 2002 to 2010. The lowest domestically produced inorganic fertilizers was recorded in 2010 at 36,000 metric tons only and zero production in 2015.

Table 2. Total supply of inorganic fertilizers in the Philippines, in '000 metric tons, by source, 1990-2016

YEAR	DOMESTIC PRODUCTION		IMPORTATION		ALL
	Amount	Percent	Amount	Percent	Amount
1990	682	38	1,093	62	1,774
1991	720	40	1,087	60	1,807
1992	668	37	1,136	63	1,803
1993	707	40	1,071	60	1,777
1994	764	40	1,124	60	1,888
1995	900	43	1,198	57	2,098
1996	1,159	50	1,175	50	2,334
1997	951	44	1,190	56	2,141
1998	762	49	783	51	1,544
1999	1,021	46	1,196	54	2,217
2000	863	40	1,321	60	2,184
2001	1,028	50	1,017	50	2,045
2002	1,000	53	879	47	1,879
2003	755	33	1,538	67	2,292
2004	786	30	1,804	70	2,591
2005	634	29	1,585	71	2,219
2006	532	29	1,315	71	1,847
2007	469	24	1,516	76	1,985
2008	215	14	1,377	86	1,592
2009	165	10	1,495	90	1,660
2010	36	2	1,911	98	1,947
2011	444	22	1,533	78	1,977
2012	622	33	1,265	67	1,888
2013	281	27	768	73	1,048
2014	298	12	2,183	88	2,481
2015	0	0	2,201	100	2,201
2016	265	11	2,167	89	2,432
<b>AVERAGE</b>	<b>619</b>	<b>31</b>	<b>1,368</b>	<b>69</b>	<b>1,987</b>

Source: Fertilizer and Pesticide Authority (FPA), 2018

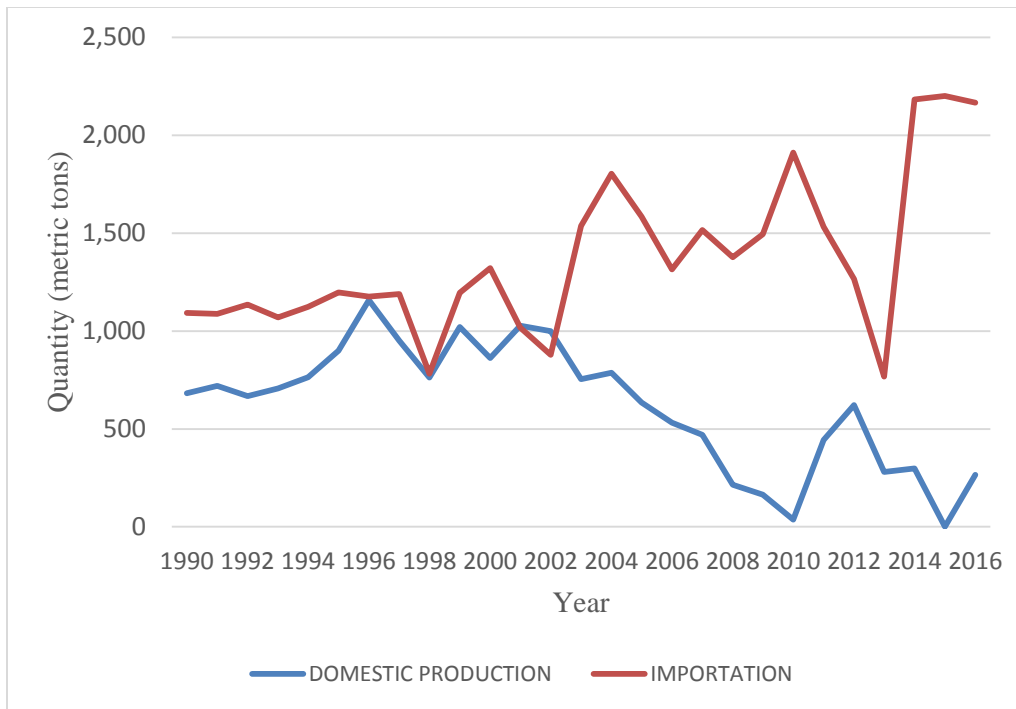


Fig. 2. Supply of inorganic fertilizers, by source, 1990-2016

The supply of the six major fertilizers from 1990-2016, as shown in Table 3, indicated nitrogenous fertilizers such as Urea and Ammonium Sulfate as the most supplied fertilizers in the country. Urea ranked first, contributing 34% of the total supply while Ammonium Sulfate ranked second providing 20% of the total supply.

Table 3. Supply of the six major inorganic fertilizers in the Philippines, in '000 metric tons, 1990-2016

YEAR	UREA (0-0-46)			AMMONIUM SULFATE (21-0-0)			AMMONIUM PHOSPHATE (16-20-0)			DIAMMONIUM PHOSPHATE (18-46-0)			COMPLETE (14-14-14)			MURIATE OF POTASH (0-0-60)			ALL		
	Domestic Production	Importation	Total	Domestic Production	Importation	Total	Domestic Production	Importation	Total	Domestic Production	Importation	Total	Domestic Production	Importation	Total	Domestic Production	Importation	Total	Domestic Production	Importation	Total
1990	0	608	608	0	290	290	333	22	355	143	20	163	206	26	232	0	128	128	682	1,093	1,774
1991	0	436	436	0	411	411	266	0	266	95	64	159	359	0	359	0	176	176	720	1,087	1,807
1992	0	567	567	0	389	389	328	1	330	96	60	156	244	6	250	0	111	111	668	1,136	1,803
1993	0	638	638	0	239	239	382	0	382	43	83	126	282	0	282	0	110	110	707	1,071	1,777
1994	0	672	672	0	273	273	347	28	375	78	79	157	340	2	342	0	70	70	764	1,124	1,888
1995	0	652	652	19	282	302	361	6	368	132	79	211	387	0	387	0	179	179	900	1,198	2,098
1996	0	660	660	186	166	352	325	0	325	151	143	294	498	0	498	0	206	206	1,159	1,175	2,334
1997	0	641	641	173	241	414	243	2	245	115	80	194	421	0	421	0	226	226	951	1,190	2,141
1998	0	551	551	113	163	276	236	0	236	71	33	105	336	0	336	5	36	41	762	783	1,544
1999	0	682	682	215	217	433	279	0	279	88	110	198	437	0	437	2	186	188	1,021	1,196	2,217
2000	0	625	625	176	316	492	231	44	275	37	154	191	418	12	430	0	171	171	863	1,321	2,184
2001	0	523	523	188	227	415	379	67	446	0	92	92	457	6	463	4	103	107	1,028	1,017	2,045
2002	0	429	429	187	193	380	319	25	345	53	113	165	441	46	487	0	73	73	1,000	879	1,879
2003	0	734	734	117	399	515	204	63	267	66	164	230	369	43	412	0	135	135	755	1,538	2,292
2004	0	841	841	164	600	764	244	85	329	94	92	186	284	59	342	0	128	128	786	1,804	2,591
2005	0	788	788	171	377	548	179	105	284	92	108	200	193	77	270	0	130	130	634	1,585	2,219
2006	0	605	605	45	351	397	141	93	234	88	105	194	258	19	276	0	142	142	532	1,315	1,847
2007	0	657	657	0	401	401	159	108	267	41	106	147	269	54	323	0	190	190	469	1,516	1,985
2008	0	626	626	8	336	344	50	128	177	0	89	89	158	44	202	0	154	154	215	1,377	1,592
2009	0	679	679	4	362	366	49	74	122	0	59	59	112	31	143	0	290	290	165	1,495	1,660
2010	0	946	946	0	495	495	10	103	113	0	137	137	26	48	74	0	182	182	36	1,911	1,947
2011	0	716	716	0	365	365	100	121	221	77	96	173	266	45	311	0	191	191	444	1,533	1,977
2012	0	562	562	71	404	476	169	62	231	44	92	137	274	29	303	64	115	180	622	1,265	1,888
2013	0	419	419	0	169	169	64	49	114	0	47	47	216	25	242	0	57	57	281	768	1,048
2014	0	960	960	0	569	569	65	185	250	0	140	140	220	102	322	13	227	240	298	2,183	2,481
2015	0	996	996	0	375	375	0	208	208	0	103	103	0	140	140	0	379	379	0	2,201	2,201
2016	0	1,051	1,051	5	492	498	72	174	246	4	84	88	166	158	324	18	207	225	265	2,167	2,432
<b>AVERAGE</b>	<b>0</b>	<b>676</b>	<b>676</b>	<b>68</b>	<b>337</b>	<b>405</b>	<b>205</b>	<b>65</b>	<b>270</b>	<b>60</b>	<b>94</b>	<b>153</b>	<b>283</b>	<b>36</b>	<b>319</b>	<b>4</b>	<b>128</b>	<b>132</b>	<b>619</b>	<b>1,368</b>	<b>1,987</b>

Source: Fertilizer and Pesticide Authority (FPA), 2018

Complete was the highest domestically produced inorganic fertilizer in the country contributing 44% of the total local supply. Ammonium phosphate ranked second with an average domestic production of 205,000 metric tons while muriate of potash ranked last with only less than 1% contribution to the total domestically produced supply of inorganic fertilizers.

In terms of imports, the highest importation is recorded for urea contributing 49% of the total imported inorganic fertilizers. Moreover, it is the only fertilizer that is not domestically produced and is mainly imported, implying vulnerability of farmers to changes in world prices. Urea is also the primary nitrogenous fertilizer used by farmers. How 2015, also emphasized that importation of fertilizer is generally increasing which peaked in 2008, majority of which were the nitrogenous type. These fertilizers are mainly sourced from ASEAN and other countries where Philippines have trade agreements (Free Trade Agreement (FTA)) (Fig. 3). It should be noted that fertilizer importation was generally liberalized in accordance to trade agreements that promote reduction/elimination of subsidies and products to flow freely. The implementation of the Agriculture and Fisheries Modernization Act (AFMA) provided for imported fertilizers that obtained certification from the Department of Agriculture (DA) be exempted from tariff duties from 2004-2015 (Aquino *et al.*, 2010).

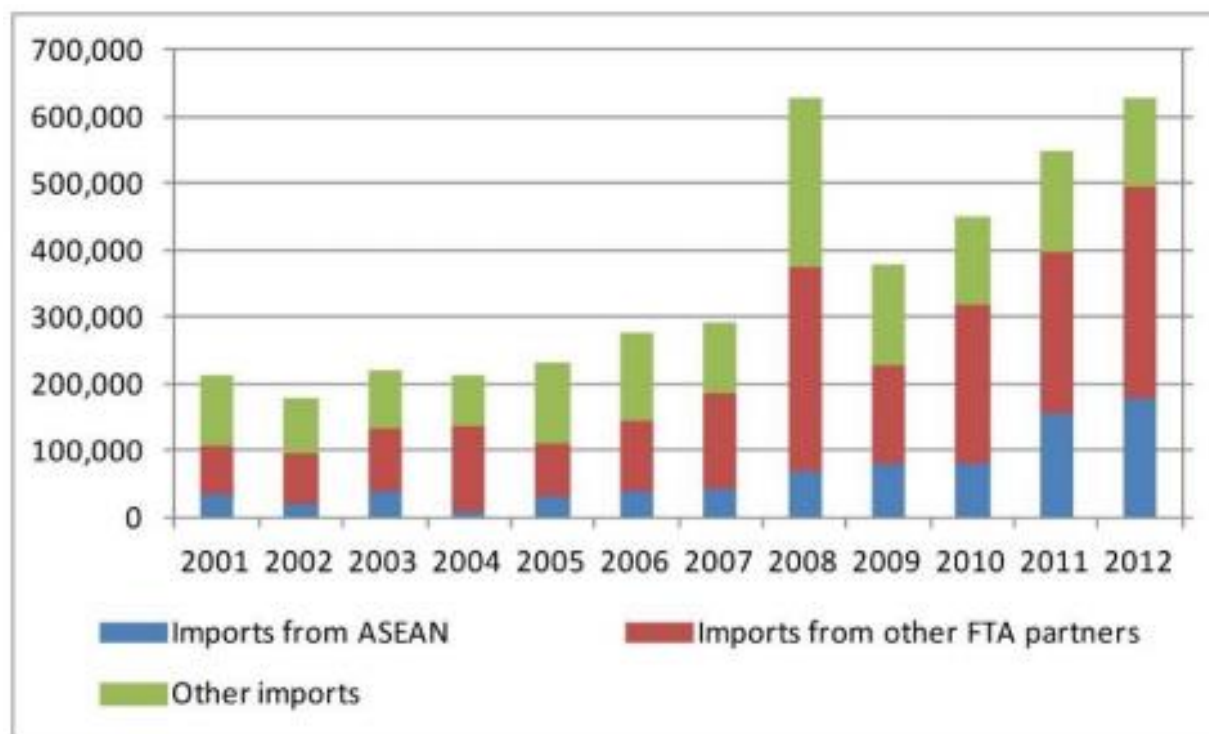


Fig. 3. Distribution of imported inorganic fertilizers, by source, 2012-2014  
Source: How, 2015

### *Disposition of inorganic fertilizers*

In terms of fertilizer disposition from 1990-2016, the Philippines recorded an average total local sales of 1,206,000 metric tons (91%) while exports comprised 124,000 metric tons (9%) (Table 4). Highest domestic sales were recorded in 1997 at 1,996,000 metric tons while minimal exports were observed with highest amount recorded in 1991 at only 357,000 metric tons. In 2014-2016, the country has no exportation of the six major fertilizers.

Table 4. Disposition of inorganic fertilizers in the Philippines, in '000 metric tons, 1990-2016

YEAR	SALES		EXPORT		ALL
	Amount	Percent	Amount	Percent	Amount
1990	1,414	86	228	14	1,642
1991	1,081	75	357	25	1,438
1992	1,295	85	236	15	1,532
1993	1,365	84	255	16	1,620
1994	1,452	85	253	15	1,705
1995	1,442	89	186	11	1,628
1996	1,793	93	141	7	1,935
1997	1,996	95	98	5	2,094
1998	1,492	96	56	4	1,548
1999	1,791	97	64	3	1,855
2000	1,797	98	38	2	1,835
2001	1,871	94	125	6	1,997
2002	1,721	91	171	9	1,892
2003	1,430	93	116	7	1,545
2004	1,886	92	159	8	2,046
2005	1,088	80	277	20	1,365
2006	1,064	91	108	9	1,172
2007	1,117	95	63	5	1,180
2008	615	89	74	11	689
2009	498	93	35	7	533
2010	246	100	0	0	246
2011	567	91	58	9	625
2012	988	84	192	16	1,180
2013	318	87	48	13	367
2014	1,711	100	0	0	1,711
2015	214	100	0	0	214
2016	301	100	0	0	301
<b>AVERAGE</b>	<b>1,206</b>	<b>91</b>	<b>124</b>	<b>9</b>	<b>1,330</b>

Source: Fertilizer and Pesticide Authority (FPA), 2018



Similar to supply, both local sales and exportation experienced fluctuations (Fig. 4). Dramatic reduction in sales, 16% annual average, was also observed for the period 2002-2010. Peaks of domestic sale were observed in 1996, 2012 and 2014 while deepest fall was recorded in 2015 with only 214,000 metric tons locally used fertilizers.

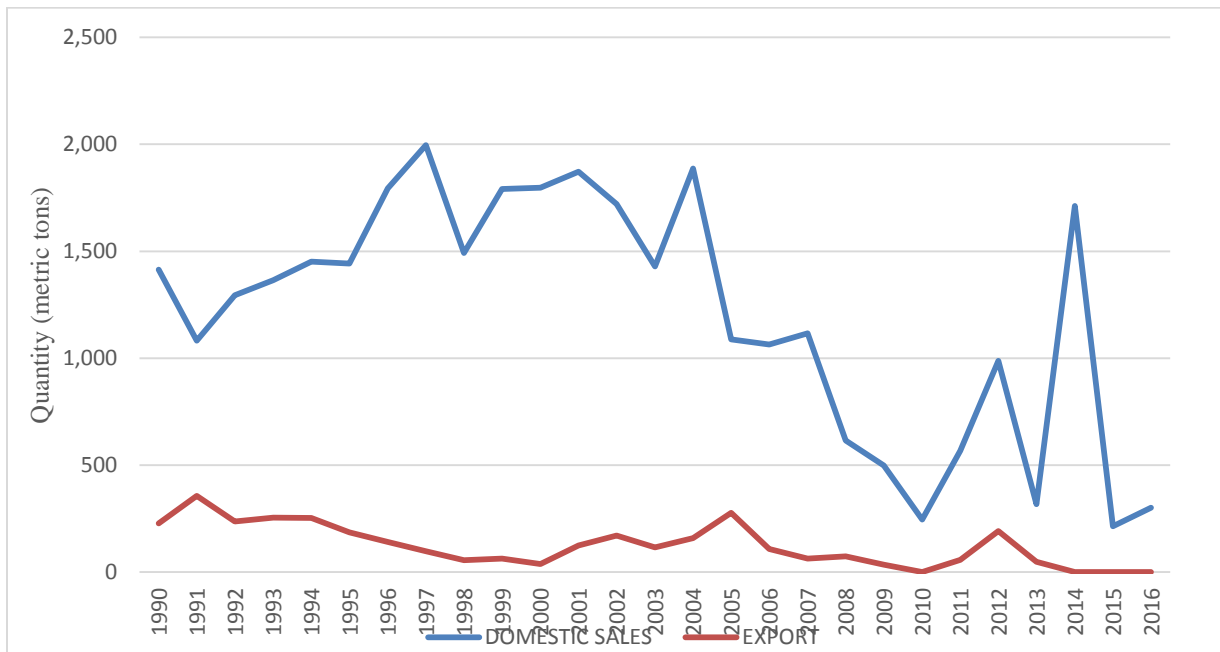


Fig. 4. Disposition of inorganic fertilizers in the Philippines, 1990-2016

Among the six major fertilizers, as shown in Table 5, the highest amount used locally is Urea at 432,000 metric tons (32%). Complete fertilizer ranked second with an average local sales of 292,000 metric tons (16%) while Ammonium Sulfate closely followed contributing 14% of the total local sales or 212,000 metric tons, on average. Considering the limited supply, muriate of potash expectedly ranked last among the fertilizers locally used with only 54,000 metric tons (4%).

Table 5. Disposition of the six major inorganic fertilizers in the Philippines, in '000 metric ton, 1990-2016.

YEAR	UREA (0-0-46)			AMMONIUM SULFATE (21-0-0)			AMMONIUM PHOSPHATE (16-20-0)			DIAMMONIUM PHOSPHATE (18-46-0)			COMPLETE (14-14-14)			MURIATE OF POTASH (0-0-60)			ALL		
	Domestic Sales	Exportation	Total	Domestic Sales	Exportation	Total	Domestic Sales	Exportation	Total	Domestic Sales	Exportation	Total	Domestic Sales	Exportation	Total	Domestic Sales	Exportation	Total	Domestic Sales	Exportation	Total
1990	580	0	580	226	0	226	234	169	403	37	58	95	276	1	277	60	0	60	1,414	228	1,642
1991	395	0	395	289	0	289	136	123	258	38	82	120	166	153	318	58	0	58	1,081	357	1,438
1992	542	0	542	252	0	252	174	135	308	28	72	99	241	30	271	58	0	58	1,295	236	1,532
1993	602	0	602	241	0	241	179	180	359	60	75	134	232	0	232	52	0	52	1,365	255	1,620
1994	580	0	580	218	0	218	216	158	374	32	95	127	338	0	338	68	0	68	1,452	253	1,705
1995	554	0	554	183	0	183	256	92	348	43	94	136	393	0	393	14	0	14	1,442	186	1,628
1996	654	0	654	302	21	323	259	36	295	68	84	152	447	0	447	64	0	64	1,793	141	1,935
1997	742	0	742	413	0	413	246	27	273	77	71	148	448	0	448	68	0	68	1,996	98	2,094
1998	577	0	577	214	24	238	226	2	228	46	30	76	364	0	364	64	0	64	1,492	56	1,548
1999	640	0	640	360	20	380	229	21	249	70	19	89	401	5	406	91	0	91	1,791	64	1,855
2000	668	0	668	367	11	378	212	28	240	48	0	48	412	0	412	89	0	89	1,797	38	1,835
2001	684	0	684	316	0	316	277	122	400	28	0	28	489	3	492	77	0	77	1,871	125	1,997
2002	675	0	675	270	76	345	244	55	298	37	41	78	439	0	439	57	0	57	1,721	171	1,892
2003	466	2	468	212	58	270	253	19	272	32	37	69	417	0	417	50	0	50	1,430	116	1,545
2004	569	14	583	395	10	405	380	41	420	60	84	144	368	11	379	114	0	114	1,886	159	2,046
2005	276	32	307	205	122	327	188	21	209	11	101	112	362	1	363	47	0	47	1,088	277	1,365
2006	328	0	328	133	3	136	228	15	242	14	90	104	298	0	298	63	0	63	1,064	108	1,172
2007	266	0	266	150	18	168	266	13	279	24	32	55	348	0	348	64	0	64	1,117	63	1,180
2008	193	38	230	57	31	89	130	0	130	5	5	10	189	0	189	41	0	41	615	74	689
2009	206	0	206	57	35	92	98	0	98	1	0	1	99	0	99	37	0	37	498	35	533
2010	186	0	186	18	0	18	19	0	19	0	0	0	23	0	23	0	0	0	246	0	246
2011	223	0	223	82	0	82	90	3	93	9	55	64	127	0	127	36	0	36	567	58	625
2012	349	20	369	151	28	180	173	68	240	10	76	86	265	0	265	40	0	40	988	192	1,180
2013	12	0	12	33	20	53	64	18	82	0	11	11	209	0	209	0	0	0	318	48	367
2014	582	0	582	466	0	466	205	0	205	39	0	39	303	0	303	115	0	115	1,711	0	1,711
2015	72	0	72	54	0	54	26	0	26	7	0	7	22	0	22	33	0	33	214	0	214
2016	0	0	0	49	0	49	47	0	47	6	0	6	200	0	200	0	0	0	301	0	301
<b>AVERAGE</b>	<b>430</b>	<b>4</b>	<b>434</b>	<b>212</b>	<b>18</b>	<b>229</b>	<b>187</b>	<b>50</b>	<b>237</b>	<b>31</b>	<b>45</b>	<b>76</b>	<b>292</b>	<b>8</b>	<b>299</b>	<b>54</b>	<b>0</b>	<b>54</b>	<b>1,206</b>	<b>124</b>	<b>1,330</b>

Source: Fertilizer and Pesticide Authority (FPA), 2018

*Price*

Retail prices of the six major fertilizer grades generally increased (Table 6). Significant surge in fertilizer prices was observed in 2008, almost all fertilizers doubled their prices. It should be noted that oil prices also spike during this period. After 2008 price hike, prices of fertilizers generally decreased except for Muriate of Potash which reached its highest price at P2,858/bag in 2013. Trade liberalization, which allowed for free movement and decrease in tariffs of products, could have contributed to the decrease in prices of fertilizers.

Table 6. Retail prices per bag of the six major inorganic fertilizers in the Philippines, 2000-2016

Year	Urea (46-0-0)	Ammonium Sulfate (21-0-0)	Ammonium Phosphate (16-20-0)	Diammonium Phosphate (18-46-0)	Complete (14-14-14)	Muriate of Potash (0-0-60)
2000	365.43	231.87	398.87	515.57	402.72	379.23
2001	439.98	272.24	413.89	552.08	426.87	434.70
2002	424.44	296.81	422.71	564.71	435.82	460.44
2003	550.96	316.06	466.23	673.90	476.66	495.49
2004	741.75	489.91	634.69	863.46	659.81	663.08
2005	897.74	522.64	751.53	1,297.21	767.36	769.04
2006	898.95	474.39	734.32	1,353.17	746.21	803.23
2007	961.08	541.78	774.89	1,398.92	796.40	859.21
2008	1,551.43	917.81	1,618.21	2,691.85	1,671.67	1,171.99
2009	975.88	570.90	1,111.63	2,240.57	1,193.13	1,951.97
2010	948.47	512.27	920.91	1,767.94	1,068.46	1,648.88
2011	1,185.62	660.53	1,048.56	1,814.00	1,165.09	1,534.22
2012	1,282.05	758.48	1,100.11	1,790.23	1,251.71	1,498.07
2013	1,139.63	694.59	1,062.99	1,754.53	1,209.48	2,857.80
2014	1,058.26	592.19	1,012.19	1,630.15	1,171.10	1,347.36
2015	1,013.83	568.36	982.79	1,541.96	1,154.91	1,292.16
2016	926.99	551.75	942.22	1,472.57	1,126.80	1,191.99
<b>Average</b>	<b>903.68</b>	<b>527.80</b>	<b>846.87</b>	<b>1,407.22</b>	<b>924.95</b>	<b>1,138.76</b>

Source: Fertilizer and Pesticide Authority (2018)

## **Bio-fertilizer sub-industry**

Bio-fertilizers is gaining recognition in the Philippine market. With the environmental threat caused by the extensive and inappropriate use of inorganic fertilizer which resulted to land degradation and significant loss of soil fertility (Tirado and Bedoya, 2008) policy makers have been pushing for balanced fertilization<sup>1</sup> and adoption of organic farming. The use of bio-fertilizers was among the key component of organic agriculture and was promoted through various government policies and programs. Incidentally, these initiatives were supported by the private sector which started with the organic movement by some non-government organizations (NGOs) in the 1980s. This was followed by the movement for sustainable development and supported through the Organic Producers and Trade Association (OPTA) formed in 1995. OPTA became the frontrunner in advocating for organic agriculture including the use of bio-fertilizers.

As of 2006, there were 59 FPA-registered organic fertilizers and 18-registered plant growth regulator brands available in the market. Domestically, 76% of the organic fertilizers and 50% of the plant growth regulator brands were produced. Organic fertilizers comprised 86% of the bio-fertilizer industry which were composed of 54 manufacturers, 13 importers, 67 distributors and 2 exporters (Aquino *et al.*, 2010).

Relative to inorganic fertilizer sub-industry, bio-fertilizer sub-industry is not well developed. This can be closely associated with the still formative stage of organic farming in the Philippines. It should be noted that the production of organic products is still marginal. They are planted in less than one percent of the total agricultural land in the country (NOAP 2012-2016). Also, marketing and distribution of bio-fertilizers is simple. The manufacturers or producers, in most cases, are also the traders who distribute organic fertilizers directly to customers such as other traders/distributors and farmers. To increase sales, other incentives given to users include trainings, seminars, discounts and free or no cost delivery of organic fertilizers.

Government programs serve as key driver to move the initiatives for the use of bio-fertilizers. As indicated in the recommendations of Aquino *et al.* (2010), for the bio-fertilizer industry to remain competitive, the government could focus on these initiatives: (1) market development to address issues on seasonality of demand; (2) establishment of royalty policy to support researchers and investors; (3) support for R&D investment; and (4) other necessary support services.

## **PHILIPPINE FERTILIZER POLICIES AND PROGRAMS**

Initially, fertilizer industry in the Philippines was marked by a laissez faire policy. By 1973, fertilizer has been recognized as one of the major components in improving farm productivity. This has led to the promulgation of agriculture and fertilizer laws which in the end have been translated into various government programs and projects.

Landmark legislations affecting the fertilizer industry were enacted which include the Creation of the Fertilizer and Pesticide Authority (Presidential Decree (PD) 1144), Agriculture and Fisheries Modernization Act (Republic Act (RA) 8435), Organic Agriculture Act of 2010 (RA 10068), and Ecological Solid Waste Management Act (RA 9003). The Bureau of Agriculture and Fisheries Standards (BAFS) also developed the national standard for organic fertilizers.

### **Creation of the regulatory board**

Through the promulgation of PD 135, the Fertilizer Industry Authority (FIA) was created on February 22, 1973. FIA was mandated to control and regulate the prices, mark-ups, distribution channels, promotion, storage, production, import and export of fertilizer. It also had the power to negotiate and enter into contract for all imports and exports of fertilizer and fertilizer inputs. In addition, importation of all kinds of fertilizers made by FIA was exempted from custom duties, compensating and sales taxes and all other taxes.

By 1977, PD 1144 merged the fertilizer and pesticide industries and placed them under the jurisdiction of a single government agency, the Fertilizer and Pesticide Authority (FPA). PD 1144 abolished FIA but adopted and retained the board power provided under PD 135 on fertilizer regulation and control.

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<sup>1</sup> Balanced fertilization is a location specific application of organic and inorganic fertilizers to reduce the effect of wide variation in soil and climatic condition (Department of Agriculture, n.d.)

In line with the liberalization policy of the government, the Philippine fertilizer industry has been deregulated since 1986. The government's role is now confined to issuance of fertilizer handler licenses, compilation of national statistics, and monitoring and assurance of good quality fertilizers (Alcala, 2012).

### **Fertilizer as a strategic component in modernizing agriculture**

On July 28, 1997, RA 8435 also known as the Agriculture and Fisheries Modernization Act (AFMA) of 1997 was promulgated. The law aims to modernize the agriculture and fisheries sectors by transforming these sectors from a resource-based to a technology-based industry. This is with the end in view of attaining food security, poverty alleviation, social equity, global competitiveness and environmental sustainability.

The law specifically cites provisions that support the optimal use of farm inputs like fertilizers. These could be seen in the credit and financing support, infrastructure support service and trade and fiscal incentives. The Agro-Industry Modernization Credit and Financing Program under the AFMA provide support to the acquisition of fertilizer and other farm inputs like seeds, poultry, livestock, feeds and other similar items as well as agriculture and fisheries production inputs including processing of fisheries and agri-based products and farm inputs.

Infrastructure support to ensure that agriculture and fisheries production inputs (including fertilizers) as well as information and technology were readily available to farmers, fisherfolks, cooperatives and entrepreneurs. This is part of the special concerns in formulating the Agriculture and Fisheries Modernization Plan.

### **Promotion and commercialization of organic fertilizer**

The approval of the RA 10068, An Act Providing for the Development and Promotion of Organic Agriculture in the Philippines and for Other Purposes also known as the Organic Agriculture Act of 2010 has profound implication on the development of the bio-fertilizer sub-industry. The law promotes, propagate, develop further and implement the practice of organic agriculture in the Philippines that will cumulatively condition and enrich the fertility of the soil, increase farm productivity, reduce pollution and destruction of the environment, prevent the depletion of natural resources, further protect the health of farmers, consumers, and the general public, and save on imported farm inputs. Towards this end, a comprehensive program was developed for the promotion of community-based organic agriculture systems.

Recognition of the use of bio-fertilizers has been accorded both by the private and public sectors. Private initiatives started with the organic movement by some NGOs in the 1980s, followed by sustainable development initiatives of many farmer organizations and other NGOs in the 1990s. The Organic Producers and Trade Association (OPTA) became one of the frontrunners in advocating for organic agriculture which include the use of bio-fertilizers (Aquino, et al., 2010).

An attached office to the Department of Agriculture, the National Organic Agricultural Board was created under RA 10068. Mandated by law, NOAB serves as the policy-making body that provides direction and general guidelines for the implementation of the National Organic Agricultural Program (NOAP). The NOAP developed for 2012-2016 is a collaborative initiative among various stakeholders of the organic industry, the national government agencies/offices, NGOs, civil society and people's organizations. NOAP serves as guide in the implementation of the organic agriculture as stipulated under the provisions of RA 10068. NOAP 2012-2016 envisions to contribute to the overall welfare and development of the Philippines wherein 5% of the total farm areas adopts and practices organic agriculture. NOAP's objective of enhancing soil fertility and farm biodiversity may have great impacts on demand and utilization of bio-fertilizers. Further, advancement in the bio-fertilizer industry is foreseen with the implementation of RA 9003 or the Ecological Solid Waste Management Act of 2000 and RA 10068 as well as the establishment of Philippine National Standard for Organic Soil Amendments.

Major issues on organic fertilizer production include irregular production due to non-continuous demand from end users. There is also non-uniformity of product pricing both at the manufacturers' and traders' levels. Hence, there is a need for strong promotion and encouragement of the establishment of facilities, equipment and processing plants that would accelerate the production and commercialization of organic fertilizers, pesticides, herbicides and other farm inputs. A facilitative delivery and extension system can also provide an enabling environment for the promotion of the use of organic fertilizers (Aquino *et al.*, 2010).

### **Composting as a solid waste management approach**

The beneficial effects of compost application to the soil and plant productivity cannot be understated. It improves the soil's physical, chemical and biochemical properties resulting to enhanced nutrient utilization by plants and

minimized nutrient leaching (Tejada, *et. al.*, 2006 as cited by Abrigo, 2008). Furthermore, it helps mitigate environmental imbalances brought by the increasing carbon dioxide concentration in the atmospheres.

The Ecological Solid Waste Management Act of 2000 (RA 9003) laid the framework for biodegradable waste to be used for organic fertilizer production. RA 9003 provides for the establishment of materials recovery facility (MRF) for composting activities which is particularly important to meet the provisions of Section 7 of the implementing rules and regulations of RA 9003 which states that at least 25% of all solid waste from waste disposal facilities should be diverted through composting.

### **Establishment of the Philippine National Standards for Soil Amendments**

Originally developed as the Philippine National Standards (PNS) for organic fertilizers (PNS/BAFS 40:2013), the BAFS revised the said PNS to include the results of recent scientific and technological studies both local and international on the specifications of organic fertilizers, compost, soil conditioner, microbial inoculants and organic plant supplements. The PNS was then revised and changed from PNS for Organic Fertilizer to PNS for Organic Soil Amendments. The PNS indicates the specifications of these soil amendments including the laboratory tests for finished products, labeling of these products (e.g. on bottles or cartons) and the permitted/allowed raw materials in the production of the soil amendments.

### **CONCLUSION**

The fertilizer industry has a very important role in the development of agricultural productivity. It has a great deal of responsibility in meeting the world's increasing demand for food through improvement in food crop productivity. To produce the greatest possible output in ensuring food security, the Philippine government promulgated landmark legislations that created the Fertilizer and Pesticide Authority and incentives that would encourage fertilizer traders to increase their imports and made it easier for domestic manufacturers to import raw materials for locally produced fertilizer as stipulated in the AFMA.

However, excess fertilizer uses and poor application methods can cause harmful effects to soil fertility and to the environment in general. The need for a responsible and sustainable manner in the use of fertilizer prompted the Philippine government in a decisive shift towards mainstreaming policies that promotes sustainable and environmentally sound options to improve quality of soil and fertility. The country has promulgated policies that encouraged the adoption of organic agriculture (RA 10068) and support it through sustainable solid waste management (RA 9003) and development of standards (PNS/BAFS 40:2013). These policies in turn supported the production and adoption of the use of soil amendments which include organic fertilizers. Clearly, the Philippine policies on fertilizers are promulgated with the ultimate goal of striking balance between increasing productivity and preventing degradation of the environment.

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