THE NEED FOR QUALITY PROTEIN MAIZE:
Maize is the third largest grain crop in the world used for direct consumption and it accounts for 15% to 56% of total daily calorie intake in developing countries. Using maize as the sole source of food intake can often lead to protein deficiencies and in some cases, stunted growth in children. Maize proteins contain on an average 2% lysine, which is half of the recommended values by the Food and Agriculture Organization (FAO). Lysine is the most limiting amino acid in maize endosperm followed by tryptophan and alternate source of protein is often required. But for many people in developing nations, this is not an option. In 2000, scientists dedicated to fight world hunger at the Mexico-based International Maize and Wheat Improvement Center (CIMMYT) successfully developed a type of maize that contains nearly twice the amount of usable protein and yet, interchangeable with current maize in cultivation. Named quality protein maize (QPM), the variety produces 70% to 100% higher lysine and tryptophan (essential amino acids). For a lot of developing countries, QPM is definitely a promising solution to the lack of protein in diet. Since the release of QPM, dozens of developing countries have benefited from growing QPM and the QPM hectares around the world have increased significantly (Table 1).

DEVELOPMENT AND SELECTION OF QPM:
• First discovered in 1963 by scientists at Purdue University.
• The gene opaque-2 (naturally occurring mutant maize gene) is responsible for lysine and tryptophan synthesis
• opaque-2 causes the grains to become chalky and susceptible to pests and low yield.
• Scientists at CIMMYT overcome the issues of opaque-2 gene using modifier genes via marker assisted selections.
• Fig. 1 shows a gradient of QPM kernels used for selection. Completely filled by protein (0%) to very little protein (100%).
• Liquid chromatography and near infrared analysis (NIR) for quantifying lysine and tryptophan levels.
• Selected kernels contain 50% to 70% opacity.
• Selections are carried for 7 to 8 generations before release.

Table 1: QPM Productions by Regions in Hectares

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>Africa</td>
<td>270,000</td>
<td>N/A*</td>
</tr>
<tr>
<td>Asia</td>
<td>405,000</td>
<td>N/A*</td>
</tr>
<tr>
<td>Central America</td>
<td>308,000</td>
<td>2,745,000</td>
</tr>
<tr>
<td>South America</td>
<td>55,000</td>
<td>250,000</td>
</tr>
</tbody>
</table>

* = Lack of accurate reported data
Source: CIMMYT

DRAWBACKS:
➢ QPM trait is maternally and paternally inherited.
➢ Farmers cannot save seeds for next season.

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