पशुपालन एवं डेयरी विभाग, भारत सरकार
Department of Animal Husbandry and Dairying
Government of India

Azadi Ka Amrit Mahotsav

BILL & MELINDA GATES foundation

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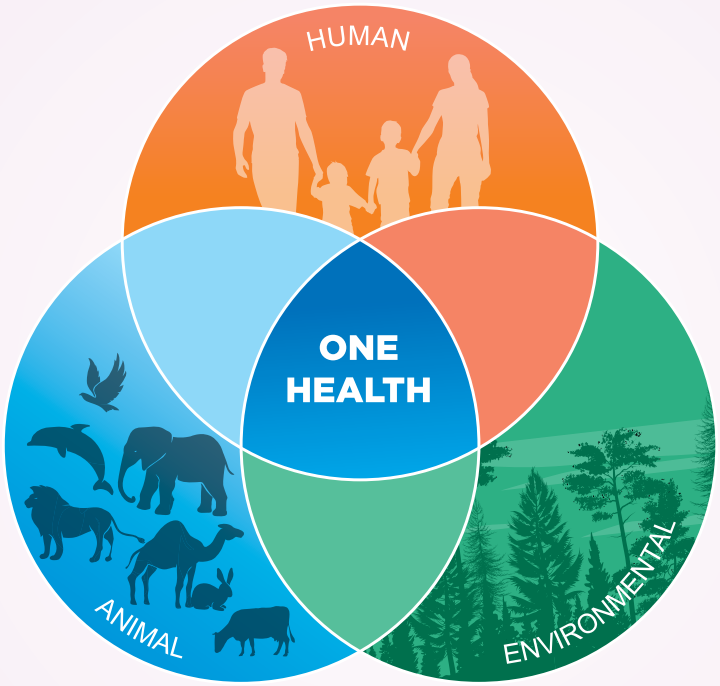
ENHANCING FOOD SAFETY THROUGH

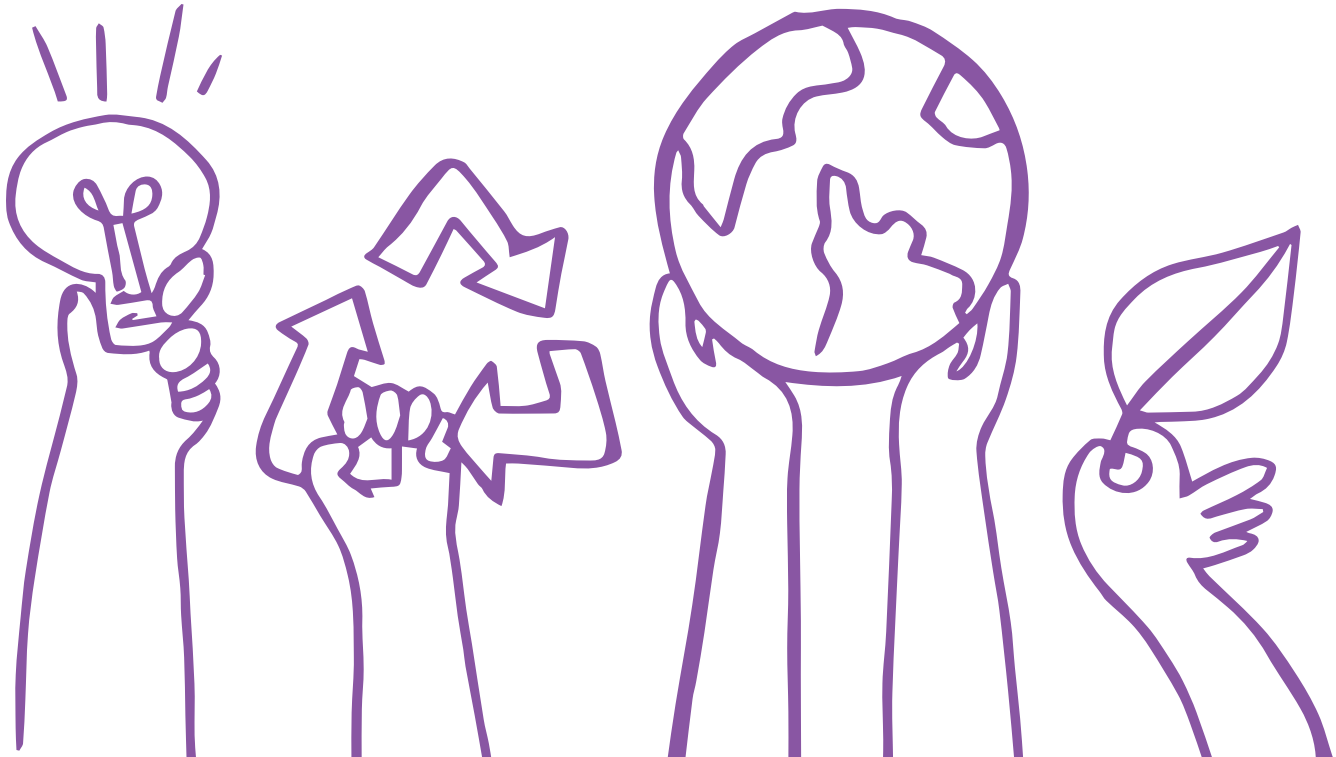
One Health Interventions



ONE HEALTH
HEALTHY ANIMALS, HEALTHY PEOPLE, HEALTHY NATIONS

One Health Support Unit (OHSU)
Department of Animal Husbandry and Dairying, MoFAHD, Government of India

Content



Executive summary

Animal disease pathogens and residues from feed and veterinary services could enter human body via food and thus it is necessary to control these food safety hazards throughout the supply chain, right from feed-to-fork. An analysis has been done based on the concept of the Hazard Analysis Critical Control Point (HACCP) for food products of animal origin (milk, meat, and eggs) gaps and probable solutions have also been identified and it is deemed necessary that food safety department and animal husbandry department should converge to address these food safety hazards. Few of the probable solutions have been identified where Food Safety and Standards Authority of India (FSSAI) & Department of Animal Husbandry and Dairying (DAHD) can converge under the interventions identified in One Health project of DAHD to strengthen the food safety ecosystem in India and to achieve the holistic One Health system in India.

Foods of animal origin have very important role in a balanced diet and, therefore, the animal-sourced foods (ASFs) must be safe for human consumption. Equally important is the need for food to be perceived as safe by the consumer. Safe food of animal origin must be free from animal pathogens that infect man and from contamination by residues. With animals, disease is inevitable; perfectly healthy animals can also be carriers and may be asymptotic excreters of pathogens. The diseases of animals which affect the safety of food are predominantly those that cause enteric disorders. While the production of meat, milk, and eggs – regardless of new technology or changes in production methods – cannot be expected to achieve zero bacterial risk, there is the need to reduce the risk and, where possible, eliminate it at 'on-the-farm" stage. Ensuring safe, accessible, affordable, and nutritious food is increasingly difficult, especially in developing countries.

Thus, to tackle this "wicked problem" of food safety hazards in animal food products, we need to analyse and control these hazards throughout the food chain to ensure that the animal disease and residues from the veterinary services do not proliferate into the human food. One such solution to tackle this issue is implementation of "One Health" concept throughout the food value chain.

An analysis has been done based on the concept of the Hazard Analysis and Critical Control Points (HACCP) for food products of animal origin (milk, meat, and eggs) throughout the food supply chain, right from "feed to fork". The hazard in the analysis includes pathogens, microbial load, aflatoxins and residues from pesticide, hormones, antibiotics, and heavy metals. Based on the assessment, gaps and probable solutions have been identified. The detailed outcomes have been mentioned in Annexure 1.

The Department of Animal Husbandry & Dairying (DAHD), Ministry of Fisheries, Animal Husbandry & Dairying (MoFAHD), Government of India (GoI) has embarked upon implementation of "One Health" project in India with collaboration and coordination with human health department and wildlife department. The Food Safety is also an integral part of the One Health concept as food is one of the many ways where zoonotic diseases can enter the human body. Thus, the food safety departments and the animal husbandry departments have to converge at various points in the food supply chain to strengthen the food safety ecosystem in India and to operationalize the holistic One Health system in India.

Based on the global best practices, six intervention points (in collaboration and coordination with human health and wildlife department) which are deemed necessary to achieve the objectives of One Health concept have been identified in One Health project. In these focal points, few points of convergence between animal husbandry department and food safety (achievable during the project term) have been identified.

Intervention 1 – Single Window Coordination

For a successful One Health implementation, it is necessary to have a single window coordination among various departments for streamlining the information flow and to remove the ambiguity and duplicity of Rapid Response Teams (RRTs).

Convergence point –

- Nominating a nodal person from Food and Drug Administration and state animal husbandry departments of the respective states for smooth transition of information flow in case of animal disease reporting, food borne-illnesses and findings from surveillance activities.

Intervention 2 - Laboratory Network

An effective disease management system relies on an efficient laboratory network for early detection of diseases and information flow for coordinated control response and to ensure harmonization in laboratory test results.

Convergence points –

- Mapping of food testing laboratories and animal disease diagnostic laboratories.
- A mechanism may be developed for sending food samples by Food Safety Officers at animal disease diagnostic labs to test them for zoonotic diseases (including sampling procedure).
- Developing capacity of animal disease diagnostic labs to diagnose animal disease pathogens in food samples.
- Revision of existing guidelines & standard operating procedure (SOPs) for harmonization of food products sampling and diagnostic procedures for animal diseases.

Intervention 3 - Digital Disease Report and Response System

For timely and efficient response to disease outbreak, it is necessary to report the disease at the earliest and for this a digital architecture National Digital Livestock Mission is being created wherein the livestock farmers, vets and paravets will be able to report the disease in real-time through mobile application. This robust disease reporting system will draw information from field activities which combined with multiple active surveillance activities allows for accurate estimation of disease event/outbreak and provides multiple options for triangulation and validation.

Convergence points –

- A mechanism may be created for information sharing related to animal disease reporting and food-borne illnesses by the food safety department and data ownership between the departments.

Intervention 4 - Customized Training modules

With improved knowledge and understanding provided through the customized training modules, the field officers will be capable of efficient inspection, surveillance activities, and management of disease outbreak(s).

Development of training modules for

- Training of Veterinarians on food safety, hygiene requirements, "Good Hygienic Practices in Dairy and Meat Plants", and implementation of Food Safety Management System (FSMS) in food handling areas such as dairy plants, slaughterhouses, wet meat markets, etc.

- Training of Food Safety Officers on management of food-borne and other zoonotic diseases.

- Training of Butchers in unorganized meat sectors on hygienic handling of meat at butcher's shop during the meat/chicken value chain at Butchers' Shop, i.e., from slaughter of the animals/birds at butchers' shop till sale to consumers.

- Utilization of existing Food Safety Training and Certification (FoSTaC) training ecosystem of FSSAI for Veterinarians and Food Safety Officers on above mentioned subjects. The FoSTaC is a large-scale training and certification ecosystem for food businesses across the food value chain.

Intervention 5 – Communications

Optimum utilization of Information – Education – Communication (IEC) tools for awareness creation among the stakeholder and community engagement is an effective way to address the food safety and zoonotic disease issues.

Convergence points –

- Using IEC material for awareness creation and community engagement to address food safety and zoonotic disease issues

- Aflatoxins in milk from feed

- Antibiotic usage and withdrawal period

- Heavy metals and pesticide residues in feed

- Good Agricultural Practices (GAPs) and Good Animal Husbandry Practices (GAHPs)

- Good Manufacturing Practices (GMPs) and Good Hygiene Practices (GHPs) for food handlers

- Disease identification and reporting from livestock farmers, food handlers, and at high-risk sites.

Intervention 6 – Biosecurity measures

Strengthening biosecurity measures at farm level and at high-risk sites is an important step to avoid the proliferation of animal diseases to human via food.

Convergence points –

- Registration of small slaughterhouses, wet meat sellers, dairy plants, street food vendors and others by organizing a registration drive or through registration mela.

- Awareness training of meat handlers at high-risk sites such as slaughter-houses, wet meat market and milk handling units.

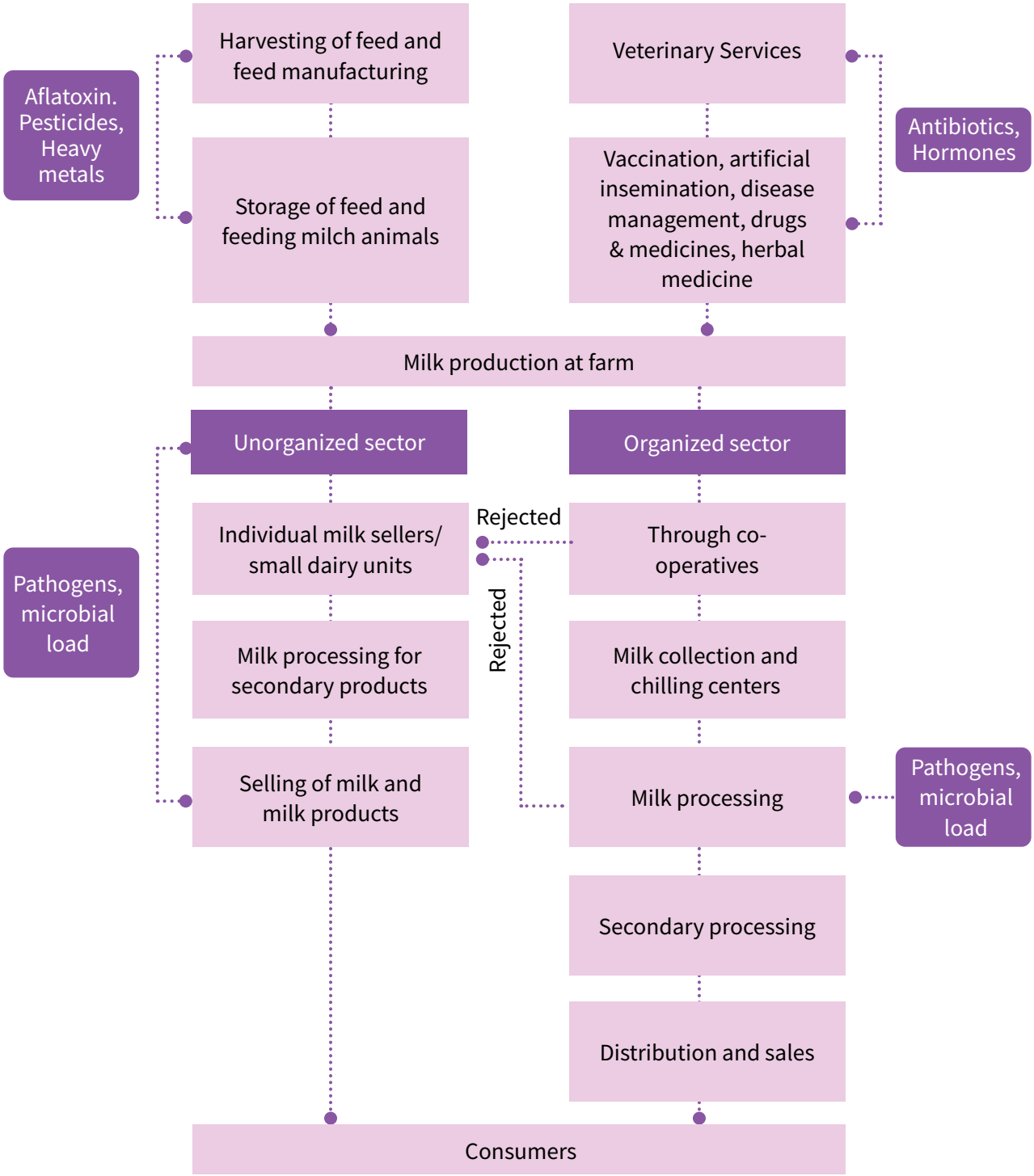
- Awareness training of street food handlers and small restaurants on meat and meat product procurement, good manufacturing practices and good hygiene practices.

Through these interventions and convergence points, food safety could be strengthened at field level under the One Health project.

Annexure-1

Food Supply Chain

1. Milk Supply Chain



Food Safety issue targeted	Steps	Gap Identified	Possible intervention	Responsibility	Gaps in term of accountability
Aflatoxins, Heavy metals, pesticides	Feed manufacturing & storage	Improper GAP at farm level.	Training of farmers for GAP.	Department of Agriculture, Co-operation, and Farmers' Welfare (DoAC&FW)	Inadequate training ecosystem for trainings of farmers for GAP.
		Improper feed manufacturing & packaging.	Proper sorting, cleaning, processing, and packaging of feed.	No accountability	FSSAI is coming up with feed regulations
		Improper feed storage at farm level.	Training of farmers to hygienically store feed in ventilated warehouse.	Department of Animal Husbandry & Dairying (DAHD) and Department of Agriculture	Inadequate training ecosystem for trainings of farmers for feed storage.
		Inadequate infrastructure facility to store feed properly.	Assistance to farmers for building hygienic and ventilated room for feed storage.	Ministry of Food Processing Industries (MoFPI)	No schemes for livestock farmers to build infrastructure for feed storage.
		Lack of awareness among farmers regarding aflatoxin and pesticide issues and their impact.	Training and capacity building of farmers to monitor aflatoxin in feed.	Department of Animal Husbandry & Dairying (DAHD)	Inadequate training ecosystem for trainings of farmers for prevention and mitigation of aflatoxin.
		Usage of herbal medicines.	Herbal medicines to be regulated for heavy metal and pesticide levels.	Department of Ayush (DoA)	No regulation and standards for heavy metal and pesticide levels in herbal medicine.
		Use of prohibited pesticides and insecticides	A ready reckoner for farmers on the prohibited and permitted pesticides and their dosage.	Department of Agriculture, Co-operation, and Farmers' Welfare (DoAC&FW)	Lack of inspection and surveillance activity for prohibited pesticides.

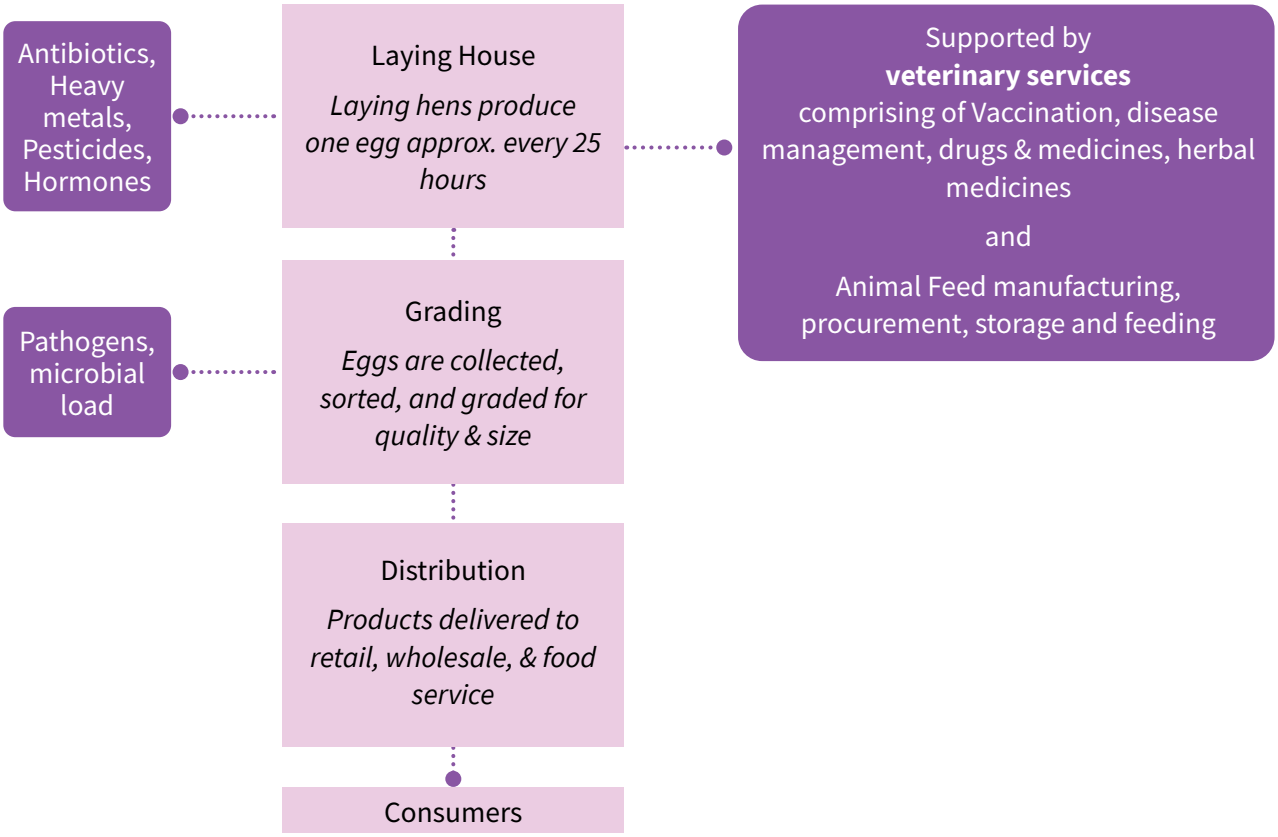
Food Safety issue targeted	Steps	Gap Identified	Possible intervention	Responsibility	Gaps in term of accountability
Antibiotics, Hormones	Veterinary services	Farmers are unaware about withdrawal period (WP) for antibiotics and hormones.	Training and awareness creation among farmers about WP.	Department of Animal Husbandry & Dairying (DAHD)	Inadequate training ecosystem for trainings of farmers about withdrawal period. Inadequate IEC activities for sensitization of farmers about withdrawal period.
			Sensitizing the farmers to not sell the milk for processing before WP is over.		
			Issue of Health Card with details of antibiotics and WP to educate farmers.		
			Adoption of innovative technologies such as colour changing tags to indicate WP.		
		Difference in WP for antibiotics from different pharma companies.	Harmonization of WP for antibiotics from different pharma companies.	Department of Animal Husbandry & Dairying (DAHD)	Regulation and standardization of approved antibiotics.
		Milk processors purchase milk without ensuring if WP is over.	Creating awareness among unregistered milk processors on importance of WP	Department of Animal Husbandry & Dairying (DAHD) & Food Safety & Standards Authority of India (FSSAI)	No accountability.
		Inadequate/ updated knowledge about WP with vets.	Ready reckoner for vets on prohibited and permitted antibiotics and their WP.	Department of Animal Husbandry & Dairying (DAHD)	Inadequate training ecosystem for trainings of vets and para vets
		No control over use of growth promoters in feed supplements	Awareness training of vets and farmers on adverse effects of growth promoters.	Department of Animal Husbandry & Dairying (DAHD)	Inadequate training ecosystem for trainings of farmers about growth promoters. Lack of IEC activities for sensitization of farmers about growth promoters.

Food Safety issue targeted	Steps	Gap Identified	Possible intervention	Responsibility	Gaps in term of accountability
Pathogens, microbial load	Milk processing in unorganized sector	Unregistered Food Businesses	Registration of Food Businesses	Food Safety & Standards Authority of India (FSSAI)	No accountability
		Unhygienic conditions and poor manufacturing processing practices.	Training and capacity building of FBOs in GHPs and milk processing.		
		Small Expansion are unaware about mandatory requirement of FSSAI registration.	Awareness creation among FBOs for FSSAI registration		
		Limited inspection and surveillance activities.	Increase in manpower for inspection and surveillance activities.	Food Safety & Standards Authority of India (FSSAI)	Recruitment of FSOs to be strengthened.
		Unvaccinated animals	Vaccination of animals	Department of Animal Husbandry & Dairying (DAHD)	Lack of ecosystem in terms of vaccines procurement, storage, transportation, and manpower capacity.
		Untraceability of animals	Traceability of animals through ear tagging	Department of Animal Husbandry & Dairying (DAHD)	Strengthening of digital infrastructure and manpower capacity to carry out ear tagging of animals.
		No food samples being tested for animal diseases	Joint capacity building of FSSAI & AH labs and sharing of resources to diagnose pathogens in food products.	Department of Animal Husbandry & Dairying (DAHD) & Food Safety & Standards Authority of India (FSSAI)	No accountability
			Ensuring availability of easy & affordable kits for testing of pathogens to field officers		
			Revised scope to accommodate testing of pathogens in food product of food testing labs.		

Food Safety issue targeted	Steps	Gap Identified	Possible intervention	Responsibility	Gaps in term of accountability
		No data ownership and sharing mechanism in between the departments related to animal diseases in food products	Building mechanism to share data related to animal diseases between FSSAI & DAHD.	Food Safety & Standards Authority of India (FSSAI) & Department of Animal Husbandry & Dairying (DAHD)	Building mechanism for data sharing.

Annexure-2

Egg Supply Chain

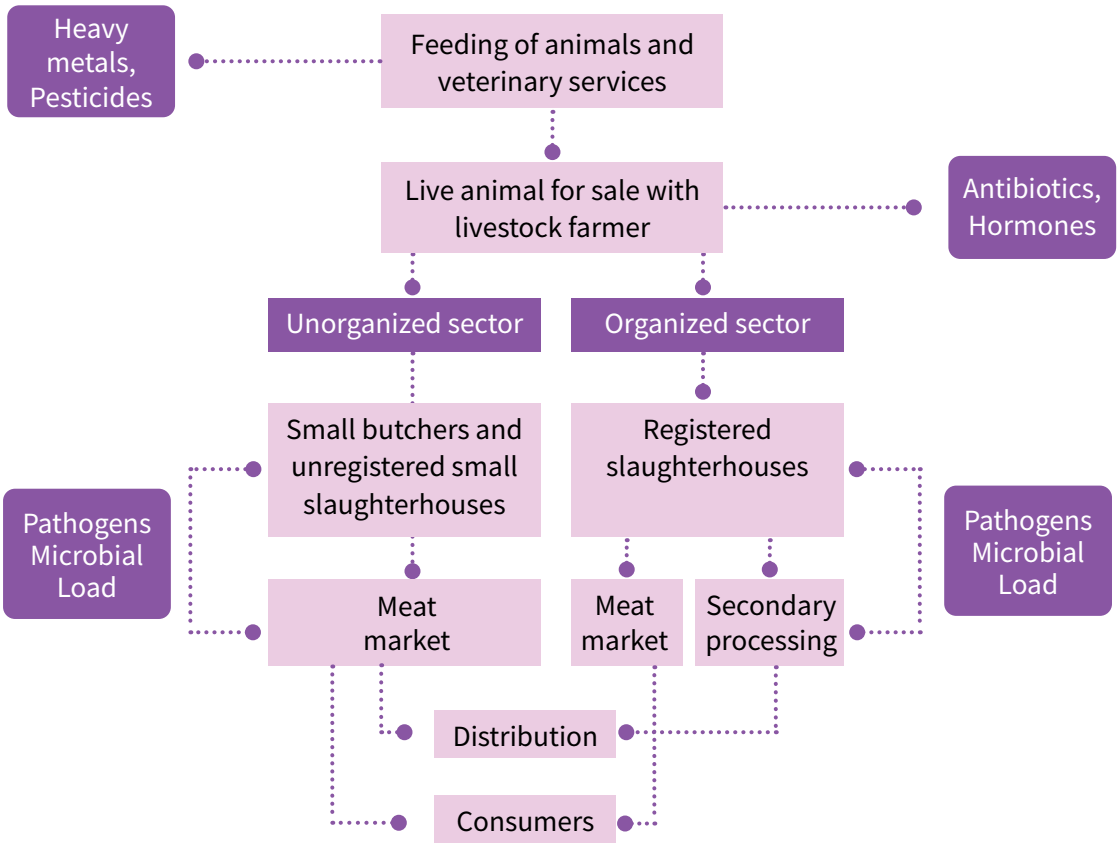


Food Safety issue targeted	Steps	Gap Identified	Possible intervention	Responsibility	Gaps in term of accountability
Pesticides, Heavy metals	Feed manufacturing & storage	Improper GAP at farm level.	Training of farmers for GAP.	Department of Agriculture, Co-operation and Farmers' Welfare (DoAC&FW)	Inadequate training ecosystem for trainings of farmers for GAP.
		lack of awareness among farmers regarding aflatoxin and pesticide issues and their impact.	Training and capacity building of farmers to monitor aflatoxin in feed.	Department of Animal Husbandry & Dairying (DAHD)	Inadequate training ecosystem for trainings of farmers for prevention and mitigation of aflatoxin.
		Use of prohibited pesticides and insecticides and	A ready-reckoner for farmers on the prohibited and permitted pesticides and their dosage.	Department of Agriculture, Co-operation and Farmers' Welfare (DoAC&FW)	Lack of inspection and surveillance activity for prohibited pesticides.
		Usage of herbal medicines.	Herbal medicines to be regulated for their heavy metal and pesticide levels.	Department of Ayush (DoA)	No regulation and standards for heavy metal and pesticide levels in herbal medicine.
Antibiotics, Hormones	Veterinary services	Irrational use of antibiotics and growth promoters for poultry birds.	Training of vets and paravets on rational use of antibiotics and avoidance of growth promoter in feed.	Department of Animal Husbandry & Dairying (DAHD)	The gap lies in terms of manpower capacity needed to educate and making farmers aware and carry out inspection activities by the field officers.
		Unawareness among farmers about ill effect of antibiotic usage.	Sensitization and awareness among farmers on ill effects of antibiotics and eliminating antibiotics in phased manner.		
		Lack of adoption of Good Farm Management Practices (GFMPs) and GHPs in poultry farms	Training of farmers on GFMPs and GHPs to minimize the requirement of antibiotics.		
		Unavailability of economical kits for diagnosis at consumer level	Ensuring availability of affordable diagnostic kits for consumers.		

Food Safety issue targeted	Steps	Gap Identified	Possible intervention	Responsibility	Gaps in term of accountability
		No information with farmers about alternatives to antibiotics.	Widespread dissemination of information about alternatives to antibiotics.		The gap lies in terms of manpower capacity needed to educate and making farmers aware and carry out inspection activities by the field officers.
		Drug and feed sellers are not under the radar of inspection activity.	Drug sellers and feed sellers should also be trained for appropriate use of antibiotics and their alternatives with regular inspection of their practices.		
		Non-compliance of NAP-AMR by relevant department(s).	Proactive approach by government department to comply with NAP-AMR to combat AMR issue.	Department of Animal Husbandry & Dairying (DAHD), Food Safety & Standards Authority of India (FSSAI), & Ministry of Environment Forest & Climate Change (MoEFCC)	The implementation of NAP-AMR needs the collaborative approach from various departments to combat AMR.
Pathogens, microbial load	Collection, grading and sorting of eggs	No food samples being tested for animal diseases	Joint capacity building of FSSAI & AH labs and sharing of resources to diagnose pathogens in food products.	Department of Animal Husbandry & Dairying (DAHD) & Food Safety & Standards Authority of India (FSSAI)	No accountability
			Ensuring availability of easy & affordable kits for testing of pathogens to field officers		
			Revised scope to accommodate testing of pathogens in food product of food testing labs.		
		No data ownership and sharing mechanism in between the departments related to animal diseases in food products	Building mechanism to share data related to animal diseases between FSSAI & DAHD.	Food Safety & Standards Authority of India (FSSAI) & Department of Animal Husbandry & Dairying (DAHD)	Building mechanism for data sharing.

Annexure-3

Meat & Meat Products Supply Chain



Food Safety issue targeted	Steps	Gap Identified	Possible intervention	Responsibility	Gaps in term of accountability
Pesticides, Heavy metals	Feed manufacturing & storage	Improper GAP at farm level.	Training of farmers for GAP.	Department of Agriculture, Co-operation, and Farmers' Welfare (DoAC&FW)	Inadequate training ecosystem for trainings of farmers for GAP.
		Lack of awareness among farmers regarding aflatoxin and pesticide issues and their impact.	Training and capacity building of farmers to monitor aflatoxin in feed.	Department of Animal Husbandry & Dairying (DAHD)	Inadequate training ecosystem for trainings of farmers for prevention and mitigation of aflatoxin.
		Use of prohibited pesticides and insecticides.	A ready-reckoner for farmers on the prohibited and permitted pesticides and their dosage.	Department of Agriculture, Co-operation, and Farmers' Welfare (DoAC&FW)	Lack of inspection and surveillance activity for prohibited pesticides.
		Usage of herbal medicines.	Herbal medicines to be regulated for their heavy metal and pesticide levels.	Department of Ayush (DoA)	No regulation and standards for heavy metal and pesticide levels in herbal medicine.
Antibiotics, Hormones	Veterinary services	Farmers are unaware about withdrawal period (WP) for antibiotics.	Training and awareness creation among farmers about WP.	Department of Animal Husbandry & Dairying (DAHD)	Inadequate training ecosystem for trainings of farmers about withdrawal period. Lack of IEC activities for sensitization of farmers about withdrawal period.
			Sensitizing the farmers to not sell the amimal or meat for processing before WP is over.		
			Issuance of Health card with details of antibiotics and WP to educate farmers.		
			Adoption of innovative technologies such as colour changing tags to indicate WP.		
		Difference in WP for same antibiotics from different pharma companies.	Harmonization of WP for same antibiotics from different pharma companies.	Department of Animal Husbandry & Dairying (DAHD)	Regulation and standardization of approved antibiotics.

Food Safety issue targeted	Steps	Gap Identified	Possible intervention	Responsibility	Gaps in term of accountability
		Inadequate/ updated knowledge about WP with vets.	Ready-reckoner for vets on prohibited and permitted antibiotics and their WP.	Department of Animal Husbandry & Dairying (DAHD)	No training ecosystem developed for trainings of vets and para vets
		Butchers/ slaughter houses purchase animal without ensuring if WP is over.	Creating awareness among unregistered butchers to not buy animal or meat until WP is over	Department of Animal Husbandry & Dairying (DAHD) & Food Safety & Standards Authority of India (FSSAI)	No accountability.
		No control over use of growth promoters in feed supplements	Awareness training of vets and farmers on adverse effects of growth promoters.	Department of Animal Husbandry & Dairying (DAHD)	Inadequate training ecosystem for training of farmers about growth promoters. Lack of IEC activities for sensitization of farmers about growth promoters.
		Irrational use of antibiotics and growth promoters for poultry birds.	Training of vets and paravets on rational use of antibiotics and avoidance of growth promoter in feed.	Department of Animal Husbandry & Dairying (DAHD)	The gap lies in terms of manpower capacity needed to educate and making the farmers aware and carry out inspection activities by the field officers.
		lack of awareness among farmers about ill-effects of antibiotic usage.	Sensitization and awareness among farmers on ill-effects of antibiotics and eliminating antibiotics in phased manner.		
		Lack of adoption of GFMPS and GHPs in poultry farms	Training of farmers on GFMPs and GHPs to minimize the requirement of antibiotics.		
		Unavailability of economical kits for diagnosis at consumer level	Ensuring availability of affordable diagnostic kits for consumers.		

Food Safety issue targeted	Steps	Gap Identified	Possible intervention	Responsibility	Gaps in term of accountability
		No information with farmers about alternatives to antibiotics.	Widespread dissemination of info about alternatives to antibiotics.		
		Drug sellers and feed sellers are not under the radar of inspection activity.	Drug sellers and feed sellers should also be trained for appropriate use of antibiotics and their alternatives with regular inspection of their practices.		
		Non-compliance of NAP-AMR by relevant dept.	Proactive approach by government department to comply with NAP-AMR to combat AMR issue.	Department of Animal Husbandry & Dairying (DAHD), Food Safety & Standards Authority of India (FSSAI), & Ministry of Environment Forest & Climate Change (MoEFCC)	The implementation of NAP-AMR needs the collaborative approach from various departments to combat AMR.
Pathogens, microbial load	Small butchers and unregistered slaughter-houses	Unregistered Food Businesses	Registration of Food Businesses		No accountability
		Unhygienic conditions and poor manufacturing processing practices.	Training and capacity building of FBOs in GHPs and clean milk processing.	Food Safety & Standards Authority of India (FSSAI)	No accountability
		Small FBOs are unaware about mandatory requirement of FSSAI registration.	Awareness creation among FBOs for FSSAI registration		
		Limited inspection and surveillance activities.	Increase in manpower for inspection and surveillance activities.	Food Safety & Standards Authority of India (FSSAI)	Recruitment of FSOs to be strengthened.
		Unvaccinated animals	Vaccination of animals	Department of Animal Husbandry & Dairying (DAHD)	Inadequacy in ecosystem in terms of vaccines procurement, storage, transportation, and manpower capacity.

Food Safety issue targeted	Steps	Gap Identified	Possible intervention	Responsibility	Gaps in term of accountability
		Untraceability of animals	Traceability of animals through ear tagging	Department of Animal Husbandry & Dairying (DAHD)	Strengthening of digital infrastructure and manpower capacity to carry out ear tagging of animals.
Pathogens, Microbial load	Registered slaughterhouses and meat processing units	Unhygienic conditions of the slaughter-houses	Upgradation of existing slaughter-houses to ensure hygienic conditions to perform slaughter, ante-mortem and post-mortem activities.	State Municipal Corporation & Food Safety & Standards Authority of India (FSSAI)	No accountability
		Improper ante-mortem and post-mortem activities conducted			
		No food samples being tested for animal diseases	Joint capacity building of FSSAI & AH labs and sharing of resources to diagnose pathogens in food products.	Department of Animal Husbandry & Dairying (DAHD) & Food Safety & Standards Authority of India (FSSAI)	No accountability
			Ensuring availability of easy & affordable kits for testing of pathogens to field officers		
			Revised scope to accommodate testing of pathogens in food product of food testing labs.		
		No data ownership and sharing mechanism in between the departments related to animal diseases in food products	Building mechanisms to share data related to animal diseases between FSSAI & DAHD.	Food Safety & Standards Authority of India (FSSAI) & Department of Animal Husbandry & Dairying (DAHD)	Building mechanisms for data sharing.

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