



South Asia

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Comprehensive study of food regulations and standards, food testing infrastructure, Codex Resource System, HACCP/ISO/Organic products certification/Accreditation system

Part – IV Human Resource Development

Prepared by:

TUV South Asia Pvt. Ltd.
321, Solitaire Corporate Park
Chakala, Andheri,
Mumbai-400093

Prepared for:

Ministry of Food Processing Industries
Govt. of India, Panchsheel Bhawan,
August Kranti Marg, New Delhi



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Human Resources Developement

Index

HRD Activities Required:	2
Existing HRD Activities:	3
Gap Analysis	6
Recommendations	8
Human Resources for food production (Farm operations):	8
Industry Level HRD	9
Managerial HRD.....	9
Mid-managerial level HRD.....	9
Operators level HRD	10
Sanitary Workers.....	10
Warehousing and Distribution HRD	10
Regulatory and trade issue related HRD	11
Enforcement HRD	11



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Development of any sector depends upon the knowledge and skill availability. The people skill is very important aspect of food industry and its development. Like any other knowledge based industry, food industry also needs highly skilled manpower at all levels to handle various operations.

The skilled human resource critical food safety requirement in food industry is required at all levels, like:

- Human Resources at Top management level
- At Middle management level to take of operations levels like production, processing, marketing training Research and new product development, food laws, etc.
- HR for operating level requirements like factory, fields, storage and transportation operations
- Shop floor level for manufacturing, maintenance, packaging and distribution level

The global demands on food trade are ever increasing and are of highly demanding nature. The requirements / standards of food are becoming stringent (e.g. MRLs of Pesticides) day by day and inevitably talk about the consumer safety. With better opportunities in the international trade, there is a huge demand of qualified and trained manpower. India being a member country to WTO has to gear up to take challenges of the international trade and align the domestic regulations, education patterns and manpower development mechanism with the international trends.

The food industry in India is of different sizes such as the organized sector, small scale entrepreneurs and unorganized sector. Hence the level of skill and knowledge of the business operators in each sector is different. It is very essential to design and develop a mechanism addressing to the manpower development for these sectors at different levels of responsibilities.

HRD Activities Required:

There are various government and private sector institutions offering courses in the area of food technology, food science, catering, agriculture etc. The syllabi on various courses were studied and students were interviewed to check on food safety knowledge. It was observed that the syllabi of such courses focus of product quality and do not really emphasize on food safety and related legislations.

- HRD for Overall Management:
- HRD for Operations Management:
- HRD for Food Manufacturing Management:
- HRD for Food Safety and Quality Management
- HRD for Food Product Development Management
- HRD for Food Equipment Design and Maintenance
- HRD for Food Packaging Management:



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- HRD for Food Distribution and Logistics Management:
- HRD for Supervisors for managing work force in food factories
- HRD for Factory operational shop floor level

Existing HRD Activities:

Let us take a look at the food courses offered by some of the institutes:

1) Central Food Technology Research Institute (CFTRI)

CFTRI is among the largest and most diversified technology and research institute in the world that offers education in the field of food science and technology, carries out research work and conduct awareness programs on food safety. Its multi-disciplinary spread (across 16 R&D departments) covers almost every field of scientific investigation connected with foods and their relationship to humans, including the cutting edge area of food biotechnology.

Various Departments under CFTRI

- Biochemistry and Nutrition
- Fermentation Technologies and Bioengineering
- Flour Milling, Baking & Confectionery Technologies
- Food Engineering
- Food Microbiology
- Food Packaging Technology
- Food Protectants and Infestation Control
- Food Safety & Analytical Quality Control Laboratories
- Fruit & Vegetable Technology
- Grain Science and Technology
- Human Resource Development
- Lipid Science and Traditional Foods
- Meat, Fish and Poultry Technology
- Plant Cell Biotechnology
- Plantation Products, Spices and Flavor Technology
- Sensory Science
- Protein Chemistry and Technology

Public Awareness Program on food safety

CFTRI conducts public awareness programs in different villages/cities of Karnataka and neighboring states, regularly as well as on special occasions. During these programs, food adulteration and its implications would be explained and appropriate tests would be demonstrated to the public, by videos in various local languages.

During these programs, the public is made aware of food adulteration and its implications and some simple tests to detect some of the most commonly found



Human Resources Development

adulterants in identified food items were also demonstrated. Video cassettes on these aspects are also made in different languages.

2) International Food Technology Training Centre (IFTTC)

The International Food Technology Training Centre was opened in CFTRI. The scientists in the R and D departments of CFTRI participate as faculty in the various academic programs conducted at CFTRI. The state-of-art facilities of the R and D labs, pilot plant and food engineering centre of CFTRI are used for giving an excellent training to the participants of the various training programs conducted at CFTRI.

3) Defence Food Research Laboratory

DFRL is organizing seminars like International Food Convention, Life Sciences Scientific Conference, Food Science and Technology, Agri Food Industry and many more at regular intervals. It also offers post graduate courses in Food Analysis and Quality Assurance.

4) Indira Gandhi National Open University (IGNOU)

a)Certificate in Food Safety (CFS)

IGNOU in collaboration with the Ministry of Health and Family Welfare (MoHFW), Government of India has launched this professional up gradation and career up-gradation on-line programme in the area of food safety and quality that would integrate education and training and address the needs of training the workforce/developing human power in this sector. The programme focuses on knowledge up-gradation and enrichment in the area of food safety especially for government functionaries, food industry workers and catering industry workers.

The programme consists of three courses

- Introduction to Food Safety
- Hazards to Food Safety
- Food Safety and Quality Assurance

b)Master's of Science Degree in Dietetics and Food Service Management {MSc. (DFSM) }

The M.Sc. Programme in the area of Dietetics and Food Service Management has been developed with a view to address the need of training work force/ developing manpower (dietitians, nutrition counselors, food service managers etc.) for the emerging employment sector - hospital/ community dietetics, food service management.



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The programme consists of the following Subjects:

- Applied Physiology
- Nutritional Biochemistry
- Food Safety and Food Microbiology
- Advance Nutrition
- Clinical and Therapeutic Nutrition
- Public Nutrition
- Entrepreneurship and Food Service Management
- Principles of Food Science
- Research Methods and Biostatistics
- Understanding Computer Applications
- Internship Programme
- Dissertation

5) Indian Council of Agricultural Research (ICAR)

ICAR acts as a repository of information and provides consultancy on agriculture, horticulture, resource management, animal sciences, agricultural engineering, fisheries, agricultural extension, agricultural education, home science and agricultural communication. It has the mandates to co-ordinate agricultural research and development programs and develop linkages at national and international level with related organizations to enhance the quality of life of the farming community.

6) Public Seminars / Conferences and Forums

There are industries Associations like Indian Industries Association, CII, FICCI, SOPA etc. which organizes seminars and conferences for Industries on recent issues related to Food safety, Regulatory aspect, New Technology, Trade issues and many more.

7) Manpower Development in Enforcement Authorities

Various enforcement authorities get involved throughout the food chain both in domestic and international trade.

As far as the enforcement of PFA is concerned, it is done either through state authorities or municipal authorities etc. In case of import and exports, the customs authorities and the various officers from the boards formed for promotion of export like APEDA or EIC etc.

The FDA officers in Maharashtra are trained at the time of joining the services. Along with the operational training schedule the training includes food regulations as well. As discussed with the authorities initiative have been taken to train the officers on modern instrumentation technique in food analysis, Food law & HACCP.



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Gap Analysis

Levels	CFTRI	ICAR	UGC	IGNOU	I.I.T	I.I.P	I.T.I	NITS	DFRL	Public Forums like CII, IIA
Farm Level		√								√
HRD for Factory operational shop floor level										
HRD for supervisors in food factories / catering				√						
HRD for food safety				√						
HRD for Quality Management	√	√	√					√	√	√
HRD for equipment design and management.	√				√					
HRD for food manufacturing management	√									
HRD for Food Packaging management	√					√				
HRD for Food Product Development Management	√		√							√
Warehousing, distribution and logistics management.										
HRD for overall Management										
HRD for operations Management	√									
Regulatory and trade issue related HRD										√



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It is evident from the table above that there are not many institutions delivering the program on HRD at various levels.

While reviewing the different platforms where training and education is imparted, it is observed that there is a tremendous thrust on the technology development and up gradation but no attempt and mechanism to design and develop the programs in totality which will cover the food safety and regulatory requirements.

Technology and science, indeed form the basis of trade economics, but given a fresh risk based approach will bring out a product which is of good quality and more importantly safe to consume.

IGNOU has certainly given a positive indication by offering a short term course on Food Safety. But the course needs a re-look in terms of inclusion of internationally accepted food standards like ISO 22000, HACCP, EurepGAP, Traceability requirements etc.

It is quite interesting to note that there are no dedicated institutes available to train the manpower at Managerial level, marketing level, operators level etc. Institutes like IIP (Indian Institute of Packaging) educate in the area of packaging development but how to ensure food safety throughout the distribution chain, transportation is not addressed.

As mentioned before the industry is divided in many sectors. There are no specific programs with food industry as a focus say the unorganized sector.

ICAR once again focuses on agricultural technology, engineering, dairy technology and so on. At the farm front APEDA has taken efforts to improve the acceptability of Indian grapes in the international market by educating, training and giving support to the growers. The same kind of approach is not visible for other produce.

On enforcement front it has been observed that the capacity building of the enforcement officers is not taken aggressively. Some training programs are arranged for the FDA officers in Maharashtra but **the efforts are minimal and would fail to create a stir in the entire approach of enforcement.**



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Recommendations

It is to be very well understood that mere changes in the education syllabi or holding seminars for the industry will not suffice the purpose. A mechanism addressing to the manpower development at various levels of the food chain has to be designed. The efforts should be multi-dimensional and multi-fold with food safety as the basis.

The various graduation and post graduation level programs offered by the institutions must be oriented **to include food safety and related issues like traceability, food recalls, Drug residues, labeling, migration of elements and regulatory mechanism.** It is very essential to make **provisions for revision of the syllabi** from time to time and revise the programs. It would be a proactive step to **invite the industry experts while designing the curricula** as industry is the ultimate user of the manpower.

IGNOU has certainly given a positive indication by offering a short terms course on Food Safety. But the course needs a re-look in terms of inclusion of internationally accepted food standards like ISO 22000, HACCP, Traceability requirements etc. The government should also include food safety in the currently running graduate and Post Graduate courses.

In addition to the above programs, short term courses with specific issues such as Import/Export regulations, International trade, implementation of HACCP principles for all the industry sectors, Good Manufacturing and Hygiene Practices etc.

Making In-plant training as an essential part of any curriculum will enhance the acceptability of the education and the students will be aware of the shop-floor requirements and skills.

Special courses need to be designed for time to time **orientation of the faculty** of these institutes as the faculty barely has any industry exposure.

Keeping in pace with the developments in communication technology, **web-based distant learning programs** may also be introduced. It will be the responsibility of the institute offering such course **to up-date it time to time** and make **proper publicity** so that the industry and other stakeholders are well aware of the same.

In our opinion following could be, the areas of focus while designing the manpower development strategy:

1) Human Resources for food production (Farm operations):

India is a country with good variation in climatic conditions and soil type and hence produces a variety of farm produce. To make the Indian produce globally accepted, stringent norms of pesticide residues, veterinary drug residues have to be followed. Farm level training should **address to the requirements of Good agricultural**



Human Resources Development

practices or a further step ahead which is organic farming. The farm level training must address to use of proper feed, pesticide dose, harvesting etc.

The national **network of ICAR** could be made use of to incorporate farm level food safety and related legislation in curriculum and there by **increase the food safety awareness in multifold**. The current facility for HRD at farm level is taken care only at State Agricultural Universities and Krishi Vigyan Kendra. The government should start developing other institutes / universities like IGNOU, ICAR for Farm Level HRD.

Bodies like APEDA should be strengthened to take efforts in supporting the growers for safe fresh produce both for the domestic consumption and export.

Group Farming may also be encouraged through proper training to have shared resources and higher benefits.

The farm level training program may also focus on packaging techniques, use of appropriate packaging material, storage and safe transportation of the farm produce.

2) Industry Level HRD

Various operations of the food industry need to be focused.

a. Managerial HRD

There should be a specific course designed to train the manpower at managerial level so that the managers are well aware of the technical aspects and commercial aspects of the business and how to match them without compromising the safety of the product. The managers should also be trained on the decision criteria in any specific situations such as rejection of a consignment.

Currently there is no institute which offers education in overall operational Management for food Industry. The Government should utilize the Management institutions for developing manpower in this field. There are institutes like “**Indian Institute of Management**” Lucknow which offers education like Agri – Business management likewise the government should develop new courses for operations management in food sector and utilize management institutions for providing education.

b. Mid-managerial level HRD

At this level the responsibility is to transform the business strategies into reality. They should be trained to aspects such as product technology, labour issues, manpower handling, effective time planning, cost reduction through process excellence etc. Product specific technology enhancement could also be considered at this stage.



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c. Operators level HRD

The operators should be trained on acquiring the skills to run a process. It is the normal scenario that the operators are skilled to operate the machines but not on what should be the action in case of equipment failures and its effects on food safety. More thrust should be given on training them on behavioral patterns and addictions, importance of personal hygiene, good manufacturing and hygiene practices. Currently there is no training institute for developing manpower at this level. The government should start utilizing the network of training Institutes like I.T.I and polytechnics.

For supervisor at factory IGNOU, NDRI Karnal etc is running short term course. Again the Government should start developing institutes like I.T.I, Polytechnics, IGNOU, and NDRI etc for more number of courses. The government should take initiative by means of increasing the number of open seminars.

d. Sanitary Workers

At this level the focus should be on understanding the concepts of personnel hygiene, safe use of sanitizers, safe storage of sanitizers, following the standard procedures for entry and exit.

Plant safety is an industry wide draw back which needs to be addressed specially in handling emergency situations.

3) Warehousing and Distribution HRD

There have been several studies conducted and it has been found that a wholesome amount of the food commodities is wasted because of poor warehousing and distribution practices.

The training programs for these operations should emphasize on how the **storage conditions, handling of food items** can affect the food safety of a product which has been approved at the factory level. In addition to this **proper record keeping** which is an essential element of product **traceability and recalls** need to be made understood.

Training programs based on the regional climatic conditions and appropriate storage practices as well as how to deal with the natural disasters and calamities should also be devised.

The industry should be made responsible to make the **transporters** aware of the products being transported and the issues such as maintenance of proper temperature conditions throughout the route. The transporters may also be trained **on the actions to be taken in case of failures of such facilities**.

National Institute of Agricultural Marketing (NIAM) under Ministry of Agriculture has taken initiative by considering Warehouse and distribution as a training need and they



Human Resources Development

have already started developing material for the Post Graduate Program on Warehousing and logistics management.

4) Regulatory and trade issue related HRD

Organizations like FICCI, CII etc. are organizing seminars on current trade issues, global changing trade requirements and their impact on the industry. These organizations can always give a platform where industry and the enforcement authorities are together to discuss the issues and the further actions with respect to policy decisions if any.

Top management (CEO) level information with respect to finance, taxation, emerging business opportunities, regulatory and trade issue in different parts of world and within the country could also be handled.

The government should include Regulatory and Trade Issues as a part of curriculum in all Institutions relevant to the knowledge requirement at different level. For e.g.: In case of a graduate course the Government should include the basic Knowledge about regulations like Packaging, Labeling, and Food Laws etc. But in case of a Management course like Business management in food/agri the Government should include the WTO aspects, TBT, SPS, Export / Import regulations, commercial aspects etc.

5) Enforcement HRD

As mentioned before the food industry in India is in both the organized and unorganized sector. The organized sector follows the regulatory norms as a trade and consumer requirement (may be limited to urban sector). There is no uniform enforcement pattern of the food regulation throughout the country. As a result food safety in the unorganized sector is a big question mark.

There could be several other reasons for not being able to implement the regulation effectively throughout the country but one of the major reasons is lack of proper food safety knowledge.

It is therefore highly recommended to develop **several basic and advanced training programs for the enforcement officers** in the following areas but not limited to:

- a. Food safety awareness
- b. Awareness and implementation of food safety management system at the plant level
- c. Industry specific Hazard Analysis and control program (e.g. meat, dairy, processed food, canned products, visual examination of fresh produce etc.)
- d. International food regulatory requirements
- e. Analytical instrumentation techniques and interpretation of results
- f. Auditing and inspection skills
- g. Process development
- h. Current domestic food regulations



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- i. Warehousing and distribution practices
- j. Decision making
- k. Communication skills
- l. Judiciary protocols
- m. Food borne illness and its management
- n. Risk analysis, management and risk communication
- o. Good manufacturing / hygiene / sanitation practices
- p. Good agricultural practices and use of pesticides.

There is a radical change in the domestic market demands as a result of which the retail industry is booming up. At the moment the **enforcement officers are not geared up to analyze the food safety risks involved in the retail business.** To know the retail trade, its intricacies and impact on consumer safety is probably the immediate requirement of the enforcement officers.

Note : The term enforcement authorities includes the national level , state level and local enforcement officers(food inspectors, public analysts) , customs authorities , authorities from EIC , APEDA , MPEDA etc.