Table 6.8 Factors affecting genetic vulnerability and resilience of *Phaseolus* beans.

Feature or crop evolutionary stage	Genetic vulnerability	Genetic resilience
Centers of origins (primary centers of diversity): wild populations	• Habitat destruction through expansion of urban areas, industrial agriculture, and nonagricultural activities; • Global warming leading to extreme weather events (drought, hurricanes); • Political instability; • Slowdown in explorations.	• Natural areas or biosphere reserves; • Land abandonment; • Ecogeographic model of explorations.
Traditional and indigenous bean production systems: domesticated populations, i.e. landraces	• Gene flow from wild to domesticated populations; • Human migration from rural to urban areas on domesticated populations; land abandonment; • Political instability; • Lack of conservation of seeds of released varieties.	• Gene flow from wild to domesticated populations; • Introduction of additional cultivars through local seed systems; • Creolization; • Traditional knowledge about adaptation and varietal traits; • Adoption of different Phaseolus species
Secondary centers of diversity: domesticates	• Selection for adaptation and different uses; • Genetic bottlenecks.	• Hybridization among varieties and gene pools; • Adoption of different Phaseolus species.
Conservation and breeding	• Limited systematic genotyping and phenotyping of gene bank collections; • Repeated use of same sources or genes to address breeding objectives.	• Large gene collections in multiple gene banks; • Diversity panels; • Whole-genome sequencing and reference sequence for the two gene pools and selected ecogeographic races; • Search for alternative sources of resistance or tolerance; • Pyramiding genes; • Hybridizations among gene pools and ecogeographic races; • Genomics-assisted selection strategies.
Large-scale, industrial production	• Single-genotype fields; • Similar pedigrees.	• Growing regions including different gene pools and ecogeographic races; • Geographic distances among growing regions.