# 2023 Bi H1 Q22

## Section: Sustainability and Interdependence

## Topic: Crop Protection

## Question Summary

The question lists three examples of recombinant DNA approaches used to increase crop yield and asks which would lead to a decrease in the use of chemicals.

## Worked Solution

1) Insertion of the *Bt* toxin gene into cotton plants:

• *Bt* cotton produces an insecticidal protein that kills certain pests, so farmers can use fewer chemical insecticides. → **Decreases chemical use**.

2) Insertion of glyphosate resistance gene into maize plants:

• This allows the use of the herbicide glyphosate to control weeds without harming the crop. It generally **enables** herbicide use and does not reduce chemical inputs. → **Does not decrease**.

3) Insertion of a drought-resistance gene into wheat plants:

• Improves tolerance to water stress but is unrelated to pesticide/herbicide inputs. → **Does not decrease** chemical use.

Therefore, only statement **1** would reduce chemical use.

## Final Answer

■ Option A — 1 only

## Revision Tips

• *Bt* crops → fewer insecticides.
• Herbicide-resistance traits typically shift weed control towards specific herbicides (not a reduction in chemicals).
• Abiotic stress traits (e.g., drought tolerance) influence water use and yield stability, not chemical inputs.