# INVESTMENT CASE

The Omnia Group, listed in the Chemicals, Oils and Plastics sector of the JSE, is a diversified specialist chemical services provider with balanced interests in the agriculture, mining and chemicals markets. The company, comprising Agriculture, Mining and Chemicals divisions, is a signatory to the Responsible Care® Charter and endorses the principles of sustainable development, effective risk management and continuous improvement.

## INNOVATE VALUE ADDING THROUGH AUTOMATION

Given Omnia's vision to offer quality products and services that afford its customers real value and best-in-class technology, during the financial year under review BME invested in advanced automated assembly plants for the production of the blasting initiation systems. Two automated plants are operating at Losberg for the assembly of non-electric Megadet detonators and the first of two automated plants for the assembly of the AXXIS® electronic delay detonators are scheduled to be commissioned by mid-2016.

BME's advanced detonator technology and increasing demand for electronic detonators has required a move away from traditional manual assembly methods to more-sophisticated robotics to consistently generate high-quality products and higher production volumes to meet increasing demand. The investment has already yielded positive results in the improvement in quality of the Megadet detonators produced.

The complexity of the AXXIS® electronic delay detonators and the need to achieve a world-class standard of less than three-in-a-million failures from the plant led BME to automate the manufacturing and assembly processes.

Each automated plant has a small footprint and is delivered to site in large shipping containers ready for installation. The plan is to scale up the BME business in electronic detonators across the globe will be achieved by adding plants regionally, thereby allowing BME to manufacture closer to the areas of demand, reduce costs and to achieve savings in shipping raw materials. Having a small state-of-the-art assembly plant near key markets will also give BME a competitive edge in terms of security of supply to customers, improved service levels and greater market confidence.

Currently, electronic detonator sales accounts for approximately 15% of the total number of detonators used in mining, quarrying and construction in South Africa. On a global basis, the proportion of electronic detonators to non-electric initiation systems used in opencast mining is closer to 30%. There is significant potential for the market to grow globally above the current level of 9.5 million units per annum. Many large opencast mines already use electronic detonators as standard practice, but many operations could still be converted to use electronic detonator systems.



*BME's automated Megadet plant in Losberg*



*BME's automated Megadet plant in Losberg*

## THE VALUE OF OMNIA NUTRIOLOGY® IN ENHANCING WATER USE EFFICIENCY AND RISK MITIGATION

Over the past year South Africa experienced the worst drought in more than 100 years, which increased focus on water scarcity, resource efficiency and associated risk mitigation. The drought is expected to pass in the short term, but limited rainfall with unpredictable distribution will remain a pervasive challenge for agriculture production through South Africa and southern Africa.

Over the last five years, Omnia Nutriology® as part of Omnia's Strategic Agriculture Services (SAS) Department, has invested significantly in projects aimed at water conservation in agriculture. A recent edition of Nutriology® News, Omnia's in-house publication, provides greater detail on these developments. An overview of the most important projects over the past year follows.

### SOIL MOISTURE CONTENT MONITORING AND PREDICTION

At present, the largest project focusing on modelling soil moisture content, operates in collaboration with North West University and University of the Free State. The main objective of the project is to gain insight into the effect of soil moisture on potential yield. The objective is to accumulate rainfall data in real time from all weather stations and basic in-field rain gauges managed by farmers. The data is gained telemetrically or by data fed into precision farming applications. This "Big Data" is fed directly into a central Geographic Information System (GIS) which is the main database for accumulating this information. Sophisticated algorithms are developed to predict available soil moisture in the soil profile. A working prototype of the model has been launched, and Omnia has exclusive ownership of the core algorithms.



*One of the weather stations placed by Omnia to collect data*

### PREDICTIVE MODELLING OF YIELD

Having developed the first prototype that predicts soil moisture, the next step was to develop an additional model (comprehensive multi-disciplinary model-dependent research programme) to predict potential yield in real time, based primarily on soil moisture prediction and rainfall probability. The programme begins with specification of an algorithm, based on first estimations from historic data, to generate new data, predictions and recommendations. This approach integrates all aspects of crop growth through simulations and mathematical programming, and is improved continuously by comparing generated data with real data. Omnia has the competitive advantage of a large team of agronomists working on farms to monitor, verify and gather data on a country wide-basis and outside South Africa.

Taking specifically maize yield in the central growing areas in South Africa as an example, The current accuracy of the combined models to predict eventual yield was recently proven to exceed 75%.



*A classic symptom of drought stress on maize*



*Soil moisture probe placed by Omnia*

## RISK MITIGATION

The soil-moisture models are invaluable to southern African growers in helping them make real-time decisions about input management and marketing of their produce. The models are also highly sought after by entities operating in, among others, insurance, credit provision and grain-trading markets. Omnia Nutriology® is exploring the potential of these "new" markets.

## SUPPORTING PRODUCTS AND CONCEPTS

### NITROGEN USE EFFICIENCY

It is well known that plant nutrition influences water use efficiency significantly, including primary nutrients such as nitrogen, potassium, sulphur and beneficial nutrient elements like silica, among others. The most prominent nutrient affecting water-use efficiency is nitrogen. There is a crucial and delicate balance between too much and too little nitrogen in terms of growth and water use in plants, notwithstanding the danger of soil water contamination. Omnia runs a nitrogen-use efficiency and management programme alongside yield prediction modelling. Examples of the successful implementation of research include accurate use of OmniSap® (plant sap analysis) and chlorophyll meters on various crops to measure required nitrogen in the field, using centrally accessed algorithms and smart devices.

The form of nitrogen in the soil is also important to ensure maximum water-use efficiency. Omnia plays a fundamental role in the manufacture of ammonium nitrate-based nitrogen fertilizers, proven by group and international greenhouse and field trials, to ensure average water use efficiency of 15% and more, than urea per unit nitrogen, especially in the presence of effective calcium nutrition. When applied as nitrate, nitrogen applied with calcium ensures significantly better water use by plants versus the use of urea. As an example, the flagship product developed to achieve this performance efficiency is the Omnia Greensulf 35™ which contains ammonium nitrate, calcium and sulphur.

### PRECISION FARMING (OMNIPRECISE®) CONCEPTS

It was proven shortly after the onset of precision farming (OmniPrecise®), that physical soil factors and water distribution in fields are the most prominent aspects affecting the variance of the geospatial yield of any crop.

> **"**_The soil-moisture models are invaluable to southern African growers in helping them make real-time decisions_**"**

Using soil profiling and combining yield monitor data, Omnia has developed sophisticated models to define different zones of crop potential and thus management zones within planted fields.

Models were also developed to calculate the cumulative probability of yields per zone, based on historical yields, regardless of crop rotation. These models have been branded as OmniZone™ and OmniRiskIQ™ respectively. As an exclusively Omnia innovation, they significantly support and increase the accuracy of predictive modelling.

### SOIL BIOLOGY, ROOT HEALTH AND SUSTAINABLE PRODUCTION

The critical importance of root health to ensure optimum uptake of nutrients, especially water, is often underestimated. Omnia Nutriology® identified this along with the increasing importance of soil health and sustainable production methods some 15 years ago. This gave rise to the establishment of OmniBio™, focusing on developing products that sustain soil biology alongside sustainable fertilization programmes. A range of root health products (Rhizovator™) was launched recently to ensure optimum root growth and biological disease resistance in row and orchard crops. Omnia also invested another R4 million during the financial year under review to expand and upgrade the state-of-the-art OmniBio™ laboratory at the Sasolburg plant and increasing related services.

### OMNIA NUTRIOLOGY®'S DATABASES

Over the past 20 years, Omnia Nutriology® has assimilated databases of soil, water, tissue and plant sap analyses through its Chemtech™ laboratory. OmniPrecise™ GIS and resultant Big Data grow exponentially, this is valuable in support of predictive modelling.

### SUMMARY

Omnia Nutriology® continues to invest in support of predictive modelling for risk mitigation, especially with regard to water- and nutrient-use efficiency. This predictive modelling, along with Omnia's support structures, adds value to basic fertilizer products. The technological future is challenging and demanding, but presents opportunities to explore new markets and related risk mitigating products.

*"The technological future is challenging but presents opportunities"*