Pesticides

Industry Study with Forecasts for 2016 & 2021

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US growth for formulated pesticide products will advance based on herbicide demand, the largest active ingredient, showing the strongest growth, especially in the agriculture market.

**US demand to reach $12.1 billion in 2016**

After a period of overall slow growth, US demand for formulated pesticide products is forecast to grow 2.6 percent per year to $12.1 billion in 2016. Over the same period, demand for active ingredients will increase by 1.4 percent per year to 945 million pounds, valued at $4.8 billion. The pricing climate is expected to continue to stabilize following a period of erratic pricing for glyphosate, the leading active ingredient. Gains will be driven by rising demand in all three market segments: agriculture, commercial, and consumer.

**Herbicides to remain leading active ingredient**

Herbicides will remain the dominant product type, accounting for over half of the market in value terms and 66 percent in volume terms in 2016. Herbicides will also show the strongest growth, although as glyphosate continues to lead the market as the largest active ingredient, farmers will be looking to supplement their glyphosate use with herbicides using different modes of action. Atrazine and 2,4-D, both commonly used herbicides, will expand their market presence as farmers use them for secondary treatment. Demand for dicamba and glufosinate will also rise, particularly when new versions of dicamba- and glufosinate-tolerant crops become available. Herbicides will also post growth in the consumer market, particularly as ready-to-use formulations remain popular.

Insecticides are expected to exhibit slow growth, as volume demand is projected to rise slightly, but gains will be limited by little change in the average price. The best growth prospects will be for products that can replace organophosphates and carbamates, both controversial and potentially harmful classes of chemicals. Usage patterns will move toward insecticides that can be applied in lower doses and have fewer harmful effects on non-target species.

Fungicide active ingredients are forecast to show slow growth, with gains largely due to increases in the number of resistant diseases that are affecting crops, particularly fruit crops. Opportunities for growth will also arise with products that can be used as safer alternatives for fungidal fumigants, mainly as products like methyl bromide leave the market.

**Agricultural market to increase most rapidly**

The agricultural market is expected to register the most rapid growth for active ingredients. Gains will be fueled by an increase in demand for herbicides in particular, as farmers continue to battle weed resistance. The consumer market will be the next fastest growing segment, particularly as the economy continues to recover and homeowners become more willing to spend money on home and garden products. The commercial market will see slow growth, largely due to slight increases in space for commercial and industrial uses.
FORMULATED PRODUCTS

Types
Demand for all types of formulated pesticides is expected to increase, but formulated herbicides are expected to show the strongest growth. Demand for formulated herbicides is projected to increase 2.9 percent per year to $6.9 billion in 2016. Increases will be fueled by a growing need for more effective herbicide formulations to combat herbicide-resistant weeds. These efforts involve increased use of some older active ingredients that had been in decline after the introduction of glyphosate and the development of pest management systems involving genetically modified seeds and complementary herbicide formulations. Although these older ingredients are off patent, producers will be able to set a higher price for their new proprietary formulated products, especially when a formulated herbicide is meant to be used with an integrated pest management system involving new seed technology. Producers are increasingly turning to these systems for weed management, rather than encouraging farmers to depend on a single product. For example, Dow’s forthcoming ENLIST product line will include genetically engineered seeds that are designed to be used with Dow’s ENLIST herbicide, which contains glyphosate and 2,4-D.

Demand for formulated insecticides is expected to show growth of 2.3 percent per year to almost $3.2 billion in 2016, largely due to slight increases in acreage for insecticide-heavy crops like fruits and vegetables, although annual use of insecticide products is also strongly affected by weather. Growth will be limited by the continued adoption of integrated pest management techniques, as farmers tend to turn to insecticides as a last resort. Insecticide formulations are expected to continue the trend toward lower doses of more potent active ingredients as consumers continue to express concern over the safety of certain insecticides. These lower dose formulations include the increased use of seed treatments, particularly with neonicotinoid insecticides.

### TABLE V-8

PESTICIDE DEMAND BY CROP (million pounds)

<table>
<thead>
<tr>
<th>Item</th>
<th>2001</th>
<th>2006</th>
<th>2011</th>
<th>2016</th>
<th>2021</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cropland Planted</td>
<td>325</td>
<td>316</td>
<td>315</td>
<td>315</td>
<td>315</td>
</tr>
<tr>
<td>lb pesticide/acre</td>
<td>2.1</td>
<td>2.1</td>
<td>2.3</td>
<td>2.4</td>
<td>2.6</td>
</tr>
<tr>
<td>Agriculture Pesticide</td>
<td>677</td>
<td>649</td>
<td>711</td>
<td>770</td>
<td>825</td>
</tr>
<tr>
<td>Corn</td>
<td>202</td>
<td>212</td>
<td>238</td>
<td>264</td>
<td>285</td>
</tr>
<tr>
<td>Soybeans</td>
<td>127</td>
<td>121</td>
<td>134</td>
<td>145</td>
<td>156</td>
</tr>
<tr>
<td>Vegetables &amp; Melons</td>
<td>84</td>
<td>84</td>
<td>90</td>
<td>92</td>
<td>95</td>
</tr>
<tr>
<td>Fruit &amp; Nuts</td>
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</tr>
<tr>
<td>Cotton</td>
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<td>45</td>
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<tr>
<td>Other</td>
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<td>110</td>
<td>133</td>
<td>146</td>
<td>160</td>
</tr>
</tbody>
</table>

### CHART VI-2

US FORMULATED PESTICIDE MARKET SHARE, 2011 ($10.7 billion)
McLaughlin Gormley King Company
8810 10th Avenue North
Golden Valley, MN 55427
763-544-0341
http://www.mgk.com

Annual Sales: $60 million (estimated)
Employment: 110 (estimated)
Key Products: pyrethrum-based insecticides

McLaughlin Gormley King (MGK) is a privately held producer of insect control chemicals, including natural pyrethrum and synthetic pyrethroids. In addition to raw chemical ingredients, the Company supplies manufacturing-use intermediates and formulated insect control products, including insecticides, repellents, insect growth regulators and synergists. MGK’s products are used in a variety of markets, including agricultural pest control, structural pest control, industrial and institutional, consumer home and garden, vector control and veterinary applications.

The Company is active in the US pesticides industry via the production of pyrethrum-based insecticides for residential, professional and agricultural applications. Residential insecticides made by MGK comprise types that rid indoor and outdoor environments from pests, as well as varieties that protect gardens, flowers, trees, and shrubs from insect damage. Packaged insecticides offered by MGK for residential applications comprise RIPTIDE, SECTOR and VAMPYRE formulations. RIPTIDE water-based pyrethrin insecticides are used to kill mosquitoes and other flying insects and are safe for use in food and nonfood areas. The Company makes SECTOR concentrated water-based insecticides for applications that involve eradicating hard-to-see insects, including

“Herbicide demand is dominated by agricultural applications, which accounted for almost 85 percent of active ingredient-level herbicide sales in volume terms in 2011. The agricultural market for herbicides is expected to continue to expand, so agriculture will continue to account for the majority of demand. Together, the highest volume field crops (corn, soybeans, wheat, and cotton) accounted for 75 percent of agricultural herbicide use, by volume, and about 64 percent of total herbicide use.”

--Section IV, pg. 82
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Other Studies

Home & Garden Pesticides
US demand for home and garden pesticides is projected to increase 3.2 percent per year to $2.3 billion in 2016. Insecticides and fungicides will be the fastest growing types. Household applications will outpace lawn and garden uses, promoted by increased awareness of pest-borne diseases and by continued problems with aggressive insects. This study analyzes the $2 billion US home and garden pesticide industry, with forecasts for 2016 and 2021 by product, application and raw material. The study also evaluates company market share and profiles industry players.

World Agricultural Pesticides
World demand for formulated agricultural pesticides is forecast grow 3.8 percent annually through 2016 to $59 billion. The fastest growth is expected in developing countries of Eastern Europe, South America, and Asia. Product demand will benefit from more value-added pesticide formulations with multiple active ingredients. This study analyzes the $49 billion world agricultural pesticide industry, with forecasts for 2016 and 2021 by product, market, world region and for 43 countries. The study also evaluates company market share and profiles industry participants.

Lawn & Garden Consumables
US packaged lawn and garden consumables demand will rise 3.3 percent yearly to $8.8 billion in 2016. Pesticides and fertilizers will remain the top segments, with fertilizers, seeds and growing media the fastest growing. Organic formulations will outpace conventional types, but from a much smaller base. This study analyzes the $7.5 billion US lawn and garden consumables industry, with forecasts for 2016 and 2021 by product, formulation, market, application, end user and US region. The study also evaluates company market shares and profiles industry participants.

Fertilizers in China
Demand for fertilizers in China is forecast to increase 3.3 percent per annum through 2015 to 262 million metric tons. Sales will be supported by growth in the amount of sown areas and rising rural incomes. Single-nutrient fertilizers will remain the dominant type, while multi-nutrient fertilizers will grow much faster. This study analyzes the 222.5 million metric ton agricultural fertilizer industry in China, with forecasts for 2015 and 2020 by product, crop and region. The study also evaluates company market share and profiles industry participants.

Agricultural Pesticides in China
Demand for formulated pesticides in the agricultural market in China is forecast to increase 5.3 percent per annum to 2.5 million metric tons in 2015. Insecticides will remain the dominant product type while fungicides will grow the fastest. This study analyzes the 1.8 million metric ton agricultural pesticides industry in China, with forecasts for 2015 and 2020 for formulated pesticides and pesticide active ingredients by type, class, crop and geographic region. The study also evaluates company market share and profiles industry participants.