



## Let's move forward together

While farming is the biggest job on earth, farmers are not facing the challenge alone. We support productive, sustainable agriculture, allowing farmers to protect the land they hold in trust for future generations while meeting the demands of modern society.

We pledge to:

- Invest in the right solutions to enable farmers to grow more quality food, more efficiently.
- Share our expertise to help farmers to make a better life for themselves and their communities.
- Never compromise on safety to allow farmers work in a safe environment and produce safe, healthy food.

In everything we do, we will play our part in leaving a positive environmental inheritance.

We stand shoulder to shoulder with farmers. Together, we will move forward on our journey.

## AgMusa™

Increasing yield and efficiency for sugarcane farmers

### ■ Solving problems for farmers

Our design process is focused on solving real problems that farmers face. In Brazil, for example, BASF's program, AgMusa™, is helping farmers to ramp up sugar cane production, an important part of the national economy.

### ■ Crucial for the economy

To provide some context, in 2012, the sugar industry employed 1.1 million workers and contributed US\$ 36 billion to Brazil's gross domestic product (GDP) – equivalent to almost 1.6% of the entire national economy.\*

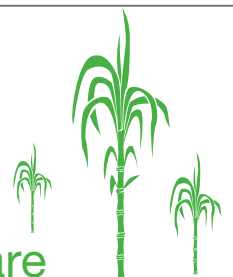
Since the 1980s, the country has successfully invested in a renewable biofuel technology industry, based on sugarcane ethanol, an alcohol-based fuel, produced by the fermentation of sugar cane juice and molasses. Today, nearly 100% of the cars produced in Brazil are the so-called flex fuel cars, which run on any combination of gasoline and/or ethanol.

## Brazilian power

Brazil produces

**600 m tons**  
of sugarcane

on roughly **8 m hectare**



### Traditional Planting – 20 ton/ha



### AgMusa™ – 1.5 ton/ha



**Easier and lighter cultivation: AgMusa™ enables farmers to sow disease free, pre-treated seedlings from nursery formation instead of heavy sugarcane plants.**

## ■ Farmers under huge pressure

However, over the years, a lack of sufficient industrial investment coupled with increasing demand for sugar, fuel and feedstock has outstripped supply, putting farmers under huge pressure to produce more.

While automation replaced manual planting and helped initially to reduce costs, there were negative side effects as the heavy machinery caused significant damage to seedlings. The conversion of commercial land to sugar cane production also led to the spread of diseases such as Sugarcane Raquitism (*Leifsonia xyli*).

The end result – a production bottleneck with Brazil forced to import ethanol in 2011 to simply meet demand. Farmers faced the perfect storm – they knew that there was opportunity but simply did not have the capacity or expertise to produce more sugar cane.

## ■ Innovation – the only way forward

Inspired by the vision of making Brazilian farmers more successful, BASF decided to develop a comprehensive solution that looked at the entire end-to-end process of sugar cane cultivation. The idea was to walk in the shoes of farmers, understand the problems they faced and design tools that allowed them to do their job properly.

AgMusa™ was initially commissioned and developed as a joint effort between BASF R&D and marketing with contributions from a diverse range of functions such as engineering, patents and industrial development. However, the partnership approach did not end there.

## ■ A partnership model

BASF opened its doors and as part of an open innovation model invited third-party companies, specializing in germplasm, automation, sensors and planting devices, to join AgMusa™ and share their collective expertise.

In a dedicated AgMusa™ biofabric at the Campinas Research Station, the team works alongside farmers, planting sugarcane from high yield varieties, developing seedlings, harvesting sugarcane and treating greenhouses. To date, over seven million seedlings have been delivered to farmers.

## ■ Mobile production

While the biofabric has a maximum gem\*\* extraction throughput capacity equivalent to 1,500 ha of planted sugarcane nurseries, additional capacity will now be provided by a mobile production unit. This offers huge benefits – the ability to go to where the farmer is located and to offer an even more responsive service.

## ■ How AgMusa™ works

### Good for the farmer

- AgMusa™ offers a flexible business model as we provide a planted area for the farmer, supported by our crop protection products and services.
- We deliver the sugar cane fully planted.
- We monitor the planted area on an ongoing basis and guarantee its performance.
- We support the farmer throughout the production process, sharing our expertise and know-how as well as providing precision agriculture tools and services.
- Higher yield per hectare.

### Good for the environment

- Less fuel consumption due to simplified planting process.
- Lower CO<sub>2</sub> emissions.
- Less soil compaction and erosion.

## ■ Direct from customers

*"In 2013, we decided to adopt AgMusa™ at our site. As a starting point, 12 hectares were planted and we also availed of other technical services from BASF. In 2014, we scaled up to 160 hectares planted and hope to reach 700 hectares in 2015.*

*We helped pioneer the AgMusa co-production program by launching the first BASF's AgMusa™ mobile bio-fabric in our area. We strongly believe this solution yields sustainable returns.*

*We are currently participating in the co-creation program to further enhance this solution. The goal is to achieve higher sugarcane longevity. We believe AgMusa™ is the way forward."*

Luís Augusto Contin Silva, Development Manager,  
Usina Alta Mogiana, Brazil.

## CONTACTS

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## SOURCES

- \* 2011 data from the Ministry of Labor and Employment's Annual Report of Social Information (RAIS).
- \*\* Gem – part of a sugarcane node which contains a meristematic tissue. A gem germination can replicate an identical seedling