

Lappeenranta University of Technology

School of Energy Technology

Master's Degree Program in Environmental Energy Technology

Prabin Khadka

Food Policies and Related Strategies Among FAO, EU and Nepal- A Comparative Analysis.

Examiners: Professor Lassi Linnanen, D.Sc. (Tech.)

Associate professor Mirja Mikkilä, D.Sc.

ABSTRACT

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Associate professor Mirja Mikkilä, D.Sc.

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In this modern era of science and technology, with increasing human population and development, various problems and threats are alarming for the present and future generations. Food security is becoming a debate for this generation as there is known fact of still over 800 million people are deprived of their daily calorie needs. The eradication of hunger, food security and supply of quality food are the major target of many countries and organizations. The need of proper and sustainable food policy arises to tackle the problems related to food production and supply. Food policies and related strategies are formulated, adopted and implemented by different organizations. Food availability, food loss, food security, food safety, consumer awareness and food sustainability are other important aspects of policy formulation and implementation. FAO, EU and Nepal are included in the research whose food policies and strategies on those aspects are studied. The differences in the policies are found out with the comparative analysis and the research questions are summarized out. The results derived upon a comparative analysis of scientific literature indicates that proper and sustainable food policies, proper plans and effective implementations are the solutions to overcome global food problems and hunger. The global unity, promise and joint action are outmost in this regard.

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LIST OF SYMBOLS AND ABBREVIATIONS

The following abbreviations are used in this Thesis report:

ANGOC	Asian NGO Coalition for Reform and Rural Development
BSE	Bovine Spongiform Encephalopathy
CAC	Codex Alimentarius Commission
CAP	Common Agriculture Policy
CFP	Common Fisheries Policy
DFTQC	Department of Food Technology and Quality Control
EU	European Union
EURLEX	European Union Legislation Database
FAO	Food and Agricultural Organization of the United nations
FAOLEX	Food and Agricultural Organization of United Nations Legislative Database
FAOSTAT	Food and Agricultural Organization of the United Nations Statistical Data
FAPDA	Food and Agriculture Policy Decision Analysis
FSB	Food Standardization Board
GHI	Global Hunger Index
HACCP	Hazard Analysis and Critical Control Point
ICESCR	International Covenant on Economic, Social and Cultural Rights
ICN	International Conference on Nutrition
IFPRI	International Food Policy Research Institute
ISO	International Organization for Standardization
MDG	Millennium Development Goal
NBSM	Nepal Bureau of Standards and Metrology

NCS	National Council for Standards
NEPLAS	Nepal Laboratory Accreditation Scheme
NNPS	National Nutrition Policy and Strategy
PoA	Plan of Action
SARSO	South Asian Regional Standards Organization
UDHR	Universal Declaration of Human Rights
UN	United Nations
UNDP	United Nations Development Programme
UNICEF	United Nations Children’s Fund
VAT	Value Added Tax
WDI	World Development Indicators
WFP	World Food Programme
WHO	World Health Organization
WIPO	World Intellectual Property Organization
WRI	World Resource Institute
WTO	World Trade Organization

1 INTRODUCTION

Food is the essential element of life cycle. The nutrients and minerals embedded in the food are vital for the human body functions. A healthy food is required for a healthy body. We cannot imagine our life without food. Hence food is vital for the overall development of an individual. A proper food brings happiness in life. Food comes under most fundamental need of growing population, no life can sustain without food and there is a huge challenge to feed the world population which is speculated to reach 9 billion by the year 2050 (Kremen, Iles and Bacon, 2012). According to Blades, 2009, various aspects of food and nutrition have a fundamental impact on happiness as all aspirations are meaningless in absence of basic fuel of food.

Food reflects who a person is and what they value, and of their capacity to meet their family's basic needs. Elizabeth Dowler, 1998, described food as a focus for social exchange which not only indicates the healthy and stable condition of the individual but also his social status and interactions. Beside affecting social and physical state of individual a food system put a huge impact upon many of the greatest environmental threats which our globe is facing like loss of biodiversity, freshwater depletion, waste management, release of gaseous pollutants to atmosphere, greenhouse gas emissions etc. (Godfray & Charles, 2011).

1.1 Background

The global food problem: Even though many progressive steps have been taken for the eradication of hunger over 800 million people still do not have capacity to meet their daily calorie needs. The One out of nine people does not get any food at all. The condition is even worse as more than two billion people are suffering from nutritional deficiencies. Whereas obesity on another hand is a growing problem. Altogether malnutrition, under nutrition, micronutrient deficiency and obesity are the major food related disorder from which all the community and household are passing through (FAO, 2014).

The human problem of hunger: The energy that people need to perform daily activities varies according to different physical factors. Age, sex and body size determines the need of calorie intake. Body needs more than 2,100 Kcal/day to live a healthy normal life. However, lack of this minimum calorie and access to food leads to a hunger. Hunger, simply means the condition of not getting sufficient food that body requires. Most of the people living in rural areas and having low

financial sources are vulnerable to hunger and developing countries comprises the major sum of hunger.

The natural disaster hit zone and war crisis zone are more prolonged to suffer from hunger. More acute hunger or starvation can be seen in this place. Even though globe produces sufficient food to feed 7 billion people one in every eight individual goes bed with hungry stomach. There are various interconnected reasons to cause this hunger; poverty, lack of investment in agriculture, climate and weather, war and displacement, unstable markets and food wastage play a significant role to cause global hunger (WFP, 2015). Millennium development project came as a global commitment to address the problems of poverty and hunger. The top leaders of world gathered at millennium summit in 2000 and adopted the UN millennium deceleration. The time bound goal was set to be achieved by 2015, known as Millennium Development Goals (UN millennium project, 2015).

Out of the eight development goals set in the millennium development goals eradication of extreme poverty and hunger is one of the primary goal which should be completed by 2015. The main target of this goal is to half the proportion of people who suffer from hunger in between 1990-2015. While the proportion of undernourished people globally decreased from 23.2 percent in 1990-1992 to 14.9 percent in 2010-2012, this still leaves 870 million people go hungry or one in every eight individuals worldwide goes hungry (UNDP, 2013).

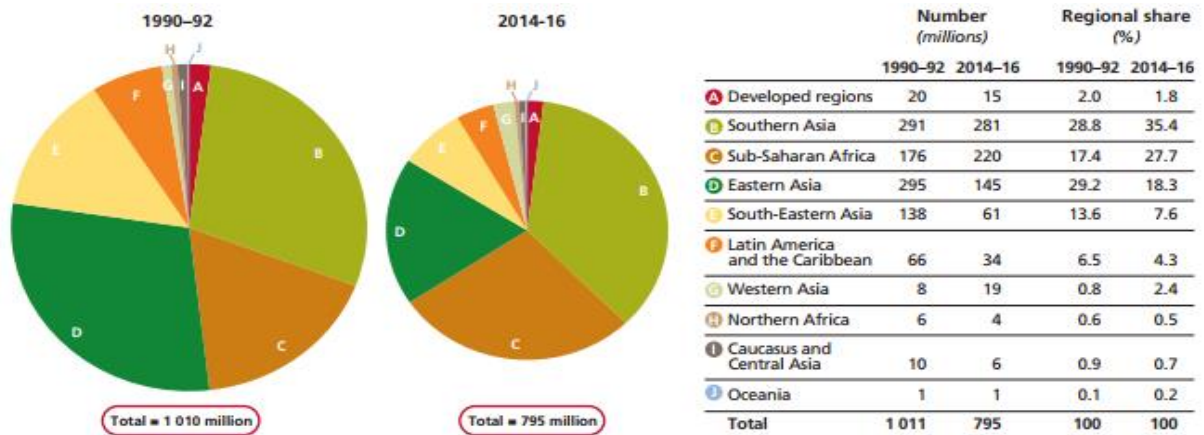


Figure 1. The Changing distribution of hunger in the world: numbers and shares of undernourished people by region, 1990-92 ad 2014-16 (The state of food insecurity in the world, 2015)

1.2 Justification

FAO, EU and Nepal have different policies and strategies regarding food sectors. Every country has its own sets of national strategies and policies bind by laws and regulations. They are internationally engaged to some organizations adopting their policies, regulations and permits. FAO and EU both as an organization contain policies which are implemented by their member countries. The member countries adopt general model, structure and formation of policies generated by those organizations. Those are common policies bind by common law whereas Nepal has its own set of national policies but being a member of FAO, it also follows policies of FAO.

Policies are made for the betterment of people and process. They are foundation of good and prosperous governance. Policies are made so that it can give guidelines and directions to carry out the plan and programs effectively. Since global food production and problems related to food are the most common issues. To feed the growing number of population, reduce hunger and malnutrition, nutrition, supplements, food safety and security all these factors needs goal oriented policies, strategies and programmes. The increasing food demand and challenges can be meet only through proper plans and policies. The sustainable agriculture and food production plays crucial role to feed the world population which can be achieved through farsighted policies. The effective implementation of these policies in working areas is outmost thing for the sustainable management of food supply chain. The study of existing policies, their comparisons, benefits and drawbacks evaluate the development and effectiveness of programmes and brings compatible vision to make further plans and strategies.

1.3 Research design

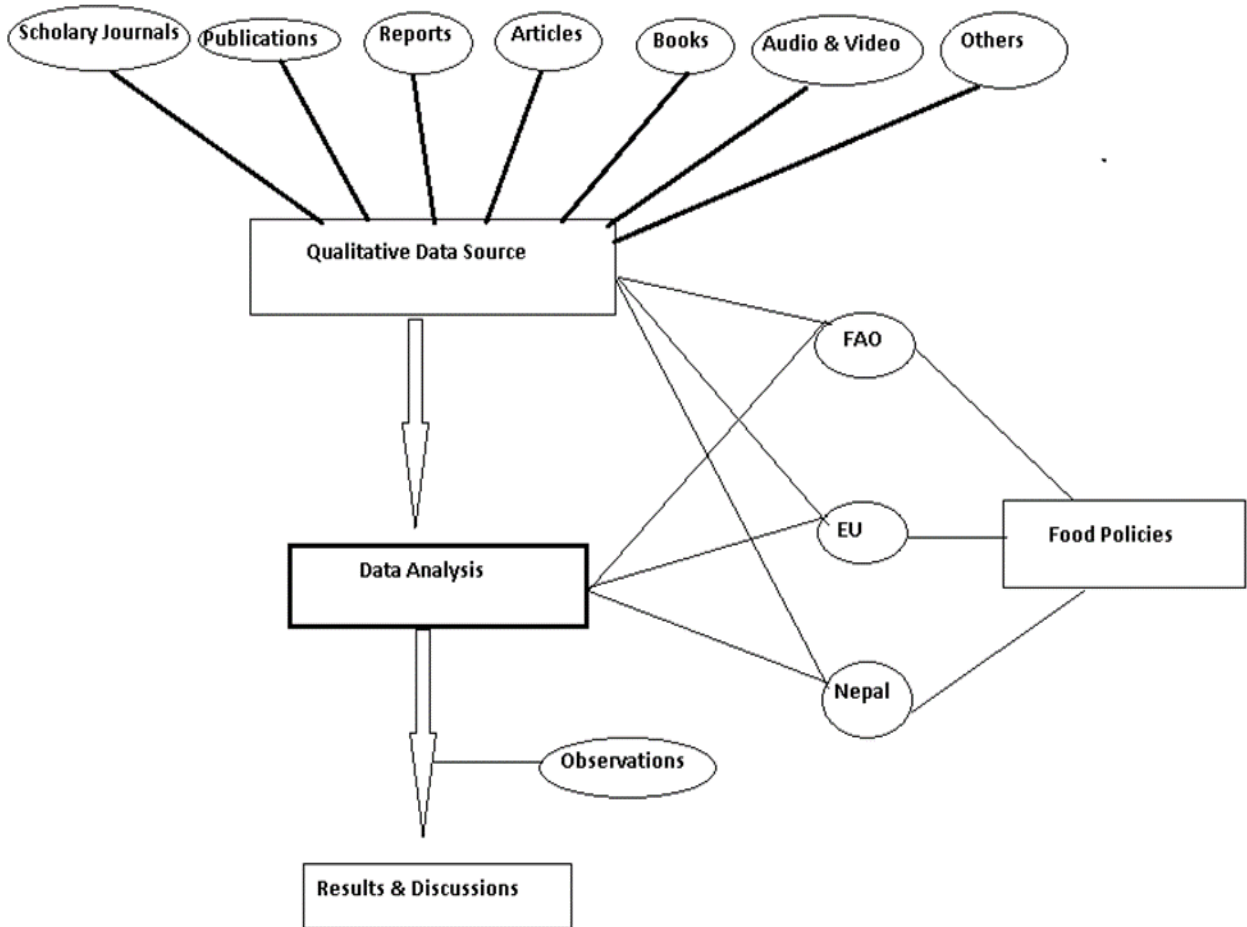


Figure 2. Research Design showing different stages of Research process

Data collection was started using various sources such as scholarly journals, reports, articles, books, websites and others. Review of data was done after carefully studying them. The data were divided into three different categories namely FAO, NEPAL and EU. The studied areas under each category was made. The policies groups were distributed and study was done. The outcome and results was discussed in briefs and comparison was made.

1.3.1 Research Question

The main Objective of this research work is to compare the policies and strategies related with food between Food and Agricultural Organizations of United Nations, European Union and Nepal. The purpose of this research work is to analyze and compare the current policies, programs and strategies regarding food in the sector of Food supply chain, packaging, standards, food safety, consumer protection, price and food waste management. All the institutions and regulatory bodies have their own sets of food policies and strategies at national and international levels and they are very essential for the progress of people and country. These policies play a significant role to obtain global commitment of poverty alleviation and hunger eradication and address the problems of food security, food sufficiency and agricultural sustainability. Furthermore, the policies will be analyzed to check how they define the problem of food security and sustainability. The limitations, boundaries and challenges that comes along will be studied and thoroughly discussed. At last the benefit and drawback of the policies will be figured out and opinions and recommendations will be given. Based on this introduction the research questions can be summarized and presented below:

- 1 What are the major food acts and regulations and how they address the current food insecurity and sustainability?
- 2 How does the food prices are regulated and resources are mobilized to ensure the food sufficiency and food availability?
- 3 How does the food safety policies and food safety situations vary among organizations?
- 4 What are the differences in food standards and food safety between organizations?
- 5 What are the major food waste management policies and their effectiveness?

2 LITERATURE REVIEW

In this part, the study of the food policies of given organizations and country will be made on different terminologies. Some facts and statistical data about food trends and supply will be shown. In addition, food system and food policy have been studied to understand the definitions, interrelation and generalization of the subject.

2.1 Food System and Food Policy

The word food system is broadly used in agriculture, food science, nutrition and in the field of medicine which carry interconnected and complex sets of procedures and activities to make food available for common people (Sobal et al. 1998). According to (Kneen, 1989) the whole intermediary series of processes that comes across in the food system are often denoted by statements like “from field to table” or “land to mouth”. In another term food system can be generalized as the integration of food chain and food economy. The food system includes three aspects of life namely: (Tansey. G, 1994)

- (1) Biological aspect: All the living methodologies used in the production of food and retain sustainability of ecosystem
- (2) Economic and Political aspects: The influence, mobilization, power and control; which are strain on the different parts of food system by different parties.
- (3) Social and cultural aspects: The social norms, values, traditions and personal relations posing impact on people`s use of food.

Hence to reach food from the production field to the plate of people, the number of interlinking stages are involved which determines the quality of food. Those stages involved in the food system are described below: (The state of food and agriculture, 2013)

- (1) Production: The production of food is the initial element of food system. This part includes all the stages from showing of seed till yielding of fruits and delivery up to the farm gate. The stages involved are:

- Production and farm management: Selection of field, mobilization of manual labor, access of agricultural tools and equipment; all these things are arranged in the production process and management.
- Inputs: Inputs in the production process indicate the utilization of fertilizers, irrigation supply and application of pests` control. These factors enhance the production of crops and better yield.

- Research and Development: Better yielding hybrid crops, disease resistance crops, soil study, new agricultural methodologies and techniques; all these achievements are continuous efforts of research and development that has been carried in the field of agriculture and food.

(2) Post-harvest supply chain: The post-harvest system connects the moment of harvest to the moment of consumption therefore it is a motive collection of participants, facilities, technologies and processes that dispatch harvested products to their consumers (Banks, H.N, 2014).



Figure 3. Simplified supply chain showing flow of product from input suppliers to consumers (Collins, R, 2014)

(3) Consumptions: Consumers are the last point of food supply chain. A product after various intermediary processes is being ready for consumption. Whereas the factors like advertising, labelling, education, safety and protection play tremendous role in the selection of appropriate and nutritious food for consumption (The state of food and agriculture, 2013). These are the things that directly affect human health and wellbeing.

The food is being produced using specific way and technics. They are classified according to their model of life span. Different models of food system are discussed below.

Conventional food system: In a conventional food system, the food is grown in a monoculture pattern i.e. same kind of crops are grown in the same location for a consecutive year. The use of pesticides, herbicides, fungicides and chemical fertilizers are done to meet the food demand of more population. In this way, this food system produces large quantity of food at the lowest possible cost.

Alternative food system: With the beginning of fair trade movement, many forms of alternatives in the food system has been emerged. Community supported agriculture, farmer`s market, farm to school programme, urban agriculture, school and community garden, slow food movement etc. are some of the alternative food systems with a common vision to produce environmentally and socially food system than the traditional mainstream food (Noah, 2010).

Organic food system: Organic food system denotes the whole food production process which uses the methods respectful of the environment from the beginning of production stages through handling and processing. This food system concerns the whole integrated system until the product is deliver to the target costumer (FAO). According to Codex Alimentarius guidelines, "Organic agriculture is a holistic production management system which promotes and enhances ecosystem health, including biological cycles and soil biological activity. The use of external inputs in the food production in organic food system is minimum and the use of fertilizers and pesticides is restricted in organic production.

Food and agriculture policy decision analysis (FAPDA) has classified food and agricultural policy in to three main groups:

- (1) Consumer oriented policies: These policy support consumers and vulnerable group directly in terms of social safety nets, food assistance and price controls by subsidies.
- (2) Producer oriented policies: These policies influence in production through fixed minimum producer`s prices, public purchase mechanism and distribution of subsidized inputs.
- (3) Trade oriented policies: Trade oriented and Macroeconomic policies include supply policies, management of trade related measures and tariffs control.

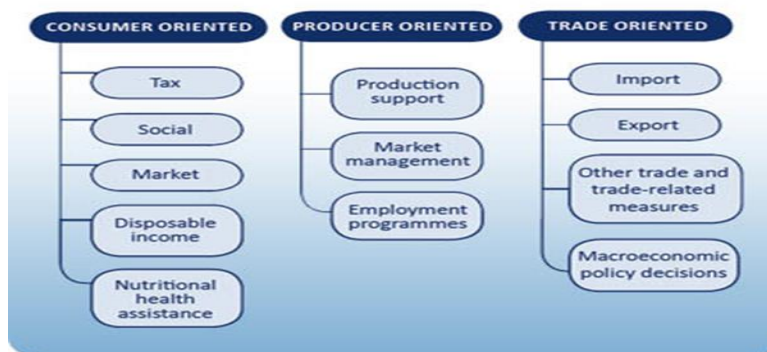


Figure 4. Policy classification according to FAPDA (FAPDA)

Tim et.al, pointed out food policy as a center point of many interacting sources. In this 21st century it is however more important that the food policy should address the competing demand of these sources. Likewise, they also pointed out the need to redefined the term of food policy; as historically, food policy was wholly concentrated on Agriculture (Primary production), Nutritional aspects of human health (consumption) and trade (international economics). The food policy in present context includes wider areas, the production and supply of food has become global phenomenon. Food availability, food loss, food security, food safety, consumer awareness and food sustainability are other important aspects of policy formulation and implementation (Simon et.al, 2004).

In global food policy report 2015-2016 there is being mentioned about global commitment i.e. reshaping the global food system for sustainable development. The betterment of human being and the world depends on such kind of food system that is more efficient, inclusive, climate friendly, nutrition and health driven, business-friendly, and sustainable (IFPRI,2016). Food security can be achieved by “twin-track approach” policy of the FAO which is meant to combat hunger through targeted programme. Table 1 elaborates recovery measures for establishing resilient food systems. The two-track approach is adopted to make fast availability of foodstuffs when needed, development of remote areas and amplify productivity (FAO,2006). The study of availability, Access and Utilization and stability is shown in the table below.

Twin Track Approach	Availability	Access and Utilization	Stability
Rural Development/ productivity enhancement	<ul style="list-style-type: none"> Enhancing food supply to the most vulnerable Improving rural food production especially by small-scale farmers Investing in rural infrastructure Investing in rural markets Revitalization of livestock sector Resource rehabilitation and conservation Enhancing income and other entitlements to food 	<ul style="list-style-type: none"> Re-establishing rural institutions Enhancing access to assets Ensuring access to land Reviving rural financial systems Strengthening the labour market Mechanisms to ensure safe food Social rehabilitation programmes 	<ul style="list-style-type: none"> Diversifying agriculture and employment Monitoring food security and vulnerability Dealing with the structural causes of food insecurity Reintegrating refugees and displaced people Developing risk analysis and management Reviving access to credit system and savings mechanisms
Direct and Immediate Access to Food	<ul style="list-style-type: none"> Food Aid Seed/input relief Restocking livestock capital Enabling Market Revival 	<ul style="list-style-type: none"> Transfers: Food/Cash based Asset redistribution Social rehabilitation programmes Nutrition intervention programmes 	<ul style="list-style-type: none"> Re-establishing social safety nets Monitoring immediate vulnerability and intervention impact Peace-building efforts

Table 1. Twin Track Approach, Policy Brief (FAO,2006)



Figure 5. Food policy as an intersecting point of competing issues (Tim et.al, 2009)

2.2 Food and Agricultural Organizations of the United Nations

Food and agricultural organizations (FAO) is one of the agencies of the United Nations established with the aim of eradicating poverty and hunger by sustainable agricultural practices and proper utilization of natural resources. Achieving food security is the core objective of FAO.

2.2.1 Some food facts and statistics

There was a swift decline in the production and supply of food in the early 90s. The FAO described this declination because of poor harvesting in North America, Australia, Eastern Europe and in the former Soviet Union. The developing countries were also unable to increase their food production remarkably at that time (Merry M, 1993).

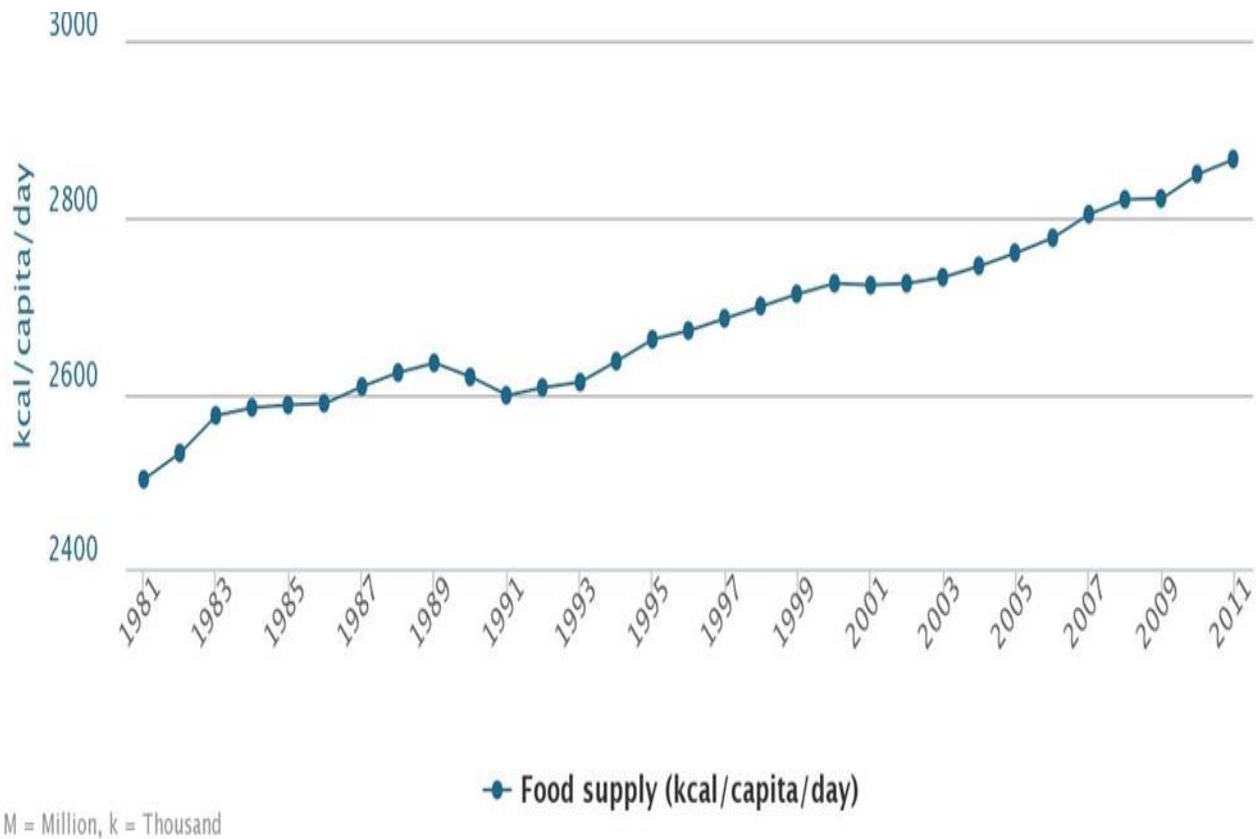


Figure 6. World average food supply (1981-2011) (FAOSTAT data, 2014)

The graph below shows that about 805 million people were estimated to be suffered from hunger in the world during 2012-2014. About 791 million people were from developing regions comprising the clear majority. This figure is 100 million less than the figure from last decade. Due to the continuous effort to eradicate the hunger the improvement has seen and the developing regions contribute a large to make this improvement over the last two decades (The state of food insecurity in the world, 2014). Despite the fact there is a huge improvement and continuous effort to decrease undernourishment only few countries will succeed to achieve the target of MDG, the target of halving the proportion of undernourished people by 2015. If we look at the figure there is a swift growth in the rate of undernourishment between 2004- 2006. The reason could be the increasing food prices and deviation of food crops to fuel production although the agricultural production has given pace with increasing demand of growing population (WDI, 2012).

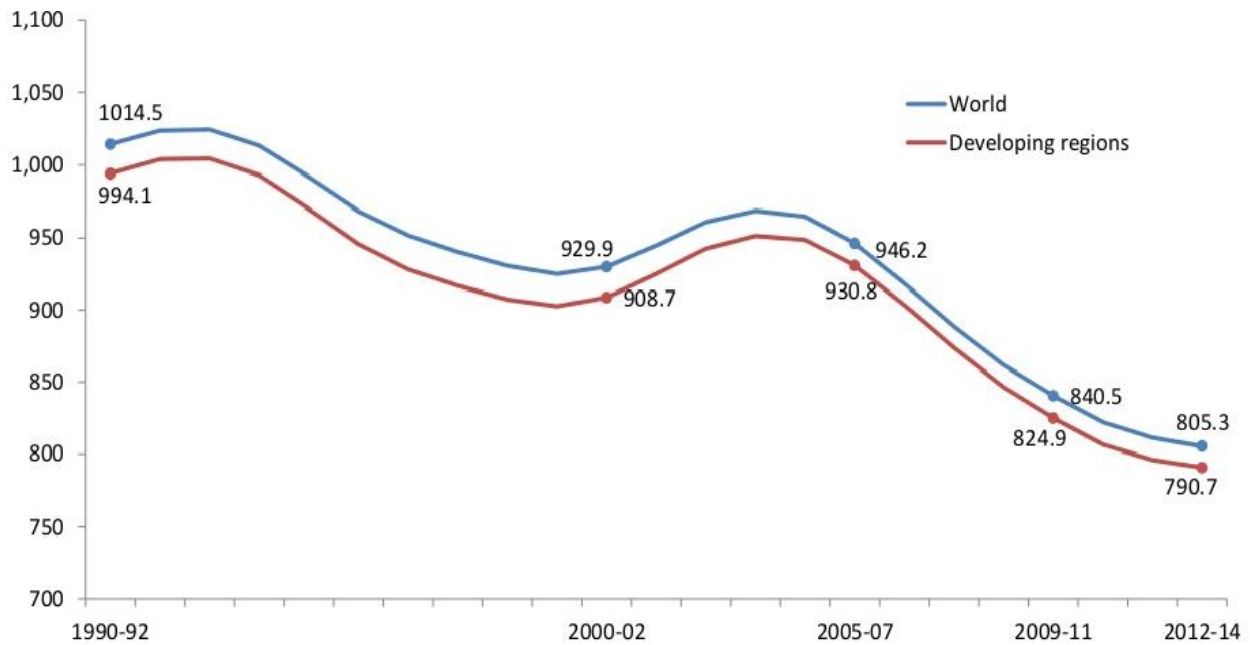
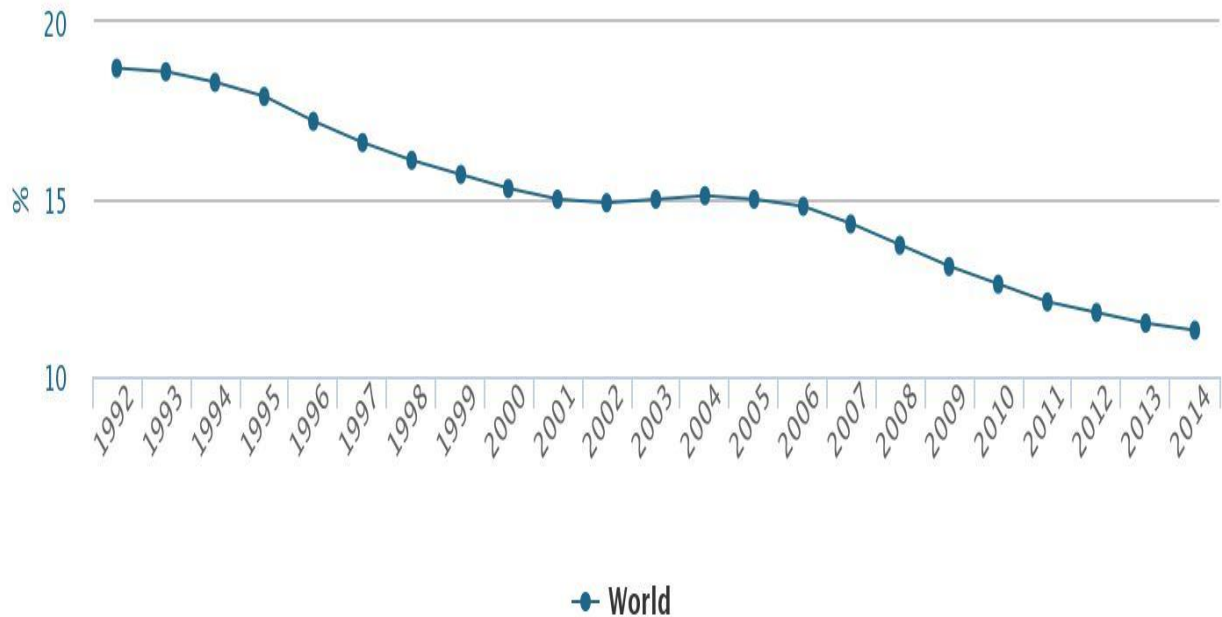


Figure 7. Undernourishment around the world (The state of food security in the world 2014, FAO)

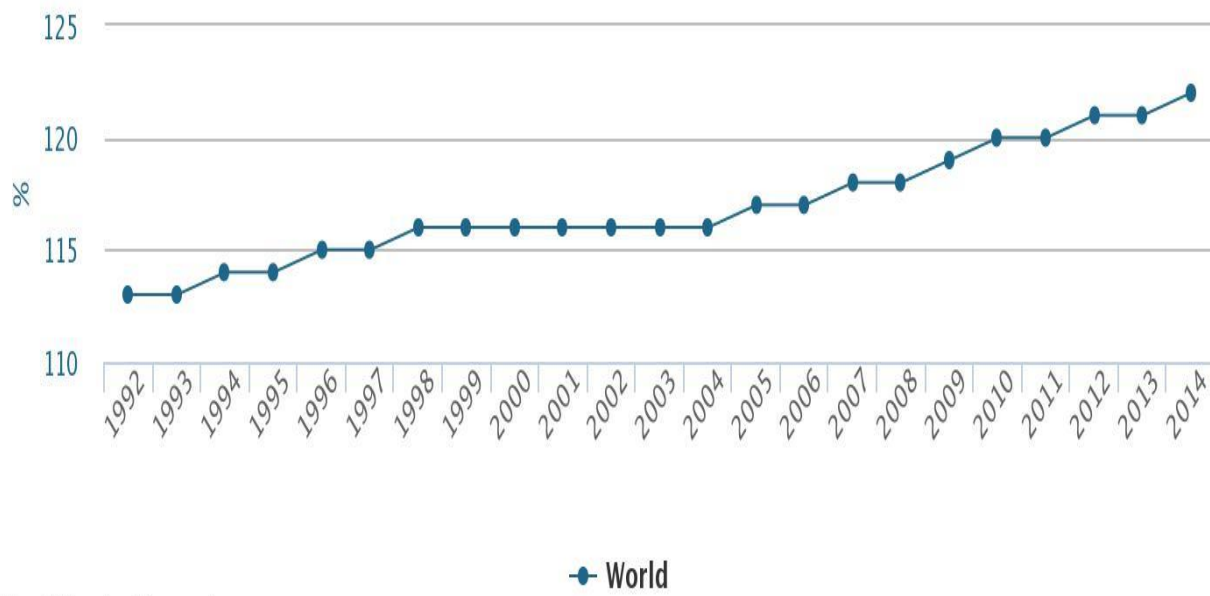
When the matters of child nutrition come the situation is very worse. In the South Asian regions and African region, we can find most of the undernourished children lack adequate food and nutrition vulnerable to death and diseases. The child under nutrition can be categorized in to three types stunting, wasting and underweight. Stunting denotes low height for one`s age, wasting denotes low weight for one`s height and underweight indicates low weight for one`s age. In collectively underweight reflects either one of them or both. The undernutrition can also be micronutrients deficiencies i.e. lack of sufficient vitamins and minerals. This form is also best described as “hidden hunger” (GHI, 2010). Even though the situation of Children undernourishment is not under complete control there has been made tremendous progress. The under nutrition is being reduced globally. There is significant decline in the prevalence of undernourished children over past two decades. The prevalence of undernourishment (<3years average) has dropped to around 10% from the 1990`s level of around 20%. Since early two years of age during childhood is very crucial and prone to under nutrition, proper care and treatment should be given to the child in terms of food and nutrition (Benson T and Shekar M, 2006).



M = Million, k = Thousand

Figure 8. Prevalence of Undernourishment (%) - 3 years' average (FAOSTAT data, 2014)

The average dietary energy requirement of the country expressed in percentage is defined as Average dietary energy supply adequacy. It measures the adequacy of the national food supply in terms of calories. The measurement helps to understand whether the undernourishment is due to insufficient food supply or to bad distribution (FAOSTAT). The supply of enough food is utmost for the insurance of food security. The data from past two decades shows the growth in global food supply rising food availability. Dietary energy supplies have also increased faster than the average dietary energy requirements, emerging in higher levels of energy adequacy. The global average dietary supply has risen to more than 120% in comparison to past two decades (The state of food insecurity in the world, 2013). Analysis of FAOSTAT data shows that there have been developments in the availability of dietary energy (WHO,2003). The tremendous shifts have taken place in diet and physical activity patterns in the last one or two decades in 20th century which is clearly visible nutrition transition and dietary shifts have taken place as people are consuming more fat, more added calorie sweeteners and more animal source foods (Popkin,2003).



M = Million, k = Thousand

Figure 9. Average dietary supply adequacy (%) (FAOSTAT data, 2014)

2.2.2 Food Acts and Food Regulations

Right to adequate food as a human right was introduced in the Universal Declaration of Human Rights (UDHR) by the UN in 1998 and further summarized by the International Covenant on Economic, Social and Cultural Rights (ICESCR) which came into force in 1976. In the UDHR article 25 it was stated that “Everyone has the right to a standard of living adequate for the health and well-being of himself and of his family, including food, clothing, housing and medical care and necessary social services, and the right to security in the event of unemployment, sickness, disability, widowhood, old age or other lack of livelihood in circumstances beyond his control.” The major key development in formulation of law, plans and policies have been done through different international activities namely:

- International Conference on Nutrition: It was held in December 1992 in Rome. It was the platform to discuss about food and environmental problems at global level for the first time. The ICN adopted the World Declaration on Nutrition and the Plan of action for Nutrition. The plan of actions interlinked with the Declaration, came out with four overall objectives: assuring supply of nutritionally adequate safe food supply; Achieving public health and nutritional wellbeing; Developing social and environmental sustainability to improve nutrition and health; and Eradicating famine and famine mortality.

- World Food Summit: In November 1996 Rome, All the delegates and important members form 185 countries gathered with aim to raise awareness about the issues of world hunger. In the inaugural session two important documents were adopted: the Rome Declaration on World Food Security and the World Food Summit Plan of Action (PoA). One of the commitments made in the Plan of Action was to address policies aimed at poverty eradication and access to adequate food.

Along with above mention regulatory framework for governing food, food safety and food standards. The world has evidenced remarkable development in the adequate food policy arena. The set up legislative trends at national and international levels defines the policy regarding the right to adequate food.

- World Trade Organization Agreements: The World Trade Organizations was established in January 1995. Two agreements were made within the framework of the WTO: The Agreement on the Application of Sanitary and Phytosanitary Measures (SPS Agreement) and the Agreement on Technical Barriers to Trade (TBT Agreement). Codex Alimentarius standards has been formulated under the SPS agreement whereas TBT agreement consists all technical requirements and standards for example labelling.
- Legislative trends: The legislation controlling food factors has been running since decade in most of the countries. Many countries have their own food laws and legislation but still some of them are solemnly dependent on standards of Codex Alimentarius Commission. The laws have been functioning since long time hence there is need to modify them and make them suitable according to current demands and challenges. Currently there exists many transparent set of rules and coherent regulations. The most appropriate and coherent model of modernize legislations are EU Regulation (EC) No. 178/2002, adopted on 28 January 2002 and another example is food legislation Indonesia. Act No. 7, 1996. Therefore, there has been changes and amendments made in the legislations. Many countries have already adopted and started implementing modified and develop legislations and rules.

2.2.3 Food Standards

FAO has been playing crucial role in formation of standards and guidelines regulating and monitoring food production and control. Since the food that we consume directly affects our health and overall development there must be some standards to maintain and follow from production of food till it reaches to the consumer. FAO has established some set of standards in 1963 with partner organization WHO. The standard is named as Codex Alimentarius or “Food Code”. This food code leads to the safety, quality and fairness of the international food trade. It makes insurance about safety of the food and its trading. All the 188 Codex members agreed to imply this scientific recommendation in all areas related to food safety and quality: food hygiene; maximum limits for food additives; residues of pesticides and veterinary drugs.

Codex Alimentarius strategic plan 2014-2019: The strategic plan 2014-2016 provides the vision and guidelines to the commission and monitor progress to achieve the goals. It fulfills the demands and targets of food safety and quality set by FAO and WHO through the work of commission. The information is provided to intergovernmental and non -governmental members and other stakeholders about the mandate and need of the members in commission (FAO,2014). The goal set by the strategic plan is shortly described below (FAO,2014)

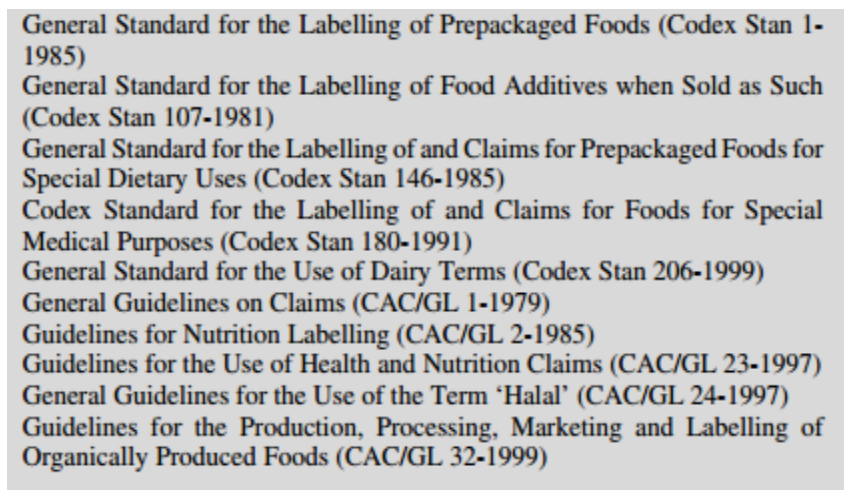
- Creation of those standards which meets the emerging food issues and challenges
- Use of risk analysis principles in the development of Codex standards
- Simplify and smooth effective participation of all Codex members
- Accomplish effective and efficient work management systems and practices

2.2.4 Packaging Policy

The packaging of food is done to make it safe, hygienic and available to the consumer for healthy consumption. The right method of packaging prevents any of the leakage or adulteration of food during any stages of FSC (FAO, 2014). The packaging should be done in such way that it should provide full protection and comfort during distribution of good in the market. The range of types of packaging depends on nature of food and its composition (Beyer, 2012). The national authority and regulatory system do not keep pace with the varying packaging technologies hence limit trade boundary particularly in the developing countries (FAO, 2014). The variation in policy and turmoil

in politics with problem of compliance cause the harm in good already shipped out or prepared to ship out (FAO).

Food Labelling: The tradition of using label on food is very historical. The clear purpose of labelling food is to protect consumer from any misleading and to ensure fair marketing. Another purpose was to prevent false claims which controls unfair market trade. These basic motives of food labelling were present long time ago and still very compatible to modern age (Albert, 2010). There is also Codex framework for food labelling comprises of general guidelines, standards, Codex commodity standards, standards for the labelling needed for specific dietary, food additives, colors and ingredients (Randell, 2010).



General Standard for the Labelling of Prepackaged Foods (Codex Stan 1-1985)
General Standard for the Labelling of Food Additives when Sold as Such (Codex Stan 107-1981)
General Standard for the Labelling of and Claims for Prepackaged Foods for Special Dietary Uses (Codex Stan 146-1985)
Codex Standard for the Labelling of and Claims for Foods for Special Medical Purposes (Codex Stan 180-1991)
General Standard for the Use of Dairy Terms (Codex Stan 206-1999)
General Guidelines on Claims (CAC/GL 1-1979)
Guidelines for Nutrition Labelling (CAC/GL 2-1985)
Guidelines for the Use of Health and Nutrition Claims (CAC/GL 23-1997)
General Guidelines for the Use of the Term 'Halal' (CAC/GL 24-1997)
Guidelines for the Production, Processing, Marketing and Labelling of Organically Produced Foods (CAC/GL 32-1999)

Figure 10. Codex texts on Food labelling (Randell,2010)

2.2.5 Nutrition Issues

According to FAO, Nutrition begins with what we consume, the products of the food and agriculture sector. In the whole process of farm to feed by working on our food systems, we can improve our diets, our health and our impact on natural resources. This work has been actively carried by FAO and it plays crucial role in Nutrition. FAO's nutrition strategy raises nutritional levels and attempts to improve diets through people centered approach (FAO, 2014). The people centered approach basically means reaching or being involved of people in making policies and

strategies. Therefore, FAO aims to work with other partners and stakeholders to improve diets and nutrition in the nutritionally vulnerable households in the least income and developing countries. The working strategy of FAO is carried by four guided principles which are presented below (FAO,2014).

- Make whole agriculture and food system nutrition sensitive by taking necessary action in entire system approach and this can be achieved by increasing variation in food, consumption of balance diet and uplifting consumer awareness.
- Strengthening organizational knowledge and experience to implement country's policies, plans and projects creating bigger impact at country level.
- Stakeholders partnership and working across sectors.
- Encouraging economically, socially, environmentally-sustainable and gender-sensitive policies, programs and investments.

According to FAO progress has been achieved in countries where there is significant reduction in malnutrition but the progress is very uneven and it needs better use of the food system for better nutrition. The effectiveness can be increased by multi-stakeholder and multi-sectoral approach. The approach thus needs better governance which engraves common vision, good political leadership, sound data, coordination and building the necessary collaboration across and within sectors.

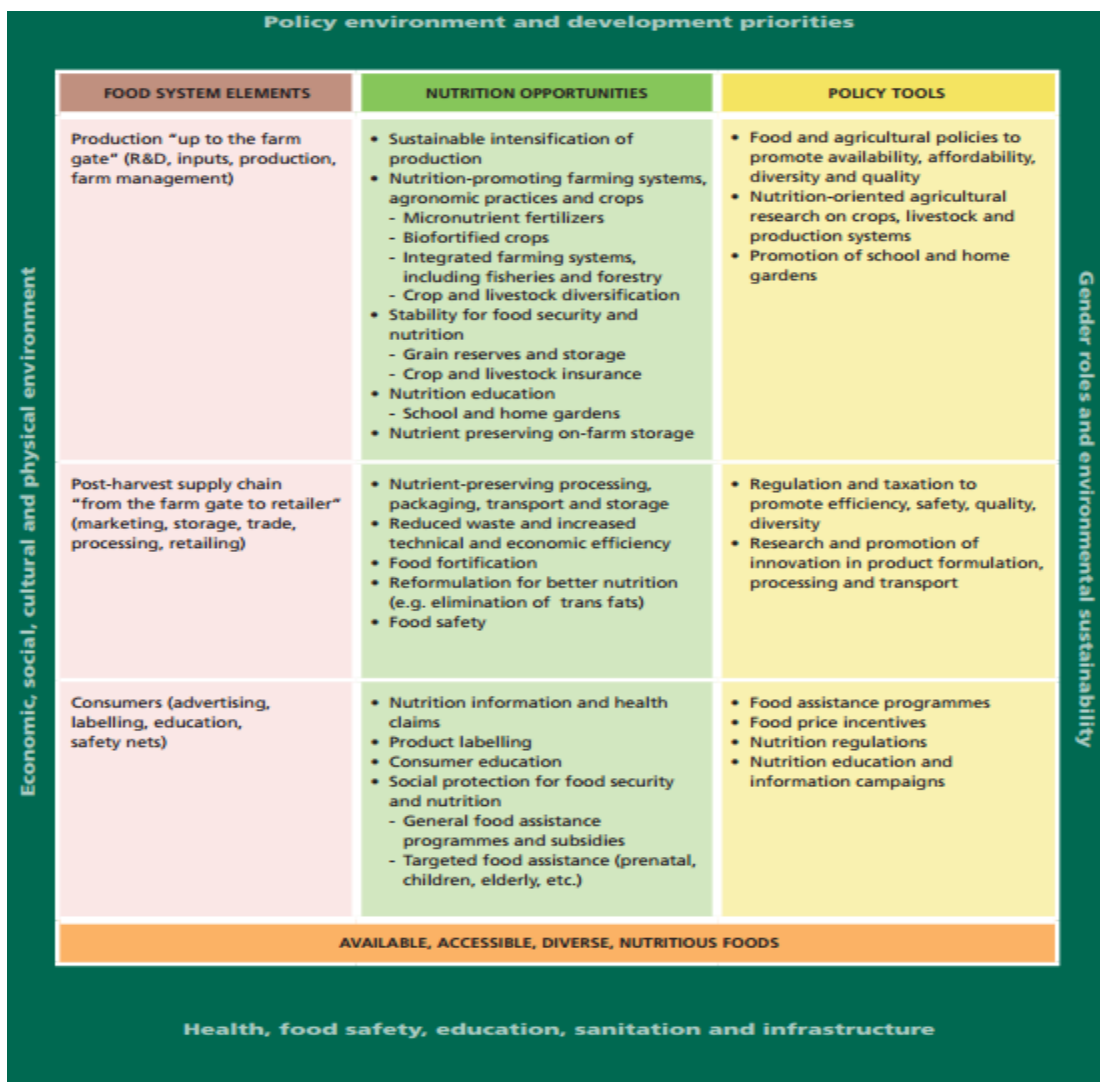


Table 2. Food System Interventions for Better Nutrition (FAO,2013)

2.2.6 Consumer Policy

Food and agricultural organization have classified policies into 3 main different groups. These policies are oriented towards consumer, producer and traders to enhance these groups that are related with the food chain.

The policy that is oriented towards the consumers are the decisions that have the goal to enhance nutrition quality and food security. To assure that these decisions work well, different actions are

taken. Taxation, social protection, market management, disposable income and nutritional and health assistance schemes are oriented towards the consumer.

Taxation policies are revised and modified on time to time basis to check that the consumers do not suffer. Different measures are regulated on fuel, power and water for domestic use. While VAT are structured on food products according to the country and income taxes depend on the income rate of the taxpayer (FAO, 2014)

For social protection, FAO has developed careful policies such as prevention and management of difficult situations which can have adverse effect on local people's social interactions. It has differentiated policies regarding the distribution of food packages in the emergency situations on targeted groups. While for the schools, children are provided meals and snacks as a provision of in-school feeding and they can take foods to their home as a provision of take-home ration.

For the orientation of market management, market policies are specified properly while food stocks are established and distributed evenly to control steady market food prices. These food reserves can help to regulate and control domestic food prices in case of shortage of food and help demolish black market selling of food in high prices.

FAO has specified many measures to improve nutritional and health assistance of the consumer society. With an aim to enhance the nutritional quality of the foods, measures are regulated for the fortification of foods. Fortification means to increase the level of necessary vitamins and minerals in food that can also minimize the risk to public health. While actions are taken with the goal of encouraging breastfeeding among women. For this purpose, training facilities from health professionals are provided. And measures to assure proper drinking water for household use and improving proper sanitation and hygiene level around homes are promoted (FAPDA).

2.2.7 Food Safety Policy

In July 2008, FAO and WHO with 176 member countries have jointly formed an inter-governmental body referred to as Codex Alimentarius Commission (CAC). Since 1932, the main responsibility of FAO and WHO is to implement Joint Food Standards Program. FAO functions

in a lot of different ways and the main responsibility is the protection of the health of consumers. FAO should make sure that fair methods are practiced while trading of food occurs.

It is also the work of the body for the co-ordination of standard of food in international level and to conclude and issue international standards, codes of practice and commendations in the Codex Alimentarius. Codex Alimentarius can also be referred as “Food Code” which contains 14 volumes of set standards. All the standards are accessible online at the website of Codex. These standards can be simply understood as suggested food quality and safety standards (FAO, 2007).

The members of FAO commission take many intuitive measures when food safety problem occurs. The first step is to identify the problem and recognize the nature of problem. After the problem is identified and understood, the next step is to deal with the problem in a proper way using appropriate resources. It is also responsibility of FAO to check and reassure that the recognized problem has been dealt professionally.

There are numerous methods that can be used to complete the above-mentioned steps. To recognize the problem, food law, regulation and standards are set up through the help of Codex. Inspection and laboratory services are established as a control management for food safety. While informing the public, providing trainings and education are also effective food control components (FAO, 2007).

Food control system should make sure that all the challenges faced should be tackled carefully. The food laws and regulations should be updated time to time make sure that the laws are complete. Resources, equipment and capable manpower should not be limited and be made available all the time. Training and education should be provided to the workers to comply with the food quality and safety assurance systems.

The FAO has set some principles that provide guidelines in a food safety policy. All the members involved in a food chain should recognize their responsibility and play their role properly. The members involve producers, processors, retailers and consumers. The aim is to make sure that the food is safe at each phase of the food chain. Risk-analysis and scientific approaches are conducted to minimize the risks and guarantees transparency at the same time (Bessy, 2009).

Food Inspection: In the implementation system, food inspection and monitoring are the key factors to reduce occurrence of food safety problems. The primitive method of food safety control system

was to sample and test the final product but nowadays these systems has shifted to more “preventive” approach than “reactive” approach believed to minimize food safety risks. The new food inspection approach system is more focused on inspector’s new technical skills and use of the risk analysis framework (FAO, 2007).

Good Practices in Progressing: There are many practices perform to maintain safety of food providing full assurance of quality in the food production chain. Those practices include some controlling factors like Good Agricultural Practices (GAP), Good Manufacturing Practices (GMPs), Good Hygienic Practices (GHPs), Hazard Analysis and Critical Control Point (HACCP) systems (Whitehead, A.J).

2.2.8 Food Loss and Waste

According to FAO (2014), food loss is “decrease in quantity or quality of food” reflected in nutritional value, economic value or food safety of all food produced for human consumption but not eaten by humans. Whereas FAO also defined food waste as part of food loss and refers to discarding or alternative (non-food) use of safe and nutritious food for human consumption all along food supply chains (FAO, 2014). Measurement of food loss and waste is very important in any reduction implementation and process. It is very important to know some global facts about the food loss and waste. The total world food production cannot reach to human consumption. One third of it is wasted or lost which accounts to 1.3 billion tons per year. The food loss occurs throughout the supply chain from the initial production to the household consumption. Invisibly Food loss indicates loss of all resources used in production like land, water, energy, fertilizers and manual input. In addition, there is emissions of greenhouse gases (FAO, 2011). Among the different causes of food loss and waste the agricultural subsidies provided to produce farm crops increase the production and increase possibility of loss and waste during food supply chain. The food waste also occurs when the food still suitable for human consumption are wasted to follow food safety and regulations. In most of the medium and high-income countries, consumer behavior, policies and regulations are the additional source of food loss and waste (FAO, 2015).

Causes of food loss and waste: The main causes of food losses and wastes can be studied by categorizing them among low income countries and high-income countries. The food losses in low income countries is primarily because of emphasis early in the supply chain. In low income countries food losses occur due to poor storage facilities, poor infrastructure and transportation,

lack of refrigeration, poor packaging and inadequate market facilities. The food waste in high income countries is primarily because of emphasis late in the supply chain. In high income countries food wastes occur while maintaining quality standards, food manufacturing, poor environmental conditions during display, lack of planning, limited focus on waste and best-before dates and most importantly food leftovers while cooking, preparing and serving food (FAO, 2011).

Food loss and waste protocol: The first step was taken towards designing a global standard for measuring food loss and waste on 21 October 2013 by the World Resource Institute. The food loss and waste can be monitor and measure within the boundaries and value chains. The countries and companies are now enabled to measure the loss in a practical, credible and persistent manner (WRI, 2013). The food loss and waste protocol further enables development of food loss and waste standard which entitles countries, companies and concerned organizations to identify the area where food loss takes place and make effort to reduce that loss. FAO in collaboration with many countries, parties, stakeholders has made new strategies to minimize the food loss and waste. The save food initiative is one of the strategy that was launched by FAO and Messe Düsseldorf at the Interpack 2011 trade fair for the packaging and processing industry, held in Düsseldorf, Germany. The main working areas of this program are collaboration and coordination, awareness raising, research and supports to projects piloting other related projects (FAO, 2011).

2.3 Nepal

2.3.1 Some food facts and statistics

Nepal is a landlocked country in the South Asian Region. The variation in geographical structures and diversity makes it a nation with different identity. The mountainous regions, the Hilly regions and the low Terai regions have their own geographical diversity. The production capacity and the fertility of the soil varies with altitude and climatic factors in each region. The average annual food supply in Nepal has been increasing since last two decades. There was dramatic rise in the supply of food during 1985-1989. After that time, the food supply increased gradually.

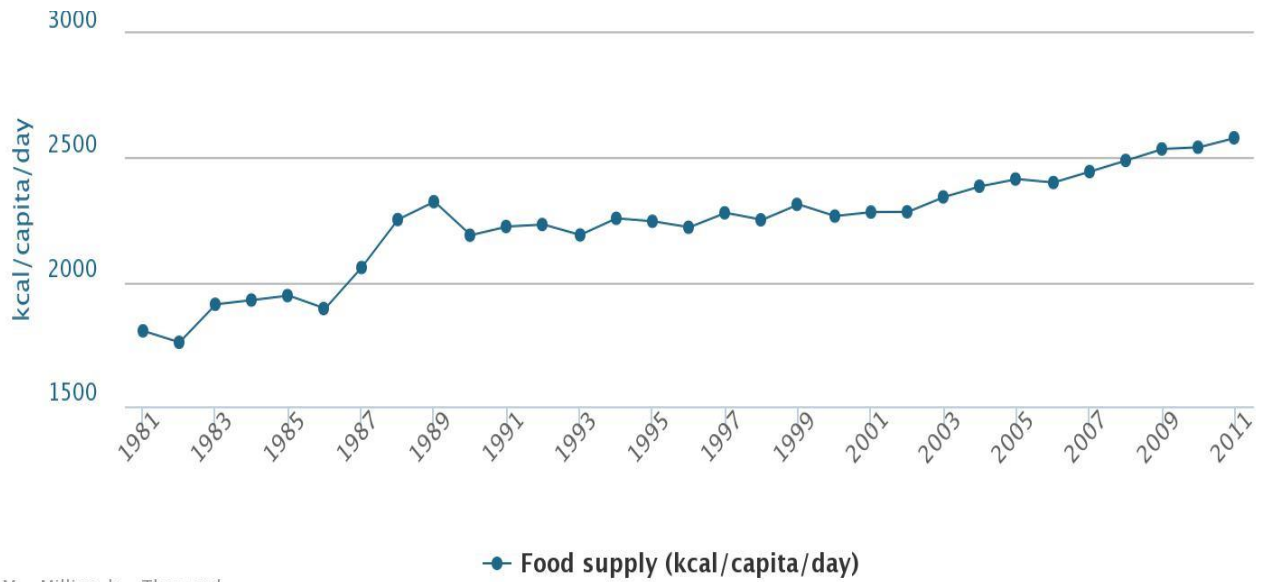


Figure 11. Average food supply in Nepal (1981-2011) (FAOSTAT, data)

In Nepal, the rate of undernourishment varies according to demographic region. The rural and Himalayan regions have maximum rate of all forms of malnutrition rather than Terai and Hilly region. The common types of malnutrition found in Nepal are Protein energy malnutrition, iodine deficiency disorder, iron deficiency anemia and vitamin A deficiency (Joshi, 2012).

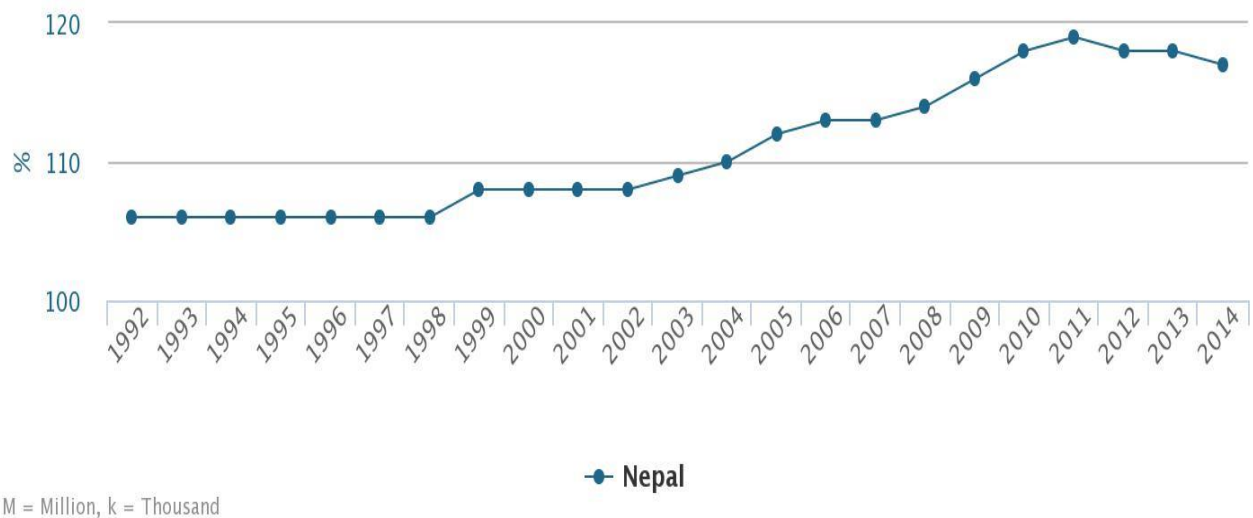


Figure 12. Prevalence of undernourishment (%) - 3 years average (FAOSTAT data, 2014)

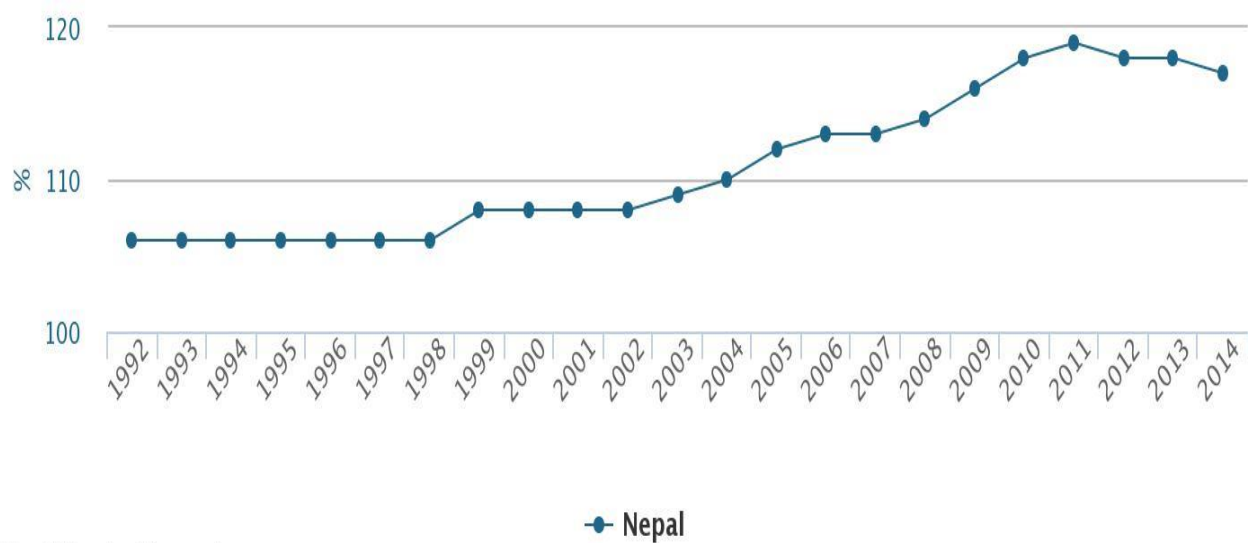


Figure 13. Average dietary supply adequacy (%) (FAOSTAT data, 2014)

Year	Male	Female	Both Sexes
1975	74.9	75.1	75
1995			64.5
1996	56.8	56.4	56.6
1998	62.6	59.5	61.1
2001	57.1	57.1	57.1
2006	49.1	49.6	49.3
2011	41.3	39.5	40.5

Table 3. Children <5 years stunted in Nepal in percentage (WHO data, 2014)

2.3.2 Food Acts and Food Regulations

The Constitution of Nepal provides right to food as a fundamental right to every citizen. The legislative frame work has been created in compliance with FAO’s definition of food security and elements of food security. Legal policies have been made in the areas of food availability, accessibility, utilization and stability (sawtee.org). Nepal became member of World Trade organization in 2004. After that Food safety, related issues started becoming matter of concerns in governmental priority areas and it was taken with great concern (Bajagai, YS). However, there were already some rules and regulations in the food sector. The food rules presented below are the key basis of policies being made. These food rules embodied various aspects of food hygiene, food additives, tolerance level of pesticides and mycotoxin, food labeling, inspection and method of sampling, licensing as well as food analysis (Karmacharya, 2004).

Food Act, 2023 B.S. (1967): The first food act came into force in 1967. It was referred as an act made to maintain purity in food. It defines the term “food”, “adulterated food” and “sub-standard food”. The act also describes about the prohibition on buy and sale of adulterate food and punishment if people disobey the rule. The act prohibits on sale of foodstuff by lying or misleading and contains power to withhold foodstuffs. Altogether three amendments have been made in the food act, 1967 (DFTQC, 2009).

Food Rules, 1970: It came into force in 1970. Five amendments have been made till date. The whole rule is divided into seven chapters. Each chapter has description of specific food related issues (Faolex). Food rules, 1970 explains us about the functions and authority of Department of food technology and quality control, recruitment, functions and responsibilities of food inspector, provisions related to food inspector, analysis of food, food quality inspection and labelling. The food inspector was earlier called food examiner which was amendment later (DFTQC, 2009).

Consumer Protection Act, 1998: It came into force on 13th April 1999. The consumer act provides consumer protection from unfair trade practices and labelling requirements. Consumer protection act formed the concept of Consumer Protection Council. The formation of council was done to make policies related to protection of the rights and interests of consumers and acting as advising policy to government in the concerned matters (lawcomissions.gov.np). It explains the formation, functions, duties and powers of consumer protection council (WIPO).

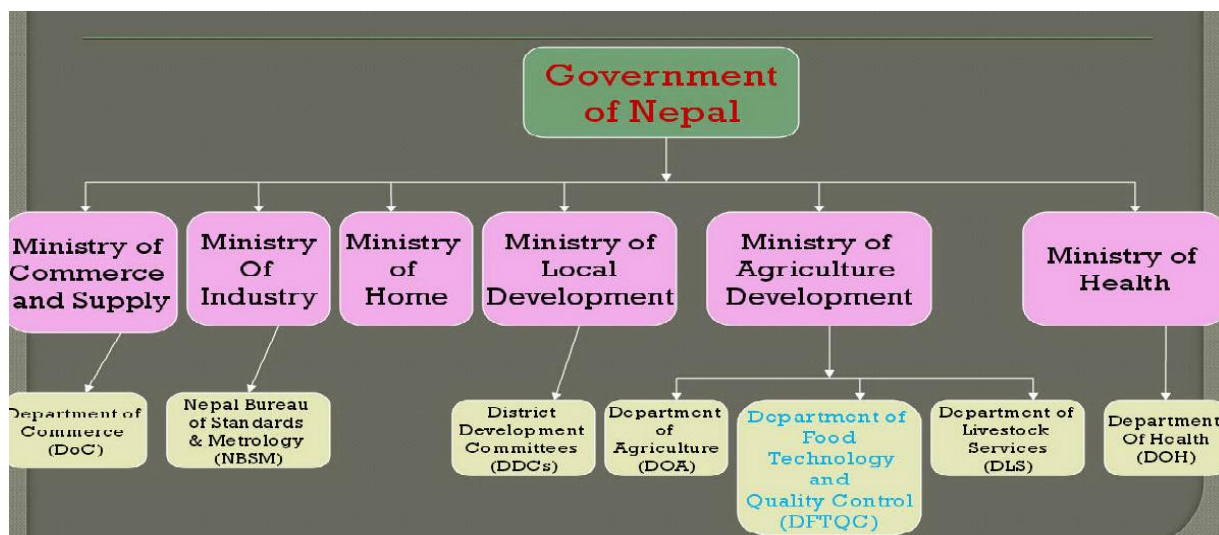


Figure 14. National framework related to food safety (Thapa Magar, MS)

2.3.3 Food Standards

Food standards in Nepal are prepared by Nepal Bureau of Standards and Metrology (NBSM). The bureau acts as the secretariat body and make country standards of the food products and food processing methods. Whereas National Council for Standards (NCS) is a governmental body to approve and endorsed the standards made by secretariat body (Bajagai, 2012). The national standards are set up in accordance with hazard analysis and critical control point (HACCP) principles. NBSM has adopted following as National Standards i.e. QMS (ISO 9001:2000), EMS (ISO 14001:2004), ISO/IEC 17025:2005, ISO 22000:2005 (Maharjan, 2014).

The industry showing the excellence in quality management activities has been awarding by NS Quality award since 1999. The evaluation is done on the principles of ISO quality management system. We can see most of the industries are becoming conscious about quality that's why the pressure upon NBSM for the testing facilities has increased. The NBSM wants private sectors to come across in developing and establishing testing laboratories. Therefore, the launched of Nepal laboratory Accreditation Scheme (NEPLAS) is being done to monitor and guide the future private laboratories. The accreditation process of more laboratories is on the way which is believed to provide competent and reliable testing to consumer (NBSM). NBSM has been launching a project with grant assistance from Finnish Government "Environmental labeling for export Industries in Nepal". This project helps some exporting industries to get license to use some internationally recognized Eco-label in their products.

National Council for Standards (NCS) is the government body responsible to approve and endorse Nepalese standard. Nepal Bureau of Standards and Metrology (NBSM) acts as the secretariat for the NCS which prepares the country standards (Nepal standard) of food products and methods of food processing. There are more than hundred Nepal standards in food sector related with food, food processing, transport and storage (table 1). Nepal is one of the active members of South Asian Regional Standards Organization (SARSO) established in 1999 and has been involved in the formation of regional standards of food and food processing methods. In addition, a separate government institution called Food Standardization Board (FSB) is present according to the provision in the Food Act 1966 which make recommendations to the government about food standards, principles and guidelines according to international practices and principles (Bajagai, 2012).

Food groups	No. of standards
Milk and milk products	18
Fats and oils	16
Fruit and vegetable products	17
Spices and condiments	22
Tea, coffee, cocoa and their products	3
Salt	2
Cereals, pulses, and their products	23
Processed drinking water	2
Sweetening agent	3
Sweets and confectionary	3
Total	109

Table 4. Number of Nepal Standards related with food, food processing, transport and storage (DFTQC, 2009)

2.3.4 Packaging Policy

Packaging of the food is done to keep food covered and safe. Simply it is container for the product (Deliya, M.M. and Parmar, B.J). Beside that these packages draw consumer's attention to specific brand, boost its image and influences consumer's perceptions towards the product (Rundh, 2005). In the food act 1996 of Nepal there are certain provisions for the packaging of food. This act regulates the packaging requirements, labelling requirements and storage requirements of a food variety (Bajagai, 2012). In the case of Eco labeling in Nepal, with the grant assistance from Finnish Government NBSM has been launching "Environmental labeling for Export Industries in Nepal" project as ac compliance with international requirements on ecofriendly production (NBSM). This policy helps export industries to get license of internationally renowned ecolabels. The use of ecolabel shows that the product has less impact on the environment and upon consumers. As a result, some companies have succeeded and some are still on the way to achieve their goal (NBSM).

2.3.5 Nutrition Issues

Being a land-locked country and having harsh terrain in hilly and mountain region, transportation and communication services in Nepal are very limited. Despite being one of the least developed country in the world, Nepal has made a significant progress in reducing poverty and food insecurity since 1996. However, in the recent years, the challenges in food and nutrition security has increased because of high food prices, natural disasters and low economic growth (WFP,2013).

Malnutrition and food insecurity are the major nutrition related problems in Nepal. Some of the reasons behind these problems are food shortages, seasonal agricultural, less mass production, changing climate patterns and lack of basic infrastructures. Deficiency in nutrients are causing a huge number of youths and children to become the victim of diabetes and heart related problems (DFTQC, 2014).

A lot of national and international organizations have been working in the sector of food and nutrition in Nepal. National departments include ministries of Agricultures and Co-operatives, Local Development, Education and Health and Population. World Food program, UNICEF and WHO are some of the international organizations (DFTQC, 2014).

The government has been developing and adopting policies and strategies to achieve food and nutritional security. Some of the policies are Multi-Sector Nutrition Plan (2013-2017), National Nutrition Policy and Strategy (2004), National School Health and Nutrition Strategy (2006) and Anemia Control Plan. The Ministry of Agriculture has the prime responsibility to ensure food security in the country (DFTQC, 2014).

The governing body has not been successful in total quality controlling in Nepal. There is a huge issue of quality foods in the market throughout Nepal. Major corporations that supply daily consumer products have been in the highlights occasionally due to the false quality standards in their products. Most of the packaged milk in the market is substandard. Use of inedible chemicals in milk have been tested positive recently. Most of the sweets sold in the market are unhygienic and produced in a dirty environment. Vegetables available in the markets contain huge amount of pesticides. And even the rice distributed by World Food Program (WFP) were not of good quality in some regions of Nepal (ANGOC, 2012).

Spreading awareness about nutrition, health and hygiene could be one effective measure to reduce nutritional problems in Nepal. People tend to care less about the importance of food nutrition and its effect on the health which can cause long term diseases. While poverty can be one significant factor in nutritional issues in Nepal, ignorance is another one. Eating habits have been changed lately in the country among the young generation. Junk food consumption is in rise among this generation which is leading to increase in health issues in a young age. These issues should be reduced quickly.

According to Joshi (1992), the factors influencing human nutrition are education, health, medicine, tradition, community, religion, culture, economic status, climate, family, age of individual, genetics, agriculture, science and technology. The lack of sufficient nutritional consumption leads to hunger or malnutrition. Malnutrition exists in various forms. The most common types of malnutrition seen in Nepal are protein-energy malnutrition, iodine deficiency disorders, iron deficiency anemia and vitamin A deficiency. Mostly woman and children are vulnerable to this disorder and has high risk of getting infectious diseases and mortality. Hence malnutrition affects people's health as well as quality of life. Beside that the whole socio-economic situation of the country is affected (NNPS, 2004). There are some strategies taken to improve nutrition situation in Nepal which are briefly highlighted below (Kharel & Dawadi, 2013).

- Promotion and utilization of community participation in all nutritional program
- Development of coordination between various sectoral divisions of department of health services
- Maintenance and strengthening of co-ordination among agencies involved in nutritional activities.
- Conduction of National Advocacy and Social Mobilization campaigns
- Raising awareness among public by effective use of mass media bringing behavioral change
- Monitoring and Evaluation of different nutritional activities and program to analyze their effectiveness and implementation to make further strong policy and modification of existing policies
- Proper training and skill development program to health workers and volunteers for effective work output.
- Inclusion of multi sector to solve the problem of malnutrition

2.3.6 Consumer Policy

Consumer protection act was formed in 1998 with main objectives to protect the consumer from any misleading and irregularities in the quality, price and quantity of consumer goods and services during the period of supply (Nepal Law Commission). Consumer protection act was founded not only to care for the consumers wellbeing but also to control the inflation caused by monopoly and unfair trade practices (Consumer Protection Act, 1998). A consumer protection council was formed to make policies and to monitor of the implementation of the act. Nepal bureau of standards and methodology has various policies and programs to create awareness in public. This has been done by different means like publicity, talk programs, seminars, workshops, campaign, and advertisements through television, radio and newspaper. The motive is to make consumer to select right kind of quality goods. The consumer protection is also carried by NBSM under the name of two different acts namely; Standard Weights and Measures Act and Quality Certification Mark Act. The initial one protects consumers by regulating and monitoring standard weighing and

measuring system in industrial sector and the later one raise consumer awareness by not letting them to use substandard products (NBSM).

2.3.7 Food Safety Policy

As Nepal is a member of different international organizations, it has many food safeties related obligations to comply with rules and regulation of those organizations. Food safety related issues started to become matter of increased concern and one of the priority areas of the Nepalese government after the country has become member of the World Trade Organization in 2004 (Food and environment). Regulation of the safety of food in Nepal began in 1966 by enforcing the food act by the government. Although food safety regulation began as early as 1966, its importance was increased after 1990s due to increased economic liberalization and international trade. Traditionally, food safety related rules and regulations were basically based on inspecting and analyzing end products to ensure safety of the food. But this approach has been increasingly replaced by total quality management i.e. ‘farm to fork’ approach which focuses on all level of production, processing, transportation and trading. Modern food safety related regulations and policies have been generally formulated following codex principles and guidelines focusing on preventive measures to produce safe food. Similarly, existing regulations and standards have also been reviewed to make them comply with codex standards wherever feasible according to national regulation and infrastructures (Food safety regulation in Nepal).

While talking about food safety, pesticides issues cannot be ignored. Pesticides are important to get rid of unnecessary pest which are harmful to crops and production. Excessive use of pesticides and lack of monitoring at the field level has reduced the production and has adverse impact on environment in recent years in Nepal. Pesticides analysis facility is limited. Due to the lack of proper laboratory, technology and skills no valid comparison can be made (Koirala, Dhakal, and Tamrakar, 2009).

2.3.8 Food Loss and Waste

Nepalese community hold richness in traditional and cultural values. Celebration of festivals are quite common each month of the year and feasts include huge amount of foods. In village areas, the wasted foods unconsumed by humans are consumed by animals or are used to make compost manures along with animal wastes. But in the city areas, where there are less spaces and people

rarely rear animals, there is barely any space for composting or given to animals. And the wasted foods are thrown in landfills. Although the government has not stated specific policies for wasted foods in Nepal, but there is Food Act 1966 which is regarded as principal legislation governing food safety in Nepal. Many national organizations have been creating social awareness about food wastes in Nepal nowadays. School canteens and lunch restaurants have notice boards and information about no to waste food (Ecogenerations.org).

	Nepal Agriculture and Food Security Country Investment Plan	ADS: Activities related to Enhanced Food Quality and Safety
· Food quality regulation.	Develop food quality control policy, updating food law and regulation, developing or updating the quality standards prioritised	Adopt and implement internationally compatible food quality and safety standards; - Enact a modern Food Act with the provision of the formation of an independent Food Authority which will enforce new Food Act with full authority to proclaim FSQ standards and
· Strengthening organizational structure of Food Quality Regulation	Strengthen the existing DFTQC and its laboratories and expand its structure at regional and district level	Strengthen and upgrade to internationally accredited level the testing laboratories; Localize DFTQC
· Consumer Awareness and Education:	Information, education, advice to consumers across the "production point to table" in terms of food quality, safety and risk associated with it. Additionally health risk associated with quality and poor nutrition.	
Institutional Coordination		Ensure effective coordination among the institutions that regulate animal health, plant and food

Table 5. Food safety related Government’s new plan and development strategy (Kharel & Dawadi, 2013)



Figure 15. Open disposal of Municipal waste (internship nepal.com)

2.4 European Union (EU)

The European Union (EU) is a political and economic association of 28 European sovereign states. It traces its origins to the establishment of the European Community by six European nations. Although the EU began as a purely economic community, cooperation has expanded in the intervening years to include areas such as migration, justice, safety, energy, environment, and foreign policy, asylum, developing into a unique political organization (EUROPA).

2.4.1 Some Food facts and Statistics

In 1993 there was global turndown of the global food supply including EU. There was significant drop in the production of developed countries. The crops were badly affected by the drought in previous years which led to low production (The state of food and agriculture, 1994).

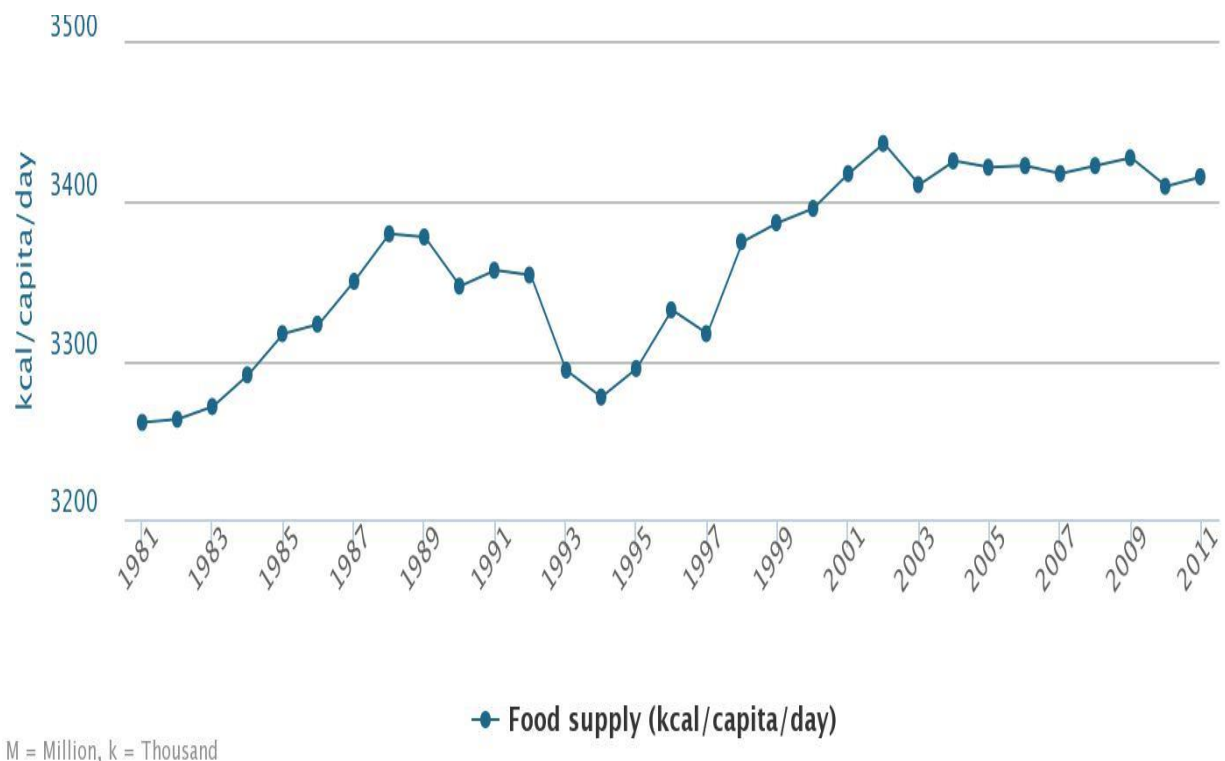


Figure 16. Average food supply in EU (1981-2011) (FAOSTAT data, 2014)

2.4.2 Food Acts and Food Regulations

In the year 2002 the white paper on food safety was formulated. The European Council passed the law in the same year which is known as General food law (Regulation (EC) No 178/2002). This general food law is the fundamental framework for all the food and feed law at the Union and national levels (europa.eu). The main objectives of general food law are to ensure consumers safety and high alert to animal and human health regarding to food. The Article no 6 of Regulation (EC) No 178/2002 states that focus should be made on risk analysis to achieve the high level of food safety. The risk assessment should be based on all the scientific evidences and should be transparent. Likewise, Article no 7 briefs about precautionary principle which talks about the matter of provisional risk management measures whereas Article no 11 mentions about food and feed imported in the community. The food that are imported in the specific community should fulfill the requirements of food and feed law of the community with proper existence of specific agreements (eur-lex.eu). The establishment of European food safety authority was also done at that time. The EFSA provides scientific advisory to the concerning authority regarding food related risk. Hence it protects consumers, animals and environment from food borne damages. It also provides highest level of food safety for the Europeans by assessing risks throughout the food chain (efsa.europa.eu).

2.4.3 Food Standards

After the food production, there is need to fulfill some technical regulations beforehand supplying food into the international market. The producers and exporters must obey the mandatory standards set by public institutions which directly affects consumer health and environment. Those standards also ensure product quality. The countries involved in export and import determines the selection of regulations. Regulations are either based on international food standards or country's own developed food standards (Liu,2007). The act and rules on food and animal feed production in the EU began since the launched of White Paper on Food Safety in 2000. This EU law is based on some general principles namely risk assessment, risk management and risk communication which is the foundation of the legal laws in member states (Global forum of food safety, 2004). The recent EU Regulation (EC) No. 178/2002 refers to the new integrated approach as follows:

“In order to ensure the safety of food, it is necessary to consider all aspects of the food production chain as a continuum from and including primary production and the production of animal feed up

to and including sale or supply of food to the consumer because each element may have a potential impact on food safety” (Europa).

Labelling and Nutrition: The policies and rules on labelling in the EU allows its citizens to make distinctive choices for their food products by using information about the content and composition of food. The information provided on labelling helps consumer to make right choice while purchasing of foodstuffs (Europa). Hence the major aims of labelling are information of the consumer, protection of the consumer and fairness in trade. All these aims are interconnected and one cannot be achieved without another. Food labelling in the EU has two components: mandatory and voluntary labelling. Nutritional labelling is optional unless no claims has been made (Przyrembel,2004). The new law on food labelling and nutrition was put into effect from 13th December 2014 by merging two directives in to one legislation. The new Regulation (EU) no 1169/2011 also contains nutritional obligations which will come into effect from 13th December 2016. The key changes have been made on legibility of information, mandatory allergens information, requirement of certain nutrition information, mandatory origin information for fresh meat, same labelling requirements, list of engineered nanomaterials, specific information on the vegetable origin, strengthened rules to prevent misleading practices, indication of substitute ingredient for “imitation food”, clear indication of formed meat and clear indication of defrosted products (Europa).

2.4.4 Packaging Policy

Packaging Policy: As stated in European parliament and Council Directive 94/62/EC, packaging means “All products made of any materials of any nature to be used for the containment, protection, handling, delivery and presentation of goods, from the producer to the user or the consumer” (Eurlex). Along with definitions packaging waste, packaging waste management, prevention, reuse and recycling, energy recovery, organic recycling and disposal has been defined by Directive 75/442/EEC.

2.4.5 Nutrition Issues

In many countries health promotion programs has been launched to promote “healthy” diet. The world “Healthy” itself is not well defined somehow it indicates state of sound health and safe from chronic diseases (Cannon, 1992). The policies which deals with the health and nutrition wellbeing

of the people has been developing by the course of key historical events. The common agriculture policy (CAP) and the Common Fisheries Policy established in 1962 and in 1970 are the examples of those policies targeted to face food production in Europe and manage most of the European countries' food availability and consumption (Elmadfa,2009).

The development of policies addressing food and nutrition in Europe has, in general, been determined by the course of key historical events necessitating action in one form or another. During the post-war era in the 1950s, food policies addressed the need of providing the population at large with secure and sufficient amounts of food. The re-establishment of a strong agriculture sector to meet this need relied on robust national and regional measures as well as the expansion and consolidation of the food-processing industry. By the 1990s, higher rates of nutrition-related diseases were detected throughout Europe, encompassing both deficiency and chronic diseases as well as increasing rates of foodborne diseases (intolerances, allergies, poisoning etc.). Currently, the public health challenges facing Europe include high rates of noncommunicable diseases such as obesity, cardiovascular diseases, cancer and other chronic degenerative pathologies, because of a nutrition transition. Certain sectors of the population remain vulnerable to food insecurity, having inadequate access to foods and thus increased risk for nutrient deficiencies. Moreover, the rise in foodborne disease and the appearance of new pathogens such as bovine spongiform encephalopathy (BSE) have captured the attention of policymakers in recent years.

2.4.6 Consumer Policy

The purpose of implicating food law is to establish the right of consumers to safe food and provide correct and authentic information about the food product. As per the provision of food law in the European Union, it is obligatory to label the food products sold in commercial market. This offers the consumers within EU to receive comprehensive nutrition information and composition of food product. EU food policy aims to protect both human and animal health (European Commission, 2016).

A new regulation on food information to consumers is set into application on 13 December 2013. The new regulation mandates the food sellers to improve legibility of information, clear information of allergens like soy, nuts, gluten or lactose. The law also requires mentioning information about the origin for fresh animal meats as well as the vegetable origin for refined oils

and fats. Labelling the list of engineered nanomaterials in the ingredients and labelling substitute ingredients is also made compulsory (European Commission, 2016).

The EU started regulating the rules on nutrition and health claims on 1st July 2007. Food business operators use this regulation when their product label have specific beneficial effects of their products on health and nutrition. The examples of this kind of products can be advertised as low fat, zero sugar, high fiber which can be normally found in the advertisements nowadays. The main purpose of this kind of rule is to make sure that the food operators present clear, precise and honest information about a specific food product (European Commission, 2016).

2.4.7 Food Safety Policy

According to the organization FUSIONS EU, the estimated amount of food waste in the EU is around 88 million tons with associated costs of estimated 143 billion euros (FUSIONS, 2016). Food waste does not only mean the economic loss, but it also means the waste of limited natural resource on Earth as well damage to the environment. The food chain includes producers and farmers, suppliers and retailers and the consumers who are totally responsible in controlling the chain. One small mistake from any of the parties playing role in the food chain has direct effect on the increase of food waste (Food Waste, 2016).

There are various reasons that are causing the food waste. From production level to the food on the table, foods are wasted because of these various reasons. The number cause currently is improper meal planning by the consumers and the retailer's promotions like "buy one get one free". Foods are being purchased in much higher quantities than required which end up in the trash as the food start to rot or become stale. While the consumers are misunderstood about the difference between "best before" and "expiry date" on the food labels. If the consumers are informed properly about the meaning between these two words, then edible foods would not be thrown away (Food Waste, 2016).

Restaurants and canteens on the other hand are responsible in huge quantity of food waste. Estimation of number of customers is difficult which is why, huge portions are prepared for the day and are thrown away if unsold. Overproduction in response to low demand sometimes lead to waste of food. Inadequate and improper storage and transportation also become the cause of food

waste. These problems are caused by the lack of awareness of food safety and reduction of food waste (Food Waste, 2016).

The EU policy against food waste is very efficient and assures to limit the wasting of food. Prevention of food waste falls under top priority of the EU. The EU has announced targets to halve per capita food waste at the retail and consumer level by the 2030 and develop sustainably. The EU has been applying varied measure and initiatives with the purpose of preventing and reducing waste of foods at all the levels of EU nations. With the help of various researches, awareness and education are provided all over the EU. Awards and certificates also provided with the aim of promoting food industry in a proper way (Food Waste, 2016).

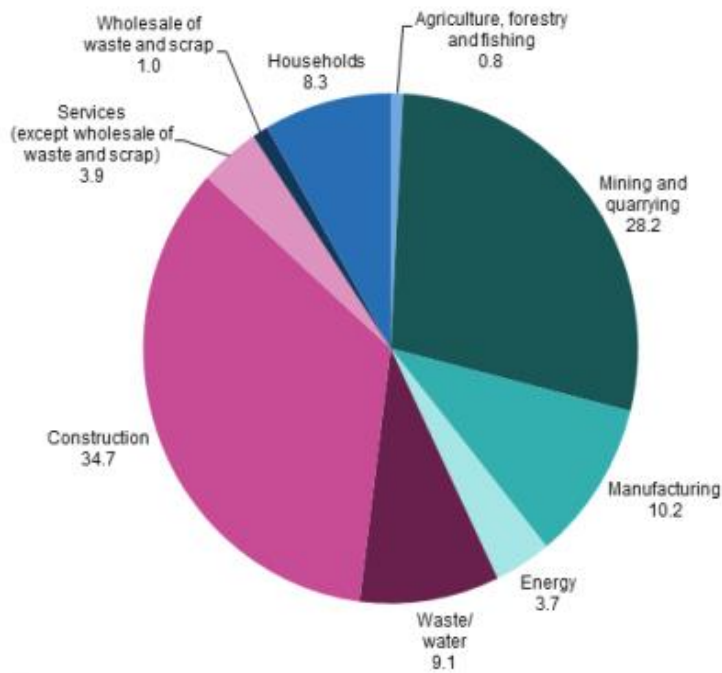


Figure 17. Waste generation by economic activities and households, EU-28, 2014 (%) (Eurostat, onlinedata code:env_wasgen)

There are lots of communication materials which can be found online with free access to them, provided by the EU commission for reducing food waste. The communication materials can be found in all languages of the countries in the European Union. The related materials aim to raise

awareness about the disadvantages of food wastes and how an individual can put up effort to minimize the level of wastes personally. Each of the tips can help to minimize the wasting of food of a daily consumer. The online resources also include information about the understanding of “best before” and “expiry date”. This simple understanding can save tons of food wastes from the consumer level (Food Waste, 2016).

2.4.8 Food Loss and Waste

According to FAO, around 1.3 billion tonnes per year of food are wasted which are produced for human consumption and the amount of food loss are subsequently higher in developed countries than developing countries. In the developing countries, more than 40% of food losses are happen during the processing of food and after harvesting of food and in industrialized countries the food losses mostly occur at retail and consumer level (Europa).

The food loss takes place or wasted in many places of food supply chain: in the production center, shops, retailers, consumers, canteens and in the household. The contributing factors behind food losses can be numerous. Some of them are mentioned below:

- Promotion campaign like “buy one get one free” leads the purchase of more food and production
- The “best before” and “use by” remarks on the labels leads to waste of edible food as there are misunderstandings about the meaning
- Excess food being prepared than number of customers in the restaurants and canteens due to lack of estimation in numbers of expected customers
- Insufficient storage facilities
- Inappropriate transportation between the supply chain

The EU strategies in reducing food loss and waste are targeted to halve per capita food waste at the retail and consumer level by 2030 and reduce food losses along the food production and supply chains. The EU in cooperation with its stakeholders is analyzing how to cut the food waste without compromising food safety.

3 ANALYSIS AND RESULTS

3.1 Synthesis

The policy and strategies of FAO, Nepal and EU are briefly explained in the table below on various policy categories:

Food Acts and Food Regulations:

FAO	NEPAL	EU
<p>Universal Deceleration of Human Rights (1998), World Deceleration on Nutrition and Plan of Action (1992), World Food Summit Plan of Action (1996)</p> <ul style="list-style-type: none"> • Fundamental basis of FAO legislatives and laws. • Right to adequate food • Assures supply of adequate safe food • Work to achieve public Health and nutritional wellbeing • Eradicates famine and Famine mortality <p>Governing bodies and Agency: Codex Alimentarius Commission, UNICEF, WTO, WHO</p>	<p>Food Act (1967), Food Rules (1970), Consumer Protection Act (1998)</p> <ul style="list-style-type: none"> • Legislative Framework in compliance with FAO guidelines • Act to maintain purity in food • Prohibition on buying and selling of adulterated food and suggests proper punishments • Conduction of food labeling, inspection, sampling, licensing and food analysis <p>Governing bodies and Agency: Consumer Protection Council, Nepal Food Corporation, Department of Food Technology and Quality Control etc.</p>	<p>General Food Law (Regulation (EC) No 178/2002).</p> <ul style="list-style-type: none"> • Fundamental framework for all the food and feed in EU and national level • Ensures consumers Safety and high alert to animal And human health regarding to food. • Assures food safety and consumer protection <p>Governing bodies and Agency: European Council, European Economic Communities, European Commission, European food safety Authority etc.</p>

Food Standards:

FAO	Nepal	EU
<p>Codex Alimentarius or “Food Code” jointly formed with WHO in 1963</p> <ul style="list-style-type: none"> • 188 binding members <p>Countries agreed to follow scientific rules.</p> <ul style="list-style-type: none"> • Leads to the safety, quality and fairness of the international food trade. • Codex Alimentarius Strategic Plan 2014-2019 gives visions and guidelines, Creations of standards meeting food issues and challenges, uses risk analysis principles by accomplishing effective and efficient work management systems and practices. 	<p>National Standards like QMS (ISO 9001:2000), EMS (ISO 14001:2004), ISO/IEC 17025:2005, ISO 22000:2005.</p> <ul style="list-style-type: none"> • Prepared by Nepal Bureau of Standards and Meteorology • Involved authority like Nepal Council for Standards, South Asian Regional Standards Organization, Food Standardization Board etc. • Standards are set to facilitates the trade and fair practices • Focus on eco-labelling of products for the growth of international market and exports of goods with co-operation of partner countries. 	<p>Food Standards are made after launched of white paper on food safety in 2000</p> <ul style="list-style-type: none"> • Recent EU Regulation (EC) No. 178/2002 refers to the new integrated approach • Food labelling and Nutrition information are kept in to priorities • Food labelling in the EU has two components: mandatory and voluntary labelling • The new Regulation (EU) no 1169/2011 merges two directives into one legislations • key changes have been made on legibility of information, mandatory allergens information, requirement of certain nutrition information, mandatory origin information for fresh meat, same labelling requirement and list of engineered nanomaterials

Packaging Policy:

FAO	NEPAL	EU
<ul style="list-style-type: none"> • Packaging of food is done to keep food safe and hygienic • Range and type of packaging depends on nature of food and its composition • Lack of Packaging technology in developing countries limits trade boundaries • Harm on goods caused prepared for the shipping because of variation in policy, turmoil in politics and problem of compliance • Packaging Policy of FAO emphasis on bio-based packaging ultimately contribute minimizing greenhouse gases 	<ul style="list-style-type: none"> • Food Act 1996 contains the packaging requirements, labelling and storage requirements • Project is launched to Motivate industries to get international ecolabel to their products • Some companies have Already succeeded in getting ecolabels and some are still on the way to get those labels 	<ul style="list-style-type: none"> • Very well and clearly Stated policies regarding packaging • Directive 75/442/EEC explains all the requirements, structure and mechanism about packaging. Packaging waste, packaging waste management, prevention, reuse and recycling, energy recovery, organic recycling and disposal all the terms are defined in the directives.

Consumer Policy:

FAO	NEPAL	EU
<ul style="list-style-type: none"> • Classified Consumer Policy into three different groups; targeted towards producer, traders and consumers • Different consumer oriented scheme, Taxation, social protection, market management, nutrition and health • Different measures are used to minimize the risk to public health. • Fortification of food is done which means to increase the level of necessary vitamins and minerals in food. 	<ul style="list-style-type: none"> • Consumer protection act was formed in 1998 • Protects consumer from misleading and irregularities • Control of inflation caused by monopoly and unfair trade practices • NBSM carries consumer protection by two acts namely; Standard Weights and Measures Act and Quality Certification Mark Act • Campaigns, talk programs, seminars, workshops are organized to raise public awareness 	<ul style="list-style-type: none"> • Implication of food law to establish the right of consumers to safe food and to provide product information to consumers • Obligatory to label the food product as regard by food law in the EU • Consumer policy aims to protect both human and animal health • Law requires to mention clear information of allergens like soy, nuts, gluten or lactose • Requires mentioning origin for fresh animal meats or vegetable origin for refined oils and fats • Labelling the list of engineered nano-materials in the ingredients and labelling substitute ingredients

Nutritional Issues:

FAO	NEPAL	EU
<ul style="list-style-type: none"> • FAO plays a crucial role in shaping up the nutrition • Adopted people centered approach to raise nutritional level • FAO works with partners and stakeholders in the nutritionally vulnerable households in the least income and developing countries • Works with four guided principles; making whole agriculture and food system nutrition sensitive, strengthening organizational knowledge and experience, stakeholder's partnership and working across sectors and encouraging economically, socially, environmentally-sustainable and gender -sensitive policies, programs and investments 	<ul style="list-style-type: none"> • Lack of sufficient nutritional consumption leads to hunger or malnutrition • Most common types of malnutrition seen in Nepal are protein-energy malnutrition, iodine deficiency disorders, iron deficiency anemia and vitamin A deficiency • Malnutrition affects people's health as well as quality of life beside that the whole socio-economic situation of the country is affected • Active community participation and conduction of social mobilization campaign 	<ul style="list-style-type: none"> • Health promotion programs has been launched to promote healthy diet • CAP and Common fisheries Policy was established to manage EU food availability and consumption • By 1990s, higher rates of nutrition-related diseases were detected throughout Europe • Because of nutrition transition Europe is facing public health challenges like obesity, cardiovascular diseases and cancer and other chronic degenerative pathologies • Nutrition issue plays major role at EU policy making levels.

Food Safety Policy:

FAO	Nepal	EU
<ul style="list-style-type: none"> • Formation of Codex Alimentarius Commission (CAC) in 2008 • Responsibility of protection of consumer health • Codex alimentarius also referred as “Food Code” contains 14 volumes of set standards. Codex standards are suggested food quality and safety standards • Inspection and laboratory services are established as a control management for food safety • New food inspection approach has been introduced namely preventive and reactive 	<ul style="list-style-type: none"> • Concerns regarding food safety started when Nepal joined World Trade Organization in 2004 • Food safety regulations began since 1966 but importance of it increased after 1990s • Traditional method of only inspection and analysis of end food products were done in the beginning • Total quality management replaced the traditional method • Modern food safety related regulations and policies has been formulated following codex principles • Excessive application of pesticides and lack of knowledge has been the problems 	<ul style="list-style-type: none"> • EU policy ensures the highest food quality for all its people without degrading food source and natural resources • Policies emphasize on protection of human health, animal and plant at every stage of its food production procedure • Scientific advices and precautions are done by European Food Safety Authority by making tests and several examinations before the food reaches to the market • Tests are done to ensure food have met all the quality standards to check contaminants, preservatives, insecticides, pesticides etc.

Food Safety Policy (continue)

FAO	Nepal	EU
<ul style="list-style-type: none"> Number of good practices performed like Good Agricultural Practices(GAP), Good manufacturing Practices (GMPs, Good hygiene Practices (GHPs), hazard analysis and <critical Control Point (HACCP) systems 	<ul style="list-style-type: none"> Lack of proper policies, laboratory facilities, technologies and skills leads to not valid comparison and records 	<ul style="list-style-type: none"> In the case of additives and flavorings of food, EU has rules and policies which asks to mention all the preservatives used, the substances added in the food are inspected so that they do not pose any risk in consumer's health.

Food Loss and Waste

FAO	Nepal	EU
<ul style="list-style-type: none"> Global standard set by World Resource Institute in 2013 as an initial step for measuring food loss and waste Food loss can be measured within the boundaries and value chains 	<ul style="list-style-type: none"> Household food waste in rural areas are dumped or burnt by the people In municipal areas, the waste collecting staff employed by the municipality come at the door 	<ul style="list-style-type: none"> EU waste management includes high technologies and economic reforms FUSIONS, EU states that 88 million tons waste is created inside EU with associated costs of about 143 billion

Food loss and Waste (continued)

FAO	Nepal	EU
<ul style="list-style-type: none"> • Food loss and waste protocol enables companies to identify area of food loss and make effort to reduce it • Various strategies have been adopted to minimize food loss and waste; The Save Food initiative is one of the strategy launched together by FAO and Messe Düsseldorf • Working areas of the save food initiative are collaboration and co-ordination, awareness raising, research and supports to projects piloting other related projects 	<ul style="list-style-type: none"> • Lack of proper policy and strategies the municipal waste management becomes difficult. • Overcrowded street and over population city creates problems in waste management • Lack of Modern technologies in waste management • Lack of public awareness and negligence for proper disposal and dumping of waste • Continuous strike in the dumping sites locality halt waste deposition • Due to the lack of proper dumping place the volume of deposit waste can be seen over the roadside as well 	<ul style="list-style-type: none"> • Prevention of food waste falls under top priority of the EU • The EU has announced targets to halve per capita food waste at the retail and consumer level by the 2030 • The EU has been applying varied measure and initiatives with the purpose of preventing and reducing waste of foods at all the levels of EU • Strategies to raise awareness at consumer level and increase wise consumption of foodstuffs • Emphasis is given on reuse and recycling of materials

4 DISCUSSIONS

Research Questions: The research questions that has been asked in the beginning of the thesis are thoroughly discussed below:

1 What are the major food acts and regulations and how they address the current food insecurity and sustainability?

In the context of FAO, numbers of food acts and regulations have been launched in previous years. At first, the global plan of action on nutrition was formed to provide guidelines and to achieve the objectives of World Declaration on Nutrition adopted by International Conference on Nutrition. The global plan of action strives hard to protect environment using sustainable solutions for deliverance of safe food supplies, health care education and other services. This has been achieved by proper plan and vision to better use natural resources for food and nutrition. The need of future generations is not affected in order to fulfill the need of growing population. The emphasis is given on production farm by providing incentives and motivation to farmers (ICN, 1992). The Rome Deceleration on World Food Security and World Food Summit Plan of Action brought all the leaders of various nations making adoptions on the eradication of hunger and increase food security. The Codex standards jointly formed by the WHO and WTO encompasses those specific guidelines and codes of practices which brings and maintain safety, quality and reliability in food trade (fao.org) by bringing sustainability in food system.

While talking about Nepal we can see the government of Nepal has put nutrition, sustainability and food security in a top priority because the economic development is only possible if the importance of nutrition and food security is only recognized. The priority is seen through governmental effort by affirming array of governmental plans, policies and strategies. Among 59 countries who are fighting to end global nutrition in all its form, Nepal is one of them considered an ‘early riser’ country for the Global Scaling Up (SUN) movement. This is due to the commitment and plans to implement and scale up evidence-based cost-effective nutrition specific and nutrition sensitive interventions (Scaling Up Nutrition).

Millennium Development Goal and achievement: Despite a decade long armed conflict in Nepal, it has made significant achievement in reduction of poverty and hunger thus achieving most of the MDG targets. The set targets have been met by 2015 deadline. Nepal has already reduced the half

number of poverty as defined by the poverty line and it is on the way to half the number of people suffering from hunger (ICN, 1992).

In case of EU, General Food Law in 2002 was formulated as a step to take high level of alertness in the area of food safety and delivery. It became the basis framework for all the regulations and directives in the union and national levels. The EU food safety policies are designed in such a way that they ensure safe and nutritious food from farm to fork. Food hygiene are kept in maximum requirements and meanwhile animal health and welfare and plant protection are kept in high priority. The EU farm policy popularly known as Common agricultural policy (CAP) plays a significant role in reducing food insecurity by helping farmers for the sufficient production and distribution in the European market. The CAP ensures modern investments in farms, market crisis and provides rural employment. It also concerns for environment and animal welfare. As looking forward to the growing population the world food production needs to be double by 2050. The EU farm policy gives farmers advice on investment and innovation to meet these challenges.

2 How does food prices are regulated and resources are mobilized to ensure the food sufficiency and food availability?

In Nepal, the main objectives of agricultural price policy during 1956 till 1981 was focus to stable consumer prices but later years the focus was started to give on agricultural production by making food products available in reasonable in food deficit and poor areas of country (Bhalla, G.S, Randhawa, D.S & Tyagi, D.S, 1989). The food price policy also provides the incentives prices to producers thus increasing food production. The food prices in Nepal are fixed by the governmental body of Nepal. The Nepal Food Corporation which was established on 2031 B.S. is the body which implements the food policy formed by the government of Nepal. The food corporation is responsible for the storage, handling and selling of food within the country. The warehouse is also built in the places for the storage of food (NFC). When Nepal joined World Trade Organization in 2004 the concerns about food safety was started and priority was given but first food safety regulations was made in 1966 which was not very much effective and inclusive. Only after 90s the food safety issues were given due importance and was put in the governmental agenda. Modern food safety policies include codex guidelines and total quality management. More Emphasis is given to pesticides issues and safety of food from pesticides uses because production has lowered and the crops are harmed in Nepal agriculture where pesticides testing is limited.

The food price is controlled through Food Price Monitoring and Analysis department of FAO. The research work usually focusses on domestic food prices such as analysis of price transmission, market integration and price volatility mostly in developing country markets. Price volatility indicates significant and frequent changes in the direction and magnitude of food prices resulting negative impact to producers, consumers and states (FAO, 2010). During food crisis in 2006 and 2008 FAO studied different policy's tools applied in 81 countries and high level of volatility was experienced due to the weak stability of agricultural markets, the limited public capability to handle the situation in favor and the dramatic consequences over the increase of world hunger (Demeke, M., Pangrazio, G.& Maetz, M, 2011). The decrease in price volatility is possible if government policies that are more applicable and indulge more private sector participation in trade, more predictability for private sectors will minimize risk, lead to narrow margins, decrease prices for consumers and increase prices for farmers (The State of Food Insecurity In The World, 2011).

In case of EU, the transparency in the food supply chain makes better distribution and consistency in the price of food. These objectives are carried by European Commission as introducing the European Food Prices Monitoring Tool to improve its pliability to price volatility. The Monitoring tool is developed by EUROSTAT and uses the data and statistics collected by it (Europa). The main objectives of the food prices monitoring tool is to gather data on price developments in the various sectors of food supply chain at a one place to compare changes in prices for agricultural commodities, food industry products and consumer goods (European Commission).

3 How does the food safety policies and food safety situations vary among organizations?

“Food safety is defined as an assurance that food will not cause harm to consumer when it is prepared and eaten according to its intended use (FAO/WHO, 1997). In Nepal, the existing food legislation is not adequate to address the current problems and issues because it is not directed by the risk assessment principles, lack of human resource in food control, poor analysis facilities in food contaminants. Food adulteration rate in Nepal is 15.6% for the fiscal year 2011 increasing with years and reached 25. 80 percentage of the package food items are imported (Budhathoky and Shrestha, 2015).

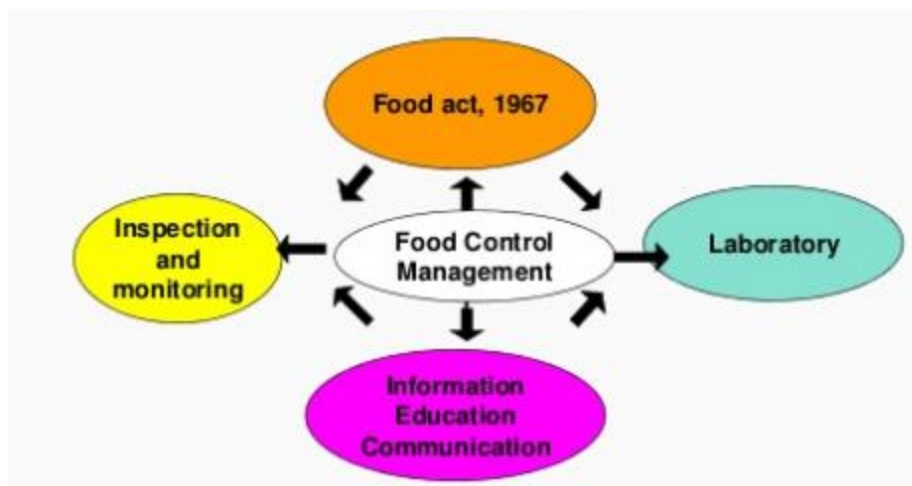


Fig: 18 National Food safety and Quality Control System (Food control system in Nepal, 2015)

According to Nepalese media research, most of the Nepalese food sold and available in the market are unsafe, adulterated or substandard. Most of the market milk is substandard. Most of the sweets sold are unhygienic, most of the vegetables available in the market contain pesticides. The dirt was found in the bottle of mineral water, the noodles contain the worms, the use of VDC in meat and meat products, Street food are sold open and they are unhygienic by consuming them many people have fallen sick (Koirala, et al., 2009).

The realization has lately been made in some of the priority sectors for incorporating principles based on Hazard Analysis Critical Control Point although the approach is not mandatory. Only the high-risk sectors like milk, water and others should incorporate HACCP otherwise first the Good Hygienic Practices (GHP) and Good Manufacturing Practices (GMP) should be mandatory ultimately following HACCP approach (Wasti, 2009).

While talking about legislation of Nepal monitoring the food market situation, it is only based upon the inspection and testing of food which is sold in the market. In addition to that the inspection of system should be done with testing of food (Wasti, 2009).

FAO acts as an organization which has worked and guided in the areas of food safety for its members organizations. Codex Alimentarius Commission jointly founded with WHO is a code of rules regarding food safety and standards thus FAO functions the protection of the consumer health and fair trade of foods. FAO facilitates its member countries by providing number of initiative measures if food safety problem occurs. Beginning with identification of problem and recognizing

the nature till dealing it with proper way, the responsibility of FAO is to check and reassure that the recognized problem has been dealt professionally regarding food safety problems. FAO has set some principles that provide guidelines in a food safety policy. The aim of this principle is to monitor food safety at each phase of the food chain. Risk analysis and scientific approaches are conducted to minimize the risks. The numbers of good practices are in progress to maintain safety of food providing quality assurance in the food supply chain. Those practices include some controlling factors like Good Agricultural Practices (GAP), Good Manufacturing Practices (GMPs), Good Hygienic Practices (GHPs), Hazard Analysis and Critical Control Point (HACCP) systems (Whitehead, 2009).

Whereas FAO in compliance with WHO form Codex Alimentarius which is the base of all the standards and guidelines related to food safety and consumer health. The identification and recognition of problems put forward by members of FAO are dealt in a proper way using available resources and the role of FAO is to make sure that all the problems are addressed and dealt professionally. The problem is dealt with setting up rules and standards using Codex. All the members actively followed the principles and guidelines from the producer's level to the consumers. The main objective of FAO food policy is to maintain food standard and keep food safe in each stage of food supply chain. Risk analysis is conducted for risk mitigation.

In the case of EU, the food quality is kept on high consideration without harming the food resources and natural resources. In every stage of production procedures emphasis is given on human health, animal and plant. The EU food safety policy and implementation goes in very systematic way. European Food Safety Authority makes series of tests and examinations before food is launched or sold to the market. The food must be passed all the required criteria to be reached to the local market. Not only this they also provide scientific advices and precautions to their member countries for the best implementation of the policies. The food standards are set which required test of preservatives, coloring, pesticides and insecticides. The food inspection is done in certain time to check and assure that hygienic and safe food are sold in the market. The food inspector carries this task. The food and consumer products imported from outside are being inspected to check whether they are safe and meet the quality standards.

4 What are the differences in food standards and food safety between organizations?

Despite the nations and organizations have their own sets of food standards, the codex standards are followed by 188 codex members which includes 187 member countries and 1 member organization i.e. EU. The Codex texts can be found in Codex website and easily accessible. Codex commodity standards defined the physical and chemical characteristics of about 200 trade products. Codex guidelines about food labelling allows effective communication from producer till consumer. A code of practice like food hygiene which demands food safety and suitable consumption throughout the food chain, the codex general standard for contaminants include maximum levels of natural toxicants and contaminants associated with food which is pronounce as safe and can be trade whereas the codex database on food additives lists permitted levels of food additives used in the production of food commodities (FAO &WTO, 2017). In context of Nepal there are also many national food standards. According to Maharjan like QMS (ISO 9001:2000), EMS (ISO 14001:2004), ISO/IEC 17025:2005, ISO 22000:2005 which follow HCAP principles (Maharjan, 2014). The national food standards in Nepal are not still accepted worldwide because of lack of necessary criteria and requirements. Many of the local products due to lack of international standard requirements fails to obtain international accreditation. The poor lab facilities and technologies are the lacking factors to achieve renowned international standards hence the international market for many domestic products are limited. Labelling and nutritional information are not updated and clearly mentioned. The consumers in rural areas are still unaware about the production and expiry date. The use of preservatives and additives in the food products have no proper limitations and quantity. Due to the lack of proper monitoring and investigations, the local producers are not responsible towards people and country.

Whereas, EU follows the codex standards and policies, supervision and inspection are very effective and well implemented in the European Union. The act and rules on food and animal feed production in the EU began since the launched of White Paper on Food Safety in 2000. This EU law is based on some general principles namely risk assessment, risk management and risk communication which is the foundation of the legal laws in member states. The new Regulation no 1169/2011 has made obligation to provide nutrition information and labelling requirement. There has been made some key changes in EU food legislations; there has to be mandatory allergen information for non-prepacked food, requirement of certain nutrition information for majority of

prepacked processed foods, mandatory origin info of fresh meat products, list of engineered nano-materials etc. These all changes have been made for the safety of public general health and reform in food safety and consumer awareness.

5 What are the major food waste management policies and their effectiveness?

The food waste occurs at all the levels from primary production to the consumer level across food chain. The significant amount of food loss takes place in industrialized regions as well as low economic countries where maximum food loss occurs in the early or middle stages of the food supply chain and the food waste is a part of food loss and denotes to discarding or alternative (non-food) use of food that is safe and nutritious for human consumption along the entire food supply chain. Over 100 million tonnes of food are wasted in Europe every year. As part of its resource efficiency strategy EU is planning to halve the level of its edible food waste by 2020. The awareness in public are held through the communication campaign in 2012 which provides tip for public to reduce food waste (http://ec.europa.eu/food/food/sustainability/index_en.htm) in addition to that concerned stakeholders are working with EU to minimize the waste volume without compromising food safety (EU, 2014). Whereas in Nepal there is no effective means of waste management system. Due to the political instability and weak governmental policy the garbage and municipal wastes are blocked to reach dumping site due to various strike. The unsystematic and open disposal of waste material in the streets leads to bad odor, pollution and various communicable diseases. There is a need of recent technology and huge government budget in areas of waste management policy. The awareness campaign and knowledge of recycle and reuse should be spread among people. On the other hand, FAO partnering with other international organizations, private sector and civil society has launched a save food initiative to create a society where is minimum food is loss or waste so that all the food can be wisely used to eradicate hunger. The programmes has been conducted in both developing and developed countries. As an intergovernmental Organization, FAO plays the role of facilitator with commemorating Save Food projects to reduce hunger and promote food sustainability (FAO, 2014).

5 CONCLUSIONS

The world population is growing in a high speed. The production of food and basic resources must be increased to feed growing population. All the nations, regional organizations and international organizations are striving hard either working alone or collaborating each other to minimize the world hunger and leading the globe towards prosperity and sustainability. The proper food system engraved by the nations and their policies becomes the backbone to tackle problems of hunger and food security. Food system stands the sum of all the diverse elements and activities which together, lead to the production and consumption of food, and their interrelations. Sustainability in the food systems ensure food security for the current and the long term which can be only achieved through effective food policies and strategies. Food policy plays a vital role in meeting the target and set goals.

Food policies and strategies of the Food and Agriculture Organization of United Nations, Nepal and European Union has been studied and researched on few categorized. The research was based on the available secondary resources therefore the scope of this study has been limited. The major differences in policies can be seen in the field of Food Safety, Food Standards and Consumer Policy. Mostly FAO collaborates with nations and other organizations to promote, upgrade and reform food safety and standards with joint actions and programmes. It provides technical assistance and aid to the countries in need. In case of Nepal, as a developing nation still lacks proper policies regarding Food Safety, Food Standards and Food Waste Management. The lack of modern technology, weak economy and awareness are the main reasons why the Nepal is unsuccessful to develop effective food policies and its implementation. Whereas, EU as a core organization of developed European Countries consists many best policies and strategies regarding Food Safety, Food Standards and Food Waste Management. The high modern technology and use of best practices facilitates to achieve the policy target in EU.

It is all up to us, everyone, what kind of future we are going to give our generations to come. We should act in time before it gets too late. All the nations, organizations, private sectors and stakeholders should work consistently and unifying to achieve sustainable development goals and zero hunger through better food policies and strategies. The public awareness, concerns and participation is also needed to overcome the challenges. We can eradicate hunger from world and make this earth a better place to live in.

6 SUMMARY

As growing population need more foods and fundamental resources, there is a huge challenge to fulfill the increasing food demand. When demands are more than food productions, scarcity arises and hunger prevails. The global problem of food insecurity and hunger can be eradicated with the farsighted policies and systems. Food policies and strategies adopted and implemented by nations and organizations plays a significant role in pivoting the food system to security and sustainability. Food law and policy, food safety policy, food standards, consumer policy, packaging policy, food loss and waste etc; all these aspects are the foundation of good food system. These aspects have been considered as a base for the comparative analysis between the concerned organizations and country. Every country and organizations has their own set of food policies and standards. Some follows regional and international standards too. FAO serves their member countries by providing specimen of policies and directives. It also partners with other international organizations to work upon food policies issues. EU as a regional organization formulates and implements food policies and strategies for the welfare of its citizen and country whereas Nepal as a developing nation has its local and international food policies and standards despite it lacks effectiveness and implementation. All the food policies and strategies are made for the benefit of common people. The entire food supply chain i.e. producers till consumers are affected by current or changing policies and strategies. The comparison between policies provides the clear picture of differentiation in policy formulation, adaptation and implementation. It provides ideas where to focus more and identify the drawbacks of polices. The best policy gives the best results and helps meet the target within given time. The analytical comparison was made to gather policy information and policy difference between given organizations. The term food system and policy encompasses many sectors. It affects environmental, social, financial and cultural norms and values therefore the deep research and analysis is needed to understand the policy variations, implementation and its effectiveness.

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