FOOD SAFETY AND INTERNATIONAL TRADE: A CHALLENGE FOR DEVELOPING COUNTRIES – A REVIEW PAPER.

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Abstract

The globalization of food trade and increasing problems world wide with emerging and re-emerging foodborne pathogens and other chemical hazards have increased the risk of cross-border transmission of infectious agents. Because of the global nature of food production manufacturing and marketing, infections agents can be spread to remote areas or regions. This situation has created the need of a well-organized international framework in order to cope with the emergence of (micro) biological and chemical hazards.
Improving or promoting trade within requires enhanced levels of regional and international cooperation.
Developing Countries need to work at regional levels in order to enhance their Food Safety system. This process can be divided in three steps, mutual recognition, equivalency and standards development. This can be achieved through regional or sub-regional economic bodies.

1. Introduction

The globalization of food trade and increasing problems world wide with emerging and re-emerging foodborne pathogens and other chemical hazards have increased the risk of cross-border transmission of infectious agents. Because of the global nature of food production manufacturing and marketing, infections agents can be spread to remote areas or regions. This situation has created the need of a well-organized international framework in order to cope with the emergence of (micro) biological and chemical hazards.
Improving or promoting trade within requires enhanced levels of regional and international cooperation.
One main obstacle to international food trade is the non-uniform Food Safety System and different levels of implementation of regulations pertaining to production, process and product standards in different countries or regions.
Many benefits are linked to improving food safety including:

- Contribution to a wider variety of choice of fresh and nutritious food,
- Increment of foreign currency asset of the exporting countries,
- Enhancement in the long run of the Food Safety System of exporting countries or regions,
- Diminution of food losses and contribution to countries' food security
- Contribution to consumer's health protection.,
- Contribution to the harmonization of food regulations and standards based on international standards as per WTO/ SPS Agreement,
- Contribution to poverty alleviation especially for peasant or small scale farmers,
- Promotion of a good country's reputation,

Achieving these goals requires enhanced level of international or regional cooperation in setting standards and regulations.

2. Strategy

2.1. Regulatory approach

In this modern environment the best is deal with Food Safety System implementation at regional or a sub-regional level. The will allow "weak" countries to upgrade their system through intense interaction with other countries in the region or sub-region facing the same problems.

In fact, the most used regulatory rapprochement to improve the safety of food trade in the international arena (EU, NAFTA, APEC and MERCOSUR) is ideally harmonization. Harmonization deals with codes of practices, product and process standards, inspection methodology, control system equivalence, training and common position on SPS/ Food Safety matters. However, the standards developed so far by these economic organizations are voluntary and cover only a limited number of SPS measures.

The most comprehensive approach to harmonization is to establish, through multilateral bodies, internationally accepted reference standards for products and processes. The WTO/SPS Agreement directs countries to base their food safety measures on existing international standards, guidelines, or recommendations. Since several years, the Codex Alimentarius is working on the harmonization of SPS measures related to food safety together with OIE and IPPC. It recommends increased reliance on these international standards.

As per WTO SPS Agreement, countries are encouraged to base their food regulations on Codex standards as benchmark for international food trade.

Nevertheless, the purpose of harmonized standards is not so much to achieve identical regulations or standards but to converge international methods for developing and administering Codex standards.

In area where no international standards exist, individual member country sanitary measures are allowed on the condition that they are based on risk assessment and are not discriminative.

Harmonization is stated in Article 3 of the SPS Agreement through the adoption by countries of Codex International Standards. Article 4 discusses equivalency and Codex has recently set adequate rules. The development of regional standards is the result of mutual recognition and equivalency.

According to Caswell (2000), the harmonization regulatory process should comprise three steps:

a) Mutual recognition
b) Equivalency
c) Developing of reference standards

Mutual recognition or acceptance of regulations diversity, in order to increase trade volume is the starting point due to the different level of food law, regulations, codes of practices and enforcement procedures among countries.

Developing countries have different capabilities of setting and enforcing different types of sanitary measures however the focus is directed towards the outcome of the regulatory process rather than the form.

Mutual recognition is a longer-run dynamic of sequential strengthening of the rapprochement efforts among countries. It will enable low standards countries to improve their food system thus offering more opportunities for food trade.

This process will be efficient if coordinated by a single Technical Regional Food Safety Body as shown with the EU experience. This approach allows for economizing on the costs of SPS regulations without jeopardizing human health, food security and trade.

When dealing with Food Safety as related to trade, two kind of technical standards come into play. The first ones concern the voluntary standards promoted by private companies and international bodies including ISO and the second ones are mandated by respective government and are meant to protect consumer's health and based on Codex or Risk Assessment.
Voluntary standards are nationally or internationally accepted procedures and guidelines adopted in order to maintain consistent quality. ISO 9000 is probably the most recognized voluntary standard in the world. It is important to emphasize that a voluntary standard, like ISO 9000, is not a substitute for either product safety or other regulatory requirements. Instead, a voluntary standard like ISO 9000 specifies the elements necessary for quality systems to consistently meet specifications.

2.2 Sanitary measures and equivalence

Sanitary measure is any requirement, procedure, criteria or system either alone or in combination, that is applied to protect human life or health within a territory of a country from hazards in food, including additives, contaminants, toxins or disease-causing organisms in food or feedstuffs, or from risks otherwise arising from diseases carried by food which are animals, plants or products thereof (Codex, 2001). Under the WTO SPS Agreement, sanitary measures include laws decrees, regulations, procedures related to end-product criteria, production process and product standards and testing and inspection.
Sanitary measure should be based on Codex standards and related text. Product, production and process standards are enacted in the food law, decrees, regulations, and codes of practice, standards, guidelines and methods of analysis. Products standards e.g. refer to quality provisions, nature and levels of chemical and microbiological criteria, nutritional requirements, labeling and methods of analysis.
It also includes a number of measures designed to protect the consumer against fraud.
Production and process standards deal with conformity assessment procedures, including technical procedures like testing, verification, laboratory accreditation, inspection, certification and sanitation practices like GAP, GHP, GMP and HACCP.
Individual sanitary measures that comprise food inspection and certification systems often vary from country to country. The reasons for such differences include differences in prevalence of particular food safety hazards, national choice about management of food safety risks and differences in the historical development of food control systems.
The application of a particular range of sanitary measures provides the level of protection actually afforded a consumer population and can be described in quantitative or qualitative terms (Hathaway, 1999).
Thus the appropriate level of protection (ALOP) reflects a particular country's public health goal in terms of management. In order to successfully conduct trade in food regulatory authorities need to determine the effectiveness of sanitary measures associated with the food safety undertaken by the exporting country in achieving the legitimate appropriate level of sanitary protection of the importing country.

3. Mechanism for equivalence determination

Article 4 of WTO/SPS Agreement discusses equivalency and Codex has

recently set adequate rules (Codex, 2001).

Applying the process of equivalence to food control sanitary measures provides the following benefits:

1. Helping to enhance food safety standards globally.
2. Encouraging scientific and risk-based approaches to food-safety, to the mutual benefit of both exporting and importing countries.
3. Facilitating food control systems that apply innovative and cost-effective sanitary measures.
4. Decreasing reliance on routine end product testing (e.g. at port of entry), which may be of limited effectiveness in protecting public health.
5. Promoting harmonization of standards.
6. Enabling better allocation of limited resources based on assessment of actual risk associated with specific products or regions.
7. Eliminating duplication of regulatory controls and inspections by importing and exporting country and minimize resource-intensive port of entry inspections.
8. On-site product-by-product inspection tasks can be reduced and/or replaced by with risk-based monitoring and verification.
9. Unnecessary paper documentation can be reduced, eliminating resource intensive registration, certification and other documentation requirements that are not science-based and provide no identified food safety benefit.
10. This produces economic benefits for all partners, and for industry and regulatory agencies resulting in lower process for consumers.

Equivalency assumes that sanitary measures from an exporting country, though different, achieve the same **appropriate level of sanitary protection of the importing country**. Then the importing country should allow goods to enter its market. An equivalence determination can be made on a measure or measures related to a specific product or category of product, or a system-wide basis (Hathaway, 1999; Codex, 2001).

Equivalence affords the same degree of protection to each country, but allows regulations or standards to be quantitatively and qualitatively different. It has the advantage of recognizing the different circumstances under which countries protect their consumers and environments, while at the same time recognizing the different conditions and factors that influence standards setting.

When conducting an equivalence process**, Food Safety Objectives** (FSO's) are used as they constitute the operational measures of the ALOP in food safety management **(Figure1).** FSO's provides the necessary bridge between the ALOP and individual sanitary measures and thus set target for the control of hazards in food through the application of codes of practice or standards.

Food industry and control authorities can use FSO in estimating the "risk" into a definable goal for establishing food safety management system that incorporate GMP; GHP and HACCP. FSO's provide a rationale on how and why a particular sanitary measure achieves, or contributes to the achievement of a country's ALOP. An FSO is a statement based on a risk analysis process that includes an expression of the level of (a) hazard (s) in food that is tolerable in relation to an appropriate level of consumer protection (Hathaway, 1999).

FSO's are important risk management activities derived from the result of risk assessments and they will enable

flexibility for authorities and industry on how to manage and control food hazards. FSO's are useful tools in the process of equivalence determination and found their foundation in the sanitary measure of each country.

FSO's have three components, the type of food, the hazard of concern and the ALOP.

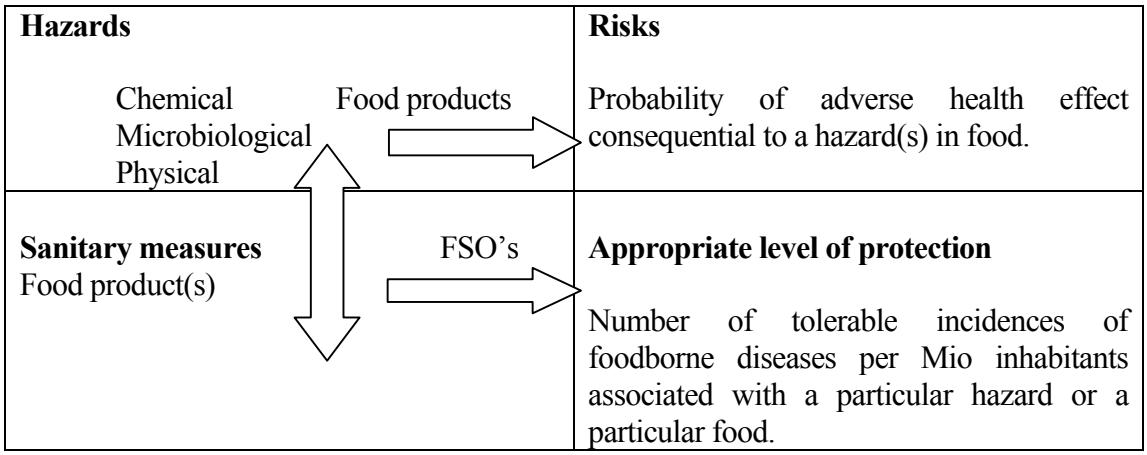

Figure1. Food safety objectives components

FSO's provide the industry a scientific basis for implementing sanitary measures deemed to control hazards of concern in food products and operations. Control authorities will use those measures for developing control, implementation and monitoring inspection procedures to assess the conformity and adequacy of control measures adopted by the food industry, determine the equivalence of inspection procedures in different countries and facilitate the communication of risk management decisions to all stakeholders in food safety.

In the case of chemical hazards in food, an ALOP is usually predetermined by regulatory food safety policy for instance "notional zero risk" in the case of residues for veterinary drugs or pesticides.

FSO can be quantified by using the following relationship:

$$H_0 + \sum R + \sum I \leq FSO$$

Where:

H_0: is thy initial level of the hazard,

$\sum R$: the cumulative reduction of the hazard through processing.

$\sum I$: the cumulative increase of the hazard through, handling, storage, transport and distribution.

4. Process of equivalence determination

The process for the determination of equivalence of sanitary measures related to inspection and certification systems include testing, inspection, certification and approval procedures, sampling procedures and methods of risk assessment, and packaging and labeling requirements directly related to food safety. This process, which applies when a country is willing to export, is given in **Figure 2**. It comprises a number of alternate steps between the exporting and the importing country through the usage of an agreed process for exchange of the information necessary to facilitate the determination of equivalence (Hathaway, 1999; Codex, 2001).

EXPORTING COUNTRY	IMPORTING COUNTRY
1. Identify sanitary measures of the importing country related to food product.	
2. Request for food safety objective (s)	3. Provides food safety objectives I. Scientific basis of the sanitary measures under consideration, including risk assessment were appropriate. II. Explain the goal and the reason behind the sanitary measure. III. Clearly identify the risks the measures in question seek to address. IV. State the ALOP the sanitary measure(s) seeks to achieve. V. State the relationship the on which the sanitary measure(s) was based, or the technical justification based on the regulations, guidelines or relevant international recommendations. VI. Attach the risk assessment upon which the sanitary measure(s) was based, or the technical justification based on the regulations, guidelines or relevant international recommendations. VII. Provide any additional information, which may assist the exporting country in presenting an objective demonstration of the equivalence of its own sanitary measure(s).
4. Seek clarification if any/explanation of the importing country ALOP expressed as food safety objective (s)	5. Clarify food safety objective (s)
6. Develop a case for alternative sanitary measure(s)	7. Evaluation based on risk assessment
	8. Equivalent? I. Yes– Case accepted. II. No–Provides list of concerns for modification
9. Modify: alternative sanitary measure (s),	10. Evaluation based on risk assessment

further develop case taking into account concerns of importing country	
	11. Equivalent? I. Yes – case accepted II. No – Risk Assessment a) Greater ALOP case accepted b) same ALOP case accepted c)Lower ALOP Mechanism for possible resolution of different opinions on case for equivalence.

Figure 2. Flowchart – Guidelines for the determination of equivalence (Codex, 2001).

5. Enforcement of food safety measures

Individual governmental regulatory systems should provide a framework for maintenance of food safety. Regulatory requirements establish limits and responsibilities but are of little value without effective enforcement.

The trade of food and feed cannot be guaranteed without and efficient enforcement system of food control within the region.

As show in the process of equivalence determination, the enforcement will contribute to the alignment of standards and controls observance that contribute to assure confidence and transparency in the safety of food and feed and to safeguard consumer's health.

The main objective of the enforcement is to improve capabilities of a country to enforce food safety norms according to Codex standards including:

1. Food additives.
2. Food contaminants and heavy metals
3. Methods of analysis
4. Sampling methods
5. Import and export inspection and certification systems
6. Residues of veterinary drugs
7. Pesticide residues
8. Microbiological hazards
9. Labeling
10. Codes of practices
11. Allergens
12. Novel foods and GMO's
13. Product composition.

Food control is the mandatory regulatory activity of enforcement by national or local authorities to provide consumer protection and ensure that food is safe with particular attention to export/import control.

An effective food enforcement system comprises four elements:

- An administration – developing countries should strive to introduce a well integrated, in line with the "farm-to-table" concept, and coordinated food control system. The activities dealing with Food Safety System need to be integrated and coordinated in order to facilitate the equivalence determination process and improve SPS activities.
- An inspectorate – able to efficiently perform the following tasks:
  - Inspecting food premises
  - Instigating necessary action for non-compliance with regulations
  - Investigating of food disease outbreaks

- Giving advices to the food production and processing sectors. The inspection should focus on modern approach based of food (safety) assurance system based on methods of controlling and monitoring risks and encourage the food sector to adopt the HACCP technique.

- An analytical capacity is the basic requirement to monitor the quality and safety of food. Regional organizations should cooperate and designate regional reference accredited laboratories that are vital for the region. Laboratories, private or governmental should be accredited according to the ISO/IEC 25 Guide. Modalities need to be defined for the participation of private laboratories.
- At the regional level, the accredited reference laboratories have to be integrated in a network of laboratories of excellence with the aim of ensuring continuous monitoring of food safety hence playing an important role in the prevention of potential health risks for citizens.
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6. Conformity assessment

Conformity assessment systems are fundamentally important to consumer safety confidence in traded goods and are widely used as food control mechanism. The conformity assessment assures that processing and or/production controls are done adequately. The confidence of consumers in the safety, fitness for purpose and truth in labeling of their food supply depends in part on their perceptions as to the effectiveness of food control measures.

A substantial proportion of worldwide trade in foods and food products depends upon the use of inspection and certification systems. However, inspection and certification requirements can also significantly impede international trade in foods and food products. Consequently, it is desirable that the design and application of the systems should reflect appropriate principles.

The WTO/SPS Agreement sets out principles, which include control, inspection and approval procedures. The Codex has developed guidelines, which set out the principles for food inspection systems as basis for aligning food inspections and minimizing their adverse impacts on international trade, while at the same time ensuring that they afford an appropriate level of protection to consumers in importing country.

7. Import/export procedures

As the trade of food products is expected to increase globally, it is necessary to lay down procedures for conformity assessment of food and food products meant for import and export.

7.1 Confidence building and system integrity

Procedures for assessing other parties' conformity assessment procedures need to be put in place. This exercise provides information whether the procedures used give confidence on the level of assurance that meets the requirements of the importing country. The conformity assessment addresses, product, process or food processing system it self:

- Conducting on site visits and evaluations of foreign food processors and producers,
- Obtaining information concerning manufacturing practices (GAP, GMP, GHP),
- Requesting documentation from processors/producers concerning controls that affect product safety (HACCP) and compliance

(microbiological, chemical, physical),

- When the assessment of risk is identified, critical points in the production and processing systems in an exporting country should be implemented.
- Provision for procedures to take corrective action if HACCP identifies breakdown in safety/quality system;
- Implementation of quality management system ISO9000 and ISO14000
- Maintenance of up-to-date records.
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7.2 Research and Exchange of information

Developing Countries should establish and actively participate in the system of systematic exchange of information that builds up confidence in food safety related issues: food problems outbreaks, food products incriminated, food borne illnesses and other relevant information. This should be done in accordance with the procedures set out in CAC/GL 19-1995, developed by the Codex Alimentarius Committee on Food Imports and Exports and Certification Systems.

This exchange of information could be fruitful if each country supports the research and the collection of information on foodborne disease, through epidemiological survey. This will also sustain the activities of this alert system.

The following topics should be addressed when conducting and reporting surveys results:

- Microbiological safety of food
- Toxicity of chemicals in foods
- Novel foods and processes
- Pesticides
- Veterinary residues

The information collected should be communicated to WHO, FAO and OIE.

7.3 Product specifications

Exporting countries should have the necessary legislation, powers, resources and expertise to develop, implement and monitor a sanitary control program capable of ensuring that food for export is safe for human consumption and truthfully labeled. This will comprise:

- A complete list of all ingredients including components to establish the safety of the product and compliance with Codex, particular attention should be given to the presence of ingredients and components that may cause severe allergic reactions, new products of biotechnology or novel foods;
- Ensure that microbiological, chemical, physical and nutritional standards meet international regulations for the concerned products or category of products;
- Ensure that written sampling procedures, analytical methodology and limits for acceptance are in compliance with Codex standards;
- Maintain complete and up-to-date records of all products;
- Ensure the compliance of labeling with international regulations.
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7.4 Certificate of analysis

The certificate of analysis should be issued by the competent authority or authorized body. The document should:

- Indicate the sampling procedure(s) and analytical methods used to ensure they are acceptable to the importing country;
- Employ an appropriate mechanism to ensure the integrity and adequacy of testing procedures and reports;
- Include the date, type of analysis, individuals/organizations conducting the analysis, product identification

(include brand and lot number), competent authority or authorized person;
- Indicate that the lot was sampled recently and stored under good conditions that prevent any deterioration;
- Be randomly verifiable to assess the conformity compliance with importing country regulations;
- Be easily available upon request.
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7.5 Exporting country laboratories

The exporting country should assure that representative samples of food products have been analyzed at a required point;
Laboratories participating in the analysis of food and food products for export should be accredited;

- The laboratory should be accredited according to ISO/IEC Guide 58;
- The laboratories involved in official import and export control of foods should comply with ISO/IEC Guide 25;
    - Use internationally recognized analytical methods of protocols set out by Codex or other international standards organizations like AOAC, IDF, AACC, ISO, ICMSF;
    - Validated by inter-laboratory method performance studies and shown to have a performance which is equivalent to that of the international standard methods;
- Laboratories participating in food analysis for export or import should also be required to participate in relevant proficiency regional testing performance scheme.
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7.6 Random sampling and analysis

Sampling procedures used in order to check and/or confirm the results of the certificates of analysis from the exporting country should be based on appropriate and agreed statistical based sampling plans:

- Chemical, microbiological, physical testing procedures.
- Administered by the competent authority or authorized person.
- Analyses should be done by internationally accredited laboratories.
- Otherwise ensure that laboratories participating in export testing and related activities are adequately equipped, staffed by competent personnel and have demonstrated capacity to provide accurate testing results.
- In any case verify the authenticity and accuracy of test report and take appropriate action on false declarations and tests reports.

7.7 Traceability and recall procedures

A well-detailed procedure should be in place in order to:

- Set out mechanism that provide for unique identification of homogenous lots or groups of products to facilitate sampling, testing and inspection.
- Ensure that lots found not to be in compliance are segregated.
- Precede to a rapid recall of imported food and food products from the market.
- Complete receiving/shipping records in order to establish the date the consignment was received
    - The lot identification number
    - Up-to-date records

7.8 Transportation and storage

Transportation and storage are important processes in the food chain so it is therefore recommended that critical safety issues pertaining to these operations are addressed. The quality control and sanitary practices at the manufacturing level may be compromised by transportation or

storage under unsanitary conditions. Proper storage ensures that safe and wholesome food products reach the consumer.

Adequate measures to guarantee the good quality of the food products should include:

- Inspection of carriers and warehouses.
- Cleanliness.
- Foreign materials, glass, oil and chemicals;
- Rodents, insects and other pests;
- Wall, ceiling and floors integrity.
- Precooking the product or the utility environment for refrigerated/frozen products.
- Maintenance of appropriate transportation and storage temperature for refrigerated products and for frozen products.
- Sanitation program based on appropriate Codex codes of practices concerning, GMP, GHP and GMDP.
- Monitoring and recording temperature program.

8. Safety Assurance and Quality Management Systems

Safety program and activities should be applied to the complete food chain, from food production on the farm, through to the consumer.

The production or manufacturing of safe food should conform to be the Codex ALINORM 97/13. This includes:

- Control measures at source of production.
- Good product design and process control of critical parameters.
- Application of good manufacturing practice during receiving, production, processing, handling and distribution, storage, sale, preparation and use.
- Implementation of preventive safety management system because the effectiveness of microbial, chemical end products testing is limited.

The food industry has the responsibility for the production of safe food. The manufacturing of safe food is tackled by quality control and quality assurance. This is achieved by the hygienic design of equipment and factory, managerial commitment to safety and quality.

This is accomplished with the implementation of GAP, GMP, GHP, HACCP, MRA, QM, ISO 9000 series (9000-9004) and 14000 and TQM (Forsythe, 2000).

The application of HACCP is compatible with the implementation of quality management systems, such as the ISO 9000 series and the system of choice in the management of food safety within such systems.

GMP covers the fundamental principles, procedures and means needed to design an environment suitable for the production of acceptable quality. GHP describes the basic hygienic measures that establishments should meet and which are the perquisites (s) to other approaches, in particular HACCP. GMP/GHP requirements have been developed by governments, Codex, food industry in collaboration with other groups and food inspection and control authorities.

- **Hazard Analysis Critical Control Point – HACCP**
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HACCCP is an internationally recognized safety assurance system for the food industry. It is an effective approach to establishing good production, sanitation, and manufacturing practices that produces safe foods. HACCP is the reference linking together all safety related control measures into one single management system.

New approaches require that HACCP food safety measures be based on an assessment of risks to human health. In order to make risk based HACCP plan effective, the expected food safety

outcome must be identified, using FSO's as essential tools in this process. Therefore FSO will provide the "target" for the HACCP plan, and a food safety outcome for the product as a result of the implementation of that plan.

- **ISO 9000-9004 Series of standards**

  They refer to a cultural approach of an organization that is focused on quality. They are based on the total commitment and participation of all members of the organization aimed at continuous improvement in order to reach customer satisfaction. They provide a sound basis for the implementation of quality management.
  ISO standards are equivalent to British Standards BS 5750:1987 and European Standards EN2000 series.

- **ISO 14000**

  This standard takes into account the new considerations related to environment protection and preservation.

- **Risk Assessment - RA**

  The changing patterns of food processing, supply and consumption and emergence of new foodborne pathogens has brought new challenges that require new approaches for managing food safety risks, despite the legislation and measures established by different countries.
  RA **(Figure 3)** is a process that evaluates the likelihood that adverse human health effects will occur following exposure to biological, chemical or physical hazards. RA generates models, which will enable the changes in food processing, distribution and consumption to be assessed with regard to their influence on food poisoning potential.
  RA is a management tool for government bodies to define an appropriate level of protection and establish guidelines to ensure the supply of safe foods.
  International and national institutions are more and more addressing food safety risk associated with biological hazards. RA is used as a tool to decrease the risk. RA information is useful in determining what hazards whose prevention elimination or reduction to acceptable levels is necessary.
  Risk assessment itself has two components, variability and uncertainty (Lammerding et al, 2000). Variability is due to biological differences observed in the same species, for instance not all people have the same size, weight, color etc… and uncertainty deals with lack of knowledge.
  It is agreed under the WTO/SPS Agreement that in case of uncertainty the principle of precaution prevails.

HAZARDS IDENTIFICATION
The identification of biological, chemical and physical agents capable of causing adverse effects and which may be present in a particular food or groups of foods.

EXPOSURE ASSESSMENT

The qualitative and/or quantitative evaluation of the likely intake of biological, chemical and physical agents in a food as well as exposures from other sources of relevance.

HAZARDS CHARACTERISATION
The qualitative and/or quantitative evaluation of the nature of the adverse effects associated with the hazard, including dose response assessment.

RISK CHARACTERIZATION
The qualitative and/quantitative estimation including attendant uncertainties of the probability of occurrence and severity of known or potential adverse health effects in a given population.

Figure 3. Codex Risk Assessment (CODEX, 1998).

9. Conclusion

Food trade is a recognized source of income of many developing countries. In order to maintain or increase their market share, safety aspects of exported food products should be addressed efficiently. Many developing countries have or are doing a lot of effort in that respect. Nevertheless efforts are more concentrated in food sector directly linked to export markets. There is a persistent idea that "good quality" is only a condition for lucrative exported products. Many Developing Countries have thus developed de facto a double standard food safety system, for export and for local market. This situation is contrary to the WTO/ SPS agreement and prejudicial to development of the food chain or industry. The implementation of tools describe in this review will improve the quality of food products produced in the developing world and give more confidence to the consumers. It will also ease the communication between food production and processing units and regulatory authorities especially and speed up

procedures at port of entry of food Data necessary for the determination of FSO's as required in international food trade will be collected easily.
The practical determination of equivalence provisions of WTO/SPS Agreement for food in international trade requires developing countries to develop the necessary skills.

List of acronyms and abbreviations

AACC – American Association of Cereal Chemists
ALOP – Acceptable Level of Sanitary Protection
AOAC – American Organization of Analytical Chemists
APEC – Asian-Pacific Economic Cooperation
BS – British Standards
Codex – Codex Alimentarius Commission
EU – European Union
EN – European Norm
FAO – Food and Agricultural Organization
FSO – Food Safety Objectives
GAP – Good Agricultural Practice
GHP – Good Hygiene Practice
GMP – Good Manufacturing Practice
GMDP – Good Manufacturing and Distribution Practice
GMO – Genetically Modified Organisms
HACCP – Hazard Analysis Critical Control Point
ICMSF- International Commission of Microbiology Specification for Foods
IDF – International Dairy federation
ISO – International Standards Organization
IPPC – International Plant Protection Convention
MERCOSUR – Southern Common Market
MRA – Microbial Risk Assessment
NAFTA – North American Free Trade Agreement
OIE – International Office of Epizootics
OECD – Organization of Economic Co-operation and Development
products.
PCB – Polychlorinated biphenyls
QM – Quality Management
RA – Risk Assessment
SPS – Sanitary and Phytosanitary
TQM – Total Quality Management
WTO – World Trade Organization
WHO – World Health Organization

References

Caswell J.A., 2000. Economic approaches to measuring the significance of food safety in international trade. Int. J. Food Microbiol. 62, 261-266.
Codex, 1998. Codex Alimentarius Commission, Codex Committee on Food and Hygiene (CX/FH98/2). Proposed Draft Principle and Guidelines for the conduct of Microbial Risk Assessment. FAO/WHO, Rome, Italy, 1998.
Codex, 2001. Draft guidelines for the judgment of equivalence of sanitary measures associated with food inspection and certification systems. Joint FAO/WHO Food Standards Programmes CX/FICS 02/04. FAO/WHO, Rome Italy, 2001.
Forsythe S.J., 2000. Food Safety in the EU. http:// science.ntu.ac.uk/external/lhc
Hathaway S. 1999. The Principle of Equivalence. Food Control, 261-265.
Lammerding A.L., 1997. An overview of microbial food safety risk assessment. Journal of Food Protection 60, 1420-1425.