

| Scenarios | Species | Animal categories | Means of transport | Transport duration | Thermal environment |
|-----------|---------|-------------------|--------------------|--------------------|---------------------|
| 1 | cattle | heifers | road | short | above |
| 2 | cattle | heifers | road | short | below |
| 3 | cattle | heifers | road | short | neutral |
| 4 | cattle | heifers | road | long | above |
| 5 | cattle | heifers | road | long | below |
| 6 | cattle | heifers | road | long | neutral |
| 7 | cattle | heifers | sea | long | above |
| 8 | cattle | heifers | sea | long | neutral |
| 9 | cattle | heifers | air | long | neutral |
| 10 | cattle | beef cattle | road | short | above |
| 11 | cattle | beef cattle | road | short | below |
| 12 | cattle | beef cattle | road | short | neutral |
| 13 | cattle | beef cattle | road | long | above |
| 14 | cattle | beef cattle | road | long | below |
| 15 | cattle | beef cattle | road | long | neutral |
| 16 | cattle | beef cattle | sea | long | above |
| 17 | cattle | beef cattle | sea | long | below |
| 18 | cattle | beef cattle | sea | long | neutral |
| 19 | cattle | cows | road | short | above |
| 20 | cattle | cows | road | short | below |
| 21 | cattle | cows | road | short | neutral |
| 22 | cattle | cows | road | long | above |
| 23 | cattle | cows | road | long | below |
| 24 | cattle | cows | road | long | neutral |
| 25 | cattle | calves | road | short | above |
| 26 | cattle | calves | road | short | below |
| 27 | cattle | calves | road | short | neutral |
| 28 | cattle | calves | road | long | above |
| 29 | cattle | calves | road | long | below |
| 30 | cattle | calves | road | long | neutral |
| 31 | cattle | calves | air | long | neutral |

Figure 1. Different transport scenarios in cattle

| HAZARD | Hazard description | Adverse effect description | Adverse effect type | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | | | | |
|--|--|---------------------------------------|------------------------|---------|-----|-----|------|------|-----|------|-----|----|-------------|------|------|------|------|-----|-----|-----|-----|------|------|------|-----|-----|-----|--------|-----|-----|-----|-----|-----|-----|------|------|------|------|
| | | | | Heifers | | | | | | | | | Beef Cattle | | | | | | | | | Cows | | | | | | Calves | | | | | | | | | | |
| | | | | RSA | RSB | RSN | RLA | RLB | RLN | SLA | SLN | PL | RSA | RSB | RSN | RLA | RLB | RLN | SLA | SLB | SLN | RSA | RSB | RSN | RLA | RLB | RLN | RSA | RSB | RSN | RLA | RLB | RLN | PLA | | | | |
| TRANSPORT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Vehicle / Container design | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| a.) Floors | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Floor surface | Slippery | Bruising, wounds, fractures | Injuries | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Floor surface | Slippery | Problems maintaining balance, strug | Ease of movement | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Floor surface | Slippery | Problems maintaining balance, strug | Fear | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Floor condition | Gaps, potholes, steps, slopings | Bruising, wounds, fractures | Injuries | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Floor condition | Gaps, potholes, steps, slopings | Difficult movement | Ease of movement | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Floor condition | Lack of bedding | Cold stress | Thermal discomfort | | | | n.a. | | | | | | | | n.a. | | | | | | | | | n.a. | | | | | | | | | | | | | | |
| Floor condition | Lack of bedding | Bruising, wounds | Comfort around resting | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Floor condition | Lack of bedding | Respiratory disorders | Disease | n.a. | | | n.a. | | | | | | n.a. | | | n.a. | | | | | | | n.a. | | | | | | | | | | | | | | | |
| b.) Partitions | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Unsuitable design | Sharp protrusion, sharp edges, grate (causes trapping extremities or head) | Bruising, wounds, fractures | Injuries | | | | | | | | | | n.a. | | | | | | | | | | | | | | | | | | | | | | | | | |
| Unsuitable design | < 1,5 min height | Bruising, wounds | Injuries | | | | | | | | | | n.a. | | | | | | | | | | | | | | | | | | | | | | | | | |
| Unsuitable design | Not solid | Bruising, wounds | Injuries | | | | | | | | | | n.a. | | | | | | | | | | | | | | | | | | | | | | | | | |
| Unsuitable design | Closed at the top (disturbs airflow) | Disturbed thermoregulation | Thermal comfort | | | | | | | | | | n.a. | | | | | | | | | | | | | | | | | | | | | | | | | |
| Absence of partions | No partitions, open sides between adjacent pens | Bruising, wounds | Injuries | | | | | | | | | | n.a. | | | | | | | | | | | | | | | | | | | | | | | | | |
| Absence of partions | No partitions, open sides between adjacent pens | Aggression | social Behaviour | | | | | | | | | | n.a. | | | | | | | | | | | | | | | | | | | | | | | | | |
| c.) Roof | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Roof colour | No reflecting bright colour | Heatstress, overheating | Thermal comfort | | | | | | | | | | n.a. | | | | n.a. | | | | | | | | | | | | | | | | | | n.a. | n.a. | | |
| Roof colour | No reflecting bright colour | Heatstress, overheating | Thirst | | | | n.a. | | | | | | n.a. | | | | n.a. | | | | | | | | | | | | | | | | | | | n.a. | n.a. | |
| Roof condition | Gaps, holes, protrusions, projections | Soaked animals | Thermal comfort | | | | | | | | | | n.a. | | | | | | | | | | | | | | | | | | | | | | | | | |
| Roof condition | Gaps, holes, protrusions, projections | Soaked animals | Comfort around resting | | | | | | | | | | n.a. | | | | | | | | | | | | | | | | | | | | | | | | | |
| Roof condition | Gaps, holes, protrusions, projections | Bruising, wounds | Injuries | | | | | | | | | | n.a. | | | | | | | | | | | | | | | | | | | | | | | | | |
| Roof condition | Gaps, holes, protrusions, projections | solar radiation | Thermal comfort | | | | | n.a. | | | | | n.a. | | | | n.a. | | | | | | | | | | | | | | | | | | | n.a. | n.a. | |
| Unsuitable insulation | Solar gain heat | Heatstress, overheating | Thermal comfort | | | | | | | | | | n.a. | | | | n.a. | | | | | | | | | | | | | | | | | | | n.a. | n.a. | |
| Unsuitable insulation | Solar gain heat | Heatstress, overheating | Thirst | | | | | n.a. | | | | | n.a. | | | | n.a. | | | | | | | | | | | | | | | | | | | n.a. | n.a. | |
| Unsuitable insulation | Condence water | Soaked animals | Comfort around resting | n.a. | | | n.a. | | | | | | n.a. | n.a. | | | n.a. | | | | | | | | | | | | | | | | | | | n.a. | n.a. | |
| Unsuitable insulation | Condence water | Soaked animals | Thermal comfort | n.a. | | | n.a. | | | | | | n.a. | n.a. | | | n.a. | | | | | | | | | | | | | | | | | | | | n.a. | n.a. |
| Unsuitable insulation | Condence water/air draught | Soaked animals | Disease | | | | | | | | | | n.a. | | | | | | | | | | | | | | | | | | | | | | | | | |
| d.) Sensory input (Sound Smell Light) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Noise | Overall noise | Aversion | Fear | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Light | Sudden change of light (tunnels), poor lighting, glaring lights | Aversion | Fear | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Smell | Unfamiliar smell | Aversion | Fear | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| e.) Space allowance/Tier height | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Deck height | < 20 cm min height above withers | Heatstress, overheating | Thermal comfort | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Deck height | < 20 cm min height above withers | blocked air exchange | Disease | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Deck height | < 20 cm min height above withers | Bruising, wounds | Injuries | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Deck height | < 20 cm min height above withers | Inability to express natural behavio | Ease of movement | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Deck height | > 50 cm man.a. height above withers | Mounting, bruising, wounds | Injuries | | | | n.a. | | | n.a. | | | n.a. | | | | | | | | | | | | | | | | | | | | | | | | n.a. | |
| f.) Suspension | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Poor suspension | Vibration, acceleration | Travel sickness | Disease | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | n.a. | | |
| Poor suspension | Vibration, acceleration | Struggling, loss of balance, falling, | Ease of movement | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | n.a. | |
| Poor suspension | Vibration, acceleration | Struggling, loss of balance, falling, | Injuries | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | n.a. | |
| g.) Inspection possibilities | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Inspection opening | <min size, < min deck height, inadequate access | Heat stress, cold stress, panting fo | Thermal comfort | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | n.a. | |
| Inspection opening | <min size, < min deck height, inadequate access | Bruising, wounds, fractures | Injuries | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | n.a. | |
| Feeding and watering | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| a.) Watering | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lack of drinking facilities | No supply of water | Dehydration | Thirst | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | n.a. | | |
| Lack of drinking facilities | No supply of water | Heat stress | Thermal comfort | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | n.a. | | |
| Inappropriate drinking facilities | Facilities not adjusted to cattle, no open water expanse, < 3 cm water depth | Dehydration | Thirst | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | n.a. | | |
| Inappropriate drinking facilities | Facilities not adjusted to cattle, no open water expanse, < 3 cm water depth | Heat stress | Thermal comfort | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | n.a. | | |
| Quantity of watering cups | < less than two watering cups per pen | Dehydration | Thirst | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | n.a. | | |
| Position of drinkers | Inadequate position in the vehicle/pen | Dehydration | Thirst | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | n.a. | | |
| Position of drinkers | Inadequate position in the vehicle/pen | Heat stress | Thermal comfort | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | n.a. | | |
| Insufficient flow rate | < 3 l min water flow rate | Dehydration | Thirst | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | n.a. | | |
| Shutdown water supply | Uncontrolled water intake of calves | Water intoxication | Disease | n.a. | | | n.a. | | | n.a. | | | n.a. | n.a. | | | n.a. | | | | | | | | | | | | | | | | | | | | | |
| Non-isolated cups/conduits/tank (cold temperature) | Freezing during cold temperature | Dehydration | Thirst | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | n.a. | | |
| Insufficient tank capacity | Insufficient watering during the trip | Dehydration | Thirst | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | n.a. | | |
| Insufficient tank capacity | Insufficient watering during the trip | Heat stress | Thermal comfort | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | n.a. | | |
| Refilling facilities (adapters) | Impossibility to refill tanks during the trip | Dehydration | Thirst | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | n.a. | | |
| Refilling facilities (adapters) | Impossibility to refill tanks during the trip | heat stress | Thermal comfort | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | n.a. | | |

Table 1. Hazards related to transport of cattle (cont.)

| HAZARD | Hazard description | Adverse effect description | Adverse effect type | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | | | |
|--|--|-------------------------------------|------------------------|---------|------|------|------|------|------|------|------|------|-------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|--------|------|------|------|------|------|------|------|------|--|
| | | | | Heifers | | | | | | | | | Beef Cattle | | | | | | | | | Cows | | | | | | Calves | | | | | | | | | |
| | | | | RSA | RSB | RSN | RLA | RLB | RLN | SLA | SLN | PL | RSA | RSB | RSN | RLA | RLB | RLN | SLA | SLB | SLN | RSA | RSB | RSN | RLA | RLB | RLN | RSA | RSB | RSN | RLA | RLB | RLN | PLA | | | |
| b.) feeding | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lack of appropriate feeding devices | No supply of feedstuff | Desnutrition, loss of body weight | Hunger | n.a. | n.a. | n.a. | | | | | | | n.a. | n.a. | n.a. | | | | | | | | n.a. | n.a. | n.a. | | | n.a. | n.a. | n.a. | | | | | | | |
| Lack of appropriate feeding devices | No supply of feedstuff | Desnutrition, loss of body weight | Social behaviour | n.a. | n.a. | n.a. | | | | | | | n.a. | n.a. | n.a. | | | | | | | | n.a. | n.a. | n.a. | | | n.a. | n.a. | n.a. | | | | | | | |
| Lack of feeding stuff storage | No supply of feedstuff | Desnutrition, loss of body weight | Hunger | n.a. | n.a. | n.a. | | | | | | | n.a. | n.a. | n.a. | | | | | | | | n.a. | n.a. | n.a. | | | n.a. | n.a. | n.a. | | | | | | | |
| Lack of feeding stuff storage | No supply of feedstuff | Desnutrition, loss of body weight | Social behaviour | n.a. | n.a. | n.a. | | | | | | | n.a. | n.a. | n.a. | | | | | | | | n.a. | n.a. | n.a. | | | n.a. | n.a. | n.a. | | | | | | | |
| Inappropriate position of storage | Contamination of feed stuff | Low/no appetite | Hunger | n.a. | n.a. | n.a. | | | | | | | n.a. | n.a. | n.a. | | | | | | | | n.a. | n.a. | n.a. | | | n.a. | n.a. | n.a. | | | | | n.a. | | |
| Inappropriate position of storage | Contamination of feed stuff | Low/no appetite | Social behaviour | n.a. | n.a. | n.a. | | | | | | | n.a. | n.a. | n.a. | | | | | | | | n.a. | n.a. | n.a. | | | n.a. | n.a. | n.a. | | | | | n.a. | | |
| Microclimate throughout transportation | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ventilation | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Natural Ventilation total surface area opened | < min air exchange/distribution (rising T°, rising humidity, low air velocity, increase of noxi) | Heat stress, dyspnoeic, panting for | Disease | | n.a. | n.a. | | n.a. | n.a. | | n.a. | n.a. | | n.a. | n.a. | | n.a. | n.a. | | n.a. | n.a. | | n.a. | n.a. | | n.a. | n.a. | | n.a. | n.a. | | n.a. | n.a. | | n.a. | n.a. | |
| Natural Ventilation total surface area opened | < min air exchange/distribution (rising T°, rising humidity, low air velocity, increase of noxi) | Heat stress | Thermal comfort | | n.a. | n.a. | | n.a. | n.a. | | n.a. | n.a. | | n.a. | n.a. | | n.a. | n.a. | | n.a. | n.a. | | n.a. | n.a. | | n.a. | n.a. | | n.a. | n.a. | | n.a. | n.a. | | n.a. | n.a. | |
| Natural Ventilation total surface area opened | < min air exchange/distribution (rising T°, rising humidity, low air velocity, increase of noxi) | Heat stress | Thirst | | n.a. | n.a. | | n.a. | n.a. | | n.a. | n.a. | | n.a. | n.a. | | n.a. | n.a. | | n.a. | n.a. | | n.a. | n.a. | | n.a. | n.a. | | n.a. | n.a. | | n.a. | n.a. | | n.a. | n.a. | |
| Natural Ventilation total surface area opened | < min air exchange/distribution (rising T°, rising humidity, low air velocity, increase of noxi) | Heat stress | Comfort around resting | | n.a. | n.a. | | n.a. | n.a. | | n.a. | n.a. | | n.a. | n.a. | | n.a. | n.a. | | n.a. | n.a. | | n.a. | n.a. | | n.a. | n.a. | | n.a. | n.a. | | n.a. | n.a. | | n.a. | n.a. | |
| Natural/forced ventilation total surface area opened | > max air exchange/distribution (draught, decreasing T°, <lower critical T°, high air velocity) | Cold stress | Disease | n.a. | | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | |
| Natural/forced ventilation total surface area opened | > max air exchange/distribution (draught, decreasing T°, <lower critical T°, high air velocity) | Cold stress | Thermal comfort | n.a. | | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | |
| Natural/forced ventilation total surface area opened | > max air exchange/distribution (draught, decreasing T°, <lower critical T°, high air velocity) | Cold stress | Comfort around resting | n.a. | | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | |
| Inadequate natural/forced ventilation | Air contaminated with exhaust gases | Intoxication | Disease | n.a. | | n.a. | | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | |
| Inadequate forced ventilation | Lack of forced ventilation | Heat stress | Thirst | | n.a. | | | n.a. | | | | | n.a. | n.a. | | | | | | | | | n.a. | | | | | n.a. | | | | | | | n.a. | | |
| Inadequate forced ventilation | Lack of forced ventilation | Heat stress | Thermal comfort | | n.a. | | | n.a. | | | | | n.a. | n.a. | | | | | | | | | n.a. | | | | | n.a. | | | | | | | n.a. | | |
| Inadequate forced ventilation | Lack of forced ventilation | Heat stress | Disease | | n.a. | | n.a. | | | | | | n.a. | n.a. | | | | | | | | | n.a. | | | | | n.a. | | | | | | | n.a. | | |
| Inadequate forced ventilation | Lack of forced ventilation | Heat stress | Comfort around resting | | n.a. | | | | | | | | n.a. | n.a. | | | | | | | | | n.a. | | | | | n.a. | | | | | | | n.a. | | |
| Inadequate forced ventilation | Max Ventilation rate lower than 60m3/h per 100 kg live weight | Heat stress | Thirst | | n.a. | n.a. | | n.a. | n.a. | | n.a. | n.a. | | n.a. | n.a. | | n.a. | n.a. | | n.a. | n.a. | | n.a. | n.a. | | n.a. | n.a. | | n.a. | n.a. | | n.a. | n.a. | | n.a. | | |
| Inadequate forced ventilation | Max Ventilation rate lower than 60m3/h per 100 kg live weight | Heat stress | Thermal comfort | | n.a. | n.a. | | n.a. | n.a. | | n.a. | n.a. | | n.a. | n.a. | | n.a. | n.a. | | n.a. | n.a. | | n.a. | n.a. | | n.a. | n.a. | | n.a. | n.a. | | n.a. | n.a. | | n.a. | | |
| Inadequate forced ventilation | Max Ventilation rate lower than 60m3/h per 100 kg live weight | Heat stress | Disease | | n.a. | n.a. | | n.a. | n.a. | | n.a. | n.a. | | n.a. | n.a. | | n.a. | n.a. | | n.a. | n.a. | | n.a. | n.a. | | n.a. | n.a. | | n.a. | n.a. | | n.a. | n.a. | | n.a. | | |
| Inadequate forced ventilation | Max Ventilation rate lower than 60m3/h per 100 kg live weight | Heat stress | Comfort around resting | | n.a. | n.a. | | n.a. | n.a. | | n.a. | n.a. | | n.a. | n.a. | | n.a. | n.a. | | n.a. | n.a. | | n.a. | n.a. | | n.a. | n.a. | | n.a. | n.a. | | n.a. | n.a. | | n.a. | | |
| Inadequate forced ventilation | Max Ventilation rate lowering about protection plates on fans | Heat stress | Thermal comfort | | n.a. | n.a. | | | | | | | n.a. | n.a. | | | | | | | | | n.a. | n.a. | | | | n.a. | n.a. | | | | | | n.a. | | |
| Inadequate forced ventilation | Max Ventilation rate lowering about protection plates on fans | Heat stress | Thermal comfort | | n.a. | n.a. | | | | | | | n.a. | n.a. | | | | | | | | | n.a. | n.a. | | | | n.a. | n.a. | | | | | | n.a. | | |
| Inadequate forced ventilation | Lack of sensors of T. and humidity in animal compartment | Heat stress | Thirst | n.a. | n.a. | | | n.a. | | | | | n.a. | n.a. | | | | | | | | | n.a. | n.a. | | | | n.a. | n.a. | | | | | | | | |
| Inadequate forced ventilation | Lack of sensors of T. and humidity in animal compartment | Heat stress | Thermal comfort | n.a. | n.a. | | | | | | | | n.a. | n.a. | | | | | | | | | n.a. | n.a. | | | | n.a. | n.a. | | | | | | | | |
| Inadequate forced ventilation | Lack of sensors of T. and humidity in animal compartment | Heat stress | Disease | n.a. | n.a. | | n.a. | | | | | | n.a. | n.a. | | | | | | | | | n.a. | n.a. | | | | n.a. | n.a. | | | | | | | | |
| Inadequate forced ventilation | Lack of sensors of T. and humidity in animal compartment | Heat stress | Comfort around resting | n.a. | n.a. | | | | | | | | n.a. | n.a. | | | | | | | | | n.a. | n.a. | | | | n.a. | n.a. | | | | | | | | |
| Inadequate forced ventilation | Lack of sensors of T. and humidity in animal compartment | Cold stress | Disease | n.a. | | | n.a. | | | | | | n.a. | | | n.a. | | | | | | | n.a. | | | n.a. | | | n.a. | | | | n.a. | | | | |
| Inadequate forced ventilation | Lack of sensors of T. and humidity in animal compartment | Cold stress | Thermal comfort | n.a. | | | n.a. | | | | | | n.a. | | | n.a. | | | | | | | n.a. | | | n.a. | | | n.a. | | | | n.a. | | | | |
| Inadequate forced ventilation | Lack of alert system in the driver compartment | Heat stress | Disease | n.a. | n.a. | | | n.a. | | | | | n.a. | n.a. | | | | | | | | | n.a. | n.a. | | | | n.a. | n.a. | | | | | | | | |
| Inadequate forced ventilation | Lack of alert system in the driver compartment | Heat stress | Comfort around resting | n.a. | n.a. | | | | | | | | n.a. | n.a. | | | | | | | | | n.a. | n.a. | | | | n.a. | n.a. | | | | | | | | |
| Inadequate forced ventilation | Lack of alert system in the driver compartment | Heat stress | Thirst | n.a. | n.a. | | | n.a. | | | | | n.a. | n.a. | | | | | | | | | n.a. | n.a. | | | | n.a. | n.a. | | | | | | | | |
| Inadequate forced ventilation | Lack of alert system in the driver compartment | Heat stress | Thermal comfort | n.a. | n.a. | | | | | | | | n.a. | n.a. | | | | | | | | | n.a. | n.a. | | | | n.a. | n.a. | | | | | | | | |
| Inadequate forced ventilation | Lack of alert system in the driver compartment | Cold stress | Disease | n.a. | | | n.a. | | | | | | n.a. | | | n.a. | | | | | | | n.a. | | | n.a. | | | n.a. | | | | n.a. | | | | |
| Inadequate forced ventilation | Lack of alert system in the driver compartment | Cold stress | Thermal comfort | n.a. | | | n.a. | | | | | | n.a. | | | n.a. | | | | | | | n.a. | | | n.a. | | | n.a. | | | | n.a. | | | | |
| Inadequate forced ventilation | Ventilation apertures distribution (inappropriate air distribution in the vehicle) | Heat stress | Disease | | n.a. | | | n.a. | | | | | | n.a. | | | | | | | | | | n.a. | | | | | n.a. | | | | | | | | |
| Inadequate forced ventilation | Ventilation apertures distribution (inappropriate air distribution in the vehicle) | Heat stress | Comfort around resting | | n.a. | | | | | | | | | n.a. | | | | | | | | | | n.a. | | | | | n.a. | | | | | | | | |
| Inadequate forced ventilation | Ventilation apertures distribution (inappropriate air distribution in the vehicle) | Heat stress | Thirst | | n.a. | | | n.a. | | | | | | n.a. | | | | | | | | | | n.a. | | | | | n.a. | | | | | | | | |
| Inadequate forced ventilation | Ventilation apertures distribution (inappropriate air distribution in the vehicle) | Heat stress | Thermal comfort | | n.a. | | | | | | | | | n.a. | | | | | | | | | | n.a. | | | | | n.a. | | | | | | | | |
| Inadequate forced ventilation | Ventilation apertures distribution (inappropriate air distribution in the vehicle) | Cold stress/draught | Disease | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Inadequate forced ventilation | Ventilation apertures distribution (inappropriate air distribution in the vehicle) | Cold stress/draught | Thermal comfort | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Table 1. Hazards related to transport of cattle (cont.)

| HAZARD | Hazard description | Adverse effect description | Adverse effect type | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | | | |
|--------------------------------------|--|--------------------------------------|---------------------------|---------|------|------|------|------|------|------|------|------|-------------|------|------|------|------|------|------|------|------|------|-----|-----|-----|-----|-----|--------|-----|-----|-----|-----|-----|-----|--|--|--|
| | | | | Heifers | | | | | | | | | Beef Cattle | | | | | | | | | Cows | | | | | | Calves | | | | | | | | | |
| | | | | RSA | RSB | RSN | RLA | RLB | RLN | SLA | SLN | PL | RSA | RSB | RSN | RLA | RLB | RLN | SLA | SLB | SLN | RSA | RSB | RSN | RLA | RLB | RLN | RSA | RSB | RSN | RLA | RLB | RLN | PLA | | | |
| MANAGEMENT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| PREPARATION TO THE TRANSPORT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| a.) Fasting | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Fasting duration | > 12h fasting duration | Desnutrition, loss of body weight | Hunger | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Fasting duration | > 12h fasting duration | Aggression | Injuries | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Fasting duration | > 12h fasting duration | Aggression | Social behaviour | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| b.) Feeding | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Feed quality | No adaption to feed stuff during transport | Desnutrition, loss of body weight | Hunger | n.a. | n.a. | n.a. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Feed quality | No adaption to feed stuff during transport | Desnutrition, loss of body weight | Social behaviour | n.a. | n.a. | n.a. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| c.) Watering | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Water withdrawal | Lack of water up until loading | Dehydration | Thirst | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Water withdrawal | Lack of water up until loading | Heatstress, overheating | Thermal comfort | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| d.) Management | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lack of previous human contact | Inappropriate previous positive contacts with humans | Scape attempt | Human-animal relationship | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lack of previous human contact | Inappropriate previous positive contacts with humans | Scape attempt | Injuries | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lack of previous human contact | Inappropriate previous positive contacts with humans | Fear | Fear | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Selection of animals to transport | Poor fitness, poor health status prior to transport | Incapacity of animals to travel | Injuries | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Selection of animals to transport | Poor fitness, poor health status prior to transport | Incapacity of animals to travel | Disease | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Selection of animals to transport | Late state of pregnancy | Incapacity of animals to travel | Disease | | | | | | | | | | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | | | | | | | | | | | | | | | | |
| Selection of animals to transport | Milking cattle | Incapacity to milk | Pain | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | | | | | | | | | | | | | | | | |
| Cleanliness of vehicle | Uncleanliness of vehicle and insufficient disinfection | Disease spread, contamination, pa | Disease | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Inadequate planning of the transport | Stationary vehicle due to delay in traffic operation/ferry times, stops etc. | Heat stress, overheating | Thermal comfort | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Inadequate planning of the transport | Stationary vehicle due to delay in traffic operation/ferry times, stops etc. | Heat stress, overheating | Thirst | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Inadequate planning of the transport | Stationary vehicle due to delay in traffic operation/ferry times, stops etc. | Heat stress, overheating | Disease | | | n.a. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Inadequate planning of the transport | Stationary vehicle due to delay in traffic operation/ferry times, stops etc. | Lowering air quality (NH3) | Disease | | | n.a. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Inadequate planning of the transport | Stationary vehicle due to delay in traffic operation/ferry times, stops etc. | Disease spread, contamination, pa | Disease | | | n.a. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Inadequate planning of the transport | Stationary vehicle due to delay in traffic operation/ferry times, stops etc. | Desnutrition, loss of body weight, f | Hunger | | | n.a. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Inadequate planning of the transport | No planning of loading/unloading schedule | Heat stress, overheating | Thermal comfort | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Inadequate planning of the transport | Inappropriate plans for emergency (catering/killing) | Severe wounds, fractures | Injury | | | n.a. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Inadequate planning of the transport | Inappropriate plans for emergency (catering/killing) | Severe wounds, fractures | Disease | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Inadequate planning of the transport | Inadequate planning of the route (road conditions, traffic, stop+go, climate, duration) | Problems maintaining balance, str | Ease of movement | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Inadequate planning of the transport | Inadequate planning of the route (road conditions, traffic, stop+go, climate, duration) | Problems maintaining balance, str | Disease | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| LOADING | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| a.) Handling | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Handlers | Inappropriate handling (hitting, lack of motivation, shouting, inappropriate use of driving to | Bruising, wounds | Injuries | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Handlers | Inappropriate handling (hitting, lack of motivation, shouting, inappropriate use of driving to | Escape attempts, balking | Human-animal relationship | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Handlers | Inappropriate handling (hitting, lack of motivation, shouting, inappropriate use of driving to | Escape attempts, balking | Fear | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Handlers | Inappropriate use of driving tools (prods, electric goads, sticks) | Bruising, wounds | Injuries | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Handlers | Inappropriate use of driving tools (prods, electric goads, sticks) | Bruising, wounds | Pain | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Handlers | Too short loading time according to animals | Fatigue | Ease of movement | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Handlers | Too short loading time according to animals | Stress | Fear | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Handlers | Number of animals in the moving group too high | Balking | Human-animal relationship | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Handlers | Incorrect tethering | Falling, bruising, wounds | Injuries | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Composition of groups | Mixing unfamiliar animals | Aggression, bruising, wounds | Injuries | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Composition of groups | Mixing unfamiliar animals | Social stress | Fear | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Composition of groups | Mixing unfamiliar animals | Spreading of diseases | Disease | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Composition of groups | Separating familiar animals | Social stress | Fear | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Composition of groups | Mixing of animals of different size/age (10% differences) | Aggression, bruising, wounds | Injuries | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Composition of groups | Mixing of animals of different size/age (10% differences) | Social stress | Fear | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Composition of groups | Mixing horned/ unhorned animals | Bruising, wounds | Injuries | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Composition of groups | Mixing horned/ unhorned animals | Aggression | Social behaviour | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Table 1. Hazards related to transport of cattle (cont.)

| HAZARD | Hazard description | Adverse effect description | Adverse effect type | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | | | |
|--|--|--|------------------------|---------|------|------|------|------|------|------|-----|------|-------------|------|------|------|-----|-----|-----|-----|-----|------|------|------|------|-----|-----|--------|-----|-----|-----|-----|-----|-----|------|--|--|
| | | | | Heifers | | | | | | | | | Beef Cattle | | | | | | | | | Cows | | | | | | Calves | | | | | | | | | |
| | | | | RSA | RSB | RSN | RLA | RLB | RLN | SLA | SLN | PL | RSA | RSB | RSN | RLA | RLB | RLN | SLA | SLB | SLN | RSA | RSB | RSN | RLA | RLB | RLN | RSA | RSB | RSN | RLA | RLB | RLN | PLA | | | |
| TRANSPORT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Vehicle design | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| a.) Bedding | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Inadequate Quality of bedding material | Type of bedding according to climate | Heat stress, cold stress | Thermal comfort | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Inadequate Quality of bedding material | Type of bedding according to climate | Heat stress, cold stress | Disease | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Inadequate Quality of bedding material | Type of bedding, high level of wetness, high level of dirt/dust | Dyspnoeic, panting for air | Disease | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Quantity of bedding material | Availability | Restless, fatigue | Comfort around resting | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Feeding and watering | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| a.) Feeding | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Inadequate feed quality | Hazardous to health, less energie content, acceptability, nutrition not adjusted to demand | Desnutrition, loss of body weight, f | Hunger | n.a. | n.a. | n.a. | | | | | | | n.a. | n.a. | n.a. | | | | | | | | n.a. | n.a. | n.a. | | | | | | | | | | | | |
| Inadequate feed quantity | Less feed according to number of animal, inadequate energie content | Desnutrition, loss of body weight, f | Hunger | n.a. | n.a. | n.a. | | | | | | | n.a. | n.a. | n.a. | | | | | | | | n.a. | n.a. | n.a. | | | | | | | | | | | | |
| Inadequate feed quantity | Less feed according to number of animal, inadequate energie content | Fatigue | Ease of movement | n.a. | n.a. | n.a. | | | | | | n.a. | n.a. | n.a. | n.a. | | | | | | | | n.a. | n.a. | n.a. | | | | | | | | | | | | |
| Inadequate feed quantity | Less feed according to number of animal, inadequate energie content | Aggression | Social behaviour | n.a. | n.a. | n.a. | | | | | | n.a. | n.a. | n.a. | n.a. | | | | | | | | n.a. | n.a. | n.a. | | | | | | | | | | | | |
| Inadequate feed quantity | Less feed according to number of animal, inadequate energie content | Aggression | Injuries | n.a. | n.a. | n.a. | | | | | | n.a. | n.a. | n.a. | n.a. | | | | | | | | n.a. | n.a. | n.a. | | | | | | | | | | | | |
| Inadequate Feeding intervall | >8 h duration, intervall of application of feed according animal needs | Desnutrition, loss of body weight, f | Hunger | n.a. | n.a. | n.a. | | | | | | | n.a. | n.a. | n.a. | | | | | | | | n.a. | n.a. | n.a. | | | | | | | | | | | | |
| Inadequate Duration of feeding | <3 h duration, less feed intake because of short feeding duration | Desnutrition, loss of body weight, f | Hunger | n.a. | n.a. | n.a. | | | | | | | n.a. | n.a. | n.a. | n.a. | | | | | | | n.a. | n.a. | n.a. | | | | | | | | | | | | |
| Inadequate Duration of feeding | <3 h duration, less feed intake because of short feeding duration | Aggression | Injuries | n.a. | n.a. | n.a. | | | | | | | n.a. | n.a. | n.a. | n.a. | | | | | | | n.a. | n.a. | n.a. | | | | | | | | | | | | |
| b.) Watering | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Water supply | > 4h period between water applications | Dehydration, vocalising, restless | Thirst | | n.a. | | | | | | | | | | | | | | | | | | n.a. | | | | | | | | | | | | | | |
| Lack of training to use the drinking facilities | Different drinking facilities as in husbandry system | Dehydration | Thirst | | n.a. | | | | | | | | | | | | | | | | | | n.a. | | | | | | | | | | | | | | |
| Lack of training to use the drinking facilities | Different drinking facilities as in husbandry system | Heatstress, overheating | Thermal comfort | | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | | | | | | | | | | | | | n.a. | n.a. | n.a. | | | | | | | | | | | | |
| Inadequate water quality | Unfamiliar taste/Different tasting water | Dehydration | Thirst | | n.a. | | | | | | | | | | | | | | | | | | n.a. | | | | | | | | | | | | | | |
| Inadequate water quality | Unfamiliar taste/Different tasting water | Heatstress, overheating | Thermal comfort | | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | | | | | | | | | | | | | n.a. | n.a. | n.a. | | | | | | | | | | | | |
| Floor allowance, resting periods and driving skills | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| a.) Stocking density | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Inadequate Stocking density according to animal size | >1.6 m2 stocking density (500 kg BW) | Aggression, bruising, wounds | Injuries | | | | | | | | | | n.a. | | | | | | | | | | | | | | | | | | | | | | | | |
| Inadequate Stocking density according to animal size | >1.6 m2 stocking density (500 kg BW) | Aggression | Comfort around resting | | | | | | | | | | n.a. | | | | | | | | | | | | | | | | | | | | | | | | |
| Inadequate Stocking density according to animal size | >1.6 m2 stocking density (500 kg BW) | Aggression | Thermal comfort | | | | | | | | | | n.a. | | | | | | | | | | | | | | | | | | | | | | | | |
| Inadequate Stocking density according to animal size | >1.6 m2 stocking density (500 kg BW) | Lack of possibility to lie down/ to gr | Comfort around resting | | | | | | | | | | n.a. | | | | | | | | | | | | | | | | | | | | | | | | |
| Inadequate Stocking density according to animal size | >1.6 m2 stocking density (500 kg BW) | Lack of possibility to lie down / star | Fear / Fatigue | | | | | | | | | | n.a. | | | | | | | | | | | | | | | | | | | | | | | | |
| Inadequate Stocking density according to animal size | >1.6 m2 stocking density (500 kg BW) | Lack of possibility to feed | Hunger | n.a. | n.a. | n.a. | | | | | | | n.a. | n.a. | n.a. | n.a. | | | | | | | | | | | | | | | | | | | | | |
| Inadequate Stocking density according to animal size | >1.6 m2 stocking density (500 kg BW) | Lack of possibility to drink | Thirst | | n.a. | n.a. | | | | | | | n.a. | n.a. | n.a. | | | | | | | | | | | | | | | | | | | | | | |
| b.) Resting periods | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Multiple loading during the same trip | Mixing animals, multiple loading procedure | Aggression, bruising, wounds | Injuries | | | | | | | | | n.a. | n.a. | n.a. | | | | | | | | n.a. | n.a. | n.a. | | | | | | | | | | | n.a. | | |
| Multiple loading during the same trip | Mixing animals, multiple loading procedure | Fatigue, physical stress | Comfort around resting | | | | | | | | | n.a. | n.a. | n.a. | | | | | | | | n.a. | n.a. | n.a. | | | | | | | | | | | n.a. | | |
| Multiple loading during the same trip | Mixing animals, multiple loading procedure | Social stress | Fear | | | | | | | | | n.a. | n.a. | n.a. | | | | | | | | n.a. | n.a. | n.a. | | | | | | | | | | | n.a. | | |
| Multiple loading during the same trip | Mixing animals, multiple loading procedure | Spread disease | Disease | | | | | | | | | n.a. | n.a. | n.a. | | | | | | | | n.a. | n.a. | n.a. | | | | | | | | | | | n.a. | | |
| Inadequate resting time | <12 h | Inappropriate recovering from trans | Comfort around resting | n.a. | n.a. | n.a. | | | | | | n.a. | n.a. | n.a. | n.a. | n.a. | | | | | | n.a. | n.a. | n.a. | | | | | | | | | | | n.a. | | |
| Inadequate resting time | <12 h | Lack of possibility to feed | Hunger | n.a. | n.a. | n.a. | | | | | | n.a. | n.a. | n.a. | n.a. | n.a. | | | | | | n.a. | n.a. | n.a. | | | | | | | | | | | n.a. | | |
| Inadequate resting time | <12 h | Lack of possibility to drink | Thirst | n.a. | n.a. | n.a. | | | | | | n.a. | n.a. | n.a. | n.a. | n.a. | | | | | | n.a. | n.a. | n.a. | | | | | | | | | | | n.a. | | |
| Resting station | Stocking density too high | Aggression, bruising, wounds | Injuries | n.a. | n.a. | n.a. | | | | | | n.a. | n.a. | n.a. | n.a. | n.a. | | | | | | n.a. | n.a. | n.a. | | | | | | | | | | | n.a. | | |
| Resting station | Stocking density too high | Lack of possibility to lie down/ to gr | Comfort around resting | n.a. | n.a. | n.a. | | | | | | n.a. | n.a. | n.a. | n.a. | n.a. | | | | | | n.a. | n.a. | n.a. | | | | | | | | | | | n.a. | | |
| Resting station | Inadequate feed quality | Desnutrition, loss of body weight, f | Hunger | n.a. | n.a. | n.a. | | | | | | n.a. | n.a. | n.a. | n.a. | n.a. | | | | | | n.a. | n.a. | n.a. | | | | | | | | | | | n.a. | | |
| Resting station | Inadequate feed quantity | Desnutrition, loss of body weight, f | Hunger | n.a. | n.a. | n.a. | | | | | | n.a. | n.a. | n.a. | n.a. | n.a. | | | | | | n.a. | n.a. | n.a. | | | | | | | | | | | n.a. | | |
| Resting station | Inadequate feed quantity | Fatigue | Ease of movement | n.a. | n.a. | n.a. | | | | | | n.a. | n.a. | n.a. | n.a. | n.a. | | | | | | n.a. | n.a. | n.a. | | | | | | | | | | | n.a. | | |
| Resting station | Mixing animals | Aggression | Social behaviour | n.a. | n.a. | n.a. | | | | | | n.a. | n.a. | n.a. | n.a. | n.a. | | | | | | n.a. | n.a. | n.a. | | | | | | | | | | | n.a. | | |
| Resting station | Mixing animals | Aggression | Injuries | n.a. | n.a. | n.a. | | | | | | n.a. | n.a. | n.a. | n.a. | n.a. | | | | | | n.a. | n.a. | n.a. | | | | | | | | | | | n.a. | | |
| c.) driving skills | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Driver | Rough driving, bad driving technique, swaying of vehicle | Problems maintaining balance, fall | Injuries | | | | | | | | | n.a. | n.a. | n.a. | | | | | | | | n.a. | n.a. | n.a. | | | | | | | | | | | n.a. | | |
| Driver | Rough driving, bad driving technique, swaying of vehicle | Physical stress | Ease of movement | | | | | | | | | n.a. | n.a. | n.a. | | | | | | | | n.a. | n.a. | n.a. | | | | | | | | | | | n.a. | | |
| Driver | Rough driving, bad driving technique, swaying of vehicle | Physical stress | Comfort around resting | | | | | | | | | n.a. | n.a. | n.a. | | | | | | | | n.a. | n.a. | n.a. | | | | | | | | | | | n.a. | | |
| Driver | Lack of monitoring during transport, lack of education/competence, untrained handlers, la | No feeding during transport | Hunger | n.a. | n.a. | n.a. | | | | | | | n.a. | n.a. | | | | | | | | | | | | | | | | | | | | | | | |
| Driver | Lack of monitoring during transport, lack of education/competence, untrained handlers, la | Dehydration, heatstress | Thirst | | n.a. | n.a. | | | | | | | | n.a. | | | | | | | | | | | | | | | | | | | | | | | |
| Driver | Lack of monitoring during transport, lack of education/competence, untrained handlers, la | Dehydration, heatstress, coldstress | Thermal discomfort | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Table 1. Hazards related to transport of cattle (cont.)

| Scenarios | Animal categories | Species | Means of transport | Transport duration | Thermal environment |
|-----------|-------------------|---------|--------------------|--------------------|---------------------|
| 1 | fish | salmon | road | short | above |
| 2 | fish | salmon | road | short | below |
| 3 | fish | salmon | road | short | neutral |
| 4 | fish | trouts | road | short | above |
| 5 | fish | trouts | road | short | below |
| 6 | fish | trouts | road | short | neutral |
| 7 | fish | eels | road | short | above |
| 8 | fish | eels | road | short | below |
| 9 | fish | eels | road | short | neutral |
| 10 | fish | catfish | road | short | above |
| 11 | fish | catfish | road | short | below |
| 12 | fish | catfish | road | short | neutral |
| 13 | fish | carps | road | short | above |
| 14 | fish | carps | road | short | below |
| 15 | fish | carps | road | short | neutral |

Figure 2. Different transport scenarios in fish

| HAZARD | Hazard description | Adverse effect description | Adverse effect type | 1 | 2 | 3 | | | | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
|---|--|--|---------------------|--------|-----|-----|-----|-----|-----|-------|-----|-----|------|-----|-----|---------|-----|-----|-------|-----|-----|
| | | | | salmon | | | | | | trout | | | eels | | | catfish | | | carps | | |
| | | | | RSA | RSB | RSN | ASA | ASB | ASN | SSA | RSA | RSB | RSN | RSA | RSB | RSN | RSA | RSB | RSN | RSA | RSB |
| FACILITIES and STRUCTURES | | | | | | | | | | | | | | | | | | | | | |
| LOADING/UNLOADING | | | | | | | | | | | | | | | | | | | | | |
| road road road air air air sea | | | | | | | | | | | | | | | | | | | | | |
| short short short short short short short | | | | | | | | | | | | | | | | | | | | | |
| above below neutral above below neutral above | | | | | | | | | | | | | | | | | | | | | |
| a.) Installations | | | | | | | | | | | | | | | | | | | | | |
| Inadequate pumping sytem | Aspiration pressure above | Skin, heath, eyes and fin lesions | Injuries | | | | | | | | n.a | | | | | | | | | | |
| Inadequate pumping sytem | Aspiration pressure below | Bruising, wounds, trapped animal | Injuries | | | | | | | | n.a | | | | | | | | | | |
| Inadequate pumping sytem | Pipe section below the average size | Skin lesion, wounds | Injuries | | | | | | | | n.a | | | | | | | | | | |
| Inadequate water flow speed | | Skin, heath, eyes and fin lesions | Injuries | | | | | | | | n.a | | | | | | | | | | |
| b.) access hole | | | | | | | | | | | | | | | | | | | | | |
| Inadequate hole design | Sharp edges | Bruising, skin and fin lesions, wounds | Injuries | | | | | | | | n.a | | | | | | | | | | |
| Insufficient width | Pipe section below the average size | Trapped animal, skin lesions | Injuries | | | | | | | | n.a | | | | | | | | | | |
| TRANSPORT | | | | | | | | | | | | | | | | | | | | | |
| Vehicle design | | | | | | | | | | | | | | | | | | | | | |
| a.) Container design | | | | | | | | | | | | | | | | | | | | | |
| Inappropriate container design | Sharp protrusion, sharp edges | Skin lesions, wounds | Injuries | | | | | | | | | | | | | | | | | | |
| Inappropriate container design | Inadequate inspection facilities | Rising T°, hypoxia, toxicity | Disease | | | | | | | | | | | | | | | | | | |
| b.) Vehicle mantainance | | | | | | | | | | | | | | | | | | | | | |
| Poor suspension | Excess of vibrations | Balance stress (lateral line) | Ease of movement | | | | n.a | n.a | n.a | n.a | | | | | | | | | | | |
| Excessive pression in tyres of the vehicle | Excess of vibrations | Balance stress (lateral line) | Ease of movement | | | | n.a | n.a | n.a | n.a | | | | | | | | | | | |
| Vehicle in bad condition | Excess of vibrations | Balance stress (lateral line) | Ease of movement | | | | n.a | n.a | n.a | n.a | | | | | | | | | | | |
| Microclimate during transport | | | | | | | | | | | | | | | | | | | | | |
| a.) water temperature | | | | | | | | | | | | | | | | | | | | | |
| Inadequate water temperature | Lack of a temperature monitoring system | Rising T° | Thermal comfort | n.a | | n.a | n.a | n.a | n.a | n.a | n.a | n.a | n.a | n.a | n.a | n.a | n.a | n.a | n.a | n.a | n.a |
| Inadequate water temperature | Failure of cooling system | Rising T° | Thermal comfort | n.a | | n.a | n.a | n.a | n.a | n.a | n.a | n.a | n.a | n.a | n.a | n.a | n.a | n.a | n.a | n.a | n.a |
| Inadequate water temperature | Temperature above maximum (according to categorie) | Rising T° | Thermal comfort | | n.a | n.a | | n.a | n.a | n.a | | n.a | n.a | | n.a | n.a | | n.a | n.a | | n.a |
| Inadequate water temperature | Temperature below minimum (according to categorie) | Fallen T° | Thermal comfort | n.a | | n.a | n.a | | n.a | n.a | n.a | n.a | n.a | | n.a | n.a | | n.a | n.a | | n.a |
| Inadequate water temperature | Sudden change of T° | | Thermal comfort | | | n.a | | | n.a | n.a | | n.a | n.a | | n.a | n.a | | n.a | n.a | | n.a |
| b.) water quality | | | | | | | | | | | | | | | | | | | | | |
| Oxygen level of water too high (according to categorie) | Failure in the oxigen delivery system | Hypoxia, unconsciousness, death | Disease | | | | | | | | n.a | | | | | | | | | | |
| Oxygen level of water too high (according to categorie) | Lack of a oxygen level monitoring system | Hypoxia, unconsciousness, death | Disease | | | | | | | | n.a | | | | | | | | | | |
| Oxygen level of water too high (according to categorie) | Super saturation | Gas bubble disease | Disease | | | | | | | | n.a | | | | | | | | | | |
| CO2 level of water too high (according to categorie) | Decrease in gas exchange | Hypoxia, foam from fish mucos | Disease | | | | | | | | n.a | | | | | | | | | | |
| Saturation of water | Super saturation | Gas bubble disease | Disease | | | | | | | | n.a | | | | | | | | | | |
| NH3 level of water too high | Higher than maximum mg/l (according to categorie) | Acute toxicity | Disease | | | | | | | | n.a | | | | | | | | | | |
| Nitrite level of water too high | Higher than maximum mg/l (according to categorie) | Acute toxicity | Disease | | | | | | | | n.a | | | | | | | | | | |
| Aluminium contamination of water | pH reduction | Acute toxicity | Disease | | | | | | | | n.a | | | | | | | | | | |
| Other metals contamination of water | | Chronic toxicity | Disease | | | | | | | | n.a | | | | | | | | | | |
| Inadequate water exchange | Raccomanded minimum /min/kg biomass (according to categorie) | Acute toxicity | Disease | | | | | | | | n.a | | | | | | | | | | |
| Inadequate areation system | Not sufficient | Acute toxicity | Disease | | | | | | | | n.a | | | | | | | | | | |

Table 2. Hazards related to transport of fish

| HAZARD | Hazard description | Adverse effect description | Adverse effect type | 1 | 2 | 3 | salmon | | | trout | | | eels | | | catfish | | |
|--|---|---|---------------------|-----|-----|-----|--------|------|------|-------|-----|-----|------|-----|-----|---------|-----|-----|
| | | | | RSA | RSB | RSN | ASA | ASB | ASN | SSA | RSA | RSB | RSN | RSA | RSB | RSN | RSA | RSB |
| MANAGEMENT | | | | | | | | | | | | | | | | | | |
| HANDLING | | | | | | | | | | | | | | | | | | |
| Lack of previous interaction with humans | Animals inappropriate reactions to handling procedures | Aversion | Fear | | | | | | | | | | | | | | | |
| Untrained personal | Rough handling | Bruising, skin and fin lesions, wounds | Injuries | | | | | | | | | | | | | | | |
| Untrained personal | Crowding | Intra specific aggression, fin lesion | Injuries | | | | | | | | | | | | | | | |
| PREPARATION FOR TRANSPORT | | | | | | | | | | | | | | | | | | |
| a.) Preparation | | | | | | | | | | | | | | | | | | |
| Inadequate cleaning and disinfection of transport vehicles | Transport vehicles contaminated with pathogen agents or contaminants | Spread of disease | Disease | | | | | | | n.a. | | | | | | | | |
| Inappropriate selection of animals to transport | Poor fitness, poor health status prior to transport | Spread of disease | Disease | | | | | | | | | | | | | | | |
| b.) Inappropriate fasting | | | | | | | | | | | | | | | | | | |
| Inappropriate fasting | Fasting too short (according to categorie) | Rising toxic catabolites | Disease | | | | | | | n.a. | | | | | | | | |
| Inappropriate fasting | Fasting period too long (according to categorie) | Hunger, intra specific aggression | Hunger | | | | | | | n.a. | | | | | | | | |
| c.) Inappropriate planning of the transport | | | | | | | | | | | | | | | | | | |
| Inappropriate planning of the transport | Selection of a inadequate vehicle for the transport conditions | Thermal comfort, lack of a oxygen level monitoring system, rising toxic catabolites | Disease | | | | | | | n.a. | | | | | | | | |
| Inappropriate planning of the transport | Stationary vehicle due to delay in traffic operation/ferry times | Thermal comfort, lack of a oxygen level monitoring system, rising toxic catabolites | Disease | | | | n.a. | n.a. | n.a. | n.a. | | | | | | | | |
| Inappropriate planning of the transport | Stops for inspection/BIP's/Customs | Thermal comfort, lack of a oxygen level monitoring system, rising toxic catabolites | Disease | | | | n.a. | n.a. | n.a. | n.a. | | | | | | | | |
| Inappropriate planning of the transport | Inappropriate planning of loading/unloading hour | Thermal comfort, lack of a oxygen level monitoring system, rising toxic catabolites | Disease | | | | n.a. | n.a. | n.a. | n.a. | | | | | | | | |
| Inappropriate planning of the transport | Inappropriate emergency plan | Thermal comfort, lack of a oxygen level monitoring system, rising toxic catabolites | Disease | | | | | | | n.a. | | | | | | | | |
| Inappropriate planning of the transport | Inadequate planning of the route (road conditions, climate, duration) | Thermal comfort, lack of a oxygen level monitoring system, rising toxic catabolites | Disease | | | | | | | n.a. | | | | | | | | |
| Inappropriate planning of the transport | Delay for the animals to be unloaded | Thermal comfort, lack of a oxygen level monitoring system, rising toxic catabolites | Disease | | | | n.a. | n.a. | n.a. | n.a. | | | | | | | | |
| LOADING | | | | | | | | | | | | | | | | | | |
| Inappropriate handling | Unproperly operated pumps and pips (too high water pressure) | Skin lesions, fatigue, muscular stress | Injuries | | | | | | | n.a. | | | | | | | | |
| Inappropriate handling | Unproperly operated nets (too crowded) | Skin lesions, fatigue, muscular stress | Injuries | | | | | | | | | | | | | | | |
| Inappropriate composition of groups | Mixing unfamiliar animals | Intra specific aggression, fin lesion | Injuries | | | | | | | | | | | | | | | |
| Inappropriate composition of groups | Mixing animals of different incompatible sizes and species | Intra specific aggression, fin lesion | Injuries | | | | | | | | | | | | | | | |
| TRANSPORT | | | | | | | | | | | | | | | | | | |
| a.) Stocking density | | | | | | | | | | | | | | | | | | |
| Stocking density | > max stocking density | lesion, rising toxic catabolites | Injuries | | | | | | | | | | | | | | | |
| b.) Handling methods and driving | | | | | | | | | | | | | | | | | | |
| Driver | Rough driving, bad driving technique | Balance stress (lateral line) | Ease of movement | | | | n.a. | n.a. | n.a. | n.a. | | | | | | | | |
| Driver | Swaying of vehicle | Balance stress (lateral line) | Ease of movement | | | | n.a. | n.a. | n.a. | n.a. | | | | | | | | |
| Driver | Lack of monitoring during transport | Balance stress (lateral line) | Ease of movement | | | | n.a. | n.a. | n.a. | n.a. | | | | | | | | |
| Driver | Lack of education/competence | Thermal comfort, lack of a oxygen level monitoring system, rising toxic catabolites | Disease | | | | n.a. | n.a. | n.a. | n.a. | | | | | | | | |
| Driver | Lack of motivation | Thermal comfort, lack of a oxygen level monitoring system, rising toxic catabolites | Disease | | | | n.a. | n.a. | n.a. | n.a. | | | | | | | | |
| Driver | Disregarding temperature measurement | Thermal comfort, lack of a oxygen level monitoring system, rising toxic catabolites | Disease | | | | n.a. | n.a. | n.a. | n.a. | | | | | | | | |
| UNLOADING | | | | | | | | | | | | | | | | | | |
| Inappropriate handling | Unproperly operated pumps and pips (too high water pressure) | skin lesions, fatigue, muscular stress | Injuries | | | | | | | n.a. | | | | | | | | |
| Inappropriate handling | Unproperly operated nets (too crowded) | skin lesions, fatigue, muscular stress | Injuries | | | | | | | n.a. | | | | | | | | |

Table 2. Hazards related to transport of fish (cont.)

| Scenarios | Species | Animal categories | Means of transport | Transport duration | Thermal environment |
|-----------|---------|-------------------|--------------------|--------------------|---------------------|
| 1 | equine | broken | road | short | above |
| 2 | equine | broken | road | short | below |
| 3 | equine | broken | road | short | neutral |
| 4 | equine | broken | road | long | above |
| 5 | equine | broken | road | long | below |
| 6 | equine | broken | road | long | neutral |
| 7 | equine | broken | sea | long | above |
| 8 | equine | broken | sea | long | below |
| 9 | equine | broken | sea | long | neutral |
| 10 | equine | unbroken | road | short | above |
| 11 | equine | unbroken | road | short | below |
| 12 | equine | unbroken | road | short | neutral |
| 13 | equine | unbroken | road | long | above |
| 14 | equine | unbroken | road | long | below |
| 15 | equine | unbroken | road | long | neutral |
| 16 | equine | unbroken | sea | long | above |
| 17 | equine | unbroken | sea | long | below |
| 18 | equine | unbroken | sea | long | neutral |
| 19 | equine | mares with foals | road | short | above |
| 20 | equine | mares with foals | road | short | below |
| 21 | equine | mares with foals | road | short | neutral |
| 22 | equine | stallions | road | short | above |
| 23 | equine | stallions | road | short | below |
| 24 | equine | stallions | road | short | neutral |
| 25 | equine | stallions | road | long | above |
| 26 | equine | stallions | road | long | below |
| 27 | equine | stallions | road | long | neutral |
| 28 | equine | stallions | sea | long | above |
| 29 | equine | stallions | sea | long | below |
| 30 | equine | stallions | sea | long | neutral |

Figure 3. Different transport scenarios in horses

| HAZARD | Hazard description | Adverse effect description | Adverse effect type |
|---|--|--|---------------------------|
| FACILITIES and STRUCTURES | | | |
| LOADING / UNLOADING | | | |
| a.) Driveway | | | |
| Inadequate driveway design | < minimum width (according to category) | Bruising, wounds | Injuries |
| Inadequate driveway design | < minimum width (according to category) | Balking | Human-animal relationship |
| Inadequate driveway design | Continuity of race (dead ends) | difficult movement, balking | Human-animal relationship |
| Inadequate structure of driveway sides | Sharp protrusions, sharp angles, open sides, short sides | Bruising, wounds | Injuries |
| Inadequate floor surface of driveways | Slippery | Bruising, wounds, fractures, ruptures | Injuries |
| Inadequate floor surface of driveways | Slippery | Difficult movement | Ease of movement |
| Inadequate floor surface | Slippery | Reluctant to move | Fear |
| Inadequate floor condition of driveways | Gaps, potholes, steps | Bruising, wounds, fractures | Injuries |
| Inadequate floor condition of driveways | Gaps, potholes, steps | Difficult movement | Ease of movement |
| Steps | > maximum height and/or <minmum tread lenght | Bruising, wounds, fractures | Injuries |
| Steps | > maximum height and/or <minmum tread lenght | Difficult movement | Ease of movement |
| b.) Gates | | | |
| Inadequate gate design | Sharp edges, sharp protrusion, sharp projections | Bruising, wounds | Injuries |
| Inadequate gate design | < minimum width (according to category) | Bruising, wounds | Injuries |
| Inadequate gate design | < minimum width (according to category) | Need of human intervention to move animals | Human-animal relationship |
| c.) Ramp | | | |
| Inadequate ramp design | Too steep up/down (according to category) | Bruising, wounds, fractures | Injuries |
| Inadequate ramp design | Too steep up/down (according to category) | Balking | Fear |
| Inadequate ramp design | Too steep up/down (according to category) | Need of human intervention to move animals | Human-animal relationship |
| Inadequate ramp design | < minimum width (according to category) | Bruising, wounds | Injuries |
| Inadequate ramp design | < minimum width (according to category) | Need of human intervention to move animals | Human-animal relationship |
| Inadequate structure of sides | Sharp protrusion, sharp projections, sharp angles, open sides | Bruising, wounds | Injuries |
| Inadequate structure of sides | <minimum height | Bruising, wounds | Injuries |
| Inadequate floor surface of ramps | Slippery | Bruising, wounds | Injuries |
| Inadequate floor surface of ramps | Slippery | Difficult movement | Ease of movement |
| Inadequate floor surface of ramps | Slippery | Difficult movement | Fear |
| Inadequate floor condition of ramps | Gaps, potholes, steps | Bruising, wounds, fractures | Injuries |
| Inadequate floor condition of ramps | Gaps, potholes, steps | Balking | Fear |
| Inadequate cleat ramps | > maximum inter-cleat distance, missing cleat, inadequate dir | Bruising, wounds, fractures | Injuries |
| Inadequate cleat ramps | > maximum inter-cleat distance, missing cleat, inadequate dir | Difficult movement | Ease of movement |
| Inadequate cleat ramps | > maximum inter-cleat distance, missing cleat, inadequate dir | Difficult movement | Fear |
| Steps between ground and ramp and loading decks | > maximum height (according to category) | Bruising, wounds | Injuries |
| Steps between ground and ramp and loading decks | > maximum height (according to category) | Balking | Fear |
| d.) Container | | | |
| Inadequate container sidewall design | Sharp protrusion, sharp edges, grate (causes trapping extrem | Bruising, wounds, fractures | Injuries |
| Inadequate container sidewall design | < minimum height (according to category) | Bruising, wounds | Injuries |
| Inadequate container sidewall design | Not solid | Bruising, wounds | Injuries |
| Inadequate container sidewall design | Closed at the top (disturbs airflow) | Disturbed Thermoregulation | Thermal comfort |
| Inadequate container roof design | Gaps, holes, protrusions, projections | Bruising, wounds | Injuries |
| e.) Sensory input (Sound Light) | | | |
| Light | Poor lighting, shadows, sudden change of light, glaring light, g | Balking/Disorientation | Fear |
| Noise | Hissing noise | Balking/Disorientation | Fear |
| Smell | Unfamiliar smell | Balking/Disorientation | Fear |
| Drafts | Air blowing to animal | Balking/Disorientation | Fear |
| TRANSPORT | | | |
| Vehicle / Container design | | | |
| a.) Floors | | | |
| Floor surface | Slippery | Bruising, wounds, fractures | Injuries |
| Floor surface | Slippery | Problems maintining balance, struggling, falling | Ease of movement |
| Floor surface | Slippery | Problems maintining balance, struggling, falling | Fear |
| Floor condition | Gaps, potholes, steps, slopings | Bruising, wounds, fractures | Injuries |
| Floor condition | Gaps, potholes, steps, slopings | Difficult movement | Ease of movement |
| Floor condition | Lack of bedding | Cold stress | Thermal discomfort |
| Floor condition | Lack of bedding | Bruising, wounds | Comfort around resting |
| b.) Partitions | | | |
| Unsuitable design | Sharp protrusion, sharp edges, grate (causes trapping extrem | Bruising, wounds, fractures | Injuries |
| Unsuitable design | < minimum height (according to category) | Bruising, wounds | Injuries |
| Unsuitable design | Not solid | Bruising, wounds | Injuries |
| Unsuitable design | Closed at the top (disturbs airflow) | Disturbed Thermoregulation | Thermal comfort |
| Absence of partions | No partitions, open sides between adjacent pens | Bruising, wounds | Injuries |
| Absence of partions | No partitions, open sides between adjacent pens | Aggression | Social behaviour |

Table 3. Hazards related to transport of horses

| HAZARD | Hazard description | Adverse effect description | Adverse effect type |
|--|---|---|------------------------|
| c.) Roof | | | |
| Roof colour | No reflecting bright colour | Heatstress, overheating | Thermal comfort |
| Roof colour | No reflecting bright colour | Heatstress, overheating | Thirst |
| Roof condition | Gaps, holes, protrusions, projections | Soaked animals | Comfort around resting |
| Roof condition | Gaps, holes, protrusions, projections | Soaked animals | Thermal comfort |
| Roof condition | Gaps, holes, protrusions, projections | Bruising, wounds | Injuries |
| Roof condition | Gaps, holes, protrusions, projections | solar radiation | Thermal comfort |
| Unsuitable insulation | Solar gain heat | Heatstress, overheating | Thermal comfort |
| Unsuitable insulation | Solar gain heat | Heatstress, overheating | Thirst |
| Unsuitable insulation | Condence water | Soaked animals | Comfort around resting |
| Unsuitable insulation | Condence water | Soaked animals | Thermal comfort |
| Unsuitable insulation | Condence water/air draught | Soaked animals | Disease |
| d.) Sensory input (Sound Smell Light) | | | |
| Noise | Overall noise | Aversion | Fear |
| Light | Sudden change of light (tunnels), poor lighting, glaring lights | Aversion | Fear |
| Smell | Unfamiliar smell | Aversion | Fear |
| e.) Space allowance/Tier height | | | |
| Deck height | < minimum height above withers (according to category) | Heatstress, overheating | Thermal comfort |
| Deck height | < minimum height above withers (according to category) | Blocked air exchange | Disease |
| Deck height | < minimum height above withers (according to category) | Bruising, wounds | Injuries |
| Deck height | < minimum height above withers (according to category) | Inability to express natural behaviour | Ease of movement |
| f.) Suspension | | | |
| Poor suspension | Vibration, acceleration | Travel sickness | Disease |
| Poor suspension | Vibration, acceleration | Struggling, loss of balance, falling, fatigue, restless | Ease of movement |
| Poor suspension | Vibration, acceleration | Struggling, loss of balance, falling, fatigue, restless | Injuries |
| g.) Inspection possibilities | | | |
| Inspection opening | <min size, < min deck height, inadequate access | Heat stress, cold stress, panting for air, dehydration | Thermal comfort |
| Inspection opening | <min size, < min deck height, inadequate access | Bruising, wounds, fractures | Injuries |
| Feeding and watering | | | |
| a.) Watering | | | |
| Lack of drinking facilities | No supply of water | Dehydration | Thirst |
| Lack of drinking facilities | No supply of water | Heat stress | Thermal comfort |
| Inappropriate drinking facilities | Facilities not adjusted to equine, no open water expanse, < m | Dehydration | Thirst |
| Inappropriate drinking facilities | Facilities not adjusted to equine, no open water expanse, < m | Heat stress | Thermal comfort |
| Quantity of watering cups | Insufficient numbers of watering cups | Dehydration | Thirst |
| Position of drinkers | Inadequate position in the vehicle/pen | Dehydration | Thirst |
| Position of drinkers | Inadequate position in the vehicle/pen | Heat stress | Thermal comfort |
| Non-isolated cups/conduits/tank (cold temperature) | Freezing during cold temperature | Dehydration | Thirst |
| Insufficient tank capacity | Insufficient watering during the trip | Dehydration | Thirst |
| Insufficient tank capacity | Insufficient watering during the trip | Heat stress | Thermal comfort |
| Refilling facilities (adapters) | Impossibility to refill tanks during the trip | Dehydration | Thirst |
| Refilling facilities (adapters) | Impossibility to refill tanks during the trip | Heat stress | Thermal comfort |
| b.) feeding | | | |
| Lack of appropriate feeding devices | No supply of feedstuff | Desnutrition, loss of body weight | Hunger |
| Lack of appropriate feeding devices | No supply of feedstuff | Desnutrition, loss of body weight | Social behaviour |
| Lack of feeding stuff storage | No supply of feedstuff | Desnutrition, loss of body weight | Hunger |
| Lack of feeding stuff storage | No supply of feedstuff | Desnutrition, loss of body weight | Social behaviour |
| Inappropriate position of storage | Contamination of feed stuff | Low/no appetite | Hunger |
| Inappropriate position of storage | Contamination of feed stuff | Low/no appetite | Social behaviour |

Table 3. Hazards related to transport of horses (cont.)

| HAZARD | Hazard description | Adverse effect description | Adverse effect type |
|---|--|--|---------------------------|
| Microclimate throughout transportation | | | |
| Ventilation | | | |
| Inadequate natural ventilation | < min air exchange/distribution (rising T°, rising humidity, low | Heat stress, dyspnoeic, panting for air | Disease |
| Inadequate natural ventilation | < min air exchange/distribution (rising T°, rising humidity, low | Heat stress | Thermal comfort |
| Inadequate natural ventilation | < min air exchange/distribution (rising T°, rising humidity, low | Heat stress | Thirst |
| Inadequate natural ventilation | < min air exchange/distribution (rising T°, rising humidity, low | Heat stress | Comfort around resting |
| Inadequate natural ventilation | > max air exchange/distribution (draught, decreasing T°, <low | cold stress | Disease |
| Inadequate natural ventilation | > max air exchange/distribution (draught, decreasing T°, <low | cold stress | Thermal comfort |
| Inadequate natural ventilation | > max air exchange/distribution (draught, decreasing T°, <low | cold stress | Comfort around resting |
| Inadequate forced ventilation | Lack of forced ventilation | Heat stress | Thirst |
| Inadequate forced ventilation | Lack of forced ventilation | Heat stress | Thermal comfort |
| Inadequate forced ventilation | Lack of forced ventilation | Heat stress | Disease |
| Inadequate forced ventilation | Lack of forced ventilation | Heat stress | Comfort around resting |
| Inadequate forced ventilation | Lack of sensors of T. and humidity in animal compartment | Heat stress | Thirst |
| Inadequate forced ventilation | Lack of sensors of T. and humidity in animal compartment | Heat stress | Thermal comfort |
| Inadequate forced ventilation | Lack of sensors of T. and humidity in animal compartment | Heat stress | Disease |
| Inadequate forced ventilation | Lack of sensors of T. and humidity in animal compartment | Heat stress | Comfort around resting |
| Inadequate forced ventilation | Lack of sensors of T. and humidity in animal compartment | Cold stress | Disease |
| Inadequate forced ventilation | Lack of sensors of T. and humidity in animal compartment | Cold stress | Thermal comfort |
| Inadequate forced ventilation | Lack of alert system in the driver compartment | Heat stress | Disease |
| Inadequate forced ventilation | Lack of alert system in the driver compartment | Heat stress | Comfort around resting |
| Inadequate forced ventilation | Lack of alert system in the driver compartment | Heat stress | Thirst |
| Inadequate forced ventilation | Lack of alert system in the driver compartment | Heat stress | Thermal comfort |
| Inadequate forced ventilation | Lack of alert system in the driver compartment | Cold stress | Disease |
| Inadequate forced ventilation | Lack of alert system in the driver compartment | Cold stress | Thermal comfort |
| Inadequate forced ventilation | Ventilation apertures distribution (inappropriate air distribution | Heat stress | Disease |
| Inadequate forced ventilation | Ventilation apertures distribution (inappropriate air distribution | Heat stress | Comfort around resting |
| Inadequate forced ventilation | Ventilation apertures distribution (inappropriate air distribution | Heat stress | Thirst |
| Inadequate forced ventilation | Ventilation apertures distribution (inappropriate air distribution | Heat stress | Thermal comfort |
| Inadequate forced ventilation | Ventilation apertures distribution (inappropriate air distribution | Cold stress/draught | Disease |
| Inadequate forced ventilation | Ventilation apertures distribution (inappropriate air distribution | Cold stress/draught | Thermal comfort |
| MANAGEMENT | | | |
| PREPARATION TO THE TRANSPORT | | | |
| a.) Fasting | | | |
| Fasting duration | > maximum fasting duration | Desnutrition, loss of body weight | Hunger |
| Fasting duration | > maximum fasting duration | Aggression | Injuries |
| Fasting duration | > maximum fasting duration | Aggression | Social behaviour |
| b.) Feeding | | | |
| Feed quality | No adaption to feed stuff during transport | Desnutrition, loss of body weight | Hunger |
| Feed quality | No adaption to feed stuff during transport | Desnutrition, loss of body weight | Social behaviour |
| c.) Watering | | | |
| Water withdrawal | Lack of water up until loading | Dehydration | Thirst |
| Water withdrawal | Lack of water up until loading | Heatstress, overheating | Thermal comfort |
| d.) Management | | | |
| Lack of previous human contact | Inappropriate previous positive contacts with humans | Scape attempt | Human-animal relationship |
| Lack of previous human contact | Inappropriate previous positive contacts with humans | Scape attempt | Injuries |
| Lack of previous human contact | Inappropriate previous positive contacts with humans | Fear | Fear |
| Selection of animals to transport | Poor fitness, poor health status prior to transport | Incapacity of animals to travel | Injuries |
| Selection of animals to transport | Poor fitness, poor health status prior to transport | Incapacity of animals to travel | Disease |
| Selection of animals to transport | Late state of pregnancy | Incapacity of animals to travel | Disease |
| Cleanliness of vehicle | Uncleanliness of vehicle and insufficient disinfection | Disease spread, contamination, pathogens | Disease |
| Inadequate planning of the transport | Stationary vehicle due to delay in traffic operation/ferry times, | Heat stress, overheating | Thermal comfort |
| Inadequate planning of the transport | Stationary vehicle due to delay in traffic operation/ferry times, | Heat stress, overheating | Thirst |
| Inadequate planning of the transport | Stationary vehicle due to delay in traffic operation/ferry times, | Heat stress, overheating | Disease |
| Inadequate planning of the transport | Stationary vehicle due to delay in traffic operation/ferry times, | Lowering air quality (NH3) | Disease |
| Inadequate planning of the transport | Stationary vehicle due to delay in traffic operation/ferry times, | Disease spread, contamination, pathogens | Disease |
| Inadequate planning of the transport | Stationary vehicle due to delay in traffic operation/ferry times, | Desnutrition, loss of body weight, foraging, restless, vocalis | Hunger |
| Inadequate planning of the transport | No planning of loading/unloading schedule | Heat stress, overheating | Thermal comfort |
| Inadequate planning of the transport | Inappropriate plans for emergency (catering/killing) | Severe wounds, fractures | Injury |
| Inadequate planning of the transport | Inappropriate plans for emergency (catering/killing) | Severe wounds, fractures | Disease |
| Inadequate planning of the transport | Inadequate planning of the route (road conditions, traffic, stop | Problems maintaining balance, struggling, restless | Ease of movement |
| Inadequate planning of the transport | Inadequate planning of the route (road conditions, traffic, stop | Problems maintaining balance, struggling, restless | Disease |

Table 2. Hazards related to transport of horses (cont.)

| HAZARD | Hazard description | Adverse effect description | Adverse effect type |
|--|--|--|---------------------------|
| LOADING | | | |
| a.) Handling | | | |
| Handlers | Inappropriate handling (hitting, lack of motivation, shouting) | Bruising, wounds | Injuries |
| Handlers | Inappropriate handling (hitting, lack of motivation, shouting) | Escape attempts, balking | Human-animal relationship |
| Handlers | Inappropriate handling (hitting, lack of motivation, shouting) | Escape attempts, balking | Fear |
| Handlers | Too short loading time according to animals | Fatigue | Ease of movement |
| Handlers | Too short loading time according to animals | Stress | Fear |
| Handlers | Number of animals in the moving group too high | Balking | Human-animal relationship |
| Handlers | Incorrect tethering | Falling, bruising, wounds | Injuries |
| Composition of groups | Mixing unfamiliar animals | Agression, bruising, wounds | Injuries |
| Composition of groups | Mixing unfamiliar animals | Social stress | Fear |
| Composition of groups | Mixing unfamiliar animals | Spreading of diseases | Disease |
| Composition of groups | Separating familiar animals | Social stress | Fear |
| Composition of groups | Mixing of animals of different size/age (10% differences) | Agression, bruising, wounds | Injuries |
| Composition of groups | Mixing of animals of different size/age (10% differences) | Social stress | Fear |
| TRANSPORT | | | |
| Vehicle design | | | |
| a.) Bedding | | | |
| Inadequate quality of bedding material | Type of bedding according to climate | Heat stress, cold stress | Thermal comfort |
| Inadequate quality of bedding material | Type of bedding according to climate | Heat stress, cold stress | Disease |
| Inadequate quality of bedding material | Type of bedding, high level of wetness, high level of dirt/dust | Dyspnoeic, panting for air | Disease |
| Lack of bedding material | Absence of bedding material | Falling, bruising, wounds | Injuries |
| Quantity of bedding material | Availability | Restless, fatigue | Comfort around resting |
| Feeding and watering | | | |
| a.) Feeding | | | |
| Inadequate feed quality | Hazardous to health, less energie content, acceptability, nutrit | Desnutrition, loss of body weight, foraging, restless, vocalis | Hunger |
| Inadequate feed quantity | Less feed according to number of animal, inadequate energie | Desnutrition, loss of body weight, foraging, restless, vocalis | Hunger |
| Inadequate feed quantity | Less feed according to number of animal, inadequate energie | Fatigue | Ease of movement |
| Inadequate feed quantity | Less feed according to number of animal, inadequate energie | Aggression | Social behaviour |
| Inadequate feed quantity | Less feed according to number of animal, inadequate energie | Aggression | Injuries |
| Inadequate feeding intervall | intervall of feed application too long (according animal needs) | Desnutrition, loss of body weight, foraging, restless, vocalis | Hunger |
| Inadequate duration of feeding | Too short feeding duration | Desnutrition, loss of body weight, foraging, restless, vocalis | Hunger |
| Inadequate duration of feeding | Too short feeding duration | Aggression | Injuries |
| b.) Watering | | | |
| Water supply | too long period between water applications | Dehydration, vocalising, restless | Thirst |
| Lack of training to use the drinking facilities | Different drinking facilities as in husbandry system | Dehydration | Thirst |
| Lack of training to use the drinking facilities | Different drinking facilities as in husbandry system | Heatstress, overheating | Thermal comfort |
| Inadequate water quality | Unfamiliar taste/different tasting water | Dehydration | Thirst |
| Inadequate water quality | Unfamiliar taste/different tasting water | Heatstress, overheating | Thermal comfort |
| Floor allowance, resting periods and driving skills | | | |
| a.) Stocking density | | | |
| inadequate stocking density | Stocking density too high (according to category) | Aggression, bruising, wounds | Injuries |
| inadequate stocking density | Stocking density too high (according to category) | Heatstress, overheating | Thermal comfort |
| inadequate stocking density | Stocking density too high (according to category) | Lack of possibility to lie down/ to groom, lack of exercise | Comfort around resting |
| inadequate stocking density | Stocking density too high (according to category) | Lack of possibility to lie down / stand up, fatigue | Fear |
| inadequate stocking density | Stocking density too high (according to category) | Lack of possibility to feed | Hunger |
| inadequate stocking density | Stocking density too high (according to category) | Lack of possibility to drink | Thirst |
| b.) Resting periods | | | |
| Multiple loading during the same trip | Mixing animals, multiple loading procedure | Agression, bruising, wounds | Injuries |
| Multiple loading during the same trip | Mixing animals, multiple loading procedure | Fatigue, physical stress | Comfort around resting |
| Multiple loading during the same trip | Mixing animals, multiple loading procedure | Social stress | Fear |
| Multiple loading during the same trip | Mixing animals, multiple loading procedure | Spread disease | Disease |
| Inadequate resting time | <12 h | Inappropriate recovering from transport | Comfort around resting |
| Inadequate resting time | <12 h | Lack of possibility to feed | Hunger |
| Inadequate resting time | <12 h | Lack of possibility to drink | Thirst |
| Resting station | Stocking density too high | Aggression, bruising, wounds | Injuries |
| Resting station | Stocking density too high | Lack of possibility to lie down/ to groom, lack of exercise | Comfort around resting |
| Resting station | Inadequate feed quality | Desnutrition, loss of body weight, foraging, restless, vocalis | Hunger |
| Resting station | Inadequate feed quantity | Desnutrition, loss of body weight, foraging, restless, vocalis | Hunger |
| Resting station | Inadequate feed quantity | Fatigue | Ease of movement |
| Resting station | Mixing animals | Aggression | Social behaviour |
| Resting station | Mixing animals | Aggression | Injuries |
| c.) driving skills | | | |
| Driver | Rough driving, bad driving technique, swaying of vehicle | Problems maintaining balance, falling, bruising, wounds | Injuries |
| Driver | Rough driving, bad driving technique, swaying of vehicle | Physical stress | Ease of movement |
| Driver | Rough driving, bad driving technique, swaying of vehicle | Physical stress | Comfort around resting |
| Driver | Lack of monitoring during transport, lack of education/compet | No feeding during transport | Hunger |
| Driver | Lack of monitoring during transport, lack of education/compet | Dehydration, heatstress | Thirst |
| Driver | Lack of monitoring during transport, lack of education/compet | Dehydration, heatstress, coldstress, dyspnoeic | Thermal discomfort |

Table 3. Hazards relate to transport of horses (cont.)

| Scenarios | Species | Animal categories | Means of transport | Transport duration | Thermal environment |
|-----------|---------|-------------------|--------------------|--------------------|---------------------|
| 1 | pigs | piglets | road | short | above |
| 2 | pigs | piglets | road | short | below |
| 3 | pigs | piglets | road | short | neutral |
| 4 | pigs | piglets | road | long | above |
| 5 | pigs | piglets | road | long | below |
| 6 | pigs | piglets | road | long | neutral |
| 7 | pigs | slaughter | road | short | above |
| 8 | pigs | slaughter | road | short | below |
| 9 | pigs | slaughter | road | short | neutral |
| 10 | pigs | slaughter | road | long | above |
| 11 | pigs | slaughter | road | long | below |
| 12 | pigs | slaughter | road | long | neutral |
| 13 | pigs | breeding | road | short | above |
| 14 | pigs | breeding | road | short | below |
| 15 | pigs | breeding | road | short | neutral |
| 16 | pigs | breeding | road | long | above |
| 17 | pigs | breeding | road | long | below |
| 18 | pigs | breeding | road | long | neutral |

Figure 3. Different transport scenarios in pigs

| HAZARD | Hazard description | Adverse effect description | Adverse effect type | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
|--|--|---|---------------------------|---------|------|------|------|------|------|----------------|-----|-----|-----|-----|-----|---------------|-----|-----|-----|-----|-----|
| | | | | Piglets | | | | | | Slaughter pigs | | | | | | Breeding pigs | | | | | |
| | | | | RSA | RSB | RSN | RLA | RLB | RLN | RSA | RSB | RSN | RLA | RLB | RLN | RSA | RSB | RSN | RLA | RLB | RLN |
| FACILITIES and STRUCTURES | | | | | | | | | | | | | | | | | | | | | |
| LOADING / UNLOADING | | | | | | | | | | | | | | | | | | | | | |
| a.) Driveway | | | | | | | | | | | | | | | | | | | | | |
| Inadequate driveway design | Too long (> max length according to different animal categories) | Fatigue | Ease of movement | | | | | | | | | | | | | | | | | | |
| Inadequate driveway design | Too narrow (< min width according to different animal categories) | Bruising, wounds | Injuries | | | | | | | | | | | | | | | | | | |
| Inadequate driveway design | Too narrow (< min width according to different animal categories) | Difficult movement, balking animals | Human-animal relationship | | | | | | | | | | | | | | | | | | |
| Inadequate driveway design | Continuity of race (dead ends) | Difficult movement | Ease of movement | | | | | | | | | | | | | | | | | | |
| Inadequate driveway design | Continuity of race (dead ends) | Difficult movement | Human-animal relationship | | | | | | | | | | | | | | | | | | |
| Inadequate structure of sides | Sharp protrusions, sharp angles, open sides, short sides | Bruising, wounds | Injuries | | | | | | | | | | | | | | | | | | |
| Inadequate floor surface | Slippery | Bruising, wounds | Injuries | | | | | | | | | | | | | | | | | | |
| Inadequate floor surface | Slippery | Difficult movement | Ease of movement | | | | | | | | | | | | | | | | | | |
| Inadequate floor surface | Slippery | Reluctant to move | Fear | | | | | | | | | | | | | | | | | | |
| Inadequate floor condition | Gaps, potholes, steps | Bruising, wounds, fractures | Injuries | | | | | | | | | | | | | | | | | | |
| Inadequate floor condition | Gaps, potholes, steps | Difficult movement | Ease of movement | | | | | | | | | | | | | | | | | | |
| Inadequate floor condition | Gaps, potholes, steps | Need of Difficult movement, balking animals | Human-animal relationship | | | | | | | | | | | | | | | | | | |
| b.) Ramp | | | | | | | | | | | | | | | | | | | | | |
| Inadequate ramp design | Too steep up/down (> max slope according to different animal categories) | Bruising, wounds, fractures | Injuries | | | | | | | | | | | | | | | | | | |
| Inadequate ramp design | Too steep up/down (> max slope according to different animal categories) | Difficult movement | Ease of movement | | | | | | | | | | | | | | | | | | |
| Inadequate ramp design | Too steep up/down (> max slope according to different animal categories) | Reluctant to move | Fear | | | | | | | | | | | | | | | | | | |
| Inadequate ramp design | Too narrow (< min width according to different animal categories) | Bruising, wounds | Injuries | | | | | | | | | | | | | | | | | | |
| Inadequate ramp design | Too narrow (< min width according to different animal categories) | Need of Difficult movement, balking animals | Human-animal relationship | | | | | | | | | | | | | | | | | | |
| Inadequate structure of sides | Sharp protrusions, sharp angles, open sides, short sides | Bruising, wounds | Injuries | | | | | | | | | | | | | | | | | | |
| Inadequate floor surface | Slippery | Bruising, wounds, fractures | Injuries | | | | | | | | | | | | | | | | | | |
| Inadequate floor surface | Slippery | Difficult movement | Ease of movement | | | | | | | | | | | | | | | | | | |
| Inadequate floor surface | Slippery | Reluctant to move | Fear | | | | | | | | | | | | | | | | | | |
| Inadequate floor condition | Gaps, potholes, steps | Bruising, wounds, fractures | Injuries | | | | | | | | | | | | | | | | | | |
| Inadequate floor condition | Gaps, potholes, steps | Difficult movement | Ease of movement | | | | | | | | | | | | | | | | | | |
| Inadequate floor condition | Gaps, potholes, steps | Need of Difficult movement, balking animals | Human-animal relationship | | | | | | | | | | | | | | | | | | |
| Inadequate cleat ramps | Inter-cleat distance > max distance on centers according to different animal categories, missing cleat | Bruising, wounds, fractures | Injuries | | | | | | | | | | | | | | | | | | |
| Inadequate cleat ramps | Inter-cleat distance > max distance on centers according to different animal categories, missing cleat | Difficult movement | Ease of movement | | | | | | | | | | | | | | | | | | |
| Inadequate stairsteps | Stairsteps > max height and > max length according to different animal categories | Bruising, wounds, fractures | Injuries | | | | | | | | | | | | | | | | | | |
| Inadequate stairsteps | Stairsteps > max height and > max length according to different animal categories | Difficult movement | Ease of movement | | | | | | | | | | | | | | | | | | |
| c.) Lift | | | | | | | | | | | | | | | | | | | | | |
| Inadequate floor surface | Slippery | Bruising, wounds, fractures | Injuries | | | | | | | | | | | | | | | | | | |
| Inadequate floor surface | Slippery | Reluctant to move | Fear | | | | | | | | | | | | | | | | | | |
| Inadequate floor condition | Gaps, potholes, steps | Bruising, wounds, fractures | Injuries | | | | | | | | | | | | | | | | | | |
| Inadequate floor condition | Gaps, potholes, steps | Reluctant to move | Fear | | | | | | | | | | | | | | | | | | |
| Inadequate structure of sides | Sharp protrusions, sharp angles, open sides, short sides (<75cm) | Bruising, wounds | Injuries | | | | | | | | | | | | | | | | | | |
| d.) Sensory input (Sound Smell Light) | | | | | | | | | | | | | | | | | | | | | |
| Inadequate lighting | Blinding light, shadows, sudden change of light, glaring objects | Disorientation | Fear | | | | | | | | | | | | | | | | | | |
| Inadequate overall noise | High intensity sounds | Disorientation | Fear | | | | | | | | | | | | | | | | | | |
| Inadequate overall noise | High frequency sounds | Disorientation | Fear | | | | | | | | | | | | | | | | | | |
| Unfamiliar smell | Unfamiliar smell | Disorientation, aversion | Fear | | | | | | | | | | | | | | | | | | |
| Drafts blowing towards animals | Air blowing in their faces | Disorientation | Fear | | | | | | | | | | | | | | | | | | |
| e.) Gate | | | | | | | | | | | | | | | | | | | | | |
| Inadequate gate design | < min width according to different animal categories | Bruising, wounds | Injuries | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | | | | | | | | | | | | |
| Inadequate gate design | < min width according to different animal categories | Need of Difficult movement, balking animals | Human-animal relationship | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | | | | | | | | | | | | |
| Inadequate gate design | < min height according to different animal categories | Bruising, wounds | Injuries | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | | | | | | | | | | | | |
| Inadequate gate design | < min height according to different animal categories | Need of Difficult movement, balking animals | Human-animal relationship | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | | | | | | | | | | | | |
| Inadequate structure of sides | Sharp protrusions | Bruising, wounds | Injuries | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | | | | | | | | | | | | |

Table 4. Hazards related to transport of pigs

| HAZARD | Hazard description | Adverse effect description | Adverse effect type | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
|--|---|--|------------------------|---------|------|------|------|------|------|----------------|-----|-----|-----|-----|-----|---------------|-----|-----|-----|-----|-----|
| | | | | Piglets | | | | | | Slaughter pigs | | | | | | Breeding pigs | | | | | |
| | | | | RSA | RSB | RSN | RLA | RLB | RLN | RSA | RSB | RSN | RLA | RLB | RLN | RSA | RSB | RSN | RLA | RLB | RLN |
| TRANSPORT | | | | | | | | | | | | | | | | | | | | | |
| Vehicle / Container design | | | | | | | | | | | | | | | | | | | | | |
| a.) Floors | | | | | | | | | | | | | | | | | | | | | |
| Inadequate floor surface | Slippery | Bruising, wounds, fractures | Injuries | | | | | | | | | | | | | | | | | | |
| Inadequate floor surface | Slippery | Problems maintaining balance | Ease of movement | | | | | | | | | | | | | | | | | | |
| Inadequate floor surface | Slippery | Reluctant to move | Fear | | | | | | | | | | | | | | | | | | |
| Inadequate floor surface | Too rough (aluminium more skin problems than iron or polyester) | Bruising, wounds | Injuries | | | | | | | | | | | | | | | | | | |
| Inadequate floor surface | Too rough (aluminium more skin problems than iron or polyester) | Restless | Comfort around resting | | | | | | | | | | | | | | | | | | |
| Inadequate floor condition | Gaps, potholes, steps, sloping | Bruising, wounds, fractures | Injuries | | | | | | | | | | | | | | | | | | |
| Inadequate floor condition | Gaps, potholes, steps, sloping | Restless | Comfort around resting | | | | | | | | | | | | | | | | | | |
| b.) Partitions | | | | | | | | | | | | | | | | | | | | | |
| Inadequate partitions design | Sharp protrusion, sharp edges | Bruising, wounds | Injuries | | | | | | | | | | | | | | | | | | |
| Inadequate partitions design | Partitions of not enough height (< min height according to different animal categories) | Aggression | Injuries | | | | | | | | | | | | | | | | | | |
| Inadequate partitions design | Partitions of not enough height (< min height according to different animal categories) | Aggression | Social behaviour | | | | | | | | | | | | | | | | | | |
| Inadequate partitions design | Too big apertures in the partitions (> max aperture according to different animal categories) | Bruising, wounds, fractures | Injuries | | | | | | | | | | | | | | | | | | |
| Inadequate partitions design | Too big apertures in the partitions (> max aperture according to different animal categories) | Aggression | Social behaviour | | | | | | | | | | | | | | | | | | |
| Inadequate partitions design | Partially open partitions: open at the bottom | Bruising, wounds, fractures | Injuries | | | | | | | | | | | | | | | | | | |
| Inadequate partitions design | Partially open partitions: open at the bottom | Aggression | Social behaviour | | | | | | | | | | | | | | | | | | |
| Absence of partitions | No partitions | Bruising, wounds | Injuries | | | | | | | | | | | | | | | | | | |
| Absence of partitions | No partitions | Aggression | Social behaviour | | | | | | | | | | | | | | | | | | |
| c.) Roof | | | | | | | | | | | | | | | | | | | | | |
| Inadequate roof colour | Not reflecting bright colour | Heatstress | Thirst | | | | | | | | | | | | | | | | | | |
| Inadequate roof colour | Not reflecting bright colour | Heatstress | Thermal comfort | | | | | | | | | | | | | | | | | | |
| Inadequate roof condition | Gaps, holes | Heatstress | Thirst | | | | | | | | | | | | | | | | | | |
| Inadequate roof condition | Gaps, holes | Heatstress | Thermal comfort | | | | | | | | | | | | | | | | | | |
| Inadequate roof condition | Gaps, holes | Coldstress | Thermal comfort | | | | | | | | | | | | | | | | | | |
| Inadequate roof condition | Gaps, holes | Soaked animals | Comfort around resting | | | | | | | | | | | | | | | | | | |
| Inadequate roof condition | Gaps, holes | Soaked animals | Thermal comfort | | | | | | | | | | | | | | | | | | |
| Inadequate roof condition | Gaps, holes | Respiratory problems | Disease | | | | | | | | | | | | | | | | | | |
| Inadequate roof condition | Gaps, holes | Burning, skin lesions | Injuries | | | | | | | | | | | | | | | | | | |
| Inadequate roof condition | Protrusions, projections | Bruising, wounds | Injuries | | | | | | | | | | | | | | | | | | |
| Inadequate roof insulation | Solar gain heat | Heatstress | Thirst | | | | | | | | | | | | | | | | | | |
| Inadequate roof insulation | Solar gain heat | Heatstress | Thermal comfort | | | | | | | | | | | | | | | | | | |
| Inadequate roof insulation | Water condensation | Rising humidity | Thermal comfort | | | | | | | | | | | | | | | | | | |
| Inadequate roof insulation | Water condensation | Rising humidity | Disease | | | | | | | | | | | | | | | | | | |
| d.) Sensory input (Sound Smell Light) | | | | | | | | | | | | | | | | | | | | | |
| Inadequate overall noise | High intensity sounds | Disorientation | Fear | | | | | | | | | | | | | | | | | | |
| Inadequate overall noise | High frequency sounds | Disorientation | Fear | | | | | | | | | | | | | | | | | | |
| Inadequate lighting | Sudden change of light (tunnels), poor lighting, glaring lights | Disorientation | Fear | | | | | | | | | | | | | | | | | | |
| Unfamiliar smell | Unfamiliar smell | Aversion | Fear | | | | | | | | | | | | | | | | | | |
| Drafts blowing towards animals | Air blowing in their faces | Disorientation | Comfort around resting | | | | | | | | | | | | | | | | | | |
| Drafts blowing towards animals | Change of pressure when passing other vehicles | Disorientation | Fear | | | | | | | | | | | | | | | | | | |
| e.) Space allowance | | | | | | | | | | | | | | | | | | | | | |
| Inadequate deck height | Too low deck height (< min height according to different animal categories) | Heatstress | Thirst | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | | | | | | | | | | | | |
| Inadequate deck height | Too low deck height (< min height according to different animal categories) | Heatstress | Thermal comfort | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | | | | | | | | | | | | |
| Inadequate deck height | Too low deck height (< min height according to different animal categories) | Rising humidity | Thermal comfort | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | | | | | | | | | | | | |
| Inadequate deck height | Too low deck height (< min height according to different animal categories) | Respiratory problems | Disease | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | | | | | | | | | | | | |
| Inadequate deck height | Too low deck height (< min height according to different animal categories) | Bruising, wounds | Injuries | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | | | | | | | | | | | | |
| Inadequate deck height | Too low deck height (< min height according to different animal categories) | Inability to raise the head/inability to stand | Ease of movement | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | | | | | | | | | | | | |
| f.) Suspension | | | | | | | | | | | | | | | | | | | | | |
| Poor suspension | Vibration, acceleration | Travel sickness | Disease | | | | | | | | | | | | | | | | | | |

Table 4. Hazards related to transport of pigs (cont.)

| HAZARD | Hazard description | Adverse effect description | Adverse effect type | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
|---|---|----------------------------|------------------------|---------|------|------|------|------|-----|----------------|------|------|------|------|-----|---------------|------|------|------|------|-----|
| | | | | Piglets | | | | | | Slaughter pigs | | | | | | Breeding pigs | | | | | |
| | | | | RSA | RSB | RSN | RLA | RLB | RLN | RSA | RSB | RSN | RLA | RLB | RLN | RSA | RSB | RSN | RLA | RLB | RLN |
| Feeding and watering | | | | | | | | | | | | | | | | | | | | | |
| a.) Watering | | | | | | | | | | | | | | | | | | | | | |
| Lack of drinking facilities | No supply of water | Dehydration | Thirst | n.a. | n.a. | n.a. | | | | n.a. | n.a. | n.a. | | | | n.a. | n.a. | n.a. | | | |
| Lack of drinking facilities | No supply of water | Heatstress, overheating | Thermal comfort | n.a. | n.a. | n.a. | | | | n.a. | n.a. | n.a. | | | | n.a. | n.a. | n.a. | | | |
| Inadequate drinking facilities | Facilities not adjusted to animal species/category | Dehydration | Thirst | n.a. | n.a. | n.a. | | | | n.a. | n.a. | n.a. | | | | n.a. | n.a. | n.a. | | | |
| Inadequate drinking facilities | Facilities not adjusted to animal species/category | Heatstress, overheating | Thermal comfort | n.a. | n.a. | n.a. | | | | n.a. | n.a. | n.a. | | | | n.a. | n.a. | n.a. | | | |
| Inadequate number of drinking troughs/watering cups/nipples | < 1 drinking trough/10 animals | Dehydration | Thirst | n.a. | n.a. | n.a. | | | | n.a. | n.a. | n.a. | | | | n.a. | n.a. | n.a. | | | |
| Inadequate number of drinking troughs/watering cups/nipples | < 1 drinking trough/10 animals | Heatstress, overheating | Thermal comfort | n.a. | n.a. | n.a. | | | | n.a. | n.a. | n.a. | | | | n.a. | n.a. | n.a. | | | |
| Inadequate flow rate | < min flow rate according to different animal categories | Dehydration | Thirst | n.a. | n.a. | n.a. | | | | n.a. | n.a. | n.a. | | | | n.a. | n.a. | n.a. | | | |
| Inadequate flow rate | < min flow rate according to different animal categories | Heatstress, overheating | Thermal comfort | n.a. | n.a. | n.a. | | | | n.a. | n.a. | n.a. | | | | n.a. | n.a. | n.a. | | | |
| Inadequate refilling facilities (adapters) | Impossibility to refill tanks during the journey | Dehydration | Thirst | n.a. | n.a. | n.a. | | | | n.a. | n.a. | n.a. | | | | n.a. | n.a. | n.a. | | | |
| Inadequate refilling facilities (adapters) | Impossibility to refill tanks during the journey | Heatstress, overheating | Thermal comfort | n.a. | n.a. | n.a. | | | | n.a. | n.a. | n.a. | | | | n.a. | n.a. | n.a. | | | |
| Inadequate position of drinkers | Difficult access to the drinkers for some animals | Dehydration | Thirst | n.a. | n.a. | n.a. | | | | n.a. | n.a. | n.a. | | | | n.a. | n.a. | n.a. | | | |
| Inadequate position of drinkers | Difficult access to the drinkers for some animals | Heatstress, overheating | Thermal comfort | n.a. | n.a. | n.a. | | | | n.a. | n.a. | n.a. | | | | n.a. | n.a. | n.a. | | | |
| Microclimate throughout transportation | | | | | | | | | | | | | | | | | | | | | |
| a.) Ventilation | | | | | | | | | | | | | | | | | | | | | |
| Inadequate natural ventilation | < min air exchange/distribution | Heatstress | Thirst | | n.a. | | | n.a. | | | n.a. | | | n.a. | | | n.a. | | | n.a. | |
| Inadequate natural ventilation | < min air exchange/distribution | Heatstress | Thermal comfort | | n.a. | | | n.a. | | | n.a. | | | n.a. | | | n.a. | | | n.a. | |
| Inadequate natural ventilation | < min air exchange/distribution | Heatstress | Disease | | n.a. | | | n.a. | | | n.a. | | | n.a. | | | n.a. | | | n.a. | |
| Inadequate natural ventilation | < min air exchange/distribution | Heatstress | Comfort around resting | | n.a. | | | n.a. | | | n.a. | | | n.a. | | | n.a. | | | n.a. | |
| Inadequate natural ventilation | > max air exchange/distribution | Cold stress | Thermal comfort | n.a. | | | n.a. | | | n.a. | | | n.a. | | | n.a. | | | n.a. | | |
| Inadequate forced ventilation | Lack of forced ventilation | Heatstress | Thirst | | n.a. | | | n.a. | | | n.a. | | | n.a. | | | n.a. | | | n.a. | |
| Inadequate forced ventilation | Lack of forced ventilation | Heatstress | Thermal comfort | | n.a. | | | n.a. | | | n.a. | | | n.a. | | | n.a. | | | n.a. | |
| Inadequate forced ventilation | Lack of forced ventilation | Heatstress | Disease | | n.a. | | | n.a. | | | n.a. | | | n.a. | | | n.a. | | | n.a. | |
| Inadequate forced ventilation | Lack of forced ventilation | Heatstress | Comfort around resting | | n.a. | | | n.a. | | | n.a. | | | n.a. | | | n.a. | | | n.a. | |
| Inadequate forced ventilation | Ventilation rate < min rate according to different animal categories | Heatstress | Thirst | | n.a. | | | n.a. | | | n.a. | | | n.a. | | | n.a. | | | n.a. | |
| Inadequate forced ventilation | Ventilation rate < min rate according to different animal categories | Heatstress | Thermal comfort | | n.a. | | | n.a. | | | n.a. | | | n.a. | | | n.a. | | | n.a. | |
| Inadequate forced ventilation | Ventilation rate < min rate according to different animal categories | Heatstress | Disease | | n.a. | | | n.a. | | | n.a. | | | n.a. | | | n.a. | | | n.a. | |
| Inadequate forced ventilation | Ventilation rate < min rate according to different animal categories | Heatstress | Comfort around resting | | n.a. | | | n.a. | | | n.a. | | | n.a. | | | n.a. | | | n.a. | |
| Inadequate forced ventilation | Lack of sensors of Ta and humidity in animal compartment | Heatstress | Thirst | | n.a. | | | n.a. | | | n.a. | | | n.a. | | | n.a. | | | n.a. | |
| Inadequate forced ventilation | Lack of sensors of Ta and humidity in animal compartment | Heatstress | Thermal comfort | | n.a. | | | n.a. | | | n.a. | | | n.a. | | | n.a. | | | n.a. | |
| Inadequate forced ventilation | Lack of sensors of Ta and humidity in animal compartment | Cold stress | Thermal comfort | n.a. | | | n.a. | | | n.a. | | | n.a. | | | n.a. | | | n.a. | | |
| Inadequate forced ventilation | Lack of sensors of Ta and humidity in animal compartment | Heatstress | Disease | | n.a. | | | n.a. | | | n.a. | | | n.a. | | | n.a. | | | n.a. | |
| Inadequate forced ventilation | Lack of sensors of Ta and humidity in animal compartment | Heatstress | Comfort around resting | | n.a. | | | n.a. | | | n.a. | | | n.a. | | | n.a. | | | n.a. | |
| Inadequate forced ventilation | Lack of alert system in the driver compartment | Heatstress | Thirst | | n.a. | | | n.a. | | | n.a. | | | n.a. | | | n.a. | | | n.a. | |
| Inadequate forced ventilation | Lack of alert system in the driver compartment | Heatstress | Thermal comfort | | n.a. | | | n.a. | | | n.a. | | | n.a. | | | n.a. | | | n.a. | |
| Inadequate forced ventilation | Lack of alert system in the driver compartment | Cold stress | Thermal comfort | n.a. | | | n.a. | | | n.a. | | | n.a. | | | n.a. | | | n.a. | | |
| Inadequate forced ventilation | Lack of alert system in the driver compartment | Heatstress | Disease | | n.a. | | | n.a. | | | n.a. | | | n.a. | | | n.a. | | | n.a. | |
| Inadequate forced ventilation | Lack of alert system in the driver compartment | Heatstress | Comfort around resting | | n.a. | | | n.a. | | | n.a. | | | n.a. | | | n.a. | | | n.a. | |
| Inadequate forced ventilation | Ventilation apertures distribution (inappropriate air distribution in the vehicle) | Heatstress | Thirst | | n.a. | | | n.a. | | | n.a. | | | n.a. | | | n.a. | | | n.a. | |
| Inadequate forced ventilation | Ventilation apertures distribution (inappropriate air distribution in the vehicle) | Heatstress | Thermal comfort | | n.a. | | | n.a. | | | n.a. | | | n.a. | | | n.a. | | | n.a. | |
| Inadequate forced ventilation | Ventilation apertures distribution (inappropriate air distribution in the vehicle) | Heatstress | Disease | | n.a. | | | n.a. | | | n.a. | | | n.a. | | | n.a. | | | n.a. | |
| Inadequate forced ventilation | Ventilation apertures distribution (inappropriate air distribution in the vehicle) | Heatstress | Comfort around resting | | n.a. | | | n.a. | | | n.a. | | | n.a. | | | n.a. | | | n.a. | |
| Inadequate forced ventilation | Ventilation apertures design (protection plate on fan induces lower air flow rates) | Heatstress | Thirst | | n.a. | | | n.a. | | | n.a. | | | n.a. | | | n.a. | | | n.a. | |
| Inadequate forced ventilation | Ventilation apertures design (protection plate on fan induces lower air flow rates) | Heatstress | Thermal comfort | | n.a. | | | n.a. | | | n.a. | | | n.a. | | | n.a. | | | n.a. | |
| Inadequate forced ventilation | Ventilation apertures design (protection plate on fan induces lower air flow rates) | Heatstress | Disease | | n.a. | | | n.a. | | | n.a. | | | n.a. | | | n.a. | | | n.a. | |
| Inadequate forced ventilation | Ventilation apertures design (protection plate on fan induces lower air flow rates) | Heatstress | Comfort around resting | | n.a. | | | n.a. | | | n.a. | | | n.a. | | | n.a. | | | n.a. | |
| Inadequate air quality | Air contaminated with exhaust gases | Respiratory disorders | Disease | | | | | | | | | | | | | | | | | | |
| Inadequate air quality | Moderate or severe dust level | Respiratory disorders | Disease | | | | | | | | | | | | | | | | | | |
| Inadequate air quality | Not sufficient O2 (< min level according to different animal categories) | Respiratory disorders | Disease | | | | | | | | | | | | | | | | | | |
| b.) Cooling devices | | | | | | | | | | | | | | | | | | | | | |
| Inadequate cooling devices (showering) | Lack of showers | Heatstress | Thermal comfort | | n.a. | | | | | | | | | | | | | | | | |

Table 3. Hazards related to transport of pigs (cont.)

| HAZARD | Hazard description | Adverse effect description | Adverse effect type | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | |
|--|--|---|---------------------------|---------|------|------|------|------|------|----------------|------|-----|-----|------|-----|---------------|------|-----|-----|------|-----|------|
| | | | | Piglets | | | | | | Slaughter pigs | | | | | | Breeding pigs | | | | | | |
| | | | | RSA | RSB | RSN | RLA | RLB | RLN | RSA | RSB | RSN | RLA | RLB | RLN | RSA | RSB | RSN | RLA | RLB | RLN | |
| MANAGEMENT | | | | | | | | | | | | | | | | | | | | | | |
| PREPARATION TO THE TRANSPORT | | | | | | | | | | | | | | | | | | | | | | |
| a.) Fasting | | | | | | | | | | | | | | | | | | | | | | |
| No fasting | Fasting period < min according to different animal categories | Travel sickness | Disease | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | | | | | | | | | | | | | |
| Too long fasting | Too long fasting > max according to different animal categories | Spread disease | Disease | | | | | | | | | | | | | | | | | | | |
| Too long fasting | Too long fasting > max according to different animal categories | Desnutrition, loss of body weight | Hunger | | | | | | | | | | | | | | | | | | | |
| Too long fasting | Too long fasting > max according to different animal categories | Fatigue | Ease of movement | | | | | | | | | | | | | | | | | | | |
| Too long fasting | Too long fasting > max according to different animal categories | Aggression | Injuries | | | | | | | | | | | | | | | | | | | |
| Too long fasting | Too long fasting > max according to different animal categories | Aggression | Social behaviour | | | | | | | | | | | | | | | | | | | |
| b.) Watering | | | | | | | | | | | | | | | | | | | | | | |
| Water withdrawal | Lack of water up until loading | Dehydration | Thirst | | | | | | | | | | | | | | | | | | | |
| Water withdrawal | Lack of water up until loading | Heatstress, overheating | Thermal comfort | | | | | | | | | | | | | | | | | | | |
| c.) Management | | | | | | | | | | | | | | | | | | | | | | |
| Lack of previous human contact | Inappropriate previous positive contacts with humans | Scape attempt | Human-animal relationship | | | | | | | | | | | | | | | | | | | |
| Lack of previous human contact | Inappropriate previous positive contacts with humans | Scape attempt | Injuries | | | | | | | | | | | | | | | | | | | |
| Lack of previous human contact | Inappropriate previous positive contacts with humans | Fear | Fear | | | | | | | | | | | | | | | | | | | |
| Inadequate selection of animals to transport | Transport of animals not fitted to travel | Incapacity of animals to travel | Injuries | | | | | | | | | | | | | | | | | | | |
| Inadequate selection of animals to transport | Transport of animals not fitted to travel | Incapacity of animals to travel | Ease of movement | | | | | | | | | | | | | | | | | | | |
| Inadequate selection of animals to transport | Transport of animals not fitted to travel | Incapacity of animals to travel | Human-animal relationship | | | | | | | | | | | | | | | | | | | |
| Inadequate cleanliness of vehicle | Uncleanliness of vehicle and insufficient disinfection | Spread disease | Disease | | | | | | | | | | | | | | | | | | | |
| Inadequate planing of the transport | Stationary vehicle due to delay in traffic operation | Heatstress | Thirst | | n.a. | | | n.a. | | | n.a. | | | n.a. | | | n.a. | | | n.a. | | n.a. |
| Inadequate planing of the transport | Stationary vehicle due to delay in traffic operation | Heatstress | Thermal comfort | | n.a. | | | n.a. | | | n.a. | | | n.a. | | | n.a. | | | n.a. | | n.a. |
| Inadequate planing of the transport | Stationary vehicle due to delay in traffic operation | Heatstress | Disease | | n.a. | | | n.a. | | | n.a. | | | n.a. | | | n.a. | | | n.a. | | n.a. |
| Inadequate planing of the transport | Stationary vehicle due to delay in traffic operation | Rising humidity | Thermal comfort | | n.a. | | | n.a. | | | n.a. | | | n.a. | | | n.a. | | | n.a. | | n.a. |
| Inadequate planing of the transport | Stationary vehicle due to delay in traffic operation | Rising humidity | Disease | | n.a. | | | n.a. | | | n.a. | | | n.a. | | | n.a. | | | n.a. | | n.a. |
| Inadequate planing of the transport | Stationary vehicle due to delay in traffic operation | Quality air (increase of NH3, dust) | Disease | | n.a. | | | n.a. | | | n.a. | | | n.a. | | | n.a. | | | n.a. | | n.a. |
| Inadequate planing of the transport | No planning of loading/unloading schedule | Heatstress | Thermal comfort | | n.a. | | | n.a. | | | n.a. | | | n.a. | | | n.a. | | | n.a. | | n.a. |
| Inadequate planing of the transport | No planning of loading/unloading schedule | Coldstress | Thermal comfort | | n.a. | | | n.a. | | | n.a. | | | n.a. | | | n.a. | | | n.a. | | n.a. |
| Inadequate planing of the transport | No plans for emergency | Heatstress | Injuries | | n.a. | | | n.a. | | | n.a. | | | n.a. | | | n.a. | | | n.a. | | n.a. |
| Inadequate planing of the transport | No plans for emergency | Heatstress | Disease | | n.a. | | | n.a. | | | n.a. | | | n.a. | | | n.a. | | | n.a. | | n.a. |
| Inadequate planing of the transport | Lack of preparation for the journey (road conditions) | Problems maintaining balance | Ease of movement | | | | | | | | | | | | | | | | | | | |
| LOADING/UNLOADING | | | | | | | | | | | | | | | | | | | | | | |
| a.) Handling | | | | | | | | | | | | | | | | | | | | | | |
| Inadequate handlers | Inappropriate handling (hitting, lack of motivation, shouting) | Bruising, wounds | Injuries | | | | | | | | | | | | | | | | | | | |
| Inadequate handlers | Inappropriate handling (hitting, lack of motivation, shouting) | Scape attempts | Human-animal relationship | | | | | | | | | | | | | | | | | | | |
| Inadequate handlers | Inappropriate handling (hitting, lack of motivation, shouting) | Reluctant to move | Fear | | | | | | | | | | | | | | | | | | | |
| Inadequate handlers | Use of unnecessary driving tools (prods, electric goads, sticks) | Bruising, wounds, fractures, crowding | Injuries | | | | | | | | | | | | | | | | | | | |
| Inadequate handlers | Use of unnecessary driving tools (prods, electric goads, sticks) | Pain | Pain | | | | | | | | | | | | | | | | | | | |
| Inadequate handlers | High speed of loading | Fatigue | Ease of movement | | | | | | | | | | | | | | | | | | | |
| Inadequate composition of groups | Inadequate number of animals in the moving group (> max according to different animal categories) | Difficult movement | Ease of movement | | | | | | | | | | | | | | | | | | | |
| Inadequate composition of groups | Mixing unfamiliar animals | Aggression | Injuries | | | | | | | | | | | | | | | | | | | |
| Inadequate composition of groups | Mixing unfamiliar animals | Aggression | Social behaviours | | | | | | | | | | | | | | | | | | | |
| Inadequate composition of groups | Mixing unfamiliar animals | Spread disease | Disease | | | | | | | | | | | | | | | | | | | |
| Inadequate composition of groups | Moving animals individually | Social isolation | Social behaviours | | | | | | | | | | | | | | | | | | | |
| TRANSPORT | | | | | | | | | | | | | | | | | | | | | | |
| Vehicle design | | | | | | | | | | | | | | | | | | | | | | |
| a.) Bedding | | | | | | | | | | | | | | | | | | | | | | |
| Inadequate quality of bedding material | Inappropriate type of bedding according to climate | Heatstress | Thermal comfort | | n.a. | | | n.a. | | | n.a. | | | n.a. | | | n.a. | | | n.a. | | n.a. |
| Inadequate quality of bedding material | Inappropriate type of bedding according to climate | Coldstress | Thermal comfort | | n.a. | | | n.a. | | | n.a. | | | n.a. | | | n.a. | | | n.a. | | n.a. |
| Inadequate quantity of bedding material | No availability | Abnormal resting/inferior resting comfort | Comfort around resting | | | | | | | | | | | | | | | | | | | |
| Inadequate quantity of bedding material | No availability | Coldstress | Thermal comfort | | n.a. | | | n.a. | | | n.a. | | | n.a. | | | n.a. | | | n.a. | | n.a. |
| Absence of enrichment material for animals | Absence of sufficient amount of enrichment material | Aggression | Injuries | | | | | | | | | | | | | | | | | | | |
| Absence of enrichment material for animals | Absence of sufficient amount of enrichment material | Abnormal behaviour (stereotype/redirected behaviour) | Social behaviour | | | | | | | | | | | | | | | | | | | |
| Absence of enrichment material for animals | Absence of sufficient amount of enrichment material | Abnormal behaviour (stereotype/redirected behaviour) | Other behaviours | | | | | | | | | | | | | | | | | | | |
| Feeding and watering | | | | | | | | | | | | | | | | | | | | | | |
| a.) Feeding | | | | | | | | | | | | | | | | | | | | | | |
| Inadequate food quality | Hazardous to health, less energie content, acceptability, nutrition not adjusted to demand of species and category | Desnutrition | Hunger | | n.a. | | | n.a. | | | n.a. | | | n.a. | | | n.a. | | | n.a. | | n.a. |
| Inadequate food quantity | Inadequate food quantity according to number of animal/category | Desnutrition, loss of body weight | Hunger | | n.a. | | | n.a. | | | n.a. | | | n.a. | | | n.a. | | | n.a. | | n.a. |
| Inadequate food quantity | Inadequate food quantity according to number of animal/category | Fatigue | Ease of movement | | n.a. | | | n.a. | | | n.a. | | | n.a. | | | n.a. | | | n.a. | | n.a. |
| Inadequate food quantity | Inadequate food quantity according to number of animal/category | Aggression | Injuries | | n.a. | | | n.a. | | | n.a. | | | n.a. | | | n.a. | | | n.a. | | n.a. |
| Inadequate food quantity | Inadequate food quantity according to number of animal/category | Aggression | Social behaviour | | n.a. | | | n.a. | | | n.a. | | | n.a. | | | n.a. | | | n.a. | | n.a. |
| b.) Watering | | | | | | | | | | | | | | | | | | | | | | |
| Inadequate water quality | Unfamiliar taste/Different tasting water | Dehydration | Thirst | | n.a. | | | n.a. | | | n.a. | | | n.a. | | | n.a. | | | n.a. | | n.a. |
| Inadequate water quality | Unfamiliar taste/Different tasting water | Heatstress, overheating | Thermal comfort | | n.a. | | | n.a. | | | n.a. | | | n.a. | | | n.a. | | | n.a. | | n.a. |
| Floor and space allowance | | | | | | | | | | | | | | | | | | | | | | |
| a.) Stocking density | | | | | | | | | | | | | | | | | | | | | | |
| Inadequate stocking density | Overcrowding (> max stocking density according to different animal categories) | Aggression, crowding | Injuries | | | | | | | | | | | | | | | | | | | |
| Inadequate stocking density | Overcrowding (> max stocking density according to different animal categories) | Aggression, crowding | Comfort around resting | | | | | | | | | | | | | | | | | | | |
| Inadequate stocking density | Overcrowding (> max stocking density according to different animal categories) | Aggression, crowding | Thermal comfort | | | | | n.a. | | | n.a. | | | n.a. | | | n.a. | | | n.a. | | n.a. |
| Inadequate stocking density | Overcrowding (> max stocking density according to different animal categories) | Aggression, crowding | Disease | | | | | | | | | | | | | | | | | | | |
| Inadequate stocking density | Overcrowding (> max stocking density according to different animal categories) | Aggression, crowding | Social behaviour | | | | | | | | | | | | | | | | | | | |
| Inadequate stocking density | Overcrowding (> max stocking density according to different animal categories) | Aggression, crowding | Ease of movement | | | | | | | | | | | | | | | | | | | |
| Driving technique | | | | | | | | | | | | | | | | | | | | | | |
| a.) Driver | | | | | | | | | | | | | | | | | | | | | | |
| Inadequate driver | Rough driving, bad driving technique | Struggling, lose of balance, falling, fatigue, restless | Injuries | | | | | | | | | | | | | | | | | | | |
| Inadequate driver | Rough driving, bad driving technique | Struggling, lose of balance, falling, fatigue, restless | Ease of movement | | | | | | | | | | | | | | | | | | | |
| Inadequate driver | Rough driving, bad driving technique | Struggling, lose of balance, falling, fatigue, restless | Comfort around resting | | | | | | | | | | | | | | | | | | | |
| Inadequate driver | Lack of monitoring during transport | Incapacity of animals to travel | Injuries | | | | | | | | | | | | | | | | | | | |
| Inadequate driver | Lack of monitoring during transport | Incapacity of animals to travel | Disease | | | | | | | | | | | | | | | | | | | |
| Inadequate driver | Disregarding adaptation of forced ventilation to changing climate conditions | Heatstress | Thermal comfort | | n.a. | | | n.a. | | | n.a. | | | n.a. | | | n.a. | | | n.a. | | n.a. |
| Inadequate driver | Disregarding temperature measurement | Heatstress | Thermal comfort | | n.a. | | | n.a. | | | n.a. | | | n.a. | | | n.a. | | | n.a. | | n.a. |

Table 4. Hazards related to transport of pigs (cont.)

| Scenarios | Species | Animal categories | Means of transport | Transport duration | Thermal environment |
|-----------|---------|--------------------|--------------------|--------------------|---------------------|
| 1 | poultry | broiler | road | short | above |
| 2 | poultry | broiler | road | short | below |
| 3 | poultry | broiler | road | short | neutral |
| 4 | poultry | hens | road | short | above |
| 5 | poultry | hens | road | short | below |
| 6 | poultry | hens | road | short | neutral |
| 7 | poultry | spent hens | road | short | above |
| 8 | poultry | spent hens | road | short | below |
| 9 | poultry | spent hens | road | short | neutral |
| 10 | poultry | one day old chicks | road | short | above |
| 11 | poultry | one day old chicks | road | short | below |
| 12 | poultry | one day old chicks | road | short | neutral |
| 13 | poultry | one day old chicks | road | long | above |
| 14 | poultry | one day old chicks | road | long | below |
| 15 | poultry | one day old chicks | road | long | neutral |
| 16 | poultry | one day old chicks | air | long | neutral |
| 17 | poultry | ducks | road | short | above |
| 18 | poultry | ducks | road | short | below |
| 19 | poultry | ducks | road | short | neutral |
| 20 | poultry | quails | road | short | above |
| 21 | poultry | quails | road | short | below |
| 22 | poultry | quails | road | short | neutral |
| 23 | poultry | turkey | road | short | above |
| 24 | poultry | turkey | road | short | below |
| 25 | poultry | turkey | road | short | neutral |

Figure 5. Different transport scenarios in poultry

| HAZARD | Hazard description | Adverse effect description | Adverse effect type | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|--|--|---------------------------|----------|------|-----|------|------|------|------------|------|------|---------------------|------|------|------|------|------|-------|------|------|--------|------|------|--------|------|------|------|------|
| | | | | Broilers | | | Hens | | | Spent Hens | | | One day old chicken | | | | | | Ducks | | | Quails | | | Turkey | | | | |
| | | | | RSA | RSB | RSN | RSA | RSB | RSN | RSA | RSB | RSN | RSA | RSB | RSN | RLA | RLB | RLN | PLN | RSA | RSB | RSN | RSA | RSB | RSN | RSA | RSB | RSN | |
| FACILITIES AND STRUCTURES | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| PREPARATION TO THE TRANSPORT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| a) Catching | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Inadequate catching (manual/harvester) | Poor maintenance of catching facilities | Bruising, wounds, fractures, dislocated bone | Injuries | | | | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. |
| Inadequate catching (manual/harvester) | Poor maintenance of catching facilities | Bruising, wounds, fractures, dislocated bone | Pain | | | | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. |
| Inadequate catching (manual/harvester) | Poor maintenance of catching facilities | Bruising, wounds, fractures, dislocated bone | Fear | | | | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. |
| Inadequate catching (manual/harvester) | Poor maintenance of catching facilities | Bruising, wounds, fractures, dislocated bone | Human-animal relationship | | | | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. |
| Duration | Long duration between catching and departure | Fatigue | Comfort around resting | | | | | | | | | | | | | | | | | | | | | | | | | | |
| b.) Installations | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Inadequate preloading installations | Inadequate protection from the wind | Cold stress | Thermal comfort | n.a. | | | n.a. | | | | | | | | | | n.a. | | | | | | | | | | n.a. | | |
| Inadequate preloading installations | Inadequate protection from the sun | Heat stress | Thermal comfort | | n.a. | | | n.a. | | | | | | | | | n.a. | | | | | | | | | | n.a. | | |
| Inadequate preloading installations | Lack of adequate ventilation | Heat stress | Thermal comfort | | | | | | | | | | | | | | | | | | | | | | | | | n.a. | |
| LOADING/ UNLOADING | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| a.) Crates design | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Inadequate crates design | Sharp objects | Bruising, wounds, fractures | Injuries | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Inadequate crates design | Mesh size too wide | Bruising, wounds, fractures, trapped extremities | Injuries | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Inadequate crates design | Mesh size too small | Heat stress | Thermal Comfort | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Inadequate crates design | Openings too small | Bruising, wounds, fractures, trapped extremities | Injuries | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Inadequate crates floor surface | Non solid bottom | Bruising, wounds, fractures | Injuries | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Inadequate crates floor surface | Non solid bottom | Contamination with faeces | Comfort around resting | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Inadequate crates floor surface | Non solid bottom | Contamination with faeces | disease | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Crates height | Too low (according to animal category), lack of position | Bruising, wounds, fractures | Injuries | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Crates height | Too low (according to animal category), lack of position | Heat stress | Thermal comfort | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Crates height | Too low (according to animal category), lack of position | Suffering upon deprived behaviour | Other behaviour | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Space allowance | Too low (according to animal category) | Suffering upon deprived behaviour | Other behaviour | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Space allowance | Too low (according to animal category) | Heat stress | Thermal comfort | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Space allowance | Too low (according to animal category) | Aggression | Fear | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Space allowance | Overcrowding (according to animal category) | Aggression | Injuries | | | | | | | | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | |
| Space allowance | Too high (according to animal category) | Bruising, wounds, fractures | Injuries | | | | | | | | | | | | | | | | | | | | | | | | | | |
| b.) loading of container/crates | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Inadequate Loading | Too rough handling (forklift → vibration and crushing) | Bruising, wounds, fractures | Injuries | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Inadequate Loading | Too rough handling (forklift → vibration and crushing) | Aversion | Fear | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Inadequate Loading | Throwing crates | Bruising, wounds, fractures | Injuries | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Inadequate Loading | Throwing crates | Aversion | Fear | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Inadequate Loading | Inadequate stacking of crates | Heat stress | Thermal comfort | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Inadequate Loading | Inadequate stacking of crates | Bruising, wounds, fractures | Injuries | | | | | | | | | | | | | | | | | | | | | | | | | | |
| c.) Sensory input (Sound Light) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Inadequate lighting | Glaring lights, sudden change of light, too much light | Vocalising, restless, aggression, aversion | Fear | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Inadequate lighting | Glaring lights, sudden change of light, too much light | Vocalising, restless, aggression, aversion | Comfort around resting | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Noises | Too loud unfamiliar noises, hissing noises | Vocalising, restless, excited | Fear | | | | | | | | | | | | | | | | | | | | | | | | | | |
| TRANSPORT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Vehicle design | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| a) Suspension | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Poor suspension | Vibration | Bruising, wounds, fractures | Injuries | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Poor suspension | Vibration | Aversion | Fear | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Poor suspension | Vibration | Fatigue | Ease of movement | | | | | | | | | | | | | | | | | | | | | | | | | | |
| b.) Roof | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Absence of roof | Solar gain heat | Heat stress | Thermal comfort | | | | | | | | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | |
| Absence of roof | Solar gain heat | Heat stress | Thirst | | | | | | | | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | |
| Absence of roof | Drop of temperature | Cold stress | Thermal comfort | | | | | | | | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | |
| Inadequate roof condition | Gaps, holes, protrusions | Heat stress | Thirst | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Inadequate roof condition | Gaps, holes, protrusions | Heat stress | Thermal comfort | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Inadequate roof condition | Gaps, holes, protrusions | Cold stress | Thermal comfort | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Inadequate roof condition | Gaps, holes, protrusions | Soaked animals | Comfort around resting | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Inadequate roof condition | Gaps, holes, protrusions | Soaked animals | Thermal comfort | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Inadequate roof condition | Gaps, holes, protrusions | Burning, skin lesions | Injuries | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Inadequate roof insulation | Solar gain heat | Heat stress, overheating | Thermal comfort | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Inadequate roof insulation | Solar gain heat | Heat stress, overheating | Comfort around resting | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Inadequate roof insulation | Condense water | Soaked animals | Thermal comfort | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Inadequate roof insulation | Condense water | Soaked animals | Comfort around resting | | | | | | | | | | | | | | | | | | | | | | | | | | |
| c.) Sensory input (Sound Light) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Inadequate lighting | Glaring lights, sudden change of light, shadows | Vocalising, restless, aggression | Fear | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Inadequate lighting | Glaring lights, sudden change of light, shadows | Vocalising, restless, aggression | Comfort around resting | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Inadequate overall noise | Too loud unfamiliar noises, hissing noise | Vocalising, restless, aversion | Fear | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Inadequate overall noise | Too loud unfamiliar noises, hissing noise | Vocalising, restless, aversion | Comfort around resting | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Drafts blowing towards animals | Change of pressure when passing other vehicles | Disorientation, aversion | Fear | | | | | | | | | | | | | | | | | | | | | | | | | | |
| d.) Microclimate throughout transportation | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Inadequate ventilation | Lack of forced ventilation system | Heat stress, overheating, dyspnoeic, fatigue | Thermal comfort | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Inadequate ventilation | Mesh size of sidewalls too small | Heat stress, overheating, dyspnoeic, fatigue | Thermal comfort | | | | n.a. | | | | n.a. | | | | | | | | | | | | | n.a. | | | | n.a. | |
| Inadequate ventilation | Mesh size of sidewalls too wide | Cold stress | Thermal comfort | n.a. | | | | n.a. | | | | | | | | | | | | | | | | | | | n.a. | n.a. | |
| Absence of side protection in the vehicle | Lack of protection from wind | Cold stress | Thermal comfort | n.a. | | | | | n.a. | | | | | | | | | | | | | | | | | | n.a. | n.a. | |
| Absence of side protection in the vehicle | Lack of protection from dust | Soaked animals | Comfort around resting | | | | | | | | | | | | | | | | | | | | | | | | n.a. | n.a. | |
| Absence of side protection in the vehicle | Lack of protection from extreme temperatures | Heat stress | Thermal comfort | | | | | | | | | | | | | | | | | | | | | | | | n.a. | n.a. | |
| Inadequate ventilation | Lack of mechanical ventilation in cold climate | Dyspnoeic, intoxication | Disease | | | | n.a. | | | | | n.a. | | | | | | | | | | | | | | | n.a. | n.a. | |
| Inadequate ventilation | Internal crates: low air penetration | Heat stress, overheating, dyspnoeic, weary | Thermal comfort | | | | | | | | | | | | | | | | | | | | | | | | n.a. | n.a. | |
| Poor air quality | Air contaminated with exhaust gases | Respiratory problems | Disease | | | | | | | | | | | | | | | | | | | | | | | | n.a. | n.a. | |
| Poor air quality | High dust level | Respiratory problems | Disease | | | | | | | | | | | | | | | | | | | | | | | | n.a. | n.a. | |
| Poor air quality | Not sufficient oxygen | Respiratory problems | Disease | | | | | | | | | | | | | | | | | | | | | | | | n.a. | n.a. | |
| e.) Watering/ Feeding | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Absence of watering facilities | No availability of water | Restless, vocalising | Thirst | | | | | | | | | | | | | | | | | | | | | | | | n.a. | n.a. | |
| Absence of feeding facilities | No availability of feed | Restless, vocalising | Hunger | | | | | | | | | | | | | | | | | | | | | | | | n.a. | n.a. | |

Table 5. Hazards related to transport of poultry

| HAZARD | Hazard description | Adverse effect description | Adverse effect type | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 |
|--|--|--|------------------------|----------|-----|-----|------|-----|-----|------------|-----|-----|---------------------|------|------|------|------|------|-------|-----|-----|--------|-----|-----|--------|-----|-----|-----|
| | | | | Broilers | | | Hens | | | Spent Hens | | | One day old chicken | | | | | | Ducks | | | Quails | | | Turkey | | | |
| | | | | RSA | RSB | RSN | RSA | RSB | RSN | RSA | RSB | RSN | RSA | RSB | RSN | RLA | RLB | RLN | PLN | RSA | RSB | RSN | RSA | RSB | RSN | RSA | RSB | RSN |
| MANAGEMENT | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| PREPARATION TO THE TRANSPORT | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| a.) Fasting | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Fasting | Too long fasting duration | Foraging, restless, vocalising | Hunger | | | | | | | | | | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | | | | | | | | | | |
| b.) Preparation | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Inadequate cleaning and disinfection of transport vehicles | Uncleanliness, transport vehicles contaminated with faeces | Spread of disease | Disease | | | | | | | | | | | | | | | | | | | | | | | | | |
| Inadequate selection of animals to transport | Animals unfit to travel | Bruising, wounds, fractures | Injuries | | | | | | | | | | | | | | | | | | | | | | | | | |
| Inadequate selection of animals to transport | Animals unfit to travel | Immobile, illness | Disease | | | | | | | | | | | | | | | | | | | | | | | | | |
| d.) Crating | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stocking density in crates | Too high (according to animal category) | Bruising, wounds, fractures, , | Injuries | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stocking density in crates | Too high (according to animal category) | Lack of possibility to lie down, to groom | Ease of movement | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stocking density in crates | Too high (according to animal category) | Aggression | Injuries | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stocking density in crates | Too high (according to animal category) | Aggression | Fear | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stocking density in crates | Too high (according to animal category) | Heatstress | Thermal comfort | | | | | | | | | | | | | | | | | | | | | | | | | |
| Filling crates | Rough handling | Bruising, wounds, fractures, trapped extremities | Injuries | | | | | | | | | | | | | | | | | | | | | | | | | |
| Inappropriate crating in farm before transport | Separation from family unit | Social stress | Social behaviour | | | | | | | | | | | | | | | | | | | | | | | | | |
| Inappropriate crating in farm before transport | Mixing of animals from different origin | Social stress | Social behaviour | | | | | | | | | | | | | | | | | | | | | | | | | |
| Inappropriate crating in farm before transport | Unfamiliar environment | Aversion | Fear | | | | | | | | | | | | | | | | | | | | | | | | | |
| e.) Handling | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lack of previous human contact | Inappropriate previous positive contacts with human | Aversion, scape attempt | Fear | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lack of previous human contact | Inappropriate previous positive contacts with human | Scape attempt | Injuries | | | | | | | | | | | | | | | | | | | | | | | | | |
| Untrained personal | Rough handling | Bruising, wounds, fractures | Injuries | | | | | | | | | | | | | | | | | | | | | | | | | |
| LOADING AND UNLOADING | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| a.) Loading | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Inadequate management of loading | Excessive time in stacking crates at the farm waiting | Heatstress | Thermal comfort | | | | | | | | | | | | | | | | | | | | | | | | | |
| Innapropriate stacking of crates | Poor ventilation | Heatstress | Thermal comfort | | | | | | | | | | | | | | | | | | | | | | | | | |
| Container loading | Rough handling | Bruising, wounds, fractures | Injuries | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stocking density of crates/containers on the transport vehicle | Too high | Heatstress | Thermal comfort | | | | | | | | | | | | | | | | | | | | | | | | | |
| Arrangement of crates/containers | Less air distribution | Heatstress | Thermal comfort | | | | | | | | | | | | | | | | | | | | | | | | | |
| Waiting time between arrival and unloading | Too long duration | Heatstress | Thermal comfort | | | | | | | | | | | | | | | | | | | | | | | | | |
| TRANSPORT | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| a.) Driver | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Driver | Rough driving, bad driving technique | Struggling, lose of balance, falling | Injuries | | | | | | | | | | | | | | | | | | | | | | | | | |
| Driver | Rough driving, bad driving technique | Struggling, lose of balance, falling | Ease of movement | | | | | | | | | | | | | | | | | | | | | | | | | |
| Driver | Rough driving, bad driving technique | Struggling, lose of balance, falling | Comfort around resting | | | | | | | | | | | | | | | | | | | | | | | | | |

Table 5. Hazards related to transport of poultry (cont.)

| Scenarios | Species | Animal categories | Means of transport | Transport duration | Thermal environment |
|-----------|---------|-------------------|--------------------|--------------------|---------------------|
| 1 | rabbit | breeding | road | short | above |
| 2 | rabbit | breeding | road | short | below |
| 3 | rabbit | breeding | road | short | neutral |
| 4 | rabbit | breeding | road | long | above |
| 5 | rabbit | breeding | road | long | below |
| 6 | rabbit | breeding | road | long | neutral |
| 7 | rabbit | slaughter | road | short | above |
| 8 | rabbit | slaughter | road | short | below |
| 9 | rabbit | slaughter | road | short | neutral |
| 10 | rabbit | slaughter | road | long | above |
| 11 | rabbit | slaughter | road | long | below |
| 12 | rabbit | slaughter | road | long | neutral |

Figure 1. Different transport scenarios in rabbits

| HAZARD | Hazard description | Adverse effect description | Adverse effect type | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|--|---|---------------------------|------|------|------|------|------|-----|------|------|------|------|------|-----|
| | | | | RSA | RSB | RSN | RLA | RLB | RLN | RSA | RSB | RSN | RLA | RLB | RLN |
| FACILITIES and STRUCTURES | | | | | | | | | | | | | | | |
| PREPARATION TO THE TRANSPORT | | | | | | | | | | | | | | | |
| a.) Preloading installations | | | | | | | | | | | | | | | |
| Inadequate preloading installations | Inadequate protection from the wind | Cold stress | Thermal comfort | n.a. | | | n.a. | | | n.a. | | | | | |
| Inadequate preloading installations | Inadequate protection from the sun | Heat stress | Thermal comfort | | n.a. | | | n.a. | | | n.a. | | | n.a. | |
| Inadequate preloading installations | Lack of adequate ventilation | Heat stress | Thermal comfort | | n.a. | | | n.a. | | | n.a. | | | n.a. | |
| LOADING / UNLOADING | | | | | | | | | | | | | | | |
| a.) Stacking of crates | | | | | | | | | | | | | | | |
| Inadequate stacking of crates | Unfamiliar environment | Stressful situation | Social behaviour | | | | | | | | | | | | |
| Inadequate stacking of crates | Unfamiliar environment | Stressful situation | Fear | | | | | | | | | | | | |
| Inadequate stacking of crates | Poor ventilation | Heat stress | Thermal comfort | | n.a. | | | n.a. | | | n.a. | | | n.a. | |
| b.) Loading tools | | | | | | | | | | | | | | | |
| Use of loading tools in bad condition | Lack of maintenance | Bruising, wounds, fractures | Injuries | | | | | | | | | | | | |
| Use of loading tools in bad condition | Lack of maintenance | Stressful situation | Fear | | | | | | | | | | | | |
| TRANSPORT | | | | | | | | | | | | | | | |
| a.) Crates design | | | | | | | | | | | | | | | |
| Inadequate size | Crates height too low | Inability to raise the head/inability to stand | Ease of movement | | | | | | | | | | | | |
| Inadequate size | Crates height too low | Inability to raise the head/inability to stand | Other behaviours | | | | | | | | | | | | |
| Inadequate crate material | Iron | Foot pad injuries | Injuries | | | | | | | | | | | | |
| Inadequate type of floor | Solid floor | Cold stress | Thermal comfort | n.a. | | | n.a. | | | n.a. | | | n.a. | | |
| Inadequate type of floor | Not solid floor | Heat stress | Thermal comfort | | n.a. | | | n.a. | | | n.a. | | | n.a. | |
| Inadequate type of floor | Not solid floor | Urine and faeces contamination | Disease | | | | | | | | | | | | |
| Inadequate floor surface | Smooth surface | Aggression | Social behaviour | | | | | | | | | | | | |
| Inadequate floor surface | Smooth surface | Bruising, wounds, fractures | Injuries | | | | | | | | | | | | |
| Inadequate floor surface | Smooth surface | Panic | Fear | | | | | | | | | | | | |
| Inadequate floor condition | Floor condition (gaps, potholes) | Bruising, wounds, fractures | Injuries | | | | | | | | | | | | |
| Inadequate mesh size | Too wide | Bruising, wounds, fractures | Injuries | | | | | | | | | | | | |
| Inadequate mesh size | Too small | Ear bruising, wounds | Injuries | | | | | | | | | | | | |
| Inadequate structure of sides | Sharp protrusions | Bruising, wounds | Injuries | | | | | | | | | | | | |
| Inadequate gate design | Gate too small | Bruising, wounds | Injuries | | | | | | | | | | | | |
| Use of clean transport crates | Strange environment | Stressful situation | Fear | | | | | | | | | | | | |
| b.) Vehicle design | | | | | | | | | | | | | | | |
| Absence of side protection in the vehicle | Lack of side curtain in the vehicle | Cold stress | Thermal comfort | n.a. | | | n.a. | | | n.a. | | | n.a. | | |
| Absence of roof in the vehicle | Solar gain heat | Heat stress | Thermal comfort | | n.a. | | | n.a. | | | n.a. | | | n.a. | |
| Absence of roof in the vehicle | Drop of temperature | Cold stress | Thermal comfort | | n.a. | | | n.a. | | | n.a. | | | n.a. | |
| Inadequate roof condition | Gaps, holes | Heat stress | Thirst | | | | | | | | | | | | |
| Inadequate roof condition | Gaps, holes | Heat stress | Thermal comfort | | | | | | | | | | | | |
| Inadequate roof condition | Gaps, holes | Heat stress | Thermal comfort | | | | | | | | | | | | |
| Inadequate roof condition | Gaps, holes | Cold stress | Thermal comfort | n.a. | | | n.a. | | | n.a. | | | n.a. | | |
| Inadequate roof condition | Gaps, holes | Soaked animals | Comfort around resting | | | | | | | | | | | | |
| Inadequate roof condition | Gaps, holes | Soaked animals | Thermal comfort | | | | | | | | | | | | |
| Inadequate roof condition | Gaps, holes | Respiratory problems | Disease | | | | | | | | | | | | |
| Inadequate roof condition | Gaps, holes | Burning, skin lesions | Injuries | | | | | | | | | | | | |
| Inadequate roof insulation | Solar gain heat | Heat stress | Thirst | | | | n.a. | | | n.a. | | | n.a. | | |
| Inadequate roof insulation | Solar gain heat | Heat stress | Thermal comfort | | | | n.a. | | | n.a. | | | n.a. | | |
| Inadequate roof insulation | Water condensation | Rising humidity | Thermal comfort | | | | n.a. | | | n.a. | | | n.a. | | |
| Inadequate crate subjection | Falling of crates | Bruising, wounds, fractures | Injuries | | | | | | | | | | | | |
| c.) Feeding and watering | | | | | | | | | | | | | | | |
| Absence of feeding facilities | No availability of food for animals | Denutrition | Hunger | n.a. | n.a. | n.a. | | | | n.a. | n.a. | n.a. | | | |
| Absence of drinking facilities | No availability of water for animals | Dehydration | Thirst | n.a. | n.a. | n.a. | | | | n.a. | n.a. | n.a. | | | |
| d.) Sensory input (Sound Smell Light) | | | | | | | | | | | | | | | |
| Inadequate overall noise | High intensity and frequency sounds | Disorientation | Fear | | | | | | | | | | | | |
| Inadequate lighting | Sudden change of light (tunnels) | Disorientation | Fear | | | | | | | | | | | | |
| Unfamiliar smell | Unfamiliar smell | Aversion | Fear | | | | | | | | | | | | |
| Drafts blowing towards animals | Change of pressure when passing other vehicles | Disorientation | Fear | | | | | | | | | | | | |
| e.) Microclimate throughout transportation | | | | | | | | | | | | | | | |
| Inadequate ventilation | Rising of temperature | Heat stress | Thermal comfort | | | | n.a. | | | n.a. | | | n.a. | | |
| Inadequate ventilation | Rising of temperature | Hypertermia | Disease | | | | | | | | | | | | |
| Inadequate ventilation | Location of ventilation apertures | Heat stress | Thermal comfort | | | | n.a. | | | n.a. | | | n.a. | | |
| Inadequate ventilation | Ventilation apertures design | Heat stress | Thermal comfort | | | | n.a. | | | n.a. | | | n.a. | | |
| Inadequate ventilation | Ventilation apertures distribution | Heat stress | Thermal comfort | | | | n.a. | | | n.a. | | | n.a. | | |
| Inadequate air quality | Inadequate ventilation | Respiratory disorders | Disease | | | | | | | | | | | | |
| Inadequate air quality | Lack of mechanical ventilation in cold climate | Respiratory disorders | Disease | | | | | | | | | | | | |
| Inadequate air quality | Increase of noxious gases (NH3, CO2) | Respiratory disorders | Disease | | | | | | | | | | | | |
| Inadequate air quality | Not sufficient O2 | Respiratory disorders | Disease | | | | | | | | | | | | |
| Inadequate air quality | Noxious gases from the lorry | Respiratory disorders | Disease | | | | | | | | | | | | |
| Inadequate air quality | Moderate or severe dust level | Respiratory disorders | Disease | | | | | | | | | | | | |
| MANAGEMENT | | | | | | | | | | | | | | | |
| PREPARATION TO THE TRANSPORT | | | | | | | | | | | | | | | |
| a.) Fasting | | | | | | | | | | | | | | | |
| Too long fasting | Too long fasting (>24h) | Denutrition, loss of body weight | Hunger | | | | | | | | | | | | |
| Too long fasting | Too long fasting (>24h) | Fatigue | Ease of movement | | | | | | | | | | | | |
| b.) Management | | | | | | | | | | | | | | | |
| Lack of previous human contact | Inappropriate previous positive contacts with humans | Scape attempt | Human-animal relationship | | | | | | | | | | | | |
| Lack of previous human contact | Inappropriate previous positive contacts with humans | Scape attempt | Injuries | | | | | | | | | | | | |
| Lack of previous human contact | Inappropriate previous positive contacts with humans | Fear | Fear | | | | | | | | | | | | |
| Inadequate selection of animals to transport | Transport of animals not fitted to travel | Incapacity of animals to travel | Injuries | | | | | | | | | | | | |
| Inadequate selection of animals to transport | Transport of animals not fitted to travel | Incapacity of animals to travel | Ease of movement | | | | | | | | | | | | |
| Inadequate selection of animals to transport | Transport of animals not fitted to travel | Incapacity of animals to travel | Human-animal relationship | | | | | | | | | | | | |
| Inadequate cleanliness of vehicle | Uncleanliness of vehicle and insufficient disinfection | Spread disease | Disease | | | | | | | | | | | | |
| Inadequate planing of the transport | Stationary vehicle due to delay in traffic operation | Heat stress | Thermal comfort | | | | n.a. | | | n.a. | | | n.a. | | |
| Inadequate planing of the transport | Stationary vehicle due to delay in traffic operation | Heat stress | Thermal comfort | | | | n.a. | | | n.a. | | | n.a. | | |
| Inadequate planing of the transport | No planning of loading/unloading schedule | Heat stress | Thermal comfort | | | | n.a. | | | n.a. | | | n.a. | | |
| Inadequate planing of the transport | No planning of loading/unloading schedule | Cold stress | Thermal comfort | | | | n.a. | | | n.a. | | | n.a. | | |
| Inadequate planing of the transport | No plans for emergency | Heat stress | Injuries | | | | n.a. | | | n.a. | | | n.a. | | |
| Inadequate planing of the transport | No plans for emergency | Heat stress | Disease | | | | n.a. | | | n.a. | | | n.a. | | |
| Inadequate planing of the transport | Lack of preparation for the journey (road conditions) | Problems maintaining balance | Ease of movement | | | | | | | | | | | | |
| LOADING / UNLOADING | | | | | | | | | | | | | | | |
| a.) Handling | | | | | | | | | | | | | | | |
| Inadequate handlers | Inappropriate handling (hitting, lack of motivation, shouting) | Bruising, wounds | Injuries | | | | | | | | | | | | |
| Inadequate handlers | Inappropriate handling (hitting, lack of motivation, shouting) | Scape attempts | Human-animal relationship | | | | | | | | | | | | |
| Inadequate handlers | Inappropriate handling (hitting, lack of motivation, shouting) | Reluctant to move | Fear | | | | | | | | | | | | |
| Inappropriate crating into farm before transport | Separation from family unit | Social stress | Social behaviour | | | | | | | | | | | | |
| Inappropriate crating into farm before transport | Mixing of animals from different origin | Social stress | Social behaviour | | | | | | | | | | | | |
| Inappropriate crating into farm before transport | Unfamiliar environment | Stressful situation | Fear | | | | | | | | | | | | |
| Inadequate stocking density in crates | Overcrowding (Standard 10 rabbits/crate) | Aggression | Social behaviour | | | | | | | | | | | | |
| Inadequate stocking density in crates | Overcrowding (Standard 10 rabbits/crate) | Aggression | Injuries | | | | | | | | | | | | |
| Inadequate stocking density in crates | Overcrowding (Standard 10 rabbits/crate) | Heat stress | Thermal comfort | | | | n.a. | | | n.a. | | | n.a. | | |
| Inadequate stocking density in crates | Overcrowding (Standard 10 rabbits/crate) | Heat stress | Comfort around resting | | | | n.a. | | | n.a. | | | n.a. | | |
| Stocking density of crates on the vehicle | Too high | Heat stress | Thermal comfort | | | | n.a. | | | n.a. | | | n.a. | | |
| TRANSPORT | | | | | | | | | | | | | | | |
| a.) Bedding | | | | | | | | | | | | | | | |
| Inadequate quality of bedding material | Inappropriate type of bedding (e.g. straw in summer) | Heat stress | Thermal comfort | | | | n.a. | | | n.a. | | | n.a. | | |
| Inadequate quality of bedding material | Inappropriate type of bedding (e.g. straw in summer) | Heat stress | Comfort around resting | | | | n.a. | | | n.a. | | | n.a. | | |
| Inadequate quantity of bedding material | No availability | Abnormal resting or not enough resting period | Comfort around resting | | | | | | | | | | | | |
| Absence of enrichment material for animals | Absence of sufficient amount of enrichment material | Abnormal behaviour (stereotype/redirected behaviour) | Other behaviours | | | | | | | | | | | | |
| b.) Driver | | | | | | | | | | | | | | | |
| Inadequate driver | Rough driving, bad driving technique | Struggling, lose of balance, falling, fatigue, restless | Injuries | | | | | | | | | | | | |
| Inadequate driver | Rough driving, bad driving technique | Struggling, lose of balance, falling, fatigue, restless | Ease of movement | | | | | | | | | | | | |
| Inadequate driver | Rough driving, bad driving technique | Struggling, lose of balance, falling, fatigue, restless | Comfort around resting | | | | | | | | | | | | |
| Inadequate driver | Lack of monitoring during transport | Incapacity of animals to travel | Injuries | | | | | | | | | | | | |
| Inadequate driver | Lack of monitoring during transport | Incapacity of animals to travel | Disease | | | | | | | | | | | | |
| Inadequate driver | Disregarding adaptation of forced ventilation to changing climate conditions | Heat stress | Thermal comfort | | | | n.a. | | | n.a. | | | n.a. | | |
| Inadequate driver | Disregarding temperature measurement | Heat stress | Thermal comfort | | | | n.a. | | | n.a. | | | n.a. | | |

Table 6. Hazards related to transport of rabbits

| Scenarios | Species | Animal categories | Means of transport | Transport duration | Thermal environment |
|-----------|-----------------|-------------------|--------------------|--------------------|---------------------|
| 1 | sheep and goats | adults | road | short | above |
| 2 | sheep and goats | adults | road | short | below |
| 3 | sheep and goats | adults | road | short | neutral |
| 4 | sheep and goats | adults | road | long | above |
| 5 | sheep and goats | adults | road | long | below |
| 6 | sheep and goats | adults | road | long | neutral |
| 7 | sheep and goats | adults | sea | long | above |
| 8 | sheep and goats | adults | sea | long | below |
| 9 | sheep and goats | adults | sea | long | neutral |
| 10 | sheep and goats | young | road | short | above |
| 11 | sheep and goats | young | road | short | below |
| 12 | sheep and goats | young | road | short | neutral |
| 13 | sheep and goats | young | road | long | above |
| 14 | sheep and goats | young | road | long | below |
| 15 | sheep and goats | young | road | long | neutral |
| 16 | sheep and goats | young | sea | long | above |
| 17 | sheep and goats | young | sea | long | below |
| 18 | sheep and goats | young | sea | long | neutral |

Figure 7. Different transport scenarios in sheep and goats

| HAZARD | Hazard description | Adverse effect description | Adverse effect type | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
|--|--|---|---------------------------|-------|-----|------|------|-----|-----|------|------|-----|-------|------|------|------|------|------|------|------|------|
| | | | | Adult | | | | | | | | | Young | | | | | | | | |
| | | | | RSA | RSB | RSN | RLA | RLB | RLN | SLA | SLB | SLN | RSA | RSB | RSN | RLA | RLB | RLN | SLA | SLB | SLN |
| LOADING | | | | | | | | | | | | | | | | | | | | | |
| a.) Handling | | | | | | | | | | | | | | | | | | | | | |
| Handlers | Inappropriate handling (hitting, lack of motivation, shouting) | Bruising, wounds | Injuries | | | | | | | | | | | | | | | | | | |
| Handlers | Inappropriate handling (hitting, lack of motivation, shouting) | Escape attempts, balking | Human-animal relationship | | | | | | | | | | | | | | | | | | |
| Handlers | Inappropriate handling (hitting, lack of motivation, shouting) | Escape attempts, balking | Fear | | | | | | | | | | | | | | | | | | |
| Handlers | Too short loading time according to animals | Fatigue | Ease of movement | | | | | | | | | | | | | | | | | | |
| Handlers | Too short loading time according to animals | Stress | Fear | | | | | | | | | | | | | | | | | | |
| Handlers | Number of animals in the moving group too high | Balking | Human-animal relationship | | | | | | | | | | | | | | | | | | |
| Handlers | Incorrect tethering | Falling, bruising, wounds | Injuries | | | | | | | | | | | | | | | | | | |
| Composition of groups | Mixing unfamiliar animals | Aggression, bruising, wounds | Injuries | | | | | | | | | | | | | | | | | | |
| Composition of groups | Mixing unfamiliar animals | Social stress | Fear | | | | | | | | | | | | | | | | | | |
| Composition of groups | Mixing unfamiliar animals | Spreading of diseases | Disease | | | | | | | | | | | | | | | | | | |
| Composition of groups | Separating familiar animals | Social stress | Fear | | | | | | | | | | | | | | | | | | |
| Composition of groups | Mixing of animals of different size/age (10% differences) | Aggression, bruising, wounds | Injuries | | | | | | | | | | | | | | | | | | |
| Composition of groups | Mixing of animals of different size/age (10% differences) | Social stress | Fear | | | | | | | | | | | | | | | | | | |
| Composition of groups | Mixing horned/ unhorned animals | Bruising, wounds | Injuries | | | | | | | | | | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. |
| Composition of groups | Mixing horned/ unhorned animals | Aggression | Social behaviour | | | | | | | | | | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. |
| TRANSPORT | | | | | | | | | | | | | | | | | | | | | |
| Vehicle design | | | | | | | | | | | | | | | | | | | | | |
| a.) Bedding | | | | | | | | | | | | | | | | | | | | | |
| Inadequate quality of bedding material | Type of bedding according to climate | Heat stress, cold stress | Thermal comfort | | | | | | | | | | | | | | | | | | |
| Inadequate quality of bedding material | Type of bedding according to climate | Heat stress, cold stress | Disease | | | n.a. | | | | n.a. | | | | | | | | | | | |
| Inadequate quality of bedding material | Type of bedding, high level of wetness, high level of dirt/dust | Dyspnoeic, panting for air | Disease | | | n.a. | | | | n.a. | | | | | | | | | | | |
| Quantity of bedding material | Availability | Restless, fatigue | Comfort around resting | | | | | | | | | | | | | | | | | | |
| Feeding and watering | | | | | | | | | | | | | | | | | | | | | |
| a.) Feeding | | | | | | | | | | | | | | | | | | | | | |
| Inadequate feed quality | Hazardous to health, less energetic content, acceptability, nutrient density | Desnutrition, loss of body weight, foraging, restless, vomiting | Hunger | | | | | | | | | | | | | | | | | | |
| Inadequate feed quantity | Less feed according to number of animal, inadequate energy density | Desnutrition, loss of body weight, foraging, restless, vomiting | Hunger | | | | | | | | | | | | | | | | | | |
| Inadequate feed quantity | Less feed according to number of animal, inadequate energy density | Fatigue | Ease of movement | | | | | | | | | | | | | | | | | | |
| Inadequate feed quantity | Less feed according to number of animal, inadequate energy density | Aggression | Social behaviour | | | | | | | | | | | | | | | | | | |
| Inadequate feed quantity | Less feed according to number of animal, inadequate energy density | Aggression | Injuries | | | | | | | | | | | | | | | | | | |
| Inadequate feeding interval | Interval of feed application too long (according to animal needs) | Desnutrition, loss of body weight, foraging, restless, vomiting | Hunger | | | | | | | | | | | | | | | | | | |
| Inadequate duration of feeding | Too short feeding duration | Desnutrition, loss of body weight, foraging, restless, vomiting | Hunger | | | | | | | | | | | | | | | | | | |
| Inadequate duration of feeding | Too short feeding duration | Aggression | Injuries | | | | | | | | | | | | | | | | | | |
| b.) Watering | | | | | | | | | | | | | | | | | | | | | |
| Water supply | too long period between water applications | Dehydration, vocalising, restless | Thirst | | | | | | | | | | | | | | | | | | |
| Lack of training to use the drinking facilities | Different drinking facilities as in husbandry system | Dehydration | Thirst | | | | | | | | | | | | | | | | | | |
| Lack of training to use the drinking facilities | Different drinking facilities as in husbandry system | Heatstress, overheating | Thermal comfort | | | n.a. | n.a. | | | n.a. | n.a. | | | | | | | | | | |
| Inadequate water quality | Unfamiliar taste/different tasting water | Dehydration | Thirst | | | | | | | | | | | | | | | | | | |
| Inadequate water quality | Unfamiliar taste/different tasting water | Heatstress, overheating | Thermal comfort | | | n.a. | n.a. | | | n.a. | n.a. | | | | | | | | | | |
| Floor allowance, resting periods and driving skills | | | | | | | | | | | | | | | | | | | | | |
| a.) Stocking density | | | | | | | | | | | | | | | | | | | | | |
| Inadequate stocking density | Stocking density too high (according to category) | Aggression, bruising, wounds | Injuries | | | | | | | | | | | | | | | | | | |
| Inadequate stocking density | Stocking density too high (according to category and length) | Heatstress, overheating | Thermal comfort | | | n.a. | | | | | | | | | | | | | | | |
| Inadequate stocking density | Stocking density too high (according to category) | Lack of possibility to lie down/ to groom, lack of exercise | Comfort around resting | | | | | | | | | | | | | | | | | | |
| Inadequate stocking density | Stocking density too high (according to category) | Lack of possibility to lie down / stand up, fatigue | Fear | | | | | | | | | | | | | | | | | | |
| Inadequate stocking density | Stocking density too high (according to category) | Lack of possibility to feed | Hunger | | | | | | | | | | | | | | | | | | |
| Inadequate stocking density | Stocking density too high (according to category) | Lack of possibility to drink | Thirst | | | | | | | | | | | | | | | | | | |
| b.) Resting periods | | | | | | | | | | | | | | | | | | | | | |
| Multiple loading during the same trip | Mixing animals, multiple loading procedure | Aggression, bruising, wounds | Injuries | | | | | | | | | | | | | | | | | | |
| Multiple loading during the same trip | Mixing animals, multiple loading procedure | Fatigue, physical stress | Comfort around resting | | | | | | | | | | | | | | | | | | |
| Multiple loading during the same trip | Mixing animals, multiple loading procedure | Social stress | Fear | | | | | | | | | | | | | | | | | | |
| Multiple loading during the same trip | Mixing animals, multiple loading procedure | Spread disease | Disease | | | | | | | | | | | | | | | | | | |
| Inadequate resting time | <12 h | Inappropriate recovering from transport | Comfort around resting | | | | | | | | | | | | | | | | | | |
| Inadequate resting time | <12 h | Lack of possibility to feed | Hunger | | | | | | | | | | | | | | | | | | |
| Inadequate resting time | <12 h | Lack of possibility to drink | Thirst | | | | | | | | | | | | | | | | | | |
| Resting station | Stocking density too high | Aggression, bruising, wounds | Injuries | | | | | | | | | | | | | | | | | | |
| Resting station | Stocking density too high | Lack of possibility to lie down/ to groom, lack of exercise | Comfort around resting | | | | | | | | | | | | | | | | | | |
| Resting station | Inadequate feed quality | Desnutrition, loss of body weight, foraging, restless, vomiting | Hunger | | | | | | | | | | | | | | | | | | |
| Resting station | Inadequate feed quantity | Desnutrition, loss of body weight, foraging, restless, vomiting | Hunger | | | | | | | | | | | | | | | | | | |
| Resting station | Inadequate feed quantity | Fatigue | Ease of movement | | | | | | | | | | | | | | | | | | |
| Resting station | Mixing animals | Aggression | Social behaviour | | | | | | | | | | | | | | | | | | |
| Resting station | Mixing animals | Aggression | Injuries | | | | | | | | | | | | | | | | | | |
| c.) driving skills | | | | | | | | | | | | | | | | | | | | | |
| Driver | Rough driving, bad driving technique, swaying of vehicle | Problems maintaining balance, falling, bruising, wounds | Injuries | | | | | | | | | | | | | | | | | | |
| Driver | Rough driving, bad driving technique, swaying of vehicle | Physical stress | Ease of movement | | | | | | | | | | | | | | | | | | |
| Driver | Rough driving, bad driving technique, swaying of vehicle | Physical stress | Comfort around resting | | | | | | | | | | | | | | | | | | |
| Driver | Lack of monitoring during transport, lack of education/competence | No feeding during transport | Hunger | | | | | | | | | | | | | | | | | | |
| Driver | Lack of monitoring during transport, lack of education/competence | Dehydration, heatstress | Thirst | | | | | | | | | | | | | | | | | | |
| Driver | Lack of monitoring during transport, lack of education/competence | Dehydration, heatstress, coldstress, dyspnoeic | Thermal discomfort | | | | | | | | | | | | | | | | | | |

Table 7. Hazards related to transport of sheep and goats (cont.)

Table with columns: Hazard, Hazard description, Adverse effect description, Adverse effect type, Magnitude, Quantitative assessment of P. of likelihood, Quantitative assessment of P. of Exposure, Risk Characterization (Risk estimate, Qualitative uncertainty), and Risk (Magnitude, Risk, Median risk, P8 Risk, P05 Risk).

Table 6. Risk Assessment on the welfare aspect of the transport of heifers, road transport, long journey, below thermoneutral zone (cont.)

| Scenarios | Species | Animal categories | Means of transport | Transport duration | Thermal environment |
|-----------|---------|-------------------|--------------------|--------------------|---------------------|
| 1 | equine | broken | road | short | above |
| 2 | equine | broken | road | short | below |
| 3 | equine | broken | road | short | neutral |
| 4 | equine | broken | road | long | above |
| 5 | equine | broken | road | long | below |
| 6 | equine | broken | road | long | neutral |
| 7 | equine | broken | sea | long | above |
| 8 | equine | broken | sea | long | below |
| 9 | equine | broken | sea | long | neutral |
| 10 | equine | unbroken | road | short | above |
| 11 | equine | unbroken | road | short | below |
| 12 | equine | unbroken | road | short | neutral |
| 13 | equine | unbroken | road | long | above |
| 14 | equine | unbroken | road | long | below |
| 15 | equine | unbroken | road | long | neutral |
| 16 | equine | unbroken | sea | long | above |
| 17 | equine | unbroken | sea | long | below |
| 18 | equine | unbroken | sea | long | neutral |
| 19 | equine | mares with foals | road | short | above |
| 20 | equine | mares with foals | road | short | below |
| 21 | equine | mares with foals | road | short | neutral |
| 22 | equine | stallions | road | short | above |
| 23 | equine | stallions | road | short | below |
| 24 | equine | stallions | road | short | neutral |
| 25 | equine | stallions | road | long | above |
| 26 | equine | stallions | road | long | below |
| 27 | equine | stallions | road | long | neutral |
| 28 | equine | stallions | sea | long | above |
| 29 | equine | stallions | sea | long | below |
| 30 | equine | stallions | sea | long | neutral |

Figure 4. Different transport scenarios in horses

