

| (6d) Fusarium Research Option D: Development of GMO Fusarium resistant banana cultivars | |
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| Countries | 19 (8 African countries, 8 Asian countries, 3 LAC countries) where Fusarium is either already present or will very likely spread in the near future if no major intervention occurs. We only included countries where local markets for 'AAA Cavendish' are important. This is because it is assumed that countries with export-oriented production patterns wouldn't adopt GMO varieties due to political and consumer concerns in importing countries whereas countries with strong local markets for 'AAA Cavendish' would be more likely to adopt GMO varieties |
| Cultivar groups considered | All six cultivar groups are assumed to be susceptible to Fusarium, but only production areas grown with ' AAA Cavendish ' are targeted with the research since efforts to develop GM varieties to Fusarium TR4 will focus only on 'AAA Cavendish' |
| Current and likely future spread | For simplicity reasons we assumed the current spread of Foc to be zero percent of the production area even though the disease is present in some countries. The estimation of the likely future spread of the disease was made separately for each country by applying a 'Foc scale' that we developed. We assumed that 100% of the banana production area in the included countries is susceptible to Foc. |
| Benefits: | |
| - Increase in yield | 100% (losses avoided) |
| - Reduction in postharvest losses | No effect |
| Production costs | No effect |
| Adoption ceiling | 40% of the affected targeted area across all countries. This translates into adoption ceilings of 0.1-17.8% of the total national production area. |
| Research period | 10 years |
| Technology release | The technology will be available in 12 years in all included countries (10 years of research plus 2 years until farmers start adopting the innovation) |
| Time from first adoption until estimated adoption ceiling will be reached | 15 years |
| Probability of success (up-take of technology) | 70% |
| R&D costs | US\$8.51 million |
| Additional country-level costs | US\$8.51 million (matched 1:1 with R&D costs) |
| Resource persons | Charles Staver, Miguel Dita |

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| Country | Production Area ('000 ha) | Share of 'AAA Cavendish' = Target Domain (% of total production area) | Current estimated spread of Foc (% of target domain) | Spread of Foc in 25 years (% of target domain) | Adoption Ceiling (% of area affected in 25 years) | Adoption Ceiling (% of production area) ($A_{t_{max}}$) | Years to First Adoption (t_0) | Years to reach maximum adoption $A_{t_{max}}$ | Yield Increase (%) | Reduction in Post-harvest Losses (%) | Change in Input Costs (%) | Probability of Success (up-take of technology) (%) |
|-------------|---------------------------|---|--|--|---|---|-----------------------------------|---|--------------------|--------------------------------------|---------------------------|--|
| Brazil | 498.45 | 51.52 | 0 | 2.24 | 40 | 0.46 | 12 | 15 | 100 | 0 | 0 | 70 |
| Burundi | 371.05 | 7.36 | 0 | 21.18 | 40 | 0.62 | 12 | 15 | 100 | 0 | 0 | 70 |
| China | 398.19 | 87.34 | 0 | 50.81 | 40 | 17.75 | 12 | 15 | 100 | 0 | 0 | 70 |
| Congo, D.R. | 391.62 | 18.67 | 0 | 27.55 | 40 | 2.06 | 12 | 15 | 100 | 0 | 0 | 70 |
| India | 1,858.28 | 10.31 | 0 | 7.44 | 40 | 0.31 | 12 | 15 | 100 | 0 | 0 | 70 |
| Indonesia | 320.03 | 12.63 | 0 | 28.88 | 40 | 1.46 | 12 | 15 | 100 | 0 | 0 | 70 |
| Kenya | 80.49 | 14.11 | 0 | 11.05 | 40 | 0.62 | 12 | 15 | 100 | 0 | 0 | 70 |
| Malaysia | 56.82 | 40.80 | 0 | 15.39 | 40 | 2.51 | 12 | 15 | 100 | 0 | 0 | 70 |
| Mexico | 86.31 | 77.31 | 0 | 2.24 | 40 | 0.69 | 12 | 15 | 100 | 0 | 0 | 70 |
| Mozambique | 27.86 | 52.15 | 0 | 50.81 | 40 | 10.60 | 12 | 15 | 100 | 0 | 0 | 70 |
| Myanmar | 65.43 | 16.56 | 0 | 38.87 | 40 | 2.57 | 12 | 15 | 100 | 0 | 0 | 70 |
| Nigeria | 455.55 | 9.63 | 0 | 3.77 | 40 | 0.15 | 12 | 15 | 100 | 0 | 0 | 70 |
| Pakistan | 31.98 | 71.23 | 0 | 50.81 | 40 | 14.48 | 12 | 15 | 100 | 0 | 0 | 70 |
| Peru | 120.83 | 18.62 | 0 | 2.24 | 40 | 0.17 | 12 | 15 | 100 | 0 | 0 | 70 |
| Rwanda | 343.64 | 4.36 | 0 | 7.44 | 40 | 0.13 | 12 | 15 | 100 | 0 | 0 | 70 |
| Tanzania | 537.68 | 3.10 | 0 | 38.87 | 40 | 0.48 | 12 | 15 | 100 | 0 | 0 | 70 |
| Thailand | 132.08 | 41.07 | 0 | 38.87 | 40 | 6.39 | 12 | 15 | 100 | 0 | 0 | 70 |
| Uganda | 1,866.25 | 3.23 | 0 | 3.77 | 40 | 0.05 | 12 | 15 | 100 | 0 | 0 | 70 |
| Vietnam | 102.17 | 46.00 | 0 | 50.81 | 40 | 9.35 | 12 | 15 | 100 | 0 | 0 | 70 |

Source: Strategic Assessment of Banana Research Priorities report