

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

In the Name of Allāh, the Most Gracious, the Most Merciful



FROM FIELD TO STORAGE
Integrated Corn Grain Handling
Prevent/Control of Insect, Pest and Fungal Contamination



Presented By

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Global Importance

Maize is the most produced cereal globally

2024 Actual-1,225 Million tons, **2025 Forecast**-1,265 Million tons



Staple Food

17%

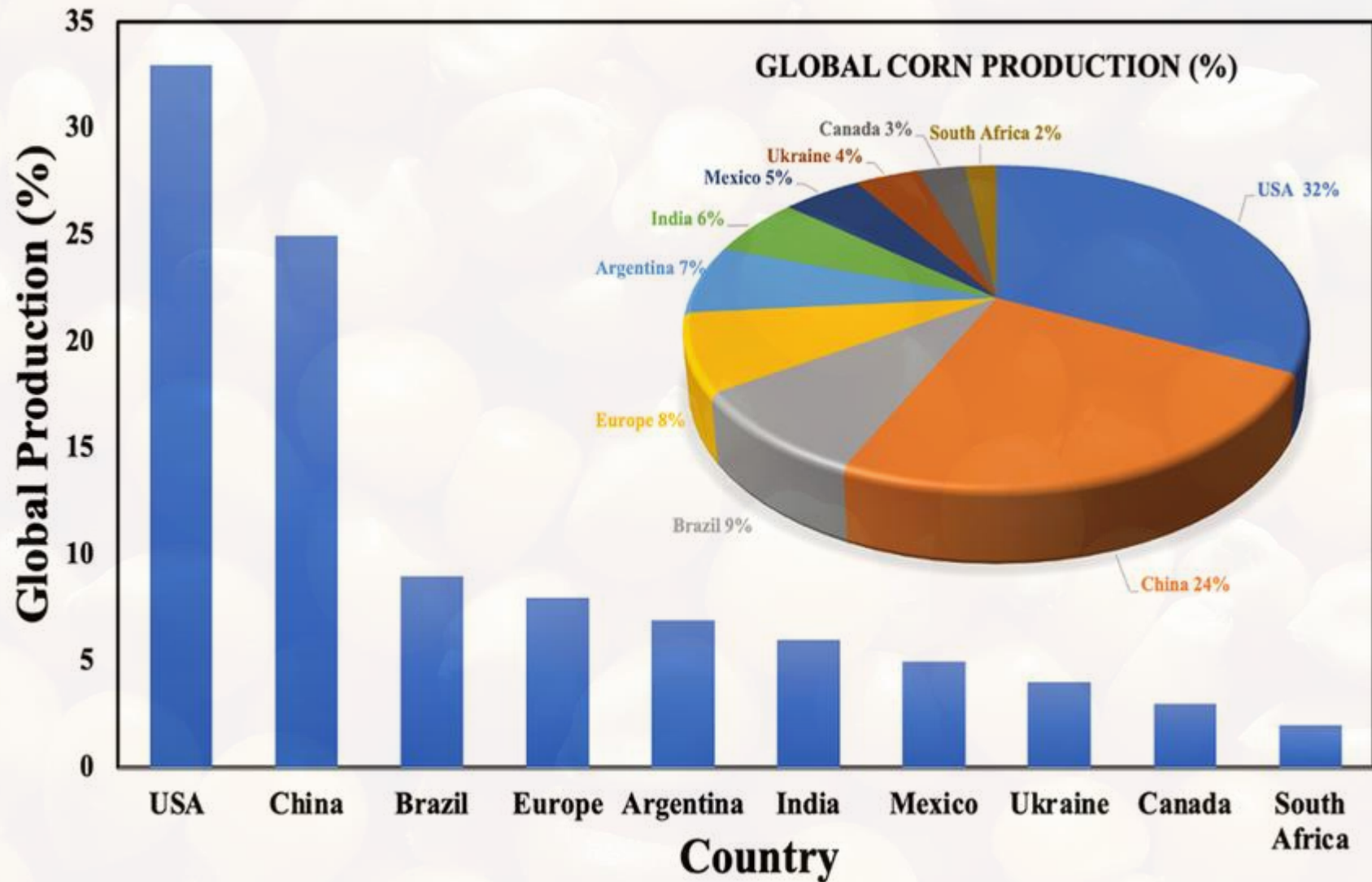
Animal Feed

61%

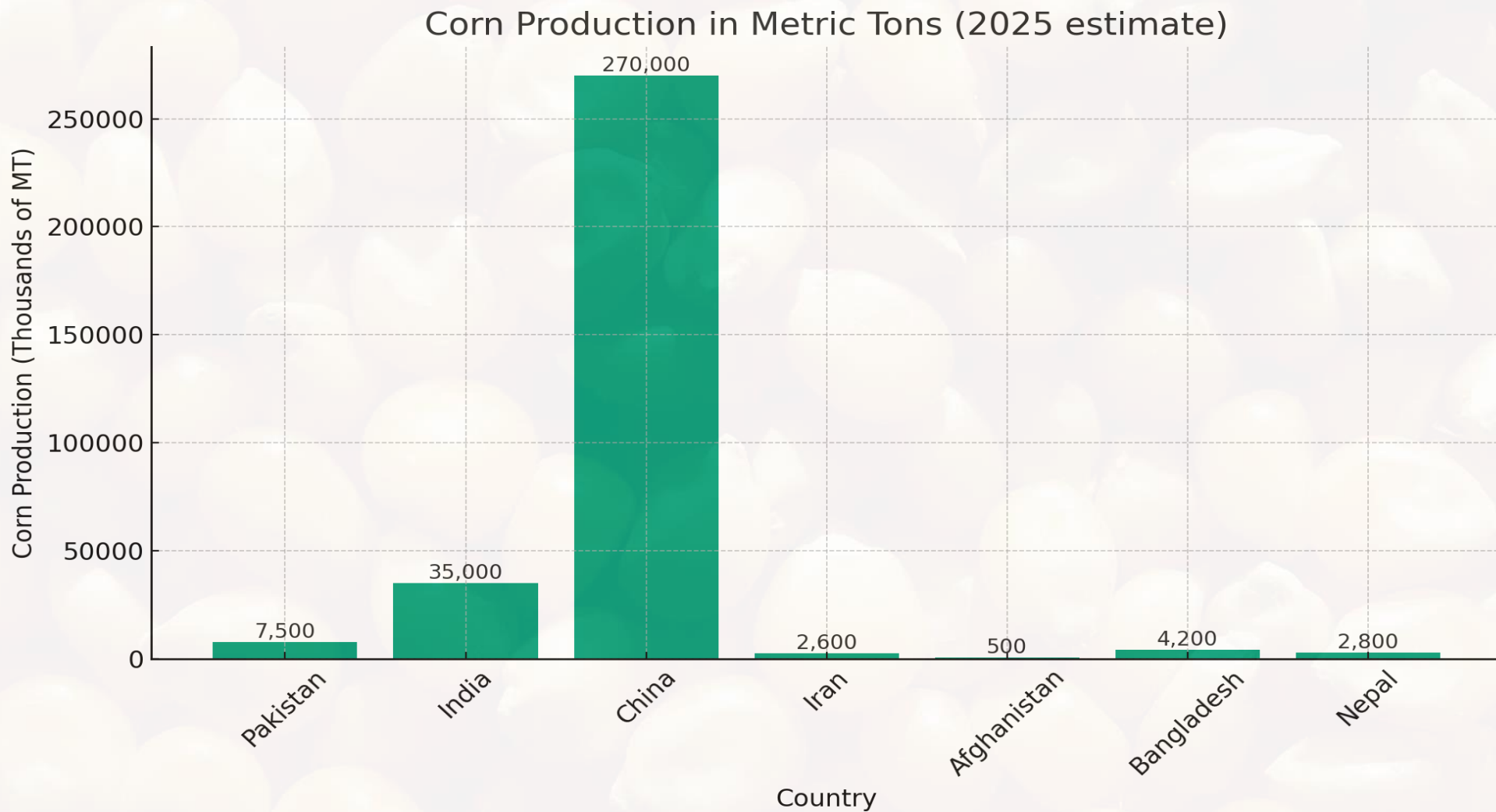
Industrial Use

22%

Global Corn Production



Regional Comparison

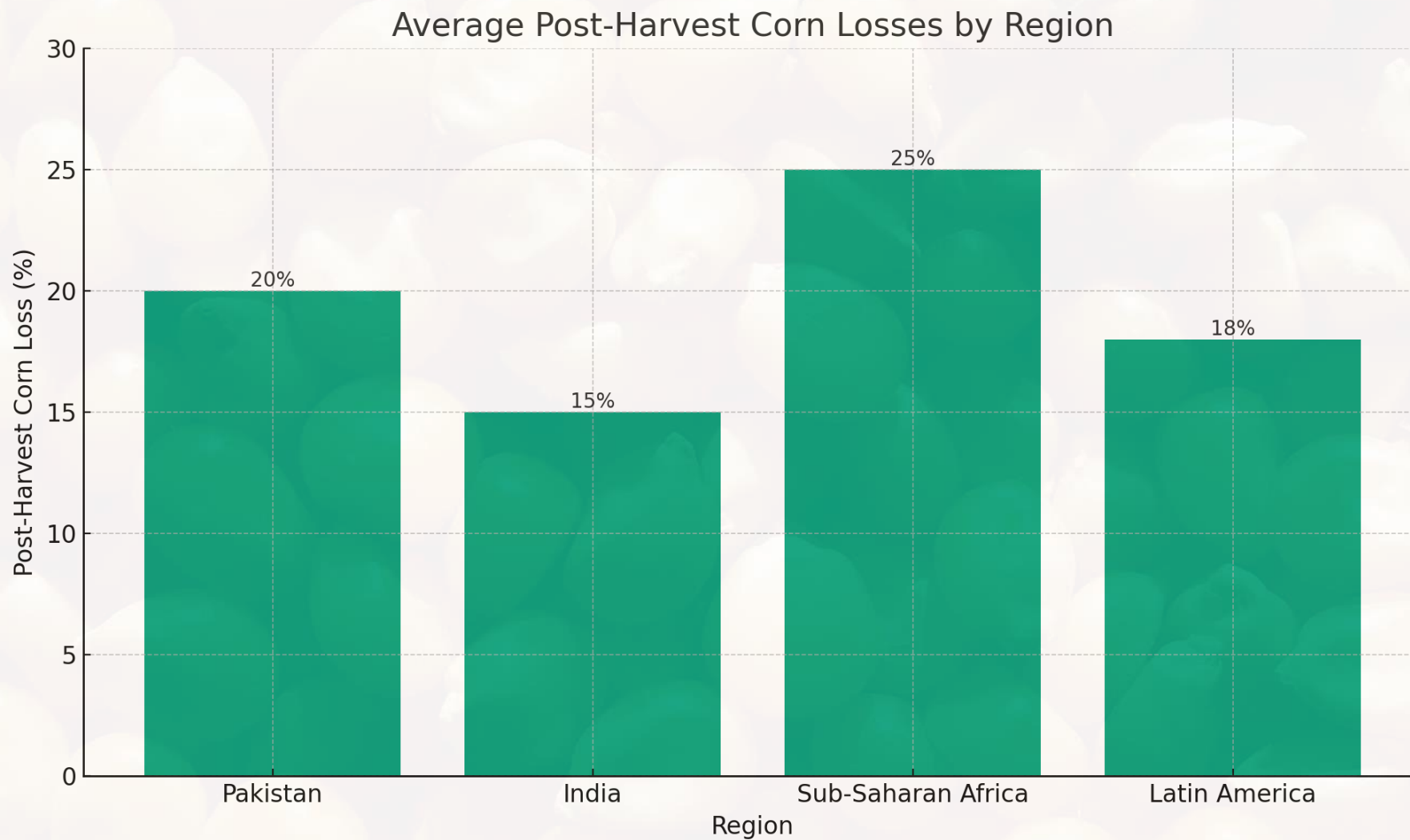


Major Threats

Production Faces Major threats

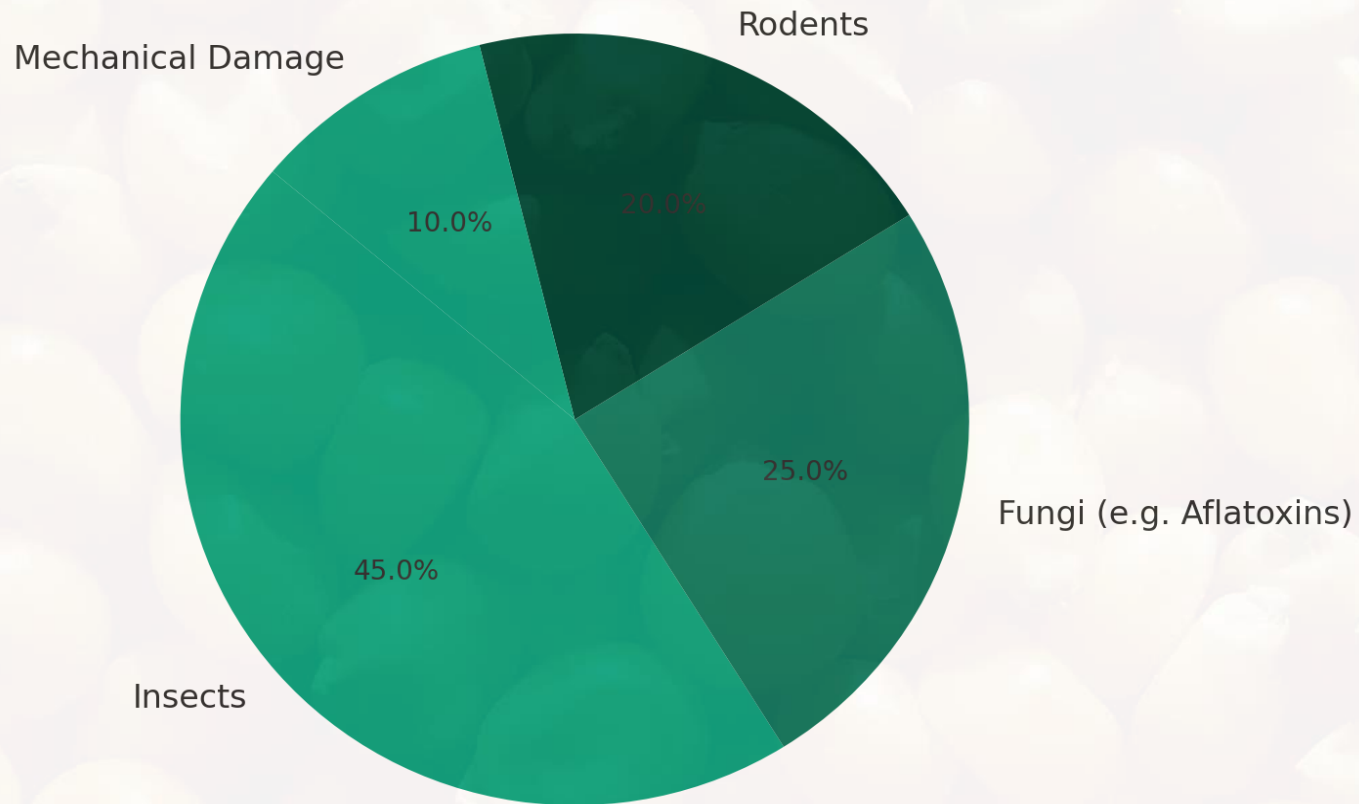


Post-Harvest Losses

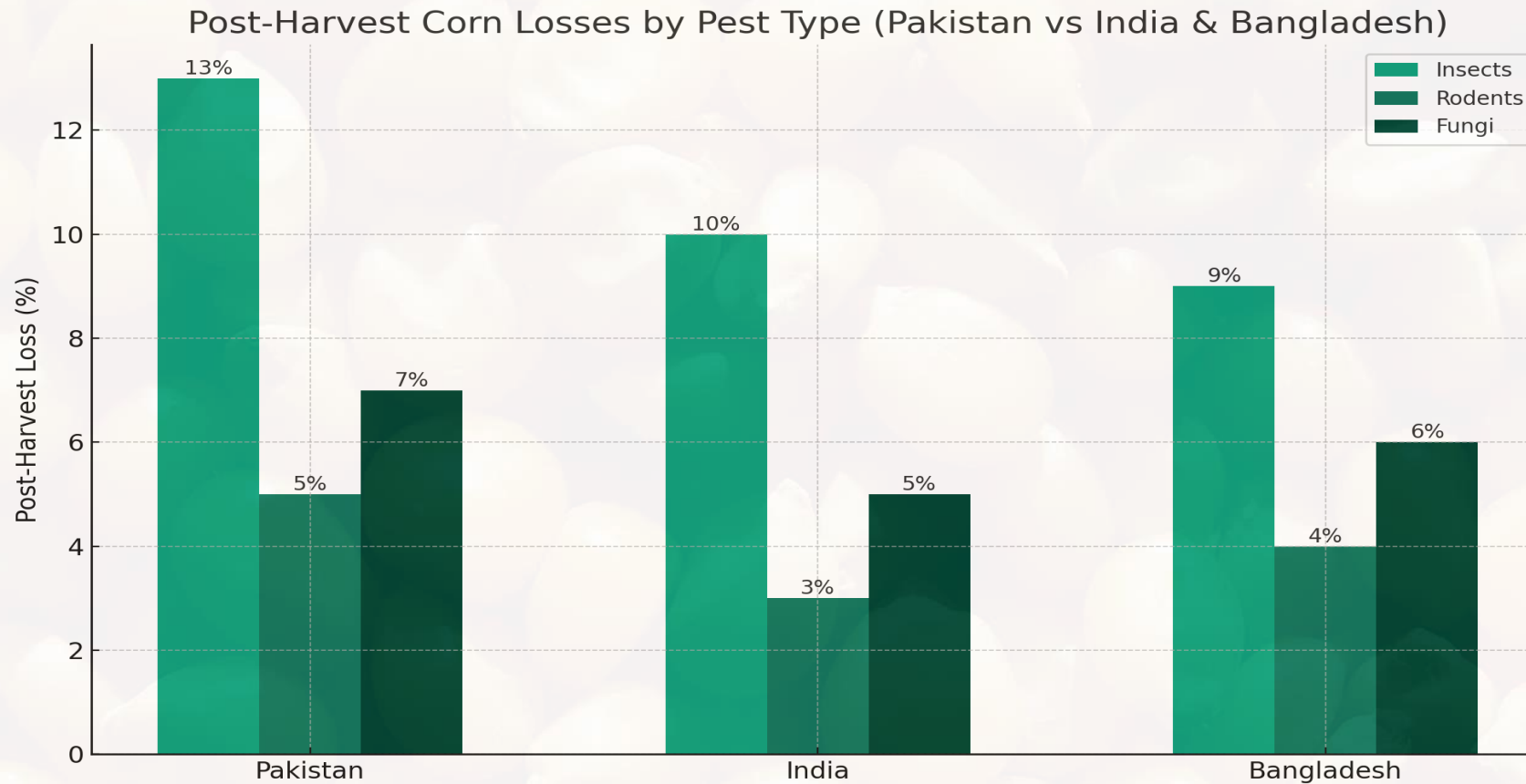


Why Stored Grain Pests-Major Threats

Global Post-Harvest Corn Losses by Cause



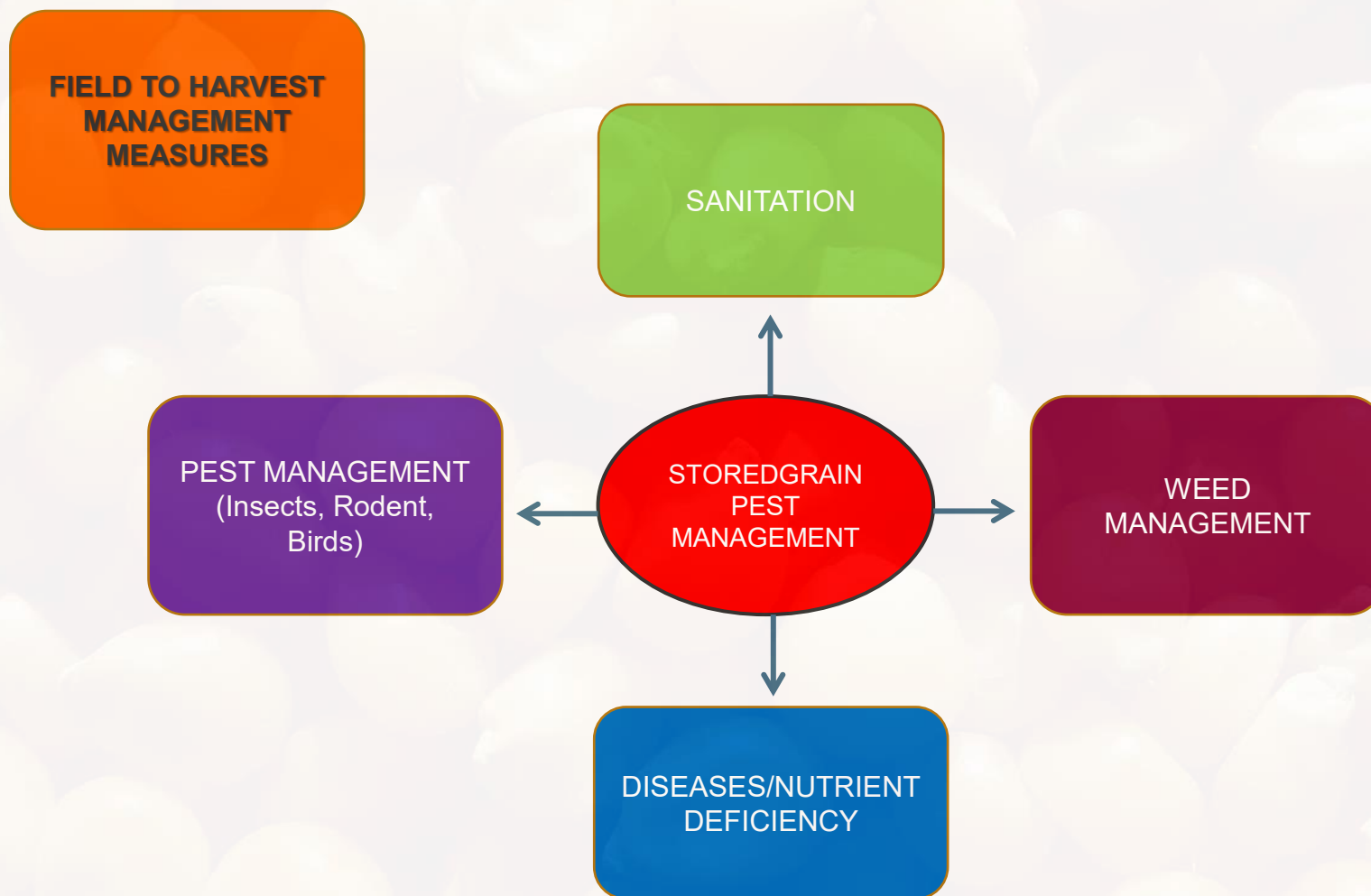
Why Stored Grain Pests-Major Threats



25%	18%	19%
Traditional storage methods	Lack of aeration and moisture control	Poor Post-harvest pest management

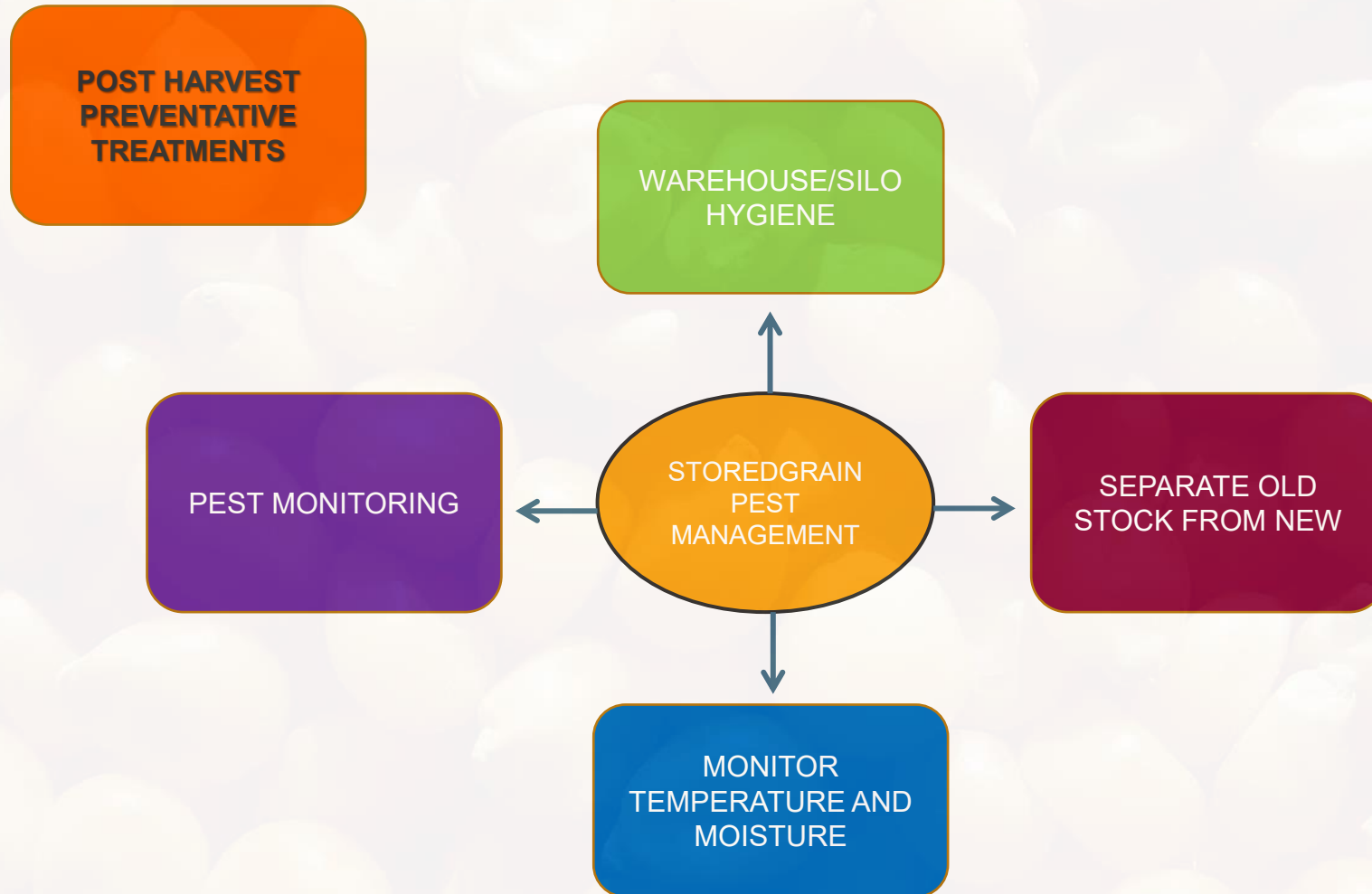
Major Threat - Stored Grain Insect Pests Infestation Management

Pre-Harvest Stage



Major Threat-Stored Grain Insect Pests Infestation Management

Post-Harvest Stage



— Post-Harvest Pest management - Warehouse Hygiene management



— Post-Harvest Pest management – Stock Management

Keep Separate Old Corn Stock from New Corn Stock



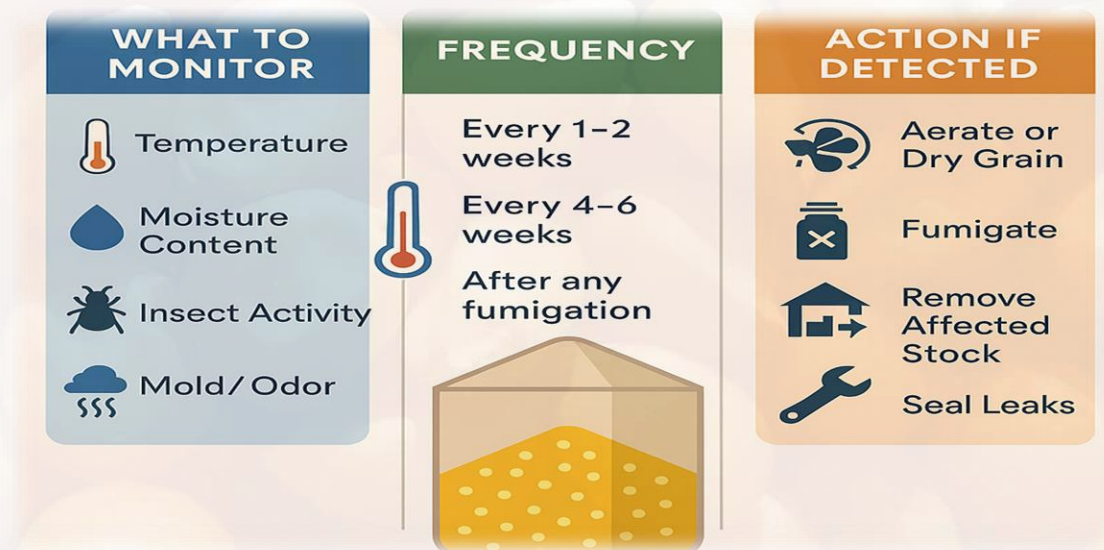
- Store separately
- Clean before filling
- Fumigate old stock

Source of Immediate Infestation

Invisible Quality Degradation

Inadequate Remediation

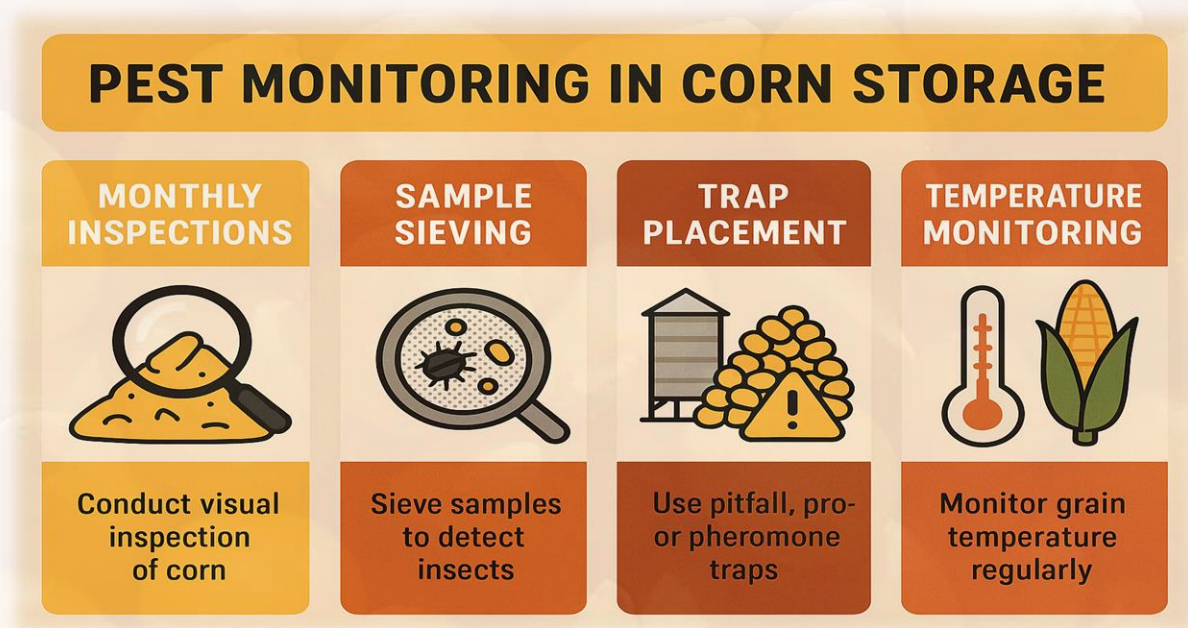
Post-Harvest Pest management – Temperature/Moisture/Humidity Management



Key Principles for Safe Corn Storage

Parameter	Safe Range for Corn Storage	Why It Matters
Moisture Content	≤ 13–14% (for long-term)	High moisture promotes mold growth, insect activity, and heating.
Temperature	Below 15°C (ideally 10–12°C for long-term)	Low temp slows insect metabolism & mold development.
Relative Humidity (RH)	Below 65%	Keeps grain from absorbing moisture from the air.
Oxygen Levels	Low (hermetic storage achieves this naturally)	Limits insect survival and fungal growth.

— Post-Harvest Pest management – Pest Monitoring



Monitoring Tool	Purpose / Usage
Probe & pitfall traps	Detect crawling beetles just below the grain surface
Pheromone traps (flight traps)	Attract specific species from a distance
Automated & E-nose systems	Provide real-time, advanced detection for early, accurate action

Common Stored Grain Insect Pest

Internal Feeder

Granary Weevil



Maize Weevil



Rice Weevil



Lesser Grain Borer



Angoumois Grain Moth



External Feeder

Red Flour Beetle



Sawtoothed Grain Beetle



Confused Flour Beetle



Flat Grain Beetle

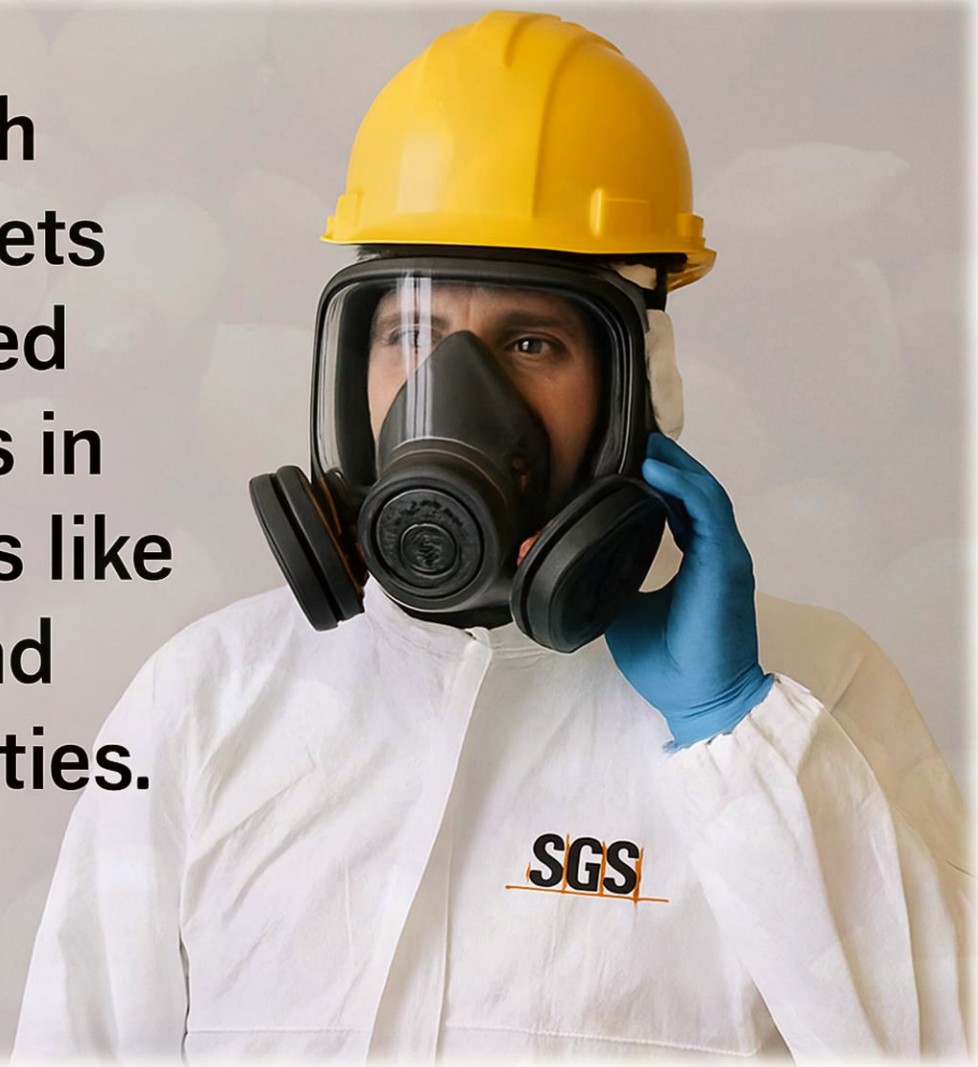


Indian Meal Moth



— Post-Harvest Pest Management-Fumigation

Fumigation with phosphine tablets is a method used to control pests in stored products like grains, flour, and other commodities.



Structures of Corn Fumigation

- Bulk grain storage fumigation
- Grain in silo.
- Stack Fumigation.
- Space Fumigation.
- Container Fumigation.



— Post-Harvest Pest management – Types of Fumigant

Fumigant	Formulation Type	Main Use	Key Note
Phosphine	Tablets, pellets	Bulk grain in silo/warehouse	Export standard
Methyl Bromide	Liquefied gas	Quarantine/pre-shipment	Restricted use
Sulfuryl Fluoride	Liquefied gas	Empty store or packaged grain	Expensive
CO ₂	Gas, dry ice	Organic-friendly pest control	Long exposure

Recommended Dosage-ALP

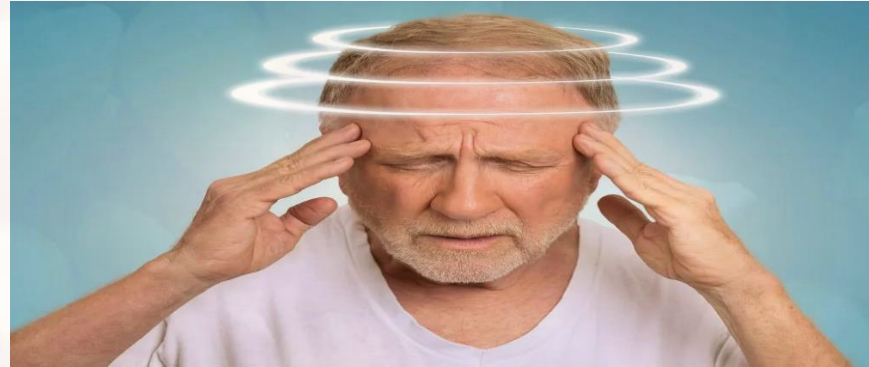
Minimum Exposure Duration Based on Temperature	
10-15 °C	07 Days
16-20 °C	07 Days
21-25 °C	07 Days
26 °C and above	07 Days

Recommended Gas Concentration	
Recommended Dosage (FAO/DPP)	1–2-gram Phosphine Per Cubic Meter

Recommended Gas Concentration after Exposure Time	
Grain above 25 °C	Maintain 300 ppm of phosphine for 7 days
Grain between 15-25 °C	Maintain 200 ppm of phosphine for 10 days

— Hazards in Fumigation with ALP

1. Phosphine Inhalation



2. Catching Fire



3. Phosphine Explosion



— **Successful Fumigation Depends**

1. Proper sealing
2. Dosage and concentration of the fumigant
3. Duration of the treatment
4. Management of the temperature
5. Monitoring of the gas concentration



**SUCCESSFUL
FUMIGATION**

— Gas Monitoring and safety Protocols



Fungal Contamination in Corn with Respect to Insect Pests

Major Types	
Fungal Species	Toxins
Aspergillus	Aflatoxins (B1,B2,G1,G2)
Fusarium	Fumonisin
Penicillium	Ochratoxin

Insect a Gateway to Fungal Contamination	
Direct Transmission	Indirect Transmission
Vectors	Stress on Plants
Enhanced Infection	Altered Storage Conditions



Services Available with SGS



- Farm Management services
- Sampling and Inspection services
- Analytical and Testing services
- Hygiene and Fumigation Services
- Audit & Certification services
- Training services



When you need to be sure

