



SHORT SUMMARY NOTES TO AUTHORS ON THE EXPECTED CONTENTS OF EACH CHAPTER OF
THE BOOK
(OCTOBER 2017)

**Sustainable, Sufficient, Safe and Healthy Food in Nepal:
Principles and Practices of Food Security**
Association of Nepalese Agricultural Professionals in Americas (NAPA)

Theme: OVERALL FOOD SECURITY

Title: Food Sufficiency Status and Challenges in Nepal: Policy Options/choices for Federal Republic of Nepal

Authors: Basu Dev Kaphle, Yadav Sharma Bajagai, Bed Prasad Khatiwada, Yamuna Ghale and Devendra Gauchan

This chapter is tentatively placed under Overall Food Security, based on the scope of table of contents submitted by the authors. This position may change based on the scope, quality and content details of the chapter manuscript to be submitted. The chapter will provide general overview of the country background, general development, agriculture situation, and the status of poverty across agro-eco zones, and sources of livelihoods and food insecurities in vulnerable sub-populations in Nepal, especially, children, women, Dalits and other disadvantaged communities for which only high level overview is expected in this chapter. The authors will present a thorough but concisely written review of policies and programs relevant to food security in Nepal, overview of food security situation of Nepal, challenges for food security and policy choices/options for future state of the Federal Democratic Republic of Nepal under their respective sub-headings submitted by the authors in the revised table of contents. It is expected that the authors will include published data/reports from government and non-governmental sources in discussing suggested policy options.

Theme: FOOD SUSTAINABILITY

Title: Nepalese Agriculture in Crossroad: Diagnostic Review of Success and Failure to Attain Food Security, Sustainability and Social Wellness.

Authors: KP Sharma, KP Paudel and KR Dahal

This chapter present a thorough review of historical development of Nepal's agriculture development from the rudimentary traditional subsistence production to modern agriculture towards the goal of 'Green revolution' through periodic national development plans. It will also provide evidence substantiated with sufficient data and information synthesized from the desk reviews for existing crisis/constraints and challenges of improving agriculture production, and opportunities to overcome them to feed the population for reducing food insecurity to an acceptable level. A series of challenges including land use, ownership, urbanization, agriculture land loss, labor shortage, climate change, excessive and uncontrolled use of agro-chemicals, geopolitics between agriculture systems of two giant economies as neighbours will be analysed from the evidence based stand points to draw a way forward with policy recommendations. In

this chapter, the authors are expected to be broad in scope of the food sustainability as it relates to food security, but all arguments and recommendations presented should be backed by evidence of literature or empirical information related to sustainable but enhanced food production for serving the purpose of food security.

Title: Capacity Building of Food Value Chain Actors in Nepal: Why and How

Authors: Ramjee Ghimire, Katsuhige Nakason, Lekh Nath Chalise

This chapter will deal with a vital component of food sustainability, i.e. building capacity for food value chain through development and adoption of information and knowledge management system. In this context, the chapter presents food chain mapping, labor inputs, product marketing and finally an asset based community development (ABCD) model as applicable to Nepal. The authors will take a route of desk reviews of literature and validate the findings with Nepalese agricultural professionals for the content relevance to Nepal.

Title: Sustainable Management of Food Production Chain for Food Security: An Interdisciplinary Approach

Authors: Rubel Chowdhury, Prerna Khawas and Shanker Dhakal

This chapter will describe post-agronomic stages of food production chain – harvest, storage, transportation, processing, supply, marketing and consumption of food, in terms of their current state, and future interventions for sustainable management of future food secure state. The technological aspects will be detailed out for their potential adoption by innovative entrepreneurs.

Title: Sustainable Soil Management for Agroecosystem Resilience and Food Security

Authors: Rajan Ghimire, Upendra Sainju and Ram Acharya

This chapter considers soil management as the fundamental aspect of farming system for food secure Nepal. The chapter will describe the farming systems focusing on three dominant sub-systems of Nepal- rice-based cropping system in Terai, rain-fed upland farming in the hills and mountains and livestock production particularly in the hills and mountains. This will be followed by soil fertility challenges such as soil nutrients, soil pH and other issues. The authors will then describe in detail the sustainable soil management practices- crop rotation/cropping systems, crop residue management, integrated nutrient management, soil amendment and tillage practices as the proposed interventions towards achieving food security. Also expected to add erosion control and soil quality aspects as well.

Title: Principles, Practices, and Future Direction of Sustainable Animal Production in Nepal

Uma Karki, Lila Karki, Rudra Poudel, Dala Ram Pradhan, and Laxman Sherchand

- Introduction/background
- Principles of Sustainable Animal Production
 - Economic/profitable
 - Environmentally friendly
 - Socially good
 - Stewardship
 - Continuity
 - Whole system approach
 - Long-term
 - Diversity
 - Interconnectedness
- Practices, programs, plans, and policies for developing livestock sector
 - Existing situation
 - Livestock population
 - Growth trend
 - Livestock production systems
 - Subsistence
 - Semi-commercial
 - Commercial
 - Current programs and policies
 - Animal health
 - Breeding
 - Others
 - Avenues for improvement
 - Recommendation for future direction
- Feeds and forages for sustainable livestock production
 - Importance of feeds and forages for livestock production
 - Current situation of feeds and forages versus the demand situation
 - Potential of forage production to meet requirements
 - Existing forage program and policy
 - Recommendation for future direction
- Sufficient and sustainable dairy production
 - Current situation of dairy programs and policies
 - Dairy industries and their contribution
 - Avenues for improvement
 - Recommendation for programs and policies
- Sufficient and sustainable meat and egg production
 - Existing programs and policies for promoting meat and egg enterprises
 - Improvement potential
 - Recommendation for future programs and policies
- Socioeconomic aspects of livestock production
 - Economic importance of livestock enterprise (household economy, employment, GDP contribution, farming system)
 - Socio-cultural value of livestock (livelihood, social aspect, cultural aspect)

- Demand and supply of livestock and livestock products
 - Essential features for operating economically viable livestock farms
 - Policy recommendations
- Conclusions
- Program and policy recommendation

DRAFT

Title: Improvement in Cereal Crop Production for Food Sufficiency

Authors: Khusi R. Tiwari, Hem S. Bhandari, Dhruva Thapa, Jiban Shrestha, and Dilip Panthee

This chapter will describe the importance of cereal crops in Nepalese agriculture, and will explore cereal foods in Nepalese diets across agro-eco zones, high mountains, middle mountains hills and Terai. Three major crops- rice, maize and wheat as the source of food will be critically examined in terms of their current status, production constraints, improvement opportunities through varietal and biotechnological interventions. Potential for increasing production of minor cereals – barley, finger millet, sorghum, oats, and others will be explored for diversifying dietary diversity to ensure the sufficiency of food made available in remote, rural as well as urban areas. Conclusions and recommendations will be drawn based on the empirical evidence how far along the cereal crops can be improved to optimize the production of cereal foods.

Title: Agroecological Crop Intensification for Food Security in Nepal

Authors: Ram B Khadka, Tejendra Chapagain, Krishna Dhital, Rajendra Uperty, and Norman Uphoff, Sharad Pande, and Suresh Mehata

This chapter will present the principles and practices of crop intensification systems that can be applicable to enhance food security, focusing first on rice based crop systems and then the systems of other crop intensification mainly wheat, finger millets and sugarcane in the context of Nepal's food production. The chapter will present perspectives of various components of crop intensifications including climate smart technology, enhancement of yield and quality, shortening of growth cycle, seed system, mitigation of biotic and abiotic stresses, opportunities for organic production of particularly organic rice, microbial inoculation, mechanization options and gender balance. Major issues, challenges and way forward through research, extension and policy interventions. Is this chapter going to discuss the inherent intensive cultivation practices and their value at the modern time as well?

Title: Household Food Security in the Nepalese Context with Special Reference to Kailali District of Nepal

Authors: Bhawani Mishra, Krishna Lal Poudel

This chapter explores the household level food security in Nepal and describe general characteristics and dimensions of food availability, access, utilization and stability at the national level. This chapter will also undertake a case study of Kailali district, presenting a concise account of the study methodology, to describe in pragmatic terms the concepts of food security with respect to famine and hunger, transient and chronic food insecurity, and seasonality of food security. The authors will underscore poverty, gender role, and conflicts as the factors associated with food insecurity. The authors will put forward a policy and institutional framework for ensuring household food security.

Title: Factors Determining Food Security/Insecurity

Authors: Prem B. Bhandari, Lila B. Karki, and Drona P. Rasali

This chapter focuses on the major factors geo-socio-economic determinants of food security with particular emphasis in Nepal. The food security scenario will be presented at the household level. This chapter will address two major questions: (i) Does household level food in/security vary by geographic regions, and (ii) Do household socio-economic and cultural contexts influence food security? To answer the first question, we will examine geographic inequality in food security with particular reference to seven geo-political provinces envisaged/demarcated by the new constitution, three ecological regions and rural-urban locations. To answer the second question, we will use the sustainable livelihood framework and/or social exclusion framework wherever appropriate to explain the associations between food security/insecurity and a household's socio-economic and cultural context. Empirical evidence will be provided through statistical analysis of available data.

Title: Neoliberal Globalization, Migration, and Food Sufficiency: The Case of Nepal

Authors: Kalpana Khanal, Kanchan Joshi

This chapter will introduce the global context of changes taking place in food governance, production, distribution, and consumption patterns in the contemporary neoliberal era and its direct and indirect impact on the changes taking place in Nepal. In the changing context, the authors will present empirical data and information as the evidence to demonstrate how the alternative modes of improving food security are emerging in the country moving from the traditional subsistence production for household supply to market oriented supply to ensure availability of sufficient food for consumption due to emergence of youth migration and remittances as the driving force. The meaning of food security is rapidly changing to be income-based, which is usually the case in many countries that are moving away from the household production-based food security. Based on the empirical premise of the change, the authors will draw policy implications and recommendations to ensure food sufficiency in the country.

Title: Innovation in Agriculture and Food Technologies for Food Security

Authors: Yakindra Timilsena, Prakash Oli, Raju Adhikari and Benu Adhikari

This chapter will introduce the importance of innovation in agriculture and food technologies to ensure food sufficiency in food secure Nepal. In the first part of the chapter, current advances in agricultural technologies such as slow release fertilizers, environmentally-friendly pesticides, Polymeric mulch films for improved agronomic practice will be explored for their applications in Nepal. In the second part, the authors will also explore innovative food processing technologies such as high hydrostatic pressure, food irradiation (gamma rays, UV rays, and microwave), Ultrasound and Cold Plasma for their application in Nepal. Then, they will describe the relationship between food and health in terms of the added benefits of fortified and enriched foods, special foods for specific health needs (e.g., foods with low glycaemic index, with reduced sugar, salt and saturated fat, and with high or reduced proteins) of the people and also the functional foods and nutraceuticals. The authors will describe current state of foods processing and product development, and explore available innovative technologies of food processing and product development (e.g. removal of anti-nutritional factors, addition of healthier ingredients, convenience foods, foods for specific purpose/situation such as foods for

natural disaster areas, technologies to protect and deliver bioactive ingredients including microencapsulation and emulsions and gels). The author will finally synthesize the potential role of innovative technologies in food security to draw future perspectives and prospects in the country.

Title: Food Self-sufficiency and Child Nutrition in Nepal

Authors: Ram N. Acharya and Apar GC

This chapter will present a specific study that evaluates food sufficiency and child nutrition using secondary data of 2010/2011 Nepal Living Standards Survey (NLSS) data on district level population, climate, land yield, and crop production. The authors will develop food supply and demand measures and use them to identify food deficit areas, and will evaluate the impact of regional food deficit on child nutrition. Based on the empirical evidence from the authors' own study, plausible policy options will be drawn for attaining food sufficiency, particularly in the deficit regions. The study methodology used will be presented will focus on the household level food access, individual consumption, and the future impact of food security on child health. Accounting for these factors, the authors will derive a child nutritional outcome function and develop a food sufficiency index from the market analysis, which will lead to the development of a second index constructed using NLSS to be used in evaluating the impact of food security on child nutrition outcome. The study methodology will be presented for knowledge transfer to the scholarly readers of this chapter.

Title: Dynamics of Food Basket Composition among Marginalized Communities: A Special Reference to Chepangs

Authors: Luni Piya and Niraj Prakash Joshi

This chapter presents a specific study using the survey methodology, highlighting the importance of food basket composition as an important component of food sufficiency in marginalized communities. The authors will describe the background and marginalized status of highly marginalized indigenous nationalities, Chepang. A thorough literature review will be presented on the similar studies in Nepal and across World. The survey methodology explaining study design collection and analysis of data and synthesis of results will be presented. The authors will present a qualitative description of the annual food basket of the community that comprises three sources- own farm produce, forests and market procurement. The dynamics of change in the food basket composition in different time periods of surveys presented will elucidate contributing factors of the change.

Title: Food Safety and Food Quality Regulations: Current Status, Issues and Way Forward for Federal Nepal

Authors: Yadav Sharma Bajagai, Bed Prasad Khatiwada, Pramod Koirala, Raju Adhikari

This chapter introduces the concept of food safety and food quality as an integral part of food security in Nepal. The authors will present a reasonably thorough review of international Regulatory Frameworks relating to food safety and food quality and their relevance to Nepal. Then, they will present a thorough review of regulatory frameworks for food safety and food quality that are existing in Nepal. The authors describe the current state of infrastructure for food safety and quality, food standards as well as the current status of the implementation of related legislative instruments to maintain them the country. Finally, the gaps will be drawn from the major issues arising from the food safety and quality system in place, and a set of recommendations will be presented based on the policy implications drawn from the review.

Title: Non-destructive Technologies for Food Safety and Quality Assessment: Review and Way forward in Nepalese Context

Author: Bed Prasad Khatiwada

Food safety and quality issues are getting attention in recent days and are an integral component of the food security system. Physical, chemical and microbiological hazards can make food unsafe for consumption while assessment of nutrition composition of the food including carbohydrates, proteins and fats are also crucial. Traditional methods of assessment of food safety and quality are tedious, time taking, expensive and uneconomical. Recently, optical methods of assessment of food safety and quality are in practice in developed countries which allow online, real time assessment of food quality. This involves scattering and absorbance properties of light while passing through the food and extracting chemical information from food using chemometric method. Non-destructive method of quality assessment is in practice along the supply chain in food system commercially since last two decades in developed economy. This chapter presents basic and recent advances on use of near infrared spectroscopy (NIRS) to assess food safety (adulteration, toxicity, frauds, authenticity, pesticides residues) and quality (carbohydrates, proteins, fats, dry matter, soluble solids, internal defects) and pave a path for advancing food safety and quality assessment and its regulations in Nepalese food system. Examples will be from meat and dairy industry, cereals and grain industry, fruit and vegetable industry. Despite a good initial investment in infrastructures and facilities, NIRS is a proven and cost-effective tool for long term quality control and food safety and quality surveillance.

Keywords: non-destructive, near infrared spectroscopy, regulations, safety

Title: Improving Fruits and Vegetables for Healthy Diet

Authors: Dilip R. Panthee, Khusi R. Tiwari, Hem S. Bhandari, Tek P. Gotame and Surendra Shrestha

This chapter will focus on fruits and vegetables as the major components of food that will contribute to healthy eating in the context of food security. The authors will review thoroughly the current area and status of production, imports and exports of fruits and vegetables, and their economic contribution to the national economy. A thorough literature review of contributions of fruits and vegetables to the nutritional requirements including the nutrition related preventable major diseases, nutrient supply and potential nutritional improvement from fruits and vegetables such as anti-oxidants, Lycopene, Vitamins will be presented. The authors will describe some of the fruits and vegetable crops that can be expanded in cultivation across various feasible agro-eco zones in the country (e.g. Apple, Citrus, Mango, Solanaceae, Legumes, Leafy vegetables, Crucifers, Indigenous fruits and vegetables) with their comparative nutrient values for potential value in food security. A road map drawn, preferably based on expert opinion survey or a Delphi process, for increasing access and availability of fruits and vegetable at the required level of healthy eating for the masses of the people, especially, the vulnerable populations such children, women, elderly people and socio-economically disadvantaged communities (Dalits, Chepang) in the country will be presented.

Title: Healthy eating for health and wellbeing

Authors: Drona P. Rasali and Shanthi C. Johnson

This chapter will introduce the concepts of healthy eating for health and well-being of the people as necessary component of food security as demanded by its globally accepted definition such that the ultimate goal of the healthy eating to ensure food security is to achieve best possible health and wellbeing. Authors will describe unhealthy eating that leads to disease and illness, access to healthy foods, balancing diets, eating habits and practices, food knowledge and skills, and some of the current day major problems of unhealthy eating such as sodium intake, sweets and sugary drinks leading to major public health issues. This chapter will focus on potential risk of increasing unhealthy eating practices taking over healthy practices and contemporary changes taking place in the food systems in the course of globalization and the modern market based food security situation. Some of the available data and research findings for Nepal on these aspects retrieved from a thorough review of literature and databases will be presented as background information in order to draw some of the policy implications and make a set of recommendations that are applicable across rural and urban areas, and across all agro-eco zones. The authors will also draw knowledge transfer from the experiences of surveillance research findings on healthy eating principles and practices in Canada to apply in the context of Nepal.