

**MARS/NDRI/KSU Communications Workshop
Himalaya Hotel, Kathmandu, 2-3 June 2022**

**Part 2
Complete Listing of Dhulikhel Conference Responses**

- A. Consumer Audience Questions – 7 pages
- B. Producers, Traders & Distributors Audience questions – 15 pages
- C. Health Professional Audience Questions – 3 pages
- D. Educator, Trainer & Researcher Audience Questions – 8 pages
- E. Policy Makers & Regulators Audience Questions – 12 pages

Nominal Group Questions/Responses from Dhulikhel Workshop Relevant for Consumer Audience Sorted by Issue

5

Health

- 1-4. *How does mycotoxin contamination impact resilience of Nepalese farmers and their families?*
- 10
- 1. Poor family health
 - 3. Increased need for health and food aid/starvation food shortage
 - 5. Reduced work performance
 - 11. Looks to government for solution
 - 13. Mental stress
- 15
- 22. Affects next generation of family
 - 24. Increased child mortality
 - 27. Lower quality of life
 - 33. Psychological impacts
- 20
- 3-1. *Who in Nepal needs more information about mycotoxin-associate health problems?*
- 2. Consumers (household level)
 - 4. Health professionals
 - 8. Pregnant women & mothers and support services
 - 10. Media
- 25
- 17. School teachers
 - 18. Parents
 - 22. Consumer activists
- 30
- 3-2. *What scares you most about mycotoxin contamination?*
- 2. Intergenerational loss
 - 3. Serious family health problems
 - 4. Cancer (especially liver cancer)
 - 5. Impaired growth/nutritional outcomes
 - 6. Threats to food security
- 35
- 7. Birth defects and disabilities
 - 8. Malnutrition
 - 9. Immune system suppression
 - 12. Hidden risks
 - 13. Disease outbreak
- 40
- 14. Fear o eat food
 - 15. Difficult to mitigate
 - 17. Death
 - 18. Illness in old age
 - 19. Insufficient knowledge and awareness
- 45
- 20. Sterility
 - 22. Effects on cognitive development

23. Decreased shelf life of food

50 3-3. *What information do new mothers and young families in Nepal need to know about the consequences of mycotoxin contamination?*

1. The harmful health effects of its contamination
2. Immune suppression
4. Transfer of mycotoxins to breastfeeding
5. Effect of mycotoxin on child growth and development
- 55 7. Leads to stunting
8. Mycotoxins are carcinogens
10. Foods, e.g., maize and peanuts, where mycotoxins naturally occur
11. Adverse effects of mycotoxins
12. Lead to aflatoxicosis and death
- 60 13. Liver cirrhosis
14. Mycotoxins take a long time to be detoxified
15. Low birth weight
17. Mycotoxins are found in foods that are not dried/stored properly
18. May lead to cognitive impairment
- 65 21. Dissemination of info about discarding contaminated food
22. Small newborn head circumference

70 4-1. *Identify educational means and materials to increase consumer awareness of mycotoxin contamination in domestic and imported foodstuffs.*

1. School syllabus/curriculum
2. Radio and TV public announcements
3. Posters & pamphlets
4. Street dramas/road shows
5. Orientation/training for FCHV – Female community health volunteers
- 75 6. Public service announcements
7. Push messages through SMS & telephone calls
8. Visual/video documents
9. Spiral flip charts
11. Convey information from trustworthy local body
- 80 12. Newspapers
13. Educational series/seminars/webinars/lectures
14. Community based programs
15. Audio visual media on YouTube
18. Community group contacts
- 85 19. Stage dramas
20. Press media briefs
21. Establish resource centers
23. Hoarding boards (public posters & bill boards)
28. Jingles
- 90 30. Campaign at retailer level
31. Home visits
34. Quarantine reports

- 95 4-2. *Identify specific messages that the Nepalese consumer and farmer need to hear about mycotoxins and mycotoxin-contaminated food.*
- 2. Long term health risks including cancer and kidney failure
 - 3. Sort out moldy food
 - 4. Mycotoxin contamination reduction and remediation are possible
 - 6. Buy carefully, eat healthy
 - 100 7. List of crops and associated mycotoxins
 - 8. Improve storage to reduce mycotoxin contamination
 - 12. Do not consume contaminated/moldy/discolored food
 - 14. Washing and cooking do not destroy mycotoxins
 - 17. Global issue, we are in this together
 - 105 18. GAP and available tech to reduce mycotoxin contamination
 - 21. Practical measures that can be readily implemented
 - 22. Diet diversification
 - 25. Instructions on how to deal with mycotoxins
 - 26. Mycotoxins are produced by fungi
 - 110 28. Healthy diet for pregnant women and infants
 - 30. Prevent pest infestation of food
 - 31. Associated with stunting of children
 - 34. Do not feed infested grain to animals
 - 35. Don't sell and buy contaminated grains
 - 115 37. Save grain from physical and pest damage
 - 38. Safely dispose of moldy food
 - 43. Store food in hermetic containers
 - 44. Mycotoxins may be present without visible signs

120

Economics

- 125 *1-2. Identify economic risks posed by mycotoxins to Nepalese farmers*
1. Increased health cost
4. Increased cost for adequate nutrition
17. Food security/ malnutrition
24. Lower quality milk
- 130 *1-4. How does mycotoxin contamination impact resilience of Nepalese farmers and their families?*
3. Increased need for health and food aid/starvation food shortage
5. Reduced work performance
10. Slows economy
- 135 27. Lower quality of life
33. Psychological impacts
- 140 *2-4. Identify methods to reduce mycotoxin contamination in foods sold in local markets.*
1. Proper grading of food
2. Increased awareness among consumers, retailers and farmers
3. Proper storage containers for food
4. Labeling and certification
11. Consumer awareness to buy properly stored/certified grain
- 145 31. Awareness campaigns in markets – pamphlets, posters, street dramas, *etc.*, and information dissemination from mass media
32. Provide the regulations, policies and information on aflatoxins and the impact of them on human and animal health
- 150 *4-2. Identify specific messages that the Nepalese consumer and farmer need to hear about mycotoxins and mycotoxin-contaminated food.*
3. Sort out moldy food
4. Mycotoxin contamination reduction and remediation are possible
6. Buy carefully, eat healthy
7. List of crops and associated mycotoxins
- 155 8. Improve storage to reduce mycotoxin contamination
14. Washing and cooking do not destroy mycotoxins
17. Global issue, we are in this together
19. Care for food, Care for family
21. Practical measures that can be readily implemented
- 160 22. Diet diversification
25. Instructions on how to deal with mycotoxins
26. Mycotoxins are produced by fungi
30. Prevent pest infestation of food
31. Associated with stunting of children
- 165 35. Don't sell and buy contaminated grains
37. Save grain from physical and pest damage
38. Safely dispose of moldy food

- 170
- 39. Safer alternative uses for some mycotoxin contaminated food
 - 43. Store food in hermetic containers
 - 44. Mycotoxins may be present without visible signs

4-6. *What responses might be expected if radio/TV/social media reported that the chilies sold in Kathmandu were contaminated with aflatoxin?*

- 175
- 1. Identify alternatives to chilies
 - 2. Verification of news
 - 3. Anger
 - 4. Request for investigation
 - 5. Strict quarantine (internal and external)
 - 7. Panic
- 180
- 8. Pressure government for response
 - 9. Understanding of permissible dose of aflatoxin
 - 11. Extent of the problem
 - 12. What is next?
 - 15. Spread the news
- 185
- 16. Worry about what else is contaminated
 - 18. Seek expert guidance
 - 19. Advocacy from consumers' forum
 - 21. Worried about health
 - 22. Decrease consumption
- 190
- 27. Consumers should purchase whole chilies
 - 29. Ban
 - 31. Find alternative sources for chilies

195

Post Harvest

None

200

Testing, Reporting & Regulation

- 205 2-4. *Identify methods to reduce mycotoxin contamination in foods sold in local markets.*
1. Proper grading of food
 2. Increased awareness among consumers, retailers & farmers
 3. Proper storage containers for food
 4. Labeling and certification
- 210 11. Consumer awareness to buy properly stored/certified grain
13. Strict implementation of laws, acts & regulation
 16. Regular inspection/evaluation by regulatory body
 30. Regular inspection of stored feedstuffs
 31. Awareness campaigns in markets – pamphlets, posters, street dramas, *etc.*, and information dissemination from mass media
- 215 32. Provide the regulations, policies and information on aflatoxins and the impact of them on human and animal health
- 220 4-6. *What responses might be expected if radio/TV/social media reported that the chilies sold in Kathmandu were contaminated with aflatoxin?*
2. Verification of news
 3. Anger
 4. Request for investigation
 5. Strict quarantine (internal and external)
 6. Identify the origin of the contaminated product(s)
- 225 7. Panic
8. Pressure government for response
 9. Understanding of permissible dose of aflatoxin
 10. Verification of tests
 11. Extent of the problem
- 230 13. Frequent monitoring, inspections and regulation
16. Worry about what else is contaminated
 17. Interest to learn about mycotoxin
 18. Seek expert guidance
 19. Advocacy from consumers' forum
- 235 21. Worried about health
29. Ban
 31. Find alternative sources for chilies

Nominal Group Questions/Responses from Dhulikhel Workshop Relevant for Producers/Traders/Distributors Audience Sorted by Issue

5 Health

- 1-4. *How does mycotoxin contamination impact resilience of Nepalese farmers and their families?*
- 1. Poor family health
 - 5. Reduced work performance
 - 13. Mental stress
 - 24. Increased child mortality
 - 27. Lower quality of life
 - 33. Psychological impact
- 3-1. *Who in Nepal needs more information about mycotoxin-associated health problems?*
- 1. Farmers/producers
 - 4. Health professionals
 - 5. Traders/distributors
 - 7. Manufacturers/processors of food & feed
 - 10. Media
 - 15. Nepal food corporation
 - 21. Federation of Nepalese Chamber of Commerce & Industry
- 3-2. *What scares you most about mycotoxin contamination?*
- 2. Intergenerational loss
 - 10. Vulnerable farmers
 - 12. Hidden risks
 - 15. Difficult to mitigate
 - 16. Serious animal health problem
 - 18. Illness in old age
 - 19. Insufficient knowledge & awareness
- 4-1. *Identify educational means and materials to increase consumer awareness of mycotoxin contamination in domestic and imported foodstuffs.*
- 1. School syllabus/curriculum
 - 2. Radio and TV public announcements
 - 3. Posters & pamphlets
 - 6. Public service announcements
 - 7. Push messages through SMS & telephone calls
 - 8. Visual/video documents
 - 9. Spiral flip charts
 - 11. Convey information from trustworthy local body
 - 12. Newspapers
 - 13. Educational series/seminars/webinars/lectures
 - 14. Community based programs

- 15. Audio visual media on YouTube
- 16. Exhibitions at agricultural fairs
- 17. Adult education programs/farmer field schools
- 50 20. Press media briefs
- 21. Establish resource centers
- 23. Hoarding boards (public posters & bill boards)
- 30. Campaign at retailer level
- 34. Quarantine reports
- 55 35. Technical bulletins

4-2. *Identify specific messages that the Nepalese consumer and farmer need to hear about mycotoxins and mycotoxin-contaminated food.*

- 1. Prompt, proper drying of crops
- 60 2. Long term health risks including cancer and kidney failure
- 3. Sort out moldy food
- 4. Mycotoxin contamination reduction and remediation are possible
- 5. Biocontrol of mycotoxins
- 7. List of crops and associated mycotoxins
- 65 8. Improve storage to reduce mycotoxin contamination
- 9. Kill fungi to save grain
- 12. Do not consume contaminated/moldy/discolored food
- 13. Do not harvest during rain
- 17. Global issue, we are in this together
- 70 18. GAP and available tech to reduce mycotoxin contamination
- 21. Practical measures that can be readily implemented
- 23. Remove crops from field at maturity and dry immediately
- 25. Instructions on how to deal with mycotoxins
- 26. Mycotoxins are produced by fungi
- 75 27. Protect crops from fungi
- 30. Prevent pest infestation of food
- 34. Do not feed infested grain to animals
- 35. Don't sell and buy contaminated grains
- 37. Save grain from physical and pest damage
- 80 38. Safely dispose of moldy food
- 39. Safer alternative uses for some mycotoxin contaminated food
- 40. Case study report results
- 43. Store food in hermetic containers
- 44. Mycotoxins may be present without visible signs
- 85 46. High fungal growth when crops are not properly dried

Economics

90

1-1. Identify local customs and practices that should change if mycotoxin contamination is to be reduced.

2. Poor storage structure with no protection from the environment

3. Improve post harvest practices, e.g. solar dryers

95

8. Research on local methods of storage

11. Clean the storage unit routinely

12. Open field drying

14. Proper drying before storage

15. Uptake of harvest and post-harvest equipment

100

18. Implement existing laws and regulations

22. Poor sorting practices

26. Artificial heat sources that can be used on cloudy days

27. Use moisture meters

28. Poor market facilities – no storage

105

31. Farmers store in open place in piles/heaps

35. Select the best quality seed

36. Sort and clean grain to remove fungal contamination

1-2. Identify economic risks posed by mycotoxins to Nepalese farmers

110

2. Crop losses

3. Reduced product price for farmer

5. Increased treatment cost for harvested materials, drying, etc.

6. Seed damage/low quality

7. Loss of income (in spite of more effort)

115

8. Loss/reduction of market

9. Increased cost of production

10. Reduced animal performance & vigor

11. Limited ability to invest in the future

12. Decreased productivity

120

13. Reduced socioeconomic status & credibility

14. Fines and/or jail

15. Rejection of materials by the international market – non-tariff trade barrier

16. Complete loss of investment

18. Pre-harvest contamination can negate post-harvest investments

125

19. Loss of livestock

20. Loss of feed for animals

21. Middleman falsifying aflatoxin results to purchase at lower price

22. Regulations forcing farmers to sell good and consume bad commodities

23. Areas with higher contamination risk could lose market access

130

24. Lower quality milk, decrease in price

26. Decreased resilience

28. Waste disposal cost

1-3. How do mycotoxins affect the ability of Nepalese farmers to market their crops?

- 135
1. Sell crop for a lower price
 2. Cannot export
 3. Difficulty in selling due to altered physical appearance or lower export quality
 4. Unable/prohibited from selling
 5. More bargaining (less leverage) for price in the market
- 140
6. Lowers farmer's reputation and/or brand value
 7. Lower production/yield
 8. No impact (due to farmer's ignorance of the question)
 10. Sell as feed (or other use) instead of food (for lower price)
 11. Shorter shelf life – cannot store for longer term (and get a higher price)
- 145
12. Must sort them (at extra cost)
 14. Weight loss due to fungal growth
 15. Reduced competitiveness
 17. Product rejection by the buyer after the sale
- 150
21. Increased costs to sell product
 23. New marketing innovations required
 25. Reduced rate of return
 29. Lowered feed quality
 30. Increased inspections

155 *1-4. How does mycotoxin contamination impact resilience of Nepalese farmers and their families?*

2. Reduced investment capacity
 4. Change in occupation (no longer farming)
 5. Reduced work performance
- 160
7. A shift to low risk crops (not maize)
 10. Slows economy
 12. Looks to government for solution
 14. Changes to farming profession and practices
 15. Loss of investment (Loss of savings)
- 165
19. Low income
 25. Difficult to obtain loans
 27. Lower quality of life
 29. Inability to cope with natural disaster
 34. Reduced child education, lack of funds for fees
- 170
35. Labor shortage

1-7. Identify methods and incentives to increase the quality of Nepalese agricultural imports.

2. Setting standards for quality in import & domestic markets
- 175
6. Regulate informal trade
 7. Reduce import duties if the product meets standards (particularly for high demand products)
 11. Regular evaluation of imports to ensure toxin levels remain low
 12. Previous certification fraud prevents further imports from source
- 180
13. Good packaging and post-harvest handling/transportation

- 14. Punishment provisions for importers violating standards
- 16. Effective implementation of export/import regulations
- 20. Import only short supply commodities
- 22. Increase efficiency/speed of border checks
- 185 23. Improved communications with agents and importers
- 26. Labeling of products with contamination levels, including pesticides

2-1. *Identify pre-harvest agricultural practices routinely used by farmers in Nepal that increase mycotoxin contamination.*

- 190 1. Planting a susceptible variety
- 2. Use of unhealthy/substandard seeds
- 3. Improper timing of planting of crops
- 4. Improper irrigation
- 5. Poor disease and pest management practices
- 195 6. Untimely harvesting of immature crops
- 7. Growing where crop is not meant to be grown
- 8. Lack of appropriate farm yard manure
- 9. Harvesting in rainy weather
- 10. Repeated use of same seed
- 200 11. Damage of crop during cultivation and weeding
- 12. Use of chemicals for accelerating ripening
- 13. No seed treatment
- 14. Lack of mulching
- 15. Not following GAP
- 205 16. Poor land preparation/soil treatment
- 17. Little, no or improper fertilizer use
- 18. Burning crop residue on soil
- 19. Poor water quality
- 20. Improper crop spacing during planting
- 210 21. Improper use of pesticides
- 22. Ignoring technical advice
- 23. Late harvest
- 24. Livestock grazing crop
- 25. Contact with soil
- 215 26. Using contaminated commodities for compost/mulch
- 27. No soil testing

2-2. *Identify postharvest agricultural practices routinely used by farmers in Nepal that increase mycotoxin contamination.*

- 220 1. Open drying
- 2. Storage without sorting
- 3. Inadequate/improper drying of product
- 4. Field drying
- 5. Harvesting before ripe
- 225 6. Harvesting irrespective of weather conditions
- 7. Use of traditional storage facilities

- 230 9. Unsound storage practices
- 10. No airtight containers for storage
- 11. Lack of monitoring during storage
- 12. Inadequate moisture measurement
- 13. No pest or rodent control
- 14. Storage in damp location
- 15. Milling contaminated grain
- 235 18. Crops stored on ground/muddy floor
- 21. Aggregated collection
- 22. Storage in cold/moist conditions
- 23. Prolonged storage of grain crops
- 24. Late harvest
- 25. Inappropriate transportation
- 240 26. Unclean drying place
- 27. Dampening during heaping
- 28. Unhygienic handling
- 29. Contamination with other contaminated products
- 30. Contaminated with soil
- 245 31. Poor packaging of products

2-4. Identify methods to reduce mycotoxin contamination in foods sold in local markets.

- 250 1. Proper grading of food
- 2. Increased awareness among consumers, retailers and farmers
- 3. Proper storage containers for food
- 4. Labeling and certification
- 6. Develop a sampling strategy for markets (suppliers & vendors)
- 7. Provide storage bins at a subsidized price
- 8. Develop SOPs for markets for supplier & vendors
- 255 9. Proper monitoring & regular inspections
- 11. Consumer awareness to buy properly stored/certified grains
- 12. Incentives for proper storage
- 13. Strict implementation of laws, acts and regulation
- 15. Hermetic sealed storage bags
- 260 16. Regular inspection/evaluation by regulatory body
- 19. Ammoniation
- 20. O₃ treatment
- 22. Quarantine
- 23. Train small farm growers – farm to market
- 265 24. Moisture monitoring tools
- 25. Regular cleaning of storage sites in local markets
- 26. Remove moist conditions in stores
- 27. Use pesticides (fungicides & insecticides) at regular intervals
- 29. Humidity-proof storage
- 270 30. Regular inspection of stored feedstuffs
- 31. Awareness campaigns in market areas – pamphlets, posters, street dramas, etc. and information dissemination from mass media

- 275 32. Provide the regulations, policies and information on aflatoxins and the impact of them on human and animal health
33. Provide incentives to market suppliers and vendors who comply with SOPs
34. Storage set ups with regulatory management for suppliers
35. Promote small scale storage facilities for women
36. Stacking of bags
- 280 2-6. *What/when/where should screening for mycotoxins occur?*
1. During storage
2. Before harvest
3. Customs checkpoints
4. Test grains from household, selling points, and market stores
- 285 8. Animal products at processing plant
10. In grain factories before processing
12. Animal feed before packaging
13. Processed food
14. At farm level
- 290 15. All seasons
17. Point of sale from traders to processors
19. Before and during drying
28. Outbreak (local)
- 295 3-2. *What scares you most about mycotoxin contamination?*
1. Economic losses, especially for farmers
6. Threats to food security
10. Vulnerable farmers
11. Reduced international trade
- 300 12. Hidden risks
14. Fear to eat food
15. Difficult to mitigate
16. Serious animal health problem
19. Insufficient knowledge & awareness
- 305 21. Loss of major crop or variety
23. Decreased shelf life of food
- 4-2. *Identify specific messages that the Nepalese consumer and farmer need to hear about mycotoxins and mycotoxin-contaminated food.*
- 310 1. Prompt, proper drying of crops
3. Sort out moldy food
4. Mycotoxin contamination reduction and remediation are possible
5. Biocontrol of mycotoxins
7. List of crops and associated mycotoxins
- 315 8. Improve storage to reduce mycotoxin contamination
9. Kill fungi to save grain
13. Do not harvest during rain
17. Global issue, we are in this together

- 320 18. GAP and available tech to reduce mycotoxin contamination
21. Practical measures that can be readily implemented
23. Remove crops from field at maturity and dry immediately
25. Instructions on how to deal with mycotoxins
26. Mycotoxins are produced by fungi
27. Protect crops from fungi
325 30. Prevent pest infestation of food
34. Do not feed infested grain to animals
35. Don't sell and buy contaminated grains
37. Save grain from physical and pest damage
38. Safely dispose of moldy food
330 39. Safer alternative uses for some mycotoxin contaminated food
40. Case study report results
43. Store food in hermetic containers
44. Mycotoxins may be present without visible signs
46. High fungal growth when crops are not properly dried
335

5-2. *Identify training needed in the Nepalese work force to provide adequate monitoring of mycotoxin contamination.*

- 340 1. GAP – Good Agricultural Procedures
3. Methods and materials for storage of food commodities
5. Sampling and subsampling for testing
6. Toxin analysis and detection
9. Post-harvest and storage procedures
11. Record keeping and data entry
13. Risk mapping
345 16. Safe handling of products
21. Risk communication
23. Toxicity of mycotoxins
25. Data collection, analysis and interpretation
26. Good manufacturing processes (GMP)
350 28. Laboratory management
29. Quality control
30. Considerations while harvesting
32. Qualitative analysis
35. Database
355 50. Biocontrol
51. Laws and regulations

5-3. *Identify positions in Nepal where training about mycotoxins, their detection, and their impact is important.*

- 360 2. Farmers/Farming association staff
3. DFTQC officials
6. Extension officers
8. Research center staff
9. Local leaders

- 365
- 10. Planning officials
 - 13. Nepal Food Corporation officials
 - 17. Media
 - 18. Customs & quarantine officers
- 370
- 21. Animal feed lab
 - 23. Traders/store keepers
 - 24. Metropolitan & provincial laboratories
 - 25. Ministry of Ag/Livestock staff
 - 27. Ag businesses – traders & processors
- 375
- 33. Private sector laboratories

Post-harvest

- 380 *1-1. Identify local customs and practices that should change if mycotoxin contamination is to be reduced.*
- 2. Poor storage structure, no protection from the environment
 - 3. Improve post-harvest practices, e.g., solar dryers
 - 4. Development of air tight storage systems
- 385
- 5. Inadequate food inspections
 - 6. Harvest fully mature grain
 - 7. Regularly examine storage units for fungal growth
 - 8. Research on local storage methods
 - 10. Improve post-harvest techniques
- 390
- 11. Routinely clean storage units
 - 12. Open field drying
 - 14. Proper drying before storage
 - 15. Uptake of harvesting and post-harvesting equipment
 - 16. Haphazard harvesting time
- 395
- 17. Improper packaging materials
 - 21. Unhygienic processing
 - 22. Poor sorting practices
 - 26. Artificial heat sources that can be used on cloudy days
 - 27. Use moisture meters
- 400
- 28. Poor market facilities – no storage
 - 31. Farmers store in open place in heaps and piles
 - 36. Sort and clean grain to remove fungal contamination
 - 37. Shell corn before storing
- 405 *2-2. Identify postharvest agricultural practices routinely used by farmers in Nepal that increase mycotoxin contamination.*
- 1. Open drying
 - 2. Storage without sorting
 - 3. Inadequate/improper drying of product
- 410
- 4. Field drying
 - 5. Harvesting before ripe
 - 6. Harvesting irrespective of weather conditions
 - 7. Use of traditional storage facilities
 - 9. Unsound storage practices
- 415
- 10. No airtight containers for storage
 - 11. Lack of monitoring during storage
 - 12. Inadequate moisture measurement
 - 13. No pest or rodent control
 - 14. Storage in damp location
- 420
- 15. Milling contaminated grain
 - 18. Crops stored on ground/muddy floor
 - 21. Aggregated collection
 - 22. Storage in cold/moist conditions

- 425 23. Prolonged storage of grain crops
- 24. Late harvest
- 25. Inappropriate transportation
- 26. Unclean drying place
- 27. Dampening during heaping
- 430 28. Unhygienic handling
- 29. Contamination with other contaminated products
- 30. Contaminated with soil
- 31. Poor packaging of products

435 2-3. *Identify facilities and training needed in Nepal to reduce post-harvest mycotoxin contamination.*

- 1. Training for Agricultural coordinators & farmers on mycotoxins and post-harvest practices (drying & storage)
- 2. Testing labs at the local level
- 440 3. Large scale hot air dryer facility required
- 5. Warehouses at community level
- 7. Subsidies for buying storage bags and renting drying facilities
- 9. Sites for technology demonstration and training
- 10. Local production of AflaSafe
- 11. Mobile SME's providing drying and storing technology
- 445 14. Storage facilities at local level
- 16. Training on Good Agricultural Practices (GAP)
- 17. Distribution of low cost dryers
- 20. Posters with awareness information
- 21. Train government engineers on cost-effective post-harvest equipment
- 450 26. Extension messaging on radio
- 27. Training on moisture measurement
- 28. Extension manuals
- 29. Technical training for field level staff
- 31. Better storage in humid areas
- 455 32. Training on packaging
- 35. Treatment facility for contaminated product
- 37. Sorting/Grading facilities
- 38. Establish cold-storage facilities

460 2-6. *What/when/where should screening for mycotoxins occur?*

- 1. During storage
- 3. Customs checkpoints
- 10. In grain factories before processing
- 12. Animal feed before packaging
- 465 13. Processed food
- 14. At farm level
- 15. All seasons
- 17. Point of sale from traders to processors
- 19. Before and during drying

- 470 20. Plants and produce
 28. Outbreak (local)
- 4-2. *Identify specific messages that the Nepalese consumer and farmer need to hear about mycotoxins and mycotoxin-contaminated food.*
- 475 1. Prompt, proper drying of crops
 3. Sort out moldy food
 4. Mycotoxin contamination reduction and remediation are possible
 7. List of crops and associated mycotoxins
 8. Improve storage to reduce mycotoxin contamination
- 480 9. Kill fungi to save grain
 13. Do not harvest during rain
 17. Global issue, we are in this together
 18. GAP and available tech to reduce mycotoxin contamination
 21. Practical measures that can be readily implemented
- 485 23. Remove crops from field at maturity and dry immediately
 25. Instructions on how to deal with mycotoxins
 26. Mycotoxins are produced by fungi
 27. Protect crops from fungi
 30. Prevent pest infestation of food
- 490 34. Do not feed infested grain to animals
 35. Don't sell and buy contaminated grains
 37. Save grain from physical and pest damage
 38. Safely dispose of moldy food
 39. Safer alternative uses for some mycotoxin contaminated food
- 495 40. Case study report results
 43. Store food in hermetic containers
 44. Mycotoxins may be present without visible signs
 46. High fungal growth when crops are not properly dried
- 500 5-2. *Identify training needed in the Nepalese work force to provide adequate monitoring of mycotoxin contamination.*
1. GAP – Good Agricultural Procedures
 3. Methods and materials for storage of food commodities
 5. Sampling and subsampling for testing
- 505 6. Toxin analysis and detection
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 11. Record keeping and data entry
 13. Risk mapping
 16. Safe handling of products
- 510 23. Toxicity of mycotoxins
 25. Data collection, analysis and interpretation
 26. Good manufacturing processes (GMP)
 28. Laboratory management
 29. Quality control
- 515 30. Considerations while harvesting

- 32. Qualitative analysis
- 35. Database
- 51. Laws and regulations

520

Testing, Reporting & Regulation

- 525 1-6. *Identify methods to make current regulations of mycotoxins more effective.*
- 3. Regular sampling and testing of crops
 - 4. Update/expand/amend standards
 - 6. Harmonize regulations with US, EU & international levels
 - 7. Strict regulation with fines & punishment
 - 9. Develop national action plan
 - 530 10. Enact legislation at provincial and local levels
 - 12. Improved collaboration/coordination amongst stakeholders, including public/private partnerships
 - 13. Policy advocacy
 - 18. Involve farmers & consumers in policy making
 - 535 19. Availability of proper storage facilities
 - 24. Improve accessibility of information
 - 25. Alternative uses for commodities exceeding contamination limits
 - 26. Set standards for more commodities
 - 28. Compulsory disposal of unusable commodities
 - 540 30. Insurance
- 1-7. *Identify methods and incentives to increase the quality of Nepalese agricultural imports.*
- 1. Strict quarantine measures
 - 545 4. Develop and implement verification system/compulsory certification
 - 5. Develop roster of firms supplying good and poor quality products
 - 6. Regulate informal trade
 - 7. Reduce import duties if the product meets standards (particularly for high demand products)
 - 550 13. Good packaging & post-harvest handling/transportation
 - 14. Punishment provisions for importers violating standards
 - 16. Effective implementation of import/export regulations
 - 17. Increased consumer awareness
 - 19. Collaborate with custom officials/police/administrative staff
 - 555 22. Increase efficiency/speed of border checks
 - 23. Improved communications with agents and importers
 - 27. Increased training for staff on import quality issues
- 2-4. *Identify methods to reduce mycotoxin contamination in foods sold in local markets.*
- 560 1. Proper grading of food
 - 3. Proper storage containers for food
 - 4. Labeling and certification
 - 6. Develop a sampling strategy for markets (suppliers & vendors)
 - 7. Provide storage bins at a subsidized price
 - 565 8. Develop SOPs for markets for suppliers & vendors
 - 9. Proper monitoring and regular inspections
 - 12. Incentives for proper storage

- 570 13. Strict implementation of laws, acts & regulations
16. Regular inspection/evaluation by regulatory body
22. Quarantine
24. Moisture monitoring tools
30. Regular inspection of stored feedstuffs
32. Provide the regulations, policies & information on aflatoxins and their impact on human & animal health
575 33. Provide incentives to market suppliers & vendors who comply with SOPs
34. Storage set-ups with regulatory management for suppliers

2-6. *What/when/where should screening for mycotoxins occur?*

- 580 1. During storage
2. Before harvest
3. Customs checkpoints
4. Test grains from household, selling points, and market stores
8. Animal products at processing plant
10. In grain factories before processing
585 12. Animal feed before packaging
13. Processed food
14. At farm level
15. All seasons
16. National surveys every 5 years
590 17. Point of sale from traders to processors
20. Plants and produce
26. Human and livestock urine and blood
28. Outbreak (local)

595 5-3. *Identify positions in Nepal where training about mycotoxins, their detection, and their impact is important.*

2. Farmers/Farming association staff
3. DFTQC officials
6. Extension officers
600 8. Research center staff
10. Planning officials
18. Customs & quarantine officers
21. Animal feed lab
24. Metropolitan & provincial laboratories
605 25. Ministry of Ag/Livestock staff
27. Ag businesses – traders & processors
33. Private sector laboratories

Nominal Group Questions/Responses from Dhulikhel Conference Relevant for Health Professionals Audience Sorted by Issue

5

Health

- 3-1. *Who in Nepal needs more information about mycotoxin-associated health problems?*
- 4. Health professionals
 - 8. Pregnant women & mothers and support services
 - 9. Development partners: NGOs, WFP, FAO, WHO, etc.
 - 12. Civil workers
 - 20. Veterinarians
- 3-3. *What information do new mothers and young families in Nepal need to know about the consequences of mycotoxin contamination?*
- 1. The harmful health effects of its contamination
 - 2. Immune suppression
 - 4. Transfer of mycotoxins to breastfeeding
 - 5. Effect of mycotoxin on child growth and development
 - 7. Leads to stunting
 - 8. Mycotoxins are carcinogens
 - 9. Transfer of mycotoxins in animal products (milk, meat)
 - 10. Foods, e.g., maize and peanuts, where mycotoxins naturally occur
 - 11. Adverse effects of mycotoxins
 - 12. Lead to aflatoxicosis and death
 - 13. Liver cirrhosis
 - 14. Mycotoxins take a long time to be detoxified
 - 15. Low birth weight
 - 16. Information on susceptible goods
 - 17. Mycotoxins are found in foods that are not dried/stored properly
 - 18. May lead to cognitive impairment
 - 22. Small newborn head circumference
- 3-4. *What do health care providers in Nepal need to know about mycotoxin contamination and its consequences?*
- 1. Proper knowledge about mycotoxins
 - 2. Knowledge about health implications
 - 3. Precautions to take
 - 4. Source of contamination
 - 5. Permissible levels
 - 6. Target/vulnerable group
 - 7. Critical seasons/Weather conditions
 - 8. Major commodities prone to mycotoxins
 - 9. Cross cuts multiple issues

3-6. *What food/feed mycotoxin combinations need to be evaluated for health risks in Nepal in the next 3-5 years?*

	By crop/commodity	By toxin
50	Animal feed – 19, 25, 26	Aflatoxin – 1, 3-5, 9, 11, 16, 18-20, 25, 26, 28-30, 35, 41, 42
	Apple juice – 10	Citrinin - 34
	Chilies – 11, 31	Ergot – 7
	Coffee – 6, 34	Fumonisin – 2
55	Dried fruits and vegetables – 3, 8, 32	Ochratoxin – 6, 8, 31, 43, 44
	Eggs – 30	Patulin – 10
	Finger millet – 36	Trichothecenes (Deoxynivalenol, T-2, HT-2) – 12, 14, 17
	Infant formula – 18	Yeast toxins – 32
60	Lentils – 28	Zearalenone – 14, 36
	Maize – 1, 2, 14, 44	
	Meat – 41	
	Milk and other dairy products – 5, 43	
	Nuts – 4	
65	Peanuts (ground nuts) – 9	
	Potato – 16, 17	
	Rice – 29	
	Spices – 20, 42	
70	Wheat – 7, 12, 35	
85		
	4-2. <i>Identify specific messages that the Nepalese consumer and farmer need to hear about mycotoxins and mycotoxin-contaminated food.</i>	
	2. Long term health risks including cancer and kidney failure	
	3. Sort out moldy food	
90	4. Mycotoxin contamination reduction and remediation are possible	
	6. Buy carefully, eat healthy	
	7. List of crops and associated mycotoxins	
	14. Washing and cooking do not destroy mycotoxins	
	17. Global issue, we are in this together	
95	19. Care for food, Care for family	
	21. Practical measures that can be readily implemented	
	22. Diet diversification	
	25. Instructions on how to deal with mycotoxins	
	26. Mycotoxins are produced by fungi	
100	28. Healthy diet for pregnant women and infants	
	30. Prevent pest infestation of food	
	31. Associated with stunting of children	
	35. Don't sell and buy contaminated grains	
	38. Safely dispose of moldy food	
105	40. Case study report results	

44. Mycotoxins may be present without visible signs

110 **Economics**

1-2. Identify economic risks posed by mycotoxins to Nepalese farmers

1. Increased health costs, including national system

4. Increased cost for adequate nutrition

115 17. Food insecurity/malnutrition

24. Lower quality milk, decrease in price

26. Decreased resilience

27. Decreased cognitive function

29. Behavior change cost

120

Post Harvest

None

125

Testing, Reporting & Regulation

None

Nominal Group Questions/Responses from Dhulikhel Conference Relevant for Educators/Trainers/Researchers Audience Sorted by Issue

5

Health

- 10 3-1. *Who in Nepal needs more information about mycotoxin-associated health problems?*
- 3. Extension workers
 - 9. Development partners: NGOs, WFP, FAO, WHO, etc.
 - 10. Media
 - 16. Agricultural researchers/scientists & associations/councils
 - 17. School teachers
 - 15 19. Universities
- 20 3-3. *What information do new mothers and young families in Nepal need to know about the consequences of mycotoxin contamination?*
- 1. The harmful health effects of its contamination
 - 2. Immune suppression
 - 4. Transfer of mycotoxins to breastfeeding
 - 5. Effect of mycotoxin on child growth and development
 - 6. Economic aspects on terms of treatment
 - 7. Leads to stunting
 - 25 8. Mycotoxins are carcinogens
 - 9. Transfer of mycotoxins in animal products (milk, meat)
 - 10. Foods, e.g., maize and peanuts, where mycotoxins naturally occur
 - 11. Adverse effects of mycotoxins
 - 12. Lead to aflatoxicosis and death
 - 30 13. Liver cirrhosis
 - 14. Mycotoxins take a long time to be detoxified
 - 15. Low birth weight
 - 16. Information on susceptible goods
 - 17. Mycotoxins are found in foods that are not dried/stored properly
 - 35 18. May lead to cognitive impairment
 - 19. Health hazards to livestock
 - 21. Dissemination of info about discarding contaminated food
 - 22. Small newborn head circumference

40

3-6. *What food/feed mycotoxin combinations need to be evaluated for health risks in Nepal in the next 3-5 years?*

	By crop/commodity		By toxin
45	Animal feed – 19, 25, 26	65	Aflatoxin – 1, 3-5, 9, 11, 16, 18-20, 25, 26, 28-30, 35, 41, 42
	Apple juice – 10		Citrinin - 34
	Chilis – 11, 31		Ergot – 7
	Coffee – 6, 34		Fumonisin – 2
	Dried fruits and vegetables – 3, 8, 32	70	Ochratoxin – 6, 8, 31, 43, 44
50	Eggs – 30		Patulin – 10
	Finger millet – 36		Trichothecenes
	Infant formula – 18		(Deoxynivalenol, T-2, HT-2, etc.) – 12, 14, 17
	Lentils – 28	75	Yeast toxins – 32
	Maize – 1, 2, 14, 44		Zearalenone – 14, 36
55	Meat – 41		
	Milk and other dairy products – 5, 43		
	Nuts – 4		
	Peanuts (ground nuts) – 9		
	Potato – 16, 17		
60	Rice – 29		
	Spices – 20, 42		
	Wheat – 7, 12, 35		

4-1. *Identify educational means and materials to increase consumer awareness of mycotoxin contamination in domestic and imported foodstuffs.*

- 80
1. School syllabus/curriculum
 3. Posters & pamphlets
 5. Orientation/training for FCHV – Female community health volunteers
 8. Visual/video documents
 9. Spiral flip charts
- 85
11. Convey information from trustworthy local body
 12. Newspapers
 13. Educational series/seminars/webinars/lectures
 14. Community based programs
 15. Audio visual media on YouTube
- 90
16. Exhibitions at agricultural fairs
 17. Adult education programs/farmer field schools
 18. Community group contacts
 21. Establish resource centers
 23. Hoarding boards (public posters & bill boards)
- 95
28. Jingles
 30. Campaign at retailer level
 31. Home visits
 34. Quarantine reports
 35. Technical bulletins

100

5-1. *Identify critical information about mycotoxins to be included in general educational curricula in Nepal.*

1. Introduction to mycotoxin types and fungi
2. Types of food susceptible to mycotoxin contamination
- 105 3. Mitigation and prevention measures
4. Harmful health effects of mycotoxin for humans and animals
5. Factors affecting mycotoxin contamination
6. Analysis of mycotoxins and identification of fungi
7. Risks and effects of mycotoxins
- 110 8. Ways to remain safe from mycotoxin
10. Traditional and local practices that accelerate contamination
12. Effect of mycotoxins on susceptible groups (pregnant, AIDS, etc.)
14. Safe levels of exposure for human and livestock
15. Hygiene and sanitation
- 115 16. Storage practices
17. Mycotoxin detection methodologies
18. Do not eat moldy foods
19. Co-occurrence of mycotoxins and their health effects
20. Use of fungicides
- 120 21. Pest control

Economics

- 125
- 1-2. Identify economic risks posed by mycotoxins to Nepalese farmers*
- 17. Food insecurity/malnutrition
 - 21. Middleman falsifying aflatoxin results to purchase at a lower price
- 130
- 1-3. How do mycotoxins affect the ability of Nepalese farmers to market their crops?*
- 8. No impact (due to farmer's ignorance of the problem)
 - 20. Increases need for proper and drying storage facilities
 - 23. New marketing innovations required
 - 24. Increases diversity of crops grown
- 135
- 30. Increased inspections
- 1-6. Identify methods to make current regulations of mycotoxins more effective.*
- 2. Capacity building at local and provincial levels
 - 5. Targeted research and development
- 140
- 8. Inclusion in university curricula
 - 12. Improved collaboration and coordination amongst stakeholders, including public/private sector cooperation
 - 15. Develop monitoring guidelines
 - 16. Human resource development (number and capacity)
- 145
- 20. Establish certification programs
 - 21. Improve extension program
 - 24. Improve accessibility of information
- 2-1. Identify pre-harvest agricultural practices routinely used by farmers in Nepal that increase mycotoxin contamination.*
- 150
- 1. Planting a susceptible variety
 - 2. Use of unhealthy/substandard seeds
 - 3. Improper timing of planting of crops
 - 4. Improper irrigation
- 155
- 5. Poor disease and pest management practices
 - 6. Untimely harvesting of immature crops
 - 7. Growing where crop is not meant to be grown
 - 8. Lack of appropriate farm yard manure
 - 9. Harvesting in rainy weather
- 160
- 10. Repeated use of same seed
 - 11. Damage of crop during cultivation and weeding
 - 12. Use of chemicals for accelerating ripening
 - 13. No seed treatment
 - 14. Lack of mulching
- 165
- 15. Not following GAP
 - 16. Poor land preparation/soil treatment
 - 17. Little, no or improper fertilizer use
 - 18. Burning crop residue on soil
 - 19. Poor water quality

- 170 20. Improper crop spacing during planting
21. Improper use of pesticides
22. Ignoring technical advice
23. Late harvest
24. Livestock grazing crop
- 175 25. Contact with soil
26. Using contaminated commodities for compost/mulch
27. No soil testing
- 180 *2-4. Identify methods to reduce mycotoxin contamination in foods sold in local markets.*
1. Proper grading of food
6. Develop a sampling strategy for markets (suppliers & vendors)
8. Develop SOPs for markets for suppliers & vendors
11. Consumer awareness to buy properly stored/certified grains
19. Ammoniation
- 185 20. O₃ treatment
23. Train small farm growers – farm to market
24. Moisture monitoring tools
27. Use pesticides (fungicides & insecticides) at regular intervals
31. Awareness campaigns in market areas – pamphlets, posters, street dramas, *etc.*, &
information distribution from mass media
- 190 35. Promote household storage facilities for women
- 5-3. Identify positions in Nepal where training about mycotoxins, their detection, and their impact is important.*
- 195 1. Lab technicians
4. NARC scientists
5. University faculty & scientists
6. Extension officers
8. Research center staff
- 200 12. Agricultural scientists
15. Researchers in mycotoxins
16. Ministry of Education staff
21. Animal feed lab
22. Ministry of Health staff
- 205 24. Metropolitan & provincial laboratories
25. Ministry of Ag/Livestock staff
26. Seed producers
29. Pathology & nutrition experts
32. Agriculture & health professionals
- 210 33. Private sector laboratories
35. Junior technicians

Post Harvest

- 215 1-1. *Identify local customs and practices that should change if mycotoxin contamination is to be reduced.*
1. Awareness program for local farmers on harvest, drying & storage
 3. Improve post-harvest practices, e.g., solar dryers
 8. Research on local storage methods
 13. Selection of resistant varieties
 - 220 15. Uptake of harvesting and post-harvesting equipment
 20. Low understanding of the (mycotoxin) problem
 25. No technical support
 35. Select the best quality seed
- 225 2-3. *Identify facilities and training needed in Nepal to reduce post-harvest mycotoxin contamination.*
1. Training for Agricultural coordinators & farmers on mycotoxins and post-harvest practices (drying & storage)
 2. Testing labs at the local level
 - 230 4. Training of lab technicians
 6. Post-harvest graduate program at university
 8. Additional NAST facilities
 9. Sites for technology demonstration and training
 12. Training on conducting surveys and data analysis
 - 235 13. Include mycotoxin information in university curriculum
 15. Testing lab at national level
 16. Training on Good Agricultural Practices (GAP)
 18. Training on use of weather data for risk mapping
 19. Weather station establishment in each district
 - 240 20. Posters with awareness information
 21. Train government engineers on cost-effective post-harvest equipment
 23. Awareness building for policy makers
 25. Upgrade animal nutrition lab @ NARC
 26. Extension messaging on radio
 - 245 27. Training on moisture measurement
 28. Extension manuals
 29. Technical training for field level staff
 32. Training on packaging
 39. Orientation/training for media
- 250 4-2. *Identify specific messages that the Nepalese consumer and farmer need to hear about mycotoxins and mycotoxin-contaminated food.*
1. Prompt, proper drying of crops
 3. Sort out moldy food
 - 255 4. Mycotoxin contamination reduction and remediation are possible
 7. List of crops and associated mycotoxins
 8. Improve storage to reduce mycotoxin contamination

- 260 9. Kill fungi to save grain
13. Do not harvest during rain
14. Washing and cooking do not destroy mycotoxins
17. Global issue, we are in this together
18. GAP and available tech to reduce mycotoxin contamination
21. Practical measures that can be readily implemented
22. Diet diversification
265 23. Remove crops from field at maturity and dry immediately
25. Instructions on how to deal with mycotoxins
26. Mycotoxins are produced by fungi
27. Protect crops from fungi
28. Healthy diet for pregnant women and infants
270 30. Prevent pest infestation of food
34. Do not feed infested grain to animals
35. Don't sell and buy contaminated grains
37. Save grain from physical and pest damage
38. Safely dispose of moldy food
275 39. Safer alternative uses for some mycotoxin contaminated food
40. Case study report results
43. Store food in hermetic containers
44. Mycotoxins may be present without visible signs
46. High fungal growth when crops are not properly dried
280
- 5-2. *Identify training needed in the Nepalese work force to provide adequate monitoring of mycotoxin contamination.*
- 285 1. GAP – Good Agricultural Procedures
3. Methods and materials for storage of food commodities
4. Statistics
5. Sampling and subsampling for testing
6. Toxin analysis and detection
9. Post-harvest and storage procedures
11. Record keeping and data entry
290 13. Risk mapping
14. Awareness of impacts on human health and nutrition
16. Safe handling of products
21. Risk communication
23. Toxicity of mycotoxins
295 25. Data collection, analysis and interpretation
26. Good manufacturing processes (GMP)
28. Laboratory management
29. Quality control
30. Considerations while harvesting
300 32. Qualitative analysis
35. Database
41. Microbial analysis
49. Impact assessment

51. Laws and regulations

305

Testing, Reporting & Regulation

4-4. *What resources do leaders and government officials need to be able to respond to a mycotoxin "crisis"?*

310

1. Funding
2. Orientation for leaders and government officials on preventative mitigation measures

315

3. Technical/human resource development
6. Response team
7. Crisis/emergency manual, contingency plan and strategic plan

320

9. Institutional development
13. Access to mass communication with targeted information
15. Collaboration among local, provincial and national governments
19. Up to date information on magnitude, determinants and impact of the crisis

325

20. Physical infrastructure, including laboratories
21. Regular monitoring and evaluation
22. Trained policy makers
28. Up to date information on prevention and mitigation measures
29. Ability to test food and feed
30. Decontamination system
33. Vehicles
34. Repository of information on previous mycotoxin crises and measures taken
35. Research back up

330

5-3. *Identify positions in Nepal where training about mycotoxins, their detection, and their impact is important.*

335

1. Lab technicians
2. Farmers/Farming association staff
4. NARC scientists

340

5. University faculty & scientists
6. Extension officers
8. Research center staff
12. Agricultural scientists
15. Researchers in mycotoxins
16. Ministry of Education staff

345

21. Animal feed lab
22. Ministry of Health staff
24. Metropolitan & provincial laboratories
25. Ministry of Ag/Livestock staff
29. Pathology & nutrition experts
32. Agriculture & health professionals
35. Junior technicians

Nominal Group Questions/Responses from the Dhulikhel Conference Relevant for Policy Makers & Regulators Audience Sorted by Issue

5 Health

1-4. *How does mycotoxin contamination impact resilience of Nepalese farmers and their families?*

- 1. Poor family health
- 3. Increased need for health & food aid/starvation food shortage
- 5. Reduced work performance
- 11. Change in food habits
- 12. Looks to government for solution
- 13. Mental stress
- 24. Increased child mortality
- 27. Lower quality of life
- 29. Inability to cope with natural disaster
- 33. Psychological impacts
- 34. Reduced child education, lack of funds for fees

3-1. *Who in Nepal needs more information about mycotoxin-associated health problems?*

- 4. Health professionals
- 6. Government of Nepal/policy makers
- 8. Pregnant women & mothers and support services
- 9. Development partners: NGOs, WFP, FAO, WHO, etc.
- 10. Media
- 14. Policy implementers
- 16. Agricultural researcher/scientists & associations/councils
- 19. Universities

4-4. *What resources do leaders and government officials need to be able to respond to a mycotoxin "crisis"?*

- 1. Funding
- 2. Orientation for leaders and government officials on preventative mitigation measures
- 3. Technical/human resource development
- 5. Reserves of contamination-free food
- 6. Response team
- 7. Crisis/emergency manual, contingency plan and strategic plan
- 13. Access to mass communication with targeted information
- 14. Effective communication team and system
- 15. Collaboration among local, provincial and national governments
- 16. Policy and legal regulation formulation and implementation
- 19. Up to date information on magnitude, determinants and impact of the crisis
- 21. Regular monitoring and evaluation
- 22. Trained policy makers

27. Implementation of plan/policy/regulations
28. Up to date information on prevention and mitigation measures
29. Ability to test food and feed
50 34. Repository of information on previous mycotoxin crises and measures taken
39. Doctors and medicine ready
- 5-5. *Identify methods and goals for inter-ministry collaboration on problems associated with mycotoxins.*
- 55 1. Central and provincial platforms and labs for a multi-sector mycotoxin analysis team
2. Specialist committee with representatives from Ministry of Health, Ministry of Agriculture, NARC and DFTQC – federal and provincial levels
3. National Action Plan for mycotoxins
60 5. Exposure to and assistance from international partners
6. Joint organization of workshops (such as this one)
7. Regular updates of mycotoxin risk map
8. Integrate mycotoxin issues into the existing MSNP II
9. Formation of a mycotoxin mitigation body
65 10. Develop Terms of Reference for different layers
11. SOPs for management of mycotoxins
12. Operational guidelines and data collection/management at provincial and federal levels
13. Joint goal to reduce mycotoxin risks
70 14. Joint research and development projects
15. Common outreach programs
16. Plan for regular monitoring of hot spots
17. Joint publications of related documents
19. Joint training and capacity building
75 21. Design and implement a crisis communications plan
22. High level talks between ministries
23. One Health approach to minimize impact of mycotoxins
25. Prioritize policies for mycotoxin management
26. Specialized training curriculum for relevant sectors
80 27. Conduct joint awareness programs
28. Regular training from each ministry at school and college level
29. Human resource development
30. Joint planning and programming

85

Economics

- 90 1-2. *Identify economic risks posed by mycotoxins to Nepalese farmers*
1. Increased health cost, including national system
 2. Crop losses
 3. Reduced product price for farmer
 4. Increased cost of food for adequate nutrition
 5. Increased treatment cost for harvested materials, drying, harvesting, *etc.*
 - 95 7. Loss of income (in spite of more effort)
 8. Loss/reduction of market
 9. Increased cost of production
 12. Decreased productivity
 15. Rejection of materials in the international market – non-tariff trade barriers
 - 100 17. Food insecurity/malnutrition
 21. Middleman falsifying aflatoxin results to negotiate lower price when purchasing
 22. Regulation forcing farmers to sell good and consume bad
 23. Areas with higher contamination risk losing market access
 26. Decreased resilience
 - 105 28. Waste disposal cost
 29. Behavior change cost
- 110 1-4. *How does mycotoxin contamination impact resilience of Nepalese farmers and their families?*
1. Poor family health
 2. Reduced investment capacity
 3. Increased need for health and food aid/starvation food shortage
 4. Change in occupation (no longer farming)
 5. Reduced work performance
 - 115 7. A shift to low risk crops (not maize)
 9. Loss of national strategic grain reserve stocks
 10. Slows economy
 12. Looks to the government for solution
 15. Loss of investment (Loss of savings)
 - 120 19. Low income
 24. Increased child mortality
 25. Difficult to obtain loans
 27. Lower quality of life
 29. Inability to cope with natural disaster
 - 125 35. Labor shortage
- 130 1-6. *Identify methods to make current regulations of mycotoxins more effective.*
1. Community awareness and policy implementation
 2. Capacity building at local and provincial levels
 3. Regular sampling and testing of crops
 4. Update/expand/amend standards
 5. Targeted research & development

- 135 6. Harmonize regulations with US, EU & international levels
7. Strict regulation with fines & punishment
9. Develop national action plan
10. Labeling mycotoxin contamination level
11. Enact legislation at provincial and national levels
12. Improved collaboration/coordination amongst stakeholders, including
public/private sector collaboration
- 140 13. Policy advocacy
15. Develop monitoring guidelines
16. Human resource development (number and capabilities)
19. Availability of proper storage facilities
21. Improve extension program
- 145 23. Check imports
25. Alternative uses for commodities exceeding contamination limits
26. Set standards for more commodities
28. Compulsory disposal of unusable commodities
30. Insurance
- 150 1-7. *Identify methods and incentives to increase the quality of Nepalese agricultural imports.*
1. Strict quarantine measures
6. Regulate informal trade
- 155 7. Reduce import duties if the product meets standards (particularly for high demand products)
10. Identify risks associated with imports
13. Good packaging and post-harvest handling/transportation
20. Import only short supply commodities
- 160 22. Increase efficiency/speed of border checks
23. Improved communication with agents & importers
26. Labeling of products with contamination levels, including pesticides
- 165 2-1. *Identify pre-harvest agricultural practices routinely used by farmers in Nepal that increase mycotoxin contamination.*
1. Planting a susceptible variety
2. Use of unhealthy/substandard seeds
4. Improper irrigation
5. Poor disease and pest management practices
- 170 7. Growing where crop is not meant to be grown
12. Use of chemicals for accelerating ripening
13. No seed treatment
17. Little, no or improper fertilizer use
21. Improper use of pesticides
- 175 26. Using contaminated commodities for compost/mulch
- 2-4. *Identify methods to reduce mycotoxin contamination in foods sold in local markets.*
1. Proper grading of food

- 180 2. Increased awareness among consumers, retailers and farmers
3. Proper storage containers for food
4. Labeling and certification
6. Develop a sampling strategy for markets (suppliers & vendors)
7. Provide storage bins at a subsidized price
8. Develop SOPs for markets for supplier & vendors
185 9. Proper monitoring & regular inspections
11. Consumer awareness to buy properly stored/certified grains
12. Incentives for proper storage
13. Strict implementation of laws, acts and regulation
15. Hermetic sealed storage bags
190 16. Regular inspection/evaluation by regulatory body
19. Ammoniation
20. O₃ treatment
22. Quarantine
23. Train small farm growers – farm to market
195 24. Moisture monitoring tools
25. Regular cleaning of storage sites in local markets
26. Remove moist conditions in stores
27. Use pesticides (fungicides & insecticides) at regular intervals
29. Humidity-proof storage
200 30. Regular inspection of stored feedstuffs
31. Awareness campaigns in market areas – pamphlets, posters, street dramas, etc. and
information dissemination from mass media
33. Provide incentives to market suppliers and vendors who comply with SOPs
34. Storage set ups with regulatory management for suppliers
205 35. Promote small scale storage facilities for women
36. Stacking of bags

2-6. *What/when/where should screening for mycotoxins occur?*

- 210 1. During storage
2. Before harvest
3. Customs checkpoints
4. Test grains from household, selling points, and market stores
5. Food products during market inspection at the research lab
8. Animal products at processing plant
215 10. In grain factories before processing
12. Animal feed before packaging
13. Processed food
14. At farm level
15. All seasons
220 16. National surveys every 5 years
17. Point of sale from traders to processors
20. Plants and produce
23. Accredited laboratory HPLC/Fluorometry/LCMS/MS
26. Human and livestock urine and blood

- 225 28. Outbreak (local)
- 3-5. *Identify methods that could be used in Nepal to reduce the effects of mycotoxin contamination of animal feed.*
- 230 1. Ammoniation of feed
2. Add toxin binders to feed
3. Diversify feed ingredients
4. Silage preparation
6. Control contamination thru GAP
7. Proper harvesting, drying storage, packaging
- 235 8. Awareness campaign
9. Discard, don't feed contaminated feed
11. Promote good post-harvest practices
13. Dilution of contaminated feed
14. Implement HACCP in feed
- 240 15. Grading and sorting of raw materials before compounding
16. Government programs subsidies for clean feed programs
17. Lab testing facilities at provincial level
18. Make farmers aware of effects
19. Treat with lactic acid bacteria
- 245 24. Feed more hay and forage and less concentrates
25. Database for mycotoxin contamination data in feed
27. Proper cleaning of compounding machine used for making feed
28. Updated quality standards for feed and raw materials
30. Monitoring of animal feed in market
- 250 32. Enzymes
34. Biocontrol – AflaSafe
38. Breeding for resistance to mycotoxins
- 5-3. *Identify positions in Nepal where training about mycotoxins, their detection, and their impact is important.*
- 255 3. DFTQC officials
4. NARC scientists
6. Extension officers
8. Research center staff
- 260 9. Local leaders
10. Planning officials
16. Ministry of Education staff
18. Customs & quarantine officers
22. Ministry of Health staff
- 265 24. Metropolitan & provincial laboratories
25. Ministry of Ag/Livestock staff
32. Agriculture & health professionals
- 5-5. *Identify methods and goals for inter-ministry collaboration on problems associated with mycotoxins.*
- 270

1. Central and provincial platforms and labs for a multi-sector mycotoxin analysis team
2. Specialist committee with representatives from Ministry of Health, Ministry of Agriculture, NARC and DFTQC – federal and provincial levels
- 275 3. National Action Plan for mycotoxins
4. Adequate budget allocation for infrastructure (e.g., warehouses & cold storage) and innovative technologies
5. Exposure to and assistance from international partners
- 280 6. Joint organization of workshops (such as this one)
7. Regular updates of mycotoxin risk map
8. Integrate mycotoxin issues into the existing MSNP II
9. Formation of a mycotoxin mitigation body
10. Develop Terms of Reference for different layers
- 285 11. SOPs for management of mycotoxins
12. Operational guidelines and data collection/management at provincial and federal levels
13. Joint goal to reduce mycotoxin risks
15. Common outreach programs
- 290 16. Plan for regular monitoring of hot spots
17. Joint publications of related documents
19. Joint training and capacity building
21. Design and implement a crisis communications plan
22. High level talks between ministries
23. One Health approach to minimize impact of mycotoxins
- 295 25. Prioritize policies for mycotoxin management
27. Conduct joint awareness programs
29. Human resource development
30. Joint planning and programming

300

Post Harvest

- 305 2-6. *What/when/where should screening for mycotoxins occur?*
1. During storage
 3. Customs checkpoints
 4. Test grains from household, selling points, and market stores
 5. Food products during market inspection at the research lab
 10. In grain factories before processing
 - 310 12. Animal feed before packaging
 13. Processed food
 14. At farm level
 15. All seasons
 16. National surveys every 5 years
 - 315 17. Point of sale from traders to processors
 19. Before and during drying
 20. Plants and produce
 23. Accredited laboratory HPLC/Fluorometry/LCMS/MS
 28. Outbreak (local)
 - 320
- 5-5. *Identify methods and goals for inter-ministry collaboration on problems associated with mycotoxins.*
1. Central and provincial platforms and labs for a multi-sector mycotoxin analysis team
 - 325 2. Specialist committee with representatives from Ministry of Health, Ministry of Agriculture, NARC and DFTQC – federal and provincial levels
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 - 345 27. Conduct joint awareness programs
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Testing, Reporting & Regulation/Policy Makers & Regulators

- 350 1-6. *Identify methods to make current regulations of mycotoxins more effective.*
1. Community awareness & policy implementation
 2. Capacity building at local and provincial levels
 3. Regular sampling and testing of crops
 4. Update/expand/amend standards
 - 355 6. Harmonize regulations with US, EU & international levels
 7. Strict regulation with fines and punishment
 9. Develop national action plan
 10. Labeling mycotoxin contamination level
 11. Enact legislation at local and provincial levels
 - 360 12. Improved collaboration/coordination amongst stakeholders, including public/private sector collaboration
 13. Policy advocacy
 15. Develop monitoring guidelines
 16. Human resource development (number and capabilities)
 - 365 18. Involve farmers & consumers in policy making
 20. Establish certification programs
 21. Improve extension program
 22. Standardization of toxicity measures
 23. Check imports
 - 370 24. Improve accessibility of information
 25. Alternative uses for crops exceeding contamination limits
 26. Set standards for more commodities
 27. Identify consistent violators
 28. Compulsory disposal of unusable commodities
 - 375 29. Establish regulatory limits for six major mycotoxins
 30. Insurance
- 1-7. *Identify methods and incentives to increase the quality of Nepalese agricultural imports.*
- 380 1. Strict quarantine measures
 2. Setting standards for quality in import and domestic markets
 3. Capacity improvement for quarantine (Lab and human resources)
 4. Develop and implement verification system/compulsory certification
 5. Develop roster of firms supplying good and poor quality products
 - 385 6. Regulate informal trade
 7. Reduce import duties if the product meets standards (particularly for high demand products)
 9. Develop and implement SOPs with agencies of exporting countries
 12. Previous certification fraud prevents further imports from source
 - 390 13. Good packaging & post-harvest handling/transportation
 14. Punishment provisions for importers violating standards
 15. Establish and equip holding yard
 16. Effective implementation of export/import regulations

- 395 17. Increased consumer awareness
20. Import only short-supply commodities
22. Increase efficiency/speed of border checks
23. Improved communication with agents & importers
26. Labeling of products with contamination levels, including pesticides
27. Increased training for staff on import quality issues
- 400 2-4. *Identify methods to reduce mycotoxin contamination in foods sold in local markets.*
1. Proper grading of food
3. Proper storage containers for food
4. Labeling & certification
- 405 7. Provide storage bins at a subsidized price
8. Develop SOPs for markets for suppliers & vendors
9. Proper monitoring and regular inspections
12. Incentives for proper storage
13. Strict implementation of laws, acts & regulations
- 410 16. Regular inspection/evaluation by regulatory body
19. Ammoniation
20. O₃ treatment
22. Quarantine
24. Moisture monitoring tools
- 415 30. Regular inspection of stored feedstuffs
32. Provide the regulations, policies & information on aflatoxins and their impact on human & animal health
33. Provide incentives to market suppliers & vendors who comply with SOPs
34. Storage set-ups with regulatory management for suppliers
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- 425 4. Test grains from household, selling points, and market stores
5. Food products during market inspection at the research lab
8. Animal products at processing plant
10. In grain factories before processing
12. Animal feed before packaging
- 430 13. Processed food
14. At farm level
15. All seasons
16. National surveys every 5 years
17. Point of sale from traders to processors
- 435 20. Plants and produce
23. Accredited laboratory HPLC/Fluorometry/LCMS/MS
26. Human and livestock urine and blood
28. Outbreak (local)

- 440 4-4. *What resources do leaders and government officials need to be able to respond to a mycotoxin “crisis”?*
1. Funding
 2. Orientation for leaders and government officials on preventative mitigation measures
 - 445 3. Technical/human resource development
 6. Response team
 7. Crisis/emergency manual, contingency plan and strategic plan
 9. Institutional development
 13. Access to mass communication with targeted information
 - 450 14. Effective communication team and system
 15. Collaboration among local, provincial and national governments
 19. Up to date information on magnitude, determinants and impact of the crisis
 20. Physical infrastructure, including laboratories
 21. Regular monitoring and evaluation
 - 455 22. Trained policy makers
 27. Implementation of plan/policy/regulations
 28. Up to date information on prevention and mitigation measures
 29. Ability to test food and feed
 30. Decontamination system
 - 460 33. Vehicles
 35. Research back up
 39. Doctors and medicine ready
- 465 5-3. *Identify positions in Nepal where training about mycotoxins, their detection, and their impact is important.*
1. Lab technicians
 3. DFTQC officials
 9. Local leaders
 10. Planning officials
 - 470 16. Ministry of Education staff
 18. Customs & quarantine officers
 22. Ministry of Health staff
 24. Metropolitan & provincial laboratories
 25. Ministry of Ag/Livestock staff
 - 475 29. Pathology & nutrition experts
 32. Agriculture & health professionals
 33. Private sector laboratories
- 480 5-5. *Identify methods and goals for inter-ministry collaboration on problems associated with mycotoxins.*
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- 490 9. Formation of a mycotoxin mitigation body
10. Develop Terms of Reference for different layers
11. SOPs for management of mycotoxins
12. Operational guidelines and data collection/management at provincial and federal levels
- 495 13. Joint goal to reduce mycotoxin risks
14. Joint research and development projects
15. Common outreach programs
16. Plan for regular monitoring of hot spots
17. Joint publications of related documents
- 500 19. Joint training and capacity building
21. Design and implement a crisis communications plan
22. High level talks between ministries
23. One Health approach to minimize impact of mycotoxins
25. Prioritize policies for mycotoxin management
- 505 27. Conduct joint awareness programs
29. Human resource development
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