Prior to developing a new product or application for an existing product, FMC considers its potential sustainability impact. This establishes an inseparable link between innovation and sustainability. In 2013 we spent 57 percent of our total Research and Development (R&D) expenditures on projects that positively impact global challenges, exceeding our 2015 target of 50 percent.

**Focused on Sustainability and Efficiency**

Each of our businesses has developed an assessment tool that determines if a project makes a positive impact on one or more of the five major global challenges FMC has identified. By using the assessment tool to analyze each project, our innovators must always consider ways to create new products that deliver positive benefits to society before initiating a project.

Our Agricultural Solutions business has developed a more comprehensive assessment tool to prioritize its R&D projects. This tool guides analysis of projects based on strategic value, innovation potential, financial contribution, risk exposure and sustainability. To be considered for development, a project must perform at a neutral or better level on the sustainability criteria compared to existing market solutions.

Along with the efficiencies derived from screening potential projects through the tool, Agricultural Solutions streamlined communications between the global R&D and marketing groups to further maximize resources. Now the R&D and marketing groups meet quarterly to review their entire project portfolio and ensure it meets the criteria set out in the scorecard tool. Initial meetings and prioritizations in 2013 led to a 57 percent decrease in the number of products being worked on with hardly any loss of potential revenue.

**Customer-Driven Innovation**

FMC’s product development is shaped by the needs of our customers. By staying close to the people who use our products we are able to move quickly to create more effective ways to address geographically specific needs. These focused relationships are maintained at local and regional levels and contribute to our market differentiation.

**Hands-On Approach Yields Solutions**

To strengthen engagement with and responsiveness to customers, we have “localized” much of our R&D function. We work directly with customers around the world to understand their concerns and then develop customized solutions based on their input. This is made possible through our diverse global research network.

Our scientists establish hands-on relationships with customers. For example, in Turkey we provided training at our food labs and conducted joint trials with a major chocolate and candy manufacturer. During educational demonstrations, prototypes were prepared which showed the creamy texture and stability imparted by our microcrystalline cellulose (MCC). MCC comes from specialized cellulose sourced from sustainably harvested trees and adds texture to food products. At another training session attended by several leading confectionary manufacturers, the Istanbul Innovation Center hosted tutorials on natural colors and pectin.

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Simultaneously we are finding ways to encourage dialogue, sharing and cross-fertilization of ideas. The FMC Asia Innovation Center (AIC) in Shanghai, China, opened in late 2013 and brings together approximately 200 scientists, technicians, sales and marketing, support and executive staff. By addressing the Asia-Pacific market from a central location, we expect to benefit from greater synergy and collaboration on product innovation and customer service. The AIC houses world-class food and pharmaceutical application laboratories where FMC customers can learn how to use our products in their formulations.

Achieving Shared Objectives

We believe that innovations that positively influence society will add to our success. Many of our customers share this belief, and together we are collaborating on product development to help achieve customer sustainability targets as we pursue our own. For example:

- A leading global consumer packaged goods company is contributing to a lower carbon footprint by using our natural soda ash instead of the synthetic alternative in products, including detergents and container glass.

- Food companies in China are bringing better nutrition to the population by adding FMC products that improve shelf life, stability and texture of beverages. Successes include use of our products in protein drinks, peanut milk, teas and coffee mixes.

- A European health products company used our Nutricol® HN Glucomannan to develop a weight management product that fosters feelings of a full stomach. With so many people overweight or obese and the numbers projected to increase, this product may help alleviate food cravings and may play a role in helping curb weight gain.

- In cooperation with a German manufacturer of sausage casing technology, we developed alginate-based sausage casings that perform better on their equipment than any other casing system in the market. FMC is being granted a patent for the casing in the U.S. and has additional patent applications underway. Potential customers began conducting trials with the system in 2013.

- In North America, our Agricultural Solutions group examined customer container size preferences and buying patterns to identify products that could be more efficiently packaged by changing to larger size product containers. This effort to “right-size” containers delivers products in a more economical, less resource-intensive way.

Building Health and Nutrition Solutions

As consumers continue to look for products that improve their health and well-being, FMC is exploring ways to address those demands by developing more sustainable and renewable products while increasing the use of natural ingredients.

Expansion in Nutraceuticals

Consumer interest in nutraceuticals, products derived from food sources that provide extra health benefits, has grown rapidly in recent years. FMC strengthened our investment in this area with the acquisition of Epax®, the world’s leading producer of premium-grade, omega-3 fish oils. Clinical research shows that the key omega-3 ingredients, eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) may help support heart, eye and brain functions.

The world’s seafood supply is challenged by overfishing that can lead to food shortages and collapse of ecosystems. With some 80 percent of our fish oil derived from anchovies, FMC has worked to ensure the longevity of this fish stock and has required all of our anchovy suppliers to be certified by Friends of the Sea. This certification affirms these suppliers meet sustainable fishery and aquaculture standards. We also work with governments to foster species protection.

Tecnocalda, FMC Brazil’s chemical handling and storage system for large agribusinesses, helps customers manage chemicals in a more economical and sustainable way. The program supports sustainability by facilitating safer and more efficient product preparation, reduction in packaging waste, more accurate inventory systems for better control and theft avoidance, and compliance with pesticide legislation.

| Dedicated Airplane Spray Mix Distribution | Dedicated Truck Spray Mix Distribution |
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Our manufacturing technology is highly efficient and recovers nearly 100 percent of available DHA and EPA. In 2013, we added new capacity to our site in Seal Sands, United Kingdom, based on simulated moving bed chromatography – the most efficient means known to concentrate EPA and DHA, affording higher yields and greater purity than any other known purification technology. Production from this facility will be used to produce omega-3 for the pharmaceutical industry and ultra high omega-3 concentrates for nutraceutical products. We are also considering the feasibility of using fish oil byproducts as biofuel to maximize use of our resources and minimize fuel consumption.

Growth in Pharmaceuticals

In 2012, FMC launched our SeaGel® soft capsule product – a vegetarian alternative to animal-derived gelatin products. SeaGel capsules are more heat resistant than gelatin capsules, helping to minimize the problems of capsules sticking together if the product is shipped and stored in warmer climates. Sales of SeaGel capsules nearly tripled in 2013 as demand grows.

Advancing Biological Alternatives

FMC is looking to nature for guidance in advancing agricultural solutions. It is through this lens that we are exploring biologicals – materials derived from renewable plant and/or microbial sources. Biologicals improve soil health, foster seed germination, increase growth of plants, allow for better management of nutrients, fight diseases and insects and increase crop resistance to stressed environmental conditions. This direction complements our continued exploration and production of synthetic agricultural solutions which together with biologicals form the basis of a successful integrated crop management strategy. (See graphic at right).

As we expand our capabilities as a unified BioSolutions business, our team focuses its research on real customer needs. The biological discovery platform begins with “smart selection,” an approach that brings customer-driven innovation to life and allows for rapid response to emerging concerns. The location of our new Center of Excellence for Agricultural BioSolutions on the Campus of RTI International in North Carolina’s Research Triangle Park lets us access unique technical skills available at a leading research institute, world class universities, global businesses and technology start-ups.

FMC formed an exclusive, global strategic alliance with Chr. Hansen, a leading company in biosciences and its applications. CAEB’s rich product pipeline, which is in various stages of development, feeds directly into Chr. Hansen’s fermentation manufacturing capabilities.

Two strategic transactions added strong competencies in biologicals to the Agricultural Solutions portfolio.
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These R&D relationships enable us to build a comprehensive portfolio that includes world-class, end-to-end biological platforms. They build on our traditional strengths in synthetic crop protection chemistries, allow for leadership in the fast-growing biological market and advance our ongoing evolution toward better crop management and protection systems using both biological and synthetic products.
Influencing the Future of Transportation

Currently 3.5 percent of all automobiles are electrified in some way and use lithium ion batteries. Although electric vehicles (EVs) show great promise in the battle to cut carbon emissions worldwide, consumer adoption is slower than anticipated. Nonetheless, leading EV manufacturers and some industry analysts believe that EVs’ environmental and economic advantages eventually will accelerate consumer adoption.

As one of the world’s largest and most innovative lithium suppliers, FMC is an active participant in the effort to encourage EV use. We have a leading market share in advanced technologies for EVs and remain at the forefront of innovation with breakthroughs that extend EV driving range and battery longevity.

In addition to helping power EVs, FMC’s lithium solutions are used to make synthetic rubber for more fuel-efficient “green” tires. Although these tires have better gas mileage performance, we are challenged by the significant amount of waste generated in the production process. We have made marginal improvements in this area and continue to explore waste reduction opportunities.

Measuring and Reducing Impact

Life Cycle Analysis

To gain greater awareness of the impacts caused by production of specific FMC products, we initiated a life cycle analysis (LCA) program. An LCA quantifies a specific product’s environmental impacts throughout the resource chain.

In 2013, FMC performed an LCA of SeaGel® capsule technology from our Health and Nutrition business, and clomazone, one of our key active herbicide ingredients from Agricultural Solutions. Results are being used to understand at what stages in the development and manufacturing process our products have the largest opportunity for impact.

Process Innovation

Discovering innovative ways to make our operations more environmentally friendly and cost effective are high priorities. This is especially true in mining, where FMC is deriving significant benefits through solution mining at our Green River, Wyoming, facility. Using secondary recovery process technology, we inject recycled water into the old mine workings and then pump that water back to the surface. This process substantially improves the recovery of trona ore that remained after traditional dry mining.

We continually look for ways to improve our extraction technology. FMC recently partnered with a local university to conduct tests that would increase our understanding of hydrodynamic behavior in our solution mining. Testing results are being used to maximize trona recovery, allowing us to minimize energy consumption in our soda ash production process.

Connecting R&D to Sustainability Values

Our solutions, the chemistry behind them and the processes we have put in place have the potential to positively influence major global challenges. By aligning product and process R&D with sustainability, moving toward deeper cooperation with customers and measuring progress on our research goals, we expect innovation to continue shaping solutions for the future.

Chemical analysts Jie Luan, Bryan Kong and Susan Xu conduct a regulatory study in the Chemical Development Center at the FMC Asia Innovation Center in Shanghai, China.
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