

# Taking on Food Loss and Waste: Vegetables by Bayer Innovations and Solutions

*/// Vegetables  
by Bayer*

Food loss and waste (FLW) represent a multifaceted challenge spanning the entire food supply chain, resulting in an estimated 2.5 billion tonnes of food going uneaten around the world each year, equivalent to 40% of total production<sup>1</sup>. It is crucial to raise awareness about the harmful impact of FLW on food systems, particularly in the face of a challenging climate context. It contributes to approximately 3.3 gigatonnes of greenhouse gas emissions, making it the world's third-largest emitter, trailing only China and the United States<sup>2</sup>.

Fruits and vegetables take center stage in this issue, accounting for 44% of all food loss and waste<sup>3</sup>. Taking that into account, Vegetables by Bayer reinforces its vision of regenerative agriculture to overcome those adverse outcomes by developing solutions that could help tackle this issue. On this significant occasion of the International Day of Awareness of Food Loss and Waste, we showcase some of our solutions.

## Food Loss and Waste Adverse Outcomes

### // Climate Change

8% of greenhouse gases comes from food that is lost or wasted

### // Economy

Food loss accounts for 6.2% of India's GDP

### // Freshwater Use

1/4 of freshwater used by agriculture goes to food that is lost or wasted

Source: [World Resources Institute](#)

According to FAO, a substantial portion of fruit and vegetable losses during agricultural production stems from post-harvest grading, driven by quality standards imposed by retailers and consumers<sup>4</sup>. This is exactly where our Bayer Vegetable Seeds melons portfolio in Europe presents some innovative breeding solutions that initial trials indicate could help reduce food loss in the field:

- Seminis® **OrangeCandy®** melon SVMA6558, offers an improved disease resistance package, good field holding ability, and longer shelf life compared to the previous Seminis variety. During three years with 12 Bayer trials in Murcia, Spain, this variety demonstrated up to a **19% reduction of losses in the field**<sup>5</sup>, because of less cracking and good field holding, compared to our own previous variety.

1 – Source: WWF

<[https://wwf.panda.org/discover/our\\_focus/food\\_practice/food\\_loss\\_and\\_waste/driven\\_to\\_waste\\_global\\_food\\_loss\\_on\\_farms/#:~:text=Driven%20to%20Waste%3A%20Global%20Food,billion%20tonnes%20wasted%20each%20year](https://wwf.panda.org/discover/our_focus/food_practice/food_loss_and_waste/driven_to_waste_global_food_loss_on_farms/#:~:text=Driven%20to%20Waste%3A%20Global%20Food,billion%20tonnes%20wasted%20each%20year)>

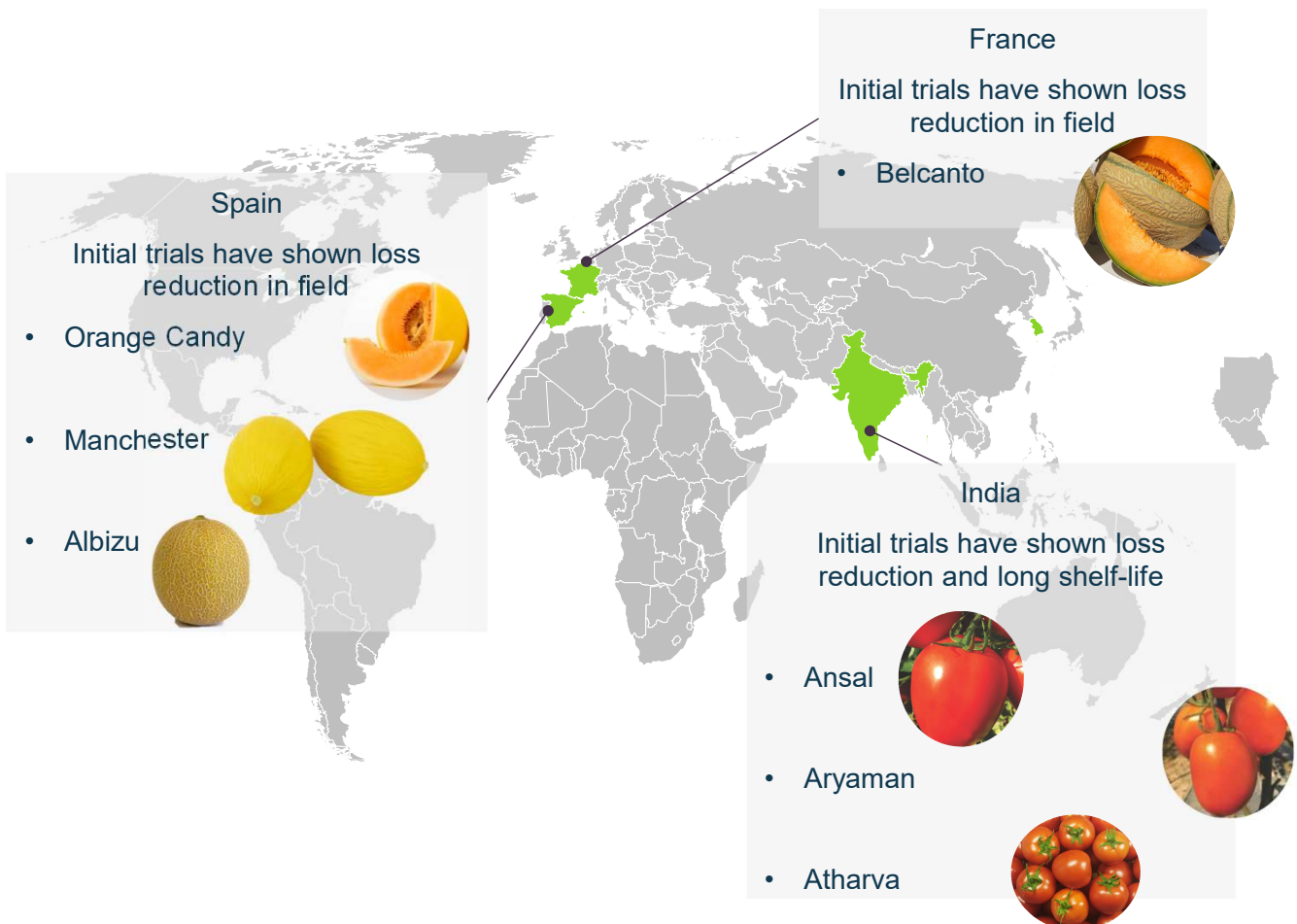
2 - Source: World Resources Institute <<https://www.wri.org/insights/whats-food-loss-and-waste-got-do-sustainable-development-lot-actually>>

3 - Source: World Resources Institute <[https://files.wri.org/d8/s3fs-public/reducing-food-loss-waste-global-action-agenda\\_1.pdf](https://files.wri.org/d8/s3fs-public/reducing-food-loss-waste-global-action-agenda_1.pdf)>

4 - FAO. 2011. Global food losses and food waste – Extent, causes, and prevention. Rome: <<https://www.fao.org/3/i2697e/i2697e.pdf>>

5 - Based on Bayer trials (years), in 12 locations in Spain compared to the previous Seminis® varieties.

- Manchester** is a yellow melon variety adapted to Open Field Production. Nine internal trials from 2019-2021 in Murcia & La Mancha (Spain) demonstrated up to **22% loss reduction**<sup>6</sup> in the field (compared to the main competitor variety in the region) due to less deformed and small fruits.
- Albizu** is a galia melon variety with outstanding fruit quality and taste, primarily grown in Spain in the Almeria (greenhouse) and Murcia (open field) regions. It has transport and storage advantages due to its long shelf-life. Under open field conditions, 12 internal trials from 2018 and 2019 in Murcia (Spain) demonstrated loss reduction in the field compared with Bayer's previous varieties: up to approximately **59% loss reduction**<sup>7</sup> versus Verdasco and approximately **31% versus Edecos**<sup>7</sup>. This is due to Albizu's great fruit uniformity.
- Belcanto is an orange melon adapted to open field production. This hybrid has demonstrated a high production level with the potential for food loss reduction. Data from 20 internal trials from 2019 to 2021 in France demonstrated up to approximately **10% loss reduction**<sup>8</sup> in the field, compared to Bayer's previous variety, Funambul. This is due to Belcanto's exceptional field flexibility.



6 - Calculation reference: Manchester production of field loss: 3242,5 Kg/Ha | Competitor production of field loss: 4186,1 Ka/Ha |  $3242,5 \cdot 100 / 4186,1 = 77,45\%$  |  $100\% - 77,45 = 22,55\%$ .

7 - Calculation reference: Albizu production of field loss: 2351,49 Kg/Ha versus 5818,76 Kg/Ha for Verdasco |  $2351,49 \cdot 100 / 5818,76 = 40,41\%$  |  $100\% - 40,41\% = 59,59\%$ . Albizu production of field loss: 2351,49 Kg/Ha versus 3440,89 Kg/Ha for Edecos |  $2351,49 \cdot 100 / 3440,89 = 68,33\%$  |  $100\% - 68,33\% = 31,67\%$

8 - Average Net yield/Food loss (t/ha): Belcanto Commercial Yield: 92% and 8% food loss | Funambul Commercial Yield: 82% and 18% food loss.

In the context of developing countries like India, FAO attests that severe losses during post-harvest and distribution stages primarily result from the deterioration of perishable crops due to the warm and humid climates of some nations, coupled with seasonality leading to unsellable surpluses, and a lack of transportation infrastructure<sup>9</sup>.

Bayer's long shelf-life crops in India show promise to address this, as initial trials have offered positive outcomes such as reduced greenhouse gas emissions and supporting smallholders with more marketable fruits.

- Ansal tomato offers great shelf life and fruit firmness, which has the potential to reduce **postharvest food losses**. In a study published by Wageningen University in 2023, using product performance data from 2013-2017 from ~65 Bayer internal trials and post-harvest data from ~60 growers and ~10 dealers and exporters for the south and west India markets, only about **8-10%** of Ansal produce was estimated to be lost in the postharvest chain. Using the ACE calculator to calculate the product life cycle, Wageningen University determined that, such a reduction in post-harvest losses could result in **~20% less CO<sub>2</sub>e per kg of marketable crop**<sup>10</sup>.
- Aryaman tomato has shown, based on 62 trials in 2016-2019 by Bayer in the primary target market - central west India (Maharashtra region), **8-9% less non-marketable fruits**<sup>11</sup>.
- Atharva is a high-yielding potential Tomato hybrid mainly destined for the summer heat set season across India's North and Western regions. It is best suited for long-distance transportation due to its firmness and it has shown excellent fruit size and uniformity over the picking until the last harvest. Due to these features, based on 115 Bayer trials, in comparison with the main competitor, it has shown approximately **7-13% total loss reduction**<sup>12</sup> (considering post-harvest and transportation).

Bayer supports the efforts of the International Day of Awareness of Food Loss and Waste and reinforces its commitment to producing more while restoring more.

Combatting Food Loss and Waste holds a central position in this mission, and some of the company's innovative and tailored solutions are already yielding remarkable results by showing potential for addressing the primary drivers of FLW from the field up to retail, and consumer levels, in addition to covering developed and developing countries. By continuing down this path, Bayer is geared towards realizing its vision of "Health for all, Hunger for none".

9 - FAO. 2011. Global food losses and food waste – Extent, causes, and prevention. Rome: <<https://www.fao.org/3/i2697e/i2697e.pdf>>

10 - Source: Broeze, J.; Guo, X.; Axmann, H. Trade-Off Analyses of Food Loss and Waste Reduction and Greenhouse Gas Emissions in Food Supply Chains. Sustainability 2023, 15, 8531. <https://doi.org/10.3390/su15118531>

11 - 100%-win rate. All comparisons are head-to-head comparisons of Seminis® Aryaman, Seminis® Garv, and a leading competitor variety.

12 - This range considers the loss due to small/discolored/uneven ripened fruits at harvest, as well as wastage due to transportation and reaches to consumers, which is less in Atharva due to its long shelf life. Calculation reference: Atharva: 8-12% | Syngenta-6242: 15-25%