



THE FOOD SECURITY ATLAS OF NEPAL

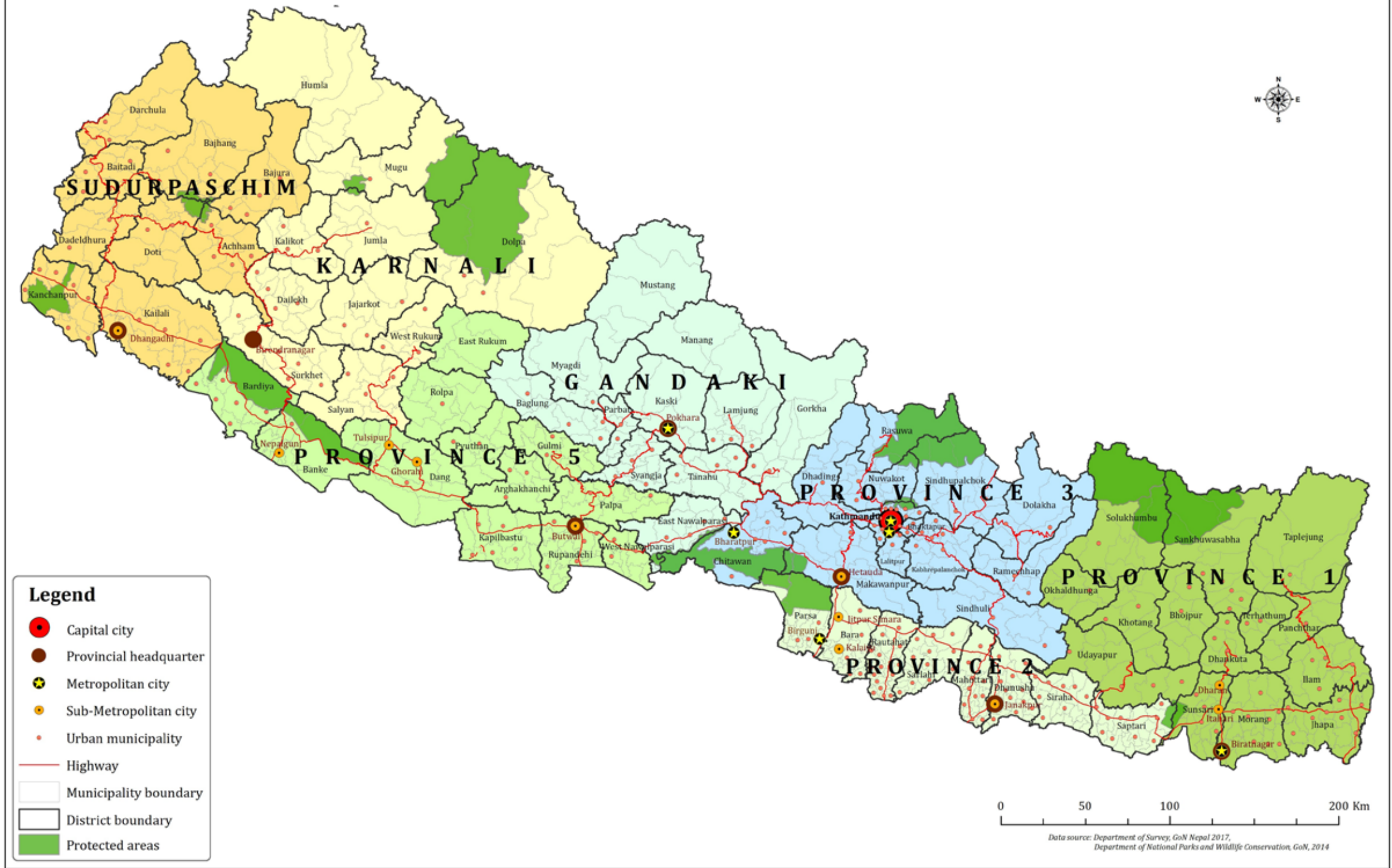


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The Food Security Atlas of Nepal

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Government of Nepal
National Planning Commission
Singha Durbar, Kathmandu
Tel: (+977)-014211013
Fax: (+977)-014211700
Email: npcs@npc.gov.np
Web: www.npc.gov.np



United Nations World Food Programme
P.O. Box No 107, Chakupat, Patan Dhoka,
Lalitpur, Kathmandu,
Tel: (+977)-015260607
Fax: (+977)-015260201
Email: WFP.Kathmandu@wfp.org
Web: www.wfp.org/countries/nepal

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Foreword

Nepal entered into a new era with the promulgation of a progressive and democratic constitution in 2015. The three tiers of the Government are now working to share a fair dividend of the country's development. The Government of Nepal (GoN) has been focusing to achieve lasting peace, good governance, sustainable development and prosperity for all citizens. For this, the government has set out strategic development path with a vision of 'Prosperous Nepal and Happy Nepali' which seeks to attain the twin objectives of sustainable economic growth and individual well-being simultaneously. This vision also coincides with the 2030 agenda for sustainable development.

The GoN has prioritized nutritious and sufficient food all year round as one of the essential rights of its citizens in the constitution and through the Right to Food and Food Sovereignty Act. In line with global SDG commitments, the GoN has also prioritized food and nutrition security as an important sector with specific targets to end hunger and malnutrition, double the agriculture productivity and income, ensure sustainable food production systems and implement resilient agricultural practices and maintain agricultural diversity.

The National Planning Commission (NPC) assumes a stewardship and coordination role of food security and nutrition across various government sectors and non-government entities. It has fostered to improve the food security and nutrition situation in Nepal. The government is implementing the Agriculture Development Strategy (ADS), Multi-sector Nutrition Plan (MSNP) II (2018-2022), and Zero Hunger Challenge National Action Plan (2016 - 2025) aiming to comprehensively improve food security and nutrition status of the population. Further, the Fifteenth Plan (2019/20-2023/24) has high priority to improve food security and nutrition. For better coordination and strategic guidance, a High Level Nutrition and Food Security Steering Committee has been established, chaired by the Vice Chairman, and a National Nutrition and Food Security Coordination Committee, chaired by Member for Health and Nutrition Sector.

With these concerted efforts, malnutrition status has reduced, and hunger and poverty rates have decreased over the years in Nepal. While these trends indicate good progress on overall achievement, there are however many challenges in sustainably attaining food and nutrition security targets.

There was a great need to share the current status and explore better efforts to contribute on the longer-term objective of food and nutrition security. The Food Security Atlas of Nepal provides national and sub-national food security and nutrition status and helps understand sub-national/spatial pattern of food security and nutrition status in Nepal aiming to provide evidence for planning and management of the food security and nutrition related programme and policies at different level of the government.

The Atlas provides an overview of food security in Nepal and identifies underlying challenges. It shows that while national level indicators are improving over the years, the rate of progress is still slow and there have been regional and social variations in food

and nutrition security. The challenge is now to build evidence-based responses, which take into account the underlying causes of and threats to food and nutrition security such as exposure to natural disaster and climate change, changing food consumption behaviour and food production systems, innovative approaches and technologies on health care, and institutional capacity building.

I hope this The Food Security Atlas of Nepal will be helpful for developing evidence-based food security plans and programmes in Nepal. I would like to thank United Nations World Food Programme for collaborating with National Planning Commission in this important endeavour.



Prof. Puspa Raj Kadel, PhD
Vice Chairman,
National Planning Commission

Acknowledgement



This, the second iteration of the Food Security Atlas of Nepal, was produced by the National Planning Commission (NPC) in collaboration with the United Nations World Food Programme (WFP).

Much like its predecessor, this Atlas introduces food security and nutrition situation in Nepal through a multi-sectoral lens, leaning on geospatial analysis, but also on detailed graphs and poignant images, to highlight the drivers and consequences of food insecurity in Nepal. The country's progress in this area is also noted, and the policy orientation of the opening and closing chapters underscores how Nepal can build on its successes to make zero hunger a reality.

Pippa Bradford, Representative of WFP deserve special thanks for her encouragement and vision on this. Moctar Aboubacar, Head of Evidence, Policy and Innovation at WFP in Nepal, was responsible for the overall design, coordination, writing and editing of the Food Security Atlas.



**Government of Nepal
National Planning Commission**

The Nepal Development Research Institute (NDRI) was the technical expert agency for this project. Dr. Jaya Kumar Gurung, Executive Director of NDRI deserves special thanks for the technical support to complete the project.

Dr. Ram Chandra Khanal, NDRI Lead Expert for this project, coordinated the study and provided substantive written inputs along with Dr. Divas Bahadur Basnyat, Dr. Nawaraj Khatiwada and Dr. Basu Dev Regmi. NDRI researchers Srijana Thapa, Shashwat Dhungana and Tanuja Shrestha prepared the data—including all maps, graphs and figures—in addition to reviewing written content and finalizing chapters. Manoj Karki oversaw the visual design and compilation of the final product.

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Deputy Director General, and Sushil Dangol, Chief Survey Officer, Department of Survey and representatives from the Department of Roads and Department of Irrigation.

Photographs were provided by WFP (Moctar Aboubacar, Marco Frattini, James Giambone, Angeli Mendoza, Pushpa Shrestha and Subina Shrestha), NDRI (Manoj Karki, Pratigya Regmi), and through Al Jazeera (Prakash Mathema), Nepal Agriculture Research Council, and the Kathmandu Post.

We sincerely hope that this Atlas will contribute to a better understanding of food security and nutrition in Nepal and catalyze action that can move the needle on one of Nepal's most pressing development challenges.

Dil Bahadur Gurung, PhD
Member,
National Planning Commission

Usha Jha, PhD
Member,
National Planning Commission



नेपाल खाद्य सुरक्षा अनुगमन प्रणाली
Nepal Khadhyo Surakshya Anugaman Pranali (NeKSAP)
Nepal Food Security Monitoring System





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1. Food Security: a 4-dimensional framework



The consumption of food plays a direct role in human health and wellbeing. Food security was long portrayed as the availability of food that could meet the daily caloric needs of a given population. By the 1996 World Food Summit, the definition had expanded to “people having physical and economic access to safe and nutritious food to meet their dietary needs for an active and healthy life”.

Contemporarily, food security comprises of four key dimensions: availability - the presence of sufficient quantity of food, access - the ability of all people to obtain and consume said food, utilization - the link between food consumed and the nutritional impact on people, and stability - the regular presence of the above three dimensions.

FOOD AVAILABILITY

The availability of food depends largely on levels of local production, international trade, and population trends. Local production of crops, especially staple crops, is key to ensuring adequate kilocalorie intake for a population. Sufficient crop production is generally a function of agriculture inputs (including land cultivated, seed, fertilizer and pesticide, irrigation) but also climate conditions. Livestock also play an integral role in food production and food security.

With over 85 percent of its land comprising hill and mountain terrain, agriculture in Nepal is highly dependent on geography; the largest share of agricultural production comes from the country’s lowland Terai region,

while its other two ecological belts, the Hills and Mountains, have less arable land and are more difficult to transport goods through, posing a challenge to ensuring the year-round availability of sufficient food.

The need to import food is also a function of the country’s population. In the 1990s population growth outpaced food production, leading Nepal to import more food from overseas. In recent years the further conversion of farmland to residential areas in certain parts of the country may have further pushed up demand for foreign food goods.

FOOD ACCESS

Access to food is generally seen through two lenses: physical and economic access. Physical

access to food refers to people’s ability to physically reach the food that is available, while economic access refers to their ability to afford that food, either through direct production or purchase or exchange.

With its hard-to-access hill and mountain areas, physical access to food in Nepal remains a challenge. However, this also means that gains in expanding transportation infrastructure in the country can have significant positive effects on food security.¹ New local governments have placed a high priority on improving and expanding road networks especially in hard-to-reach areas, presenting a unique opportunity to address physical access to food in the country.





1. Food Security: a 4-dimensional framework



Still, with over 20 percent of the population living under the national poverty line, and as households' own food production is not sufficient for their year-round needs, many Nepali have resorted to strategies like migrant labor to fill the gap. Through their remittances (which together account for a third² of GDP), food insecure Nepali households strive to mitigate regular food shortages and the negative effects of unpredictable harvests.

FOOD UTILIZATION

Food utilization refers to both the metabolism of food by the body and the way in which food

is processed and stored. Households have good food utilization when they are able to safely store and process their food, and ensure that they are ingesting the right kinds of foods to be healthy and active.

Utilization is considered hand-in-hand with health, sanitation and hygiene when looking at nutrition status. Proper nutrition, especially for infants in the critical first 1,000 days from conception, is essential to physical and cognitive development.

Nepal has had high rates of childhood malnutrition for decades, spurred by low

dietary diversity and lack of access to prenatal healthcare. Gender-based discrimination and inequalities within the household also inform differences in nutrition outcomes between men and women, boys and girls. Though rates remain high, the country has succeeded in greatly reducing malnutrition over the past 15 years—this is generally ascribed to a stronger social protection system, changes in diet and improvements in access to healthcare.

FOOD STABILITY

Stability is the temporal dimension of food security, examining how the availability of food, access and utilization of food change over time. Seasonal fluctuations in food production—type or price, for example—cause strain on people's ability to remain food secure all year round. Acute shocks, including natural hazards, conflict, disease and trade or market failure, can also precipitate intermittent food insecurity. Understanding food security requires analyzing, beyond a single snapshot in time, people's vulnerability to external changes.

This concept is important in Nepal's context, as a high incidence of seasonal fluctuations (including in food availability and prices) and shocks (including earthquakes, landslides, floods, and in the past, conflict) continue to drive food insecurity in the country. Addressing food security in Nepal therefore requires taking on the different



types of household vulnerability and the central drivers of risk in order to ensure that availability, access and utilization of food are secured for all Nepali people, at all times.



Figure 1 Dimensions of Food Security

2. Food Security Policy Architecture in Nepal



Food security policy in Nepal has evolved over the years, expanding beyond agricultural production to address the country's main challenges.

Early legislation, policies and plans laid the groundwork to address food availability and pricing issues within the country. The Nepal Food Corporation Act of 1964 established the eponymous government body, which facilitates the availability of food goods through a system of over 150 food storage depots across the country, giving the neediest people access to subsidized food when they need it most. Nepal also focused on agricultural production policies and plans, such as the Agriculture Perspective Plan, initiated in 1995. These policies envisaged expanding Nepal's commercial agricultural base, improving agricultural inputs and related infrastructure.

Nepal's recent policies, strategies and plans have become more comprehensive in their approach to addressing food security. The Agricultural Development Strategy (ADS 2015-2035) bridges the divide between creating a competitive commercial agricultural sector and improving livelihoods, access to food and nutrition in the country. The Multi Sector Nutrition Plan (MSNP 2018-2022) brings the health, education, WASH and agricultural sectors together to craft a multi-sector approach to nutrition. Together these two strategies reflect a comprehensive approach to food security.

The National Planning Commission (NPC) is charged with coordinating food security and nutrition policy nationwide. In addition to a special committee to coordinate the ADS—the national ADS Coordination Committee—the NPC has Nutrition and Food Security coordinating bodies (figure 2.1) which are in charge of overseeing the entire SDG-2 Zero Hunger agenda in the country. These bodies are in charge of monitoring progress on key policies and plans, resourcing and cross-sectorial coordination.

Nepal's transition to a Federal Republic has brought new challenges and opportunities to coordinating food security policy. Under the new constitution promulgated in 2015, 753 new local governments are mandated to provide services, public management and to represent the people. Coordinating the implementation of national policies becomes more complex with the diversity local government priorities. Federalism is an



opportunity however, as it brings government closer to the Nepali people, and compels policies to be more flexible and adapted to local need and context. Against the backdrop of federalism, coordinating food security and nutrition policy in Nepal is more important than ever.

The Local Government Operation Act (LGOA) 2017 mandates the local governments to formulate, implement, monitor, evaluate and regulate policy, legislation, standards, norms related to the development projects and programs including Food and nutrition security. It also mandates local governments to implement the projects and delivery of services related to (a) agriculture and animal husbandry, (b) basic education and public health, (c) collection and documentation of data (d) formulation of local policies, legislations, standards, planning, implementation, monitoring and evaluation of agricultural and health related activities. Therefore, this act will have several implications to food and nutritional security.

THE RIGHT TO FOOD AND FOOD SOVEREIGNTY

The Right to Food and Food Sovereignty Act, passed in 2018, declares the right of all Nepali people to be free from hunger and to be able to access sufficient nutritious food all year round. The

act also defines the right to food sovereignty, as the right of Nepali people to freely pursue the occupation of farmer or food producer, with adequate means and resources.

Following the 2015 Constitution's declaration on the basic rights of Nepali, in which particular mention is made of food sovereignty, the Right to Food and Food Sovereignty Act was drafted as a landmark piece of legislation, one of few framework laws in the world declaring food to be a basic right.

The Right to Food and Food Sovereignty Act holds the Government of Nepal accountable to ensuring its people's food security and the wellbeing of its farmers, namely by:

NPC Food Security and Nutrition Governance Structure

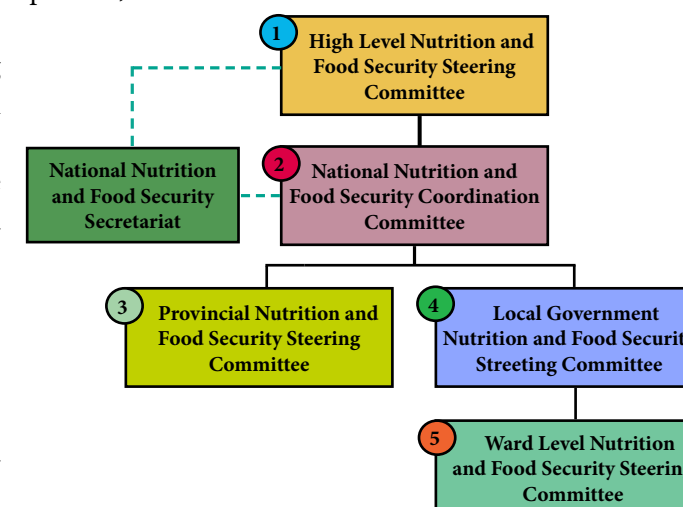


Figure 2.1
Chairpersonship: (1) Vice Chair, NPC; (2) NPC Member, Health and Nutrition; (3) Vice Chair, Provincial Planning Commission; (4) Chief of local government; (5) Ward Chair



2. Food Security Policy Architecture in Nepal

- Identifying and keeping records of food insecure individuals, households and communities
- Targeting food insecure people for subsidized food or other food assistance
- Providing emergency food assistance to people affected by disasters
- Taking steps to promote farmers' living standards
- Promoting local agricultural farming and animal products
- Ensuring the sustainable management of agricultural land
- Mitigating the effects of climate change

The Right to Food and Food Sovereignty Act, 2018

Chapter 2, Paragraph 3:

Every citizen shall have the following right relating to food and food security without infringing upon the general principles mentioned in Sub-section (1):

1. To have regular access to adequate, nutritious and quality food without any discrimination.
2. To be free from hunger.
3. To be secured from a vulnerable condition of life due to food scarcity.
4. A person or family at risk of famine, or food insecurity to acquire nutritional support and sustainable access to food.
5. To utilize culturally acceptable food.

The Act outlines mechanisms to govern these guarantees around food security, anchored in the federal structure of government. At the federal level, a National Food Council, chaired by the Minister looking after the Agriculture portfolio will oversee the elaboration of a National Food Plan, focused on the Act's fulfilment, and promotion of food security and food sovereignty. The Federal government has the responsibility to procure food and manage food stocks, and to ensure the stability of basic food prices.

A principal provision in the Act is that of providing subsidized food to food insecure Nepali people through a system of subsidized shops or public food distribution centres, drastically improving access to food amongst the poorest in the country.

Ensuring proper food and nutrition education, as well as scientific research and related technology development is also the federal government's responsibility. The National Human Rights Commission (NHRC) also carries out food security related right based work to the community. The NHRC together with other organisations runs advocacy on the rights of marginalized groups such as women, children, senior citizens and persons living with HIV/AIDS. The NHRC also conducts monitoring of right to food and health care during and aftermath of outbreak of diseases or any incidences resulting in human loss.

Very recently, the government of Nepal has proposed policy on climate change (2019)

aiming to improve food security and nutrition by adopting climate friendly agriculture systems and other adaptation measures.

At the provincial level, Provincial Food Councils play a coordinating role in ensuring the fulfilment of the Act. Responsibility for implementing yearly food security programmes based on the spirit of the Act falls to municipal governments. Through its Local Food Coordination Committees, municipalities are to design and operationalize additional interventions in line with the Act.

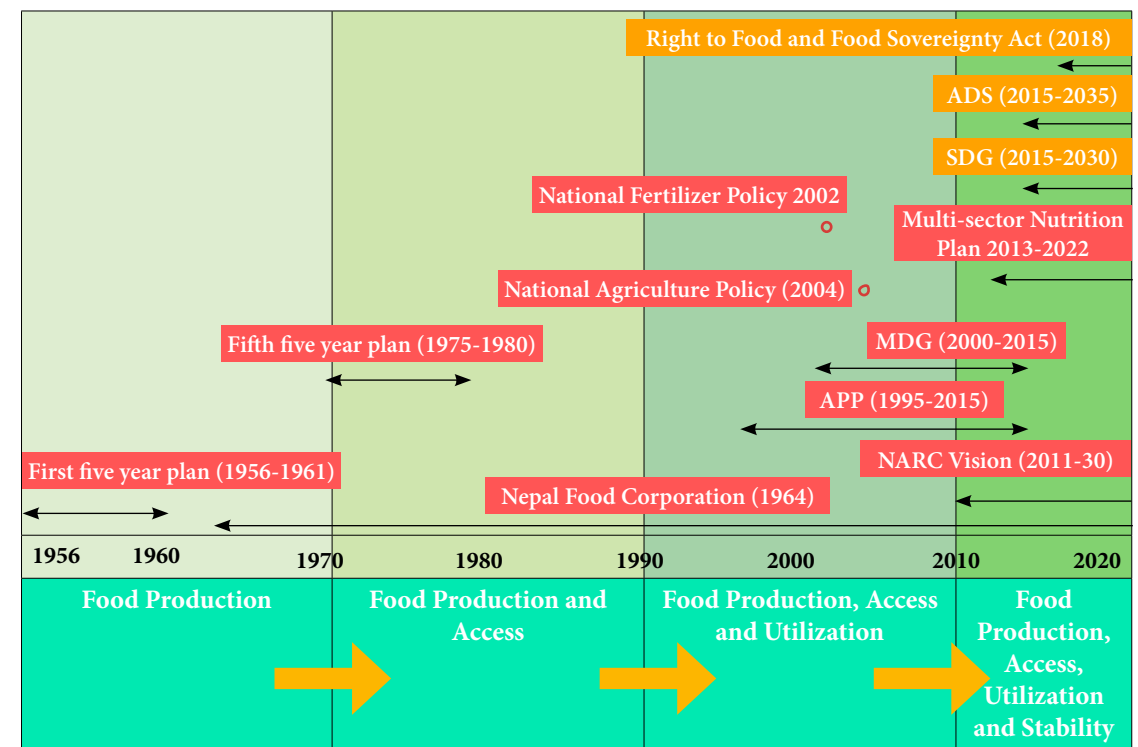


Figure 2.2 Shift in food security policies paradigm in Nepal

Note: Core policies on food security are in orange boxes and peripheral policies are in pink

3. Overview of Food Security in Nepal



Nepal has made good progress in reducing food insecurity and malnutrition for its nearly 30 million population over the last decade, showing year-on-year progress in key indicators. In 2019, the country ranked 73rd out of 117 qualifying countries on the Global Hunger Index (GHI),¹ a multidimensional approach to measuring hunger that looks at the adequacy of national food supply, child undernutrition and child mortality.

Nepal's GHI has improved over the years, going from 36.8 in 2000 to 20.8 in 2019, almost graduating from "serious" to "moderate" severity (Figure 3.1), and outpacing other SAARC countries including Bangladesh, India, Pakistan and Afghanistan.²

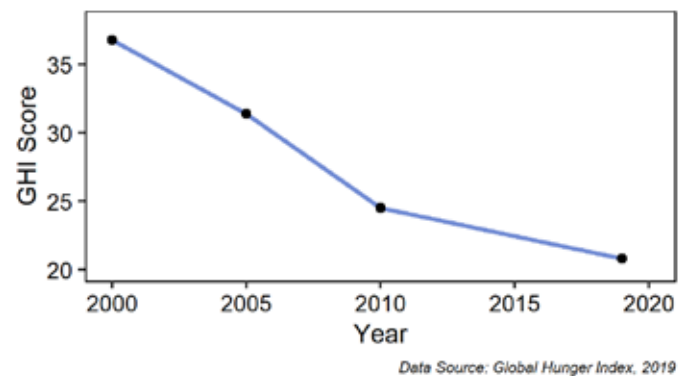


Figure 3.1 GHI Score Trend for Nepal

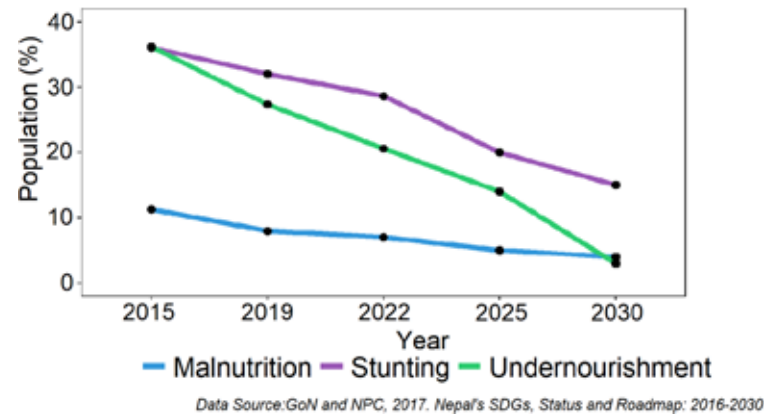


Figure 3.2 Trend for Indicator Values

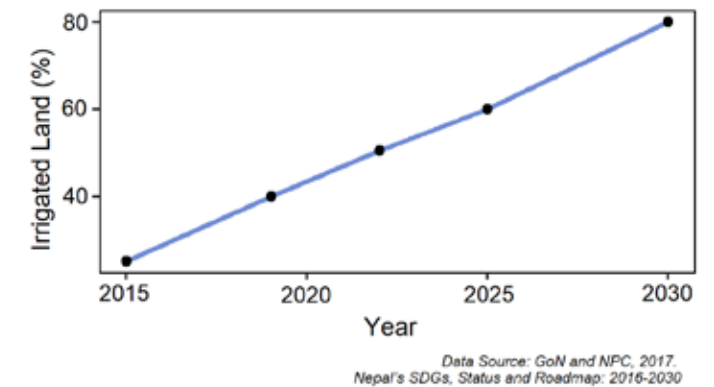
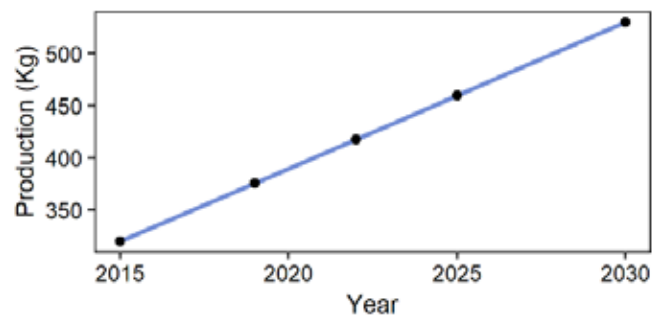


Figure 3.3 Year-round irrigated land in total arable land (%)

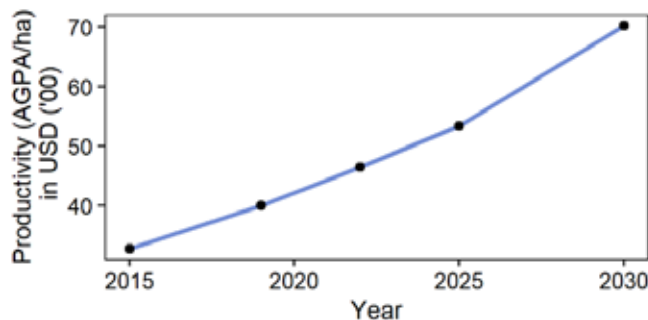


3. Overview of Food Security in Nepal



Data Source: GoN and NPC, 2017. Nepal's SDGs, Status and Roadmap: 2016-2030

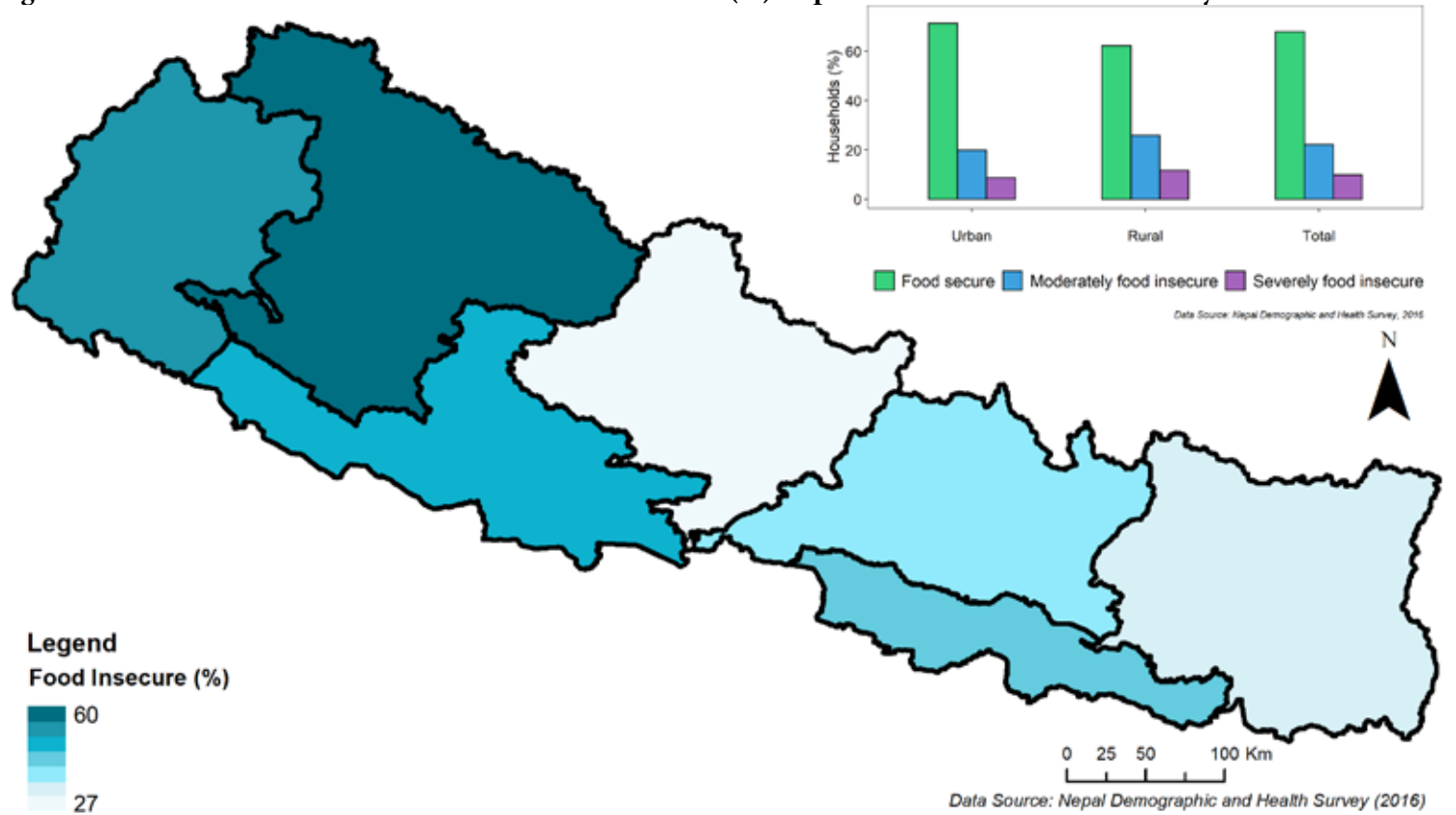
Figure 3.4 Per Capita Food Grain Production (kg)



Data Source: GoN and NPC, 2017. Nepal's SDGs, Status and Roadmap: 2016-2030

Figure 3.5 Land Productivity (AGPA/ha) USD

Figure 3.6 Province-wise Food Secure Households (%) as per Household Food Insecurity Access Scale



3. Overview of Food Security in Nepal



FOOD SECURITY IN NEPAL

Although overall agriculture production is increasing at national level, trends over the last decade show that chronic food insecurity is focused in two parts of the country: the Mid- and Far-Western Mountains, and the Central Mountain regions. Rural-urban disparities affect this geographical dispersion of hunger, as food insecure (moderately and severely food insecure) households are more likely to be in the hard-to-access mountainous regions of Provinces 3, Gandaki, Karnali and Sudurpaschim. In fact, while 29% of households in urban areas are food-insecure (according to the Household Food Insecurity Access Scale), this is true of only 38% of rural households.

Nepal's progress in food insecurity is clearly visible in figures 3.6 and 3.7, as areas of severe

chronic food insecurity have receded over time. The maps also show a clear seasonal relationship however: as the most vulnerable populations depend heavily on rain-fed agriculture, the crop cycle and weather play a central role in determining food security.

Given the importance of understanding how food security and nutrition continue to evolve in Nepal, the Ministry of Agriculture and Livestock Development (MoALD) and WFP provide regular monitoring of food security in Nepal through the Nepal Food Security Monitoring System (NeKSAP). By tracking food security and nutrition trends, identifying hotspots and relating food outcomes to climate, economic and social phenomena, Nepal can track progress toward Zero Hunger while developing an understanding of the drivers of food insecurity and malnutrition.

REACHING ZERO HUNGER

Achieving Zero Hunger, under Sustainable Development Goal 2, will mean concerted efforts towards not only ending food insecurity and malnutrition, but ensuring systemic change in their root causes. This requires a cross-sectoral approach, including ensuring sustainable food systems, resilient agriculture, adequate investments in rural infrastructure, and strengthening the stability of food commodity markets.

With significant progress achieved over the last ten years, Nepal has set its roadmap to reaching the SDGs,³ in so doing identifying areas where significant progress is needed to achieve Zero Hunger. The largest planned shifts will be a drastic reduction in the prevalence of undernourishment, from 36.1% to 3%, and in the prevalence of anemia in children under 5 from 46% to 10%. Recognizing the central role of agriculture in reducing food insecurity, the roadmap also recognizes increasing year-round irrigated land more than threefold (Figure 3.3), increasing per capita food production significantly (Figure 3.4) and close to doubling land productivity (Figure 3.5) by 2030.

Food security and nutrition are multi-sectoral, and will therefore require concerted efforts in the areas of physical infrastructure, health and sanitation, education, livelihoods, markets and others in order to achieve Zero Hunger.

Box 1 Nepal Food Security Monitoring System (NeKSAP) Food Security Phase Classification

Phase	Classification	Description
I	Minimally Food Insecure	Households with secure food and non-food needs without shifting or changing livelihood strategies. These households are capable of adjusting to small scale stresses caused by hazards, disasters, shocks, epidemics and conflicts or violence by means of existing social, natural and economic capital
II	Moderately Food Insecure (or Stressed)	Households meet minimal food needs with traditional coping strategies, but are unable to afford some essential non-food expenditures without engaging in irreversible coping strategies.
III	Highly Food Insecure (or Crisis)	Households experience food consumption gaps and high or above usual acute malnutrition, or meet minimal food needs only with accelerated depletion of livelihood assets - leading to food consumption gaps.
IV	Severely Food Insecure (or Emergency)	Households unable to meet food and non-food needs without losing livelihood assets. This induces very high acute malnutrition leading to high morbidity, mortality and shortened life expectancy. Probable high level of violence and movement restriction due to conflict. Some immediate interventions and assistance required.
V	Humanitarian Emergency (or Declared Famine)	Almost all households have an extreme lack of food and other basic needs where starvation, destitution, irreversible loss of capital resources and loss of life are evident. Households of the whole areas are challenged by acute shortage of food and other basic needs - hazards, disasters, epidemics or destruction of infrastructure, disturbances of services. Immediate humanitarian assistance required.





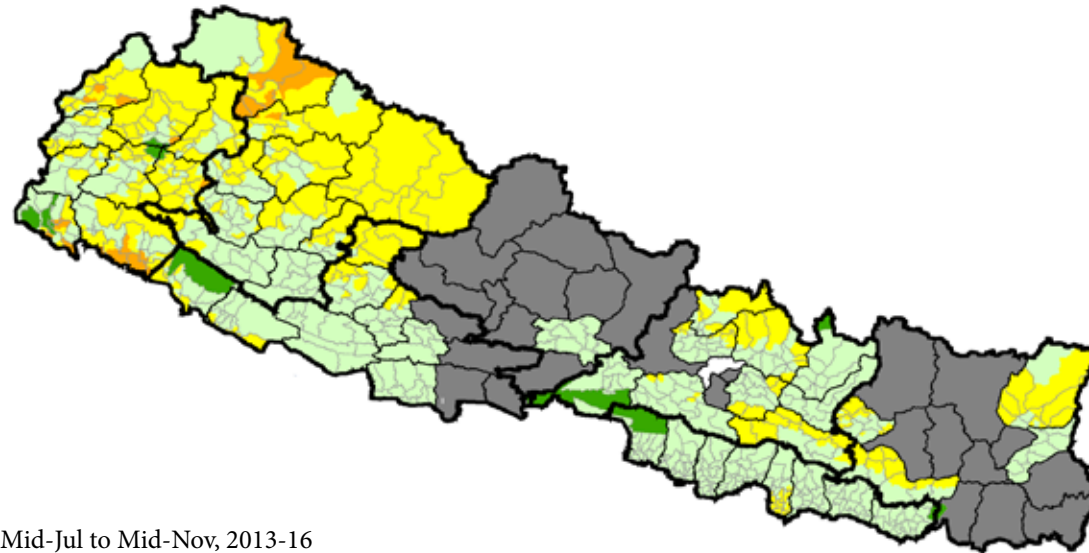
3. Overview of Food Security in Nepal

Figure 3.7

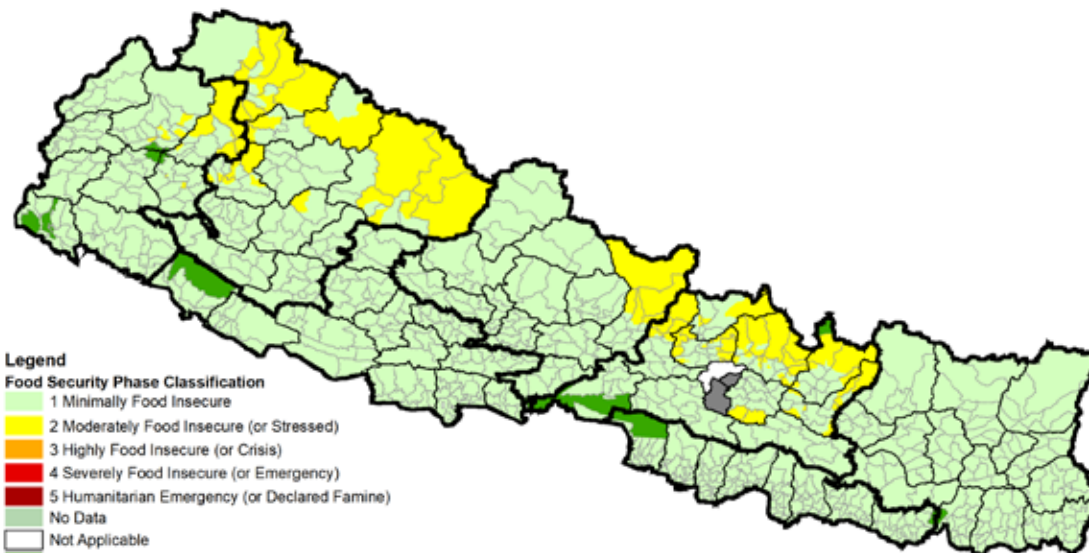
Food Security Phase Classification (Lean and harvest seasons)

Lean Season

July to September, 2008-12



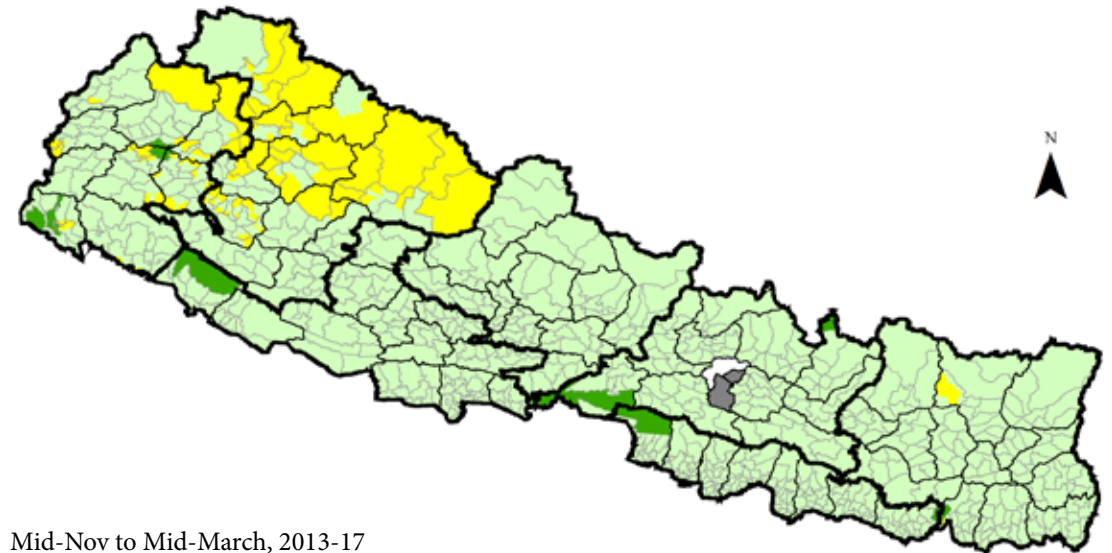
Mid-Jul to Mid-Nov, 2013-16



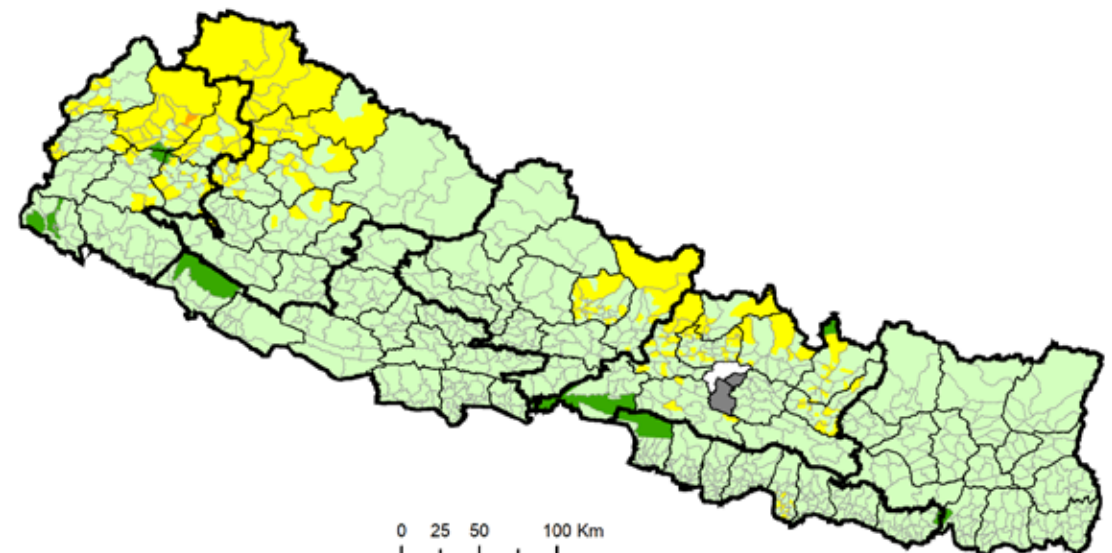
- Legend**
- Food Security Phase Classification**
- 1 Minimally Food Insecure
 - 2 Moderately Food Insecure (or Stressed)
 - 3 Highly Food Insecure (or Crisis)
 - 4 Severely Food Insecure (or Emergency)
 - 5 Humanitarian Emergency (or Declared Famine)
 - No Data
 - Not Applicable
 - Protected Areas/No Populated Area
 - Not assessed districts
- Administrative Boundaries**
- Province
 - District
 - Municipality

Harvest Season

October to December, 2008-12



Mid-Nov to Mid-March, 2013-17



0 25 50 100 Km

Data Source: Nepal Food Security Monitoring System/Nepal Khadya Surakshya Anugaman Pranali (NeKSAP), Ministry of Agricultural Development, Government of Nepal and World Food Programme, 2008-2017

4. Nepal's People



Nepal's history dates back to the time of the *Gopals* and *Mahishapalas* who were conquered by the *Kirantis* in the 7th or 8th Century BC. From early on, the region that would become Nepal was a confluence of migrating peoples, especially Tibeto-Burmans and those of Indo-Aryan origin. Early migration brought rich cultural, ethnic, religious and linguistic diversity which continues to this day. This diversity is further influenced by a heterogeneous topography and climate spanning from the northern Himalayan Mountains, down the country's hill region through to its Terai flatlands.

Nepal's demographic and cultural makeup

greatly informs how food is produced, accessed and used. Social norms inform the production of food, its preparation, and also often still drive inequalities in food security, economic opportunity as well as the distribution of food-related resources within a household.

DEMOGRAPHY

Nepal, a country of 29.6 million people, has a very young population: the average age is just 21 years. The population growth rate is declining over the years (2.25%, 1.35% and 1.32% in 2001, 2011 and 2016 respectively).¹ Nepal's population density varies according

to geographic location. Urbanization is increasing throughout the country, as populations continue to move from the mountainous northern regions to the more populous Terai cities and Kathmandu. The average Nepalese household has just under 5 members, and is larger in rural areas (5.08) and smaller in urban areas (4.85).²

ETHNICITY

Nepal is a centre of ethnic and linguistic diversity. It is a multi-ethnic, multi-cultural, multilingual country with more than one hundred ethnic groups and languages. The caste system still holds strong sway in some parts of the country. Caste belonging often influences access to and control over resources and opportunities, which in turn affect food security and nutrition. Brahmin and Chhetri together are the largest group overall, though castes and ethnic groups are often clustered across different Provinces. These communities have diverse food-related practices resulting in diverse crop cultivation, use of food items in cultural events and food consumption practices.

EDUCATION

Nepal has made remarkable gains in literacy and educational attainment over the years. Nevertheless, disparities still exist across

gender, rural-urban, and districts. Overall literacy rates have been on the rise. Men are more likely than women to have some secondary or higher education (71% and 50%, respectively). Onethird of women and 10% of men have no education. Eighty-nine percent of men are literate, as compared with 69% of women.³ While female literacy rates have greatly increased, they still lag years behind the national rate. Rural literacy has a similar gap, with urban literacy rates outpacing rural rates by some 20% points.⁴ Primary school enrollment in Nepal is high (above 96%) while the average dropout rate is relatively low at 4% in 2015/2016.

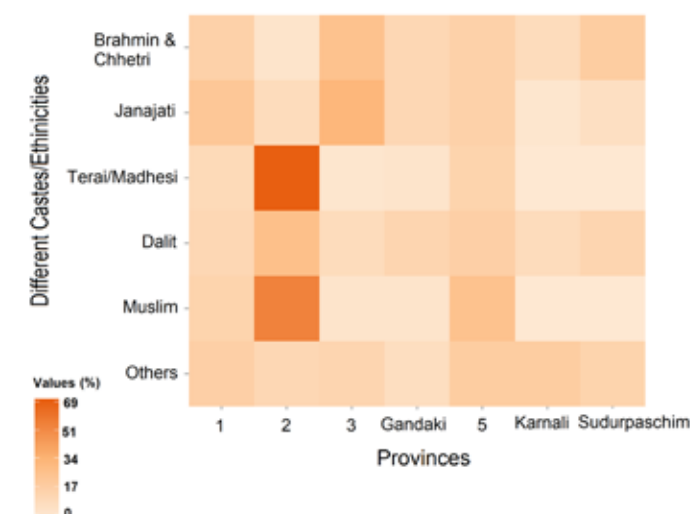


Figure 4.1 Heat map of Major caste and ethnicity of Nepal by province, 2011 (as a proportion of each caste's total population)



4. Nepal's People

Figure 4.2 Projected Population Density, 2020

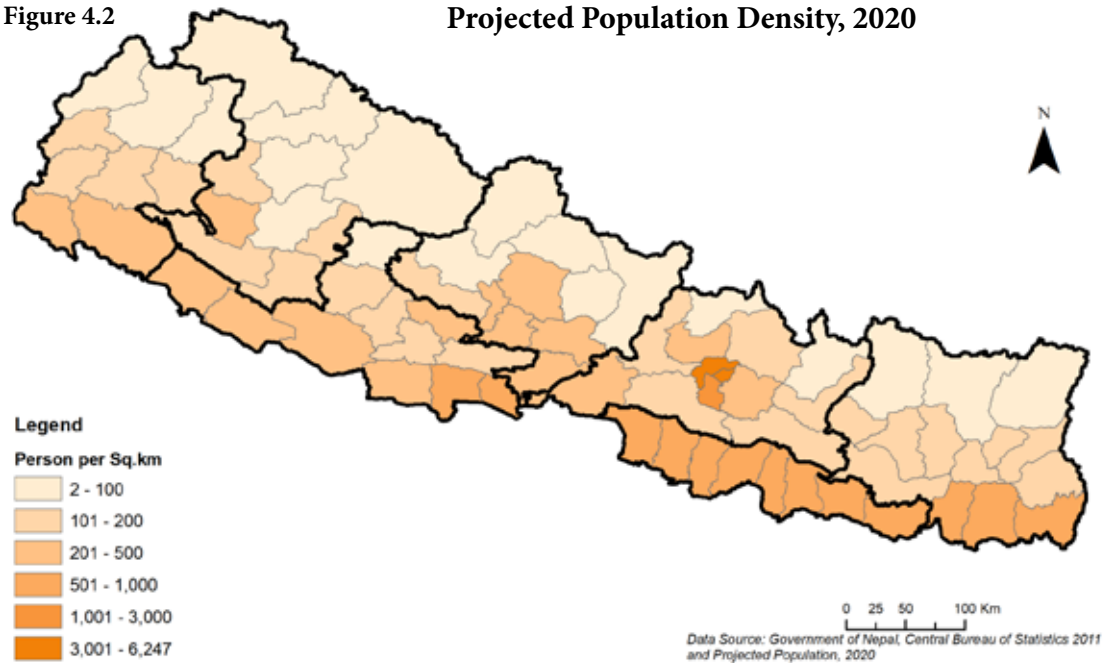


Figure 4.4 Female Headed Households

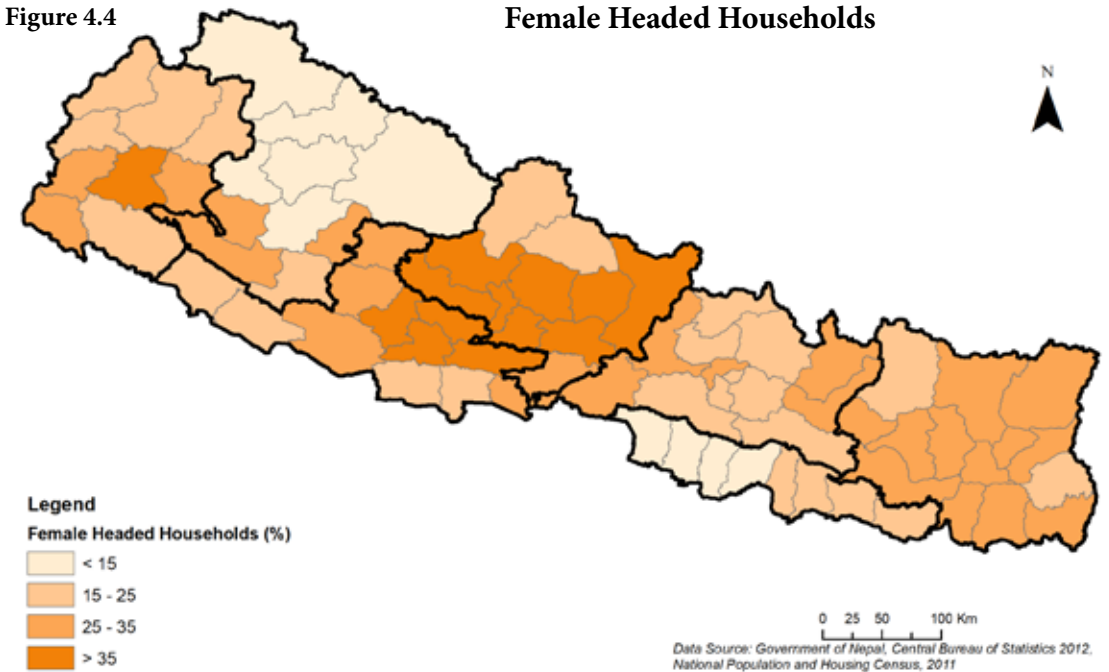


Figure 4.3 Economically Active Population

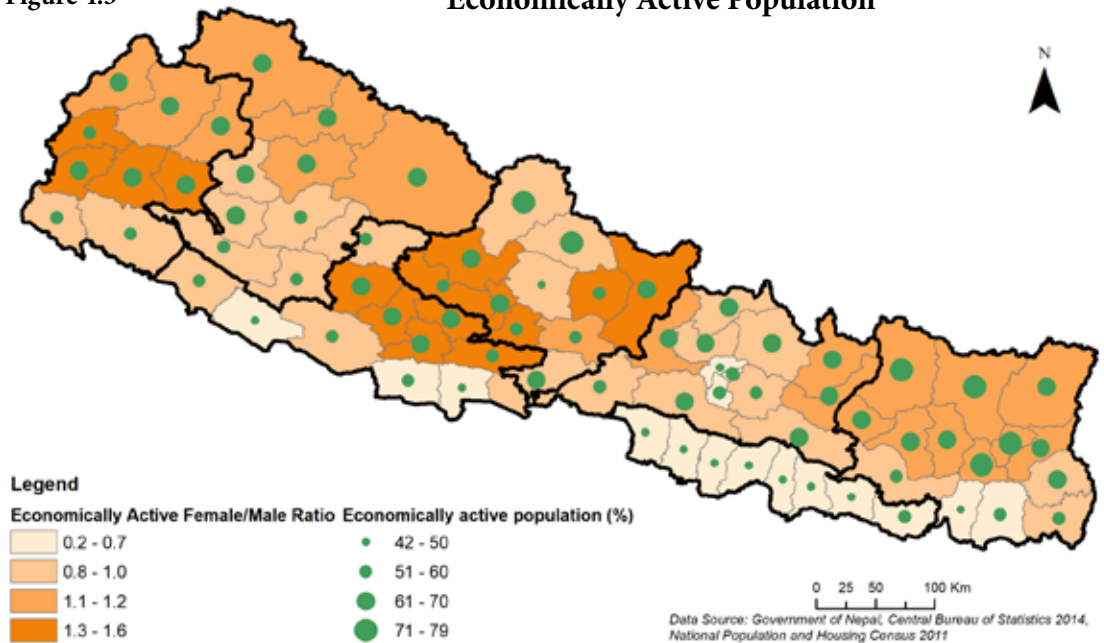
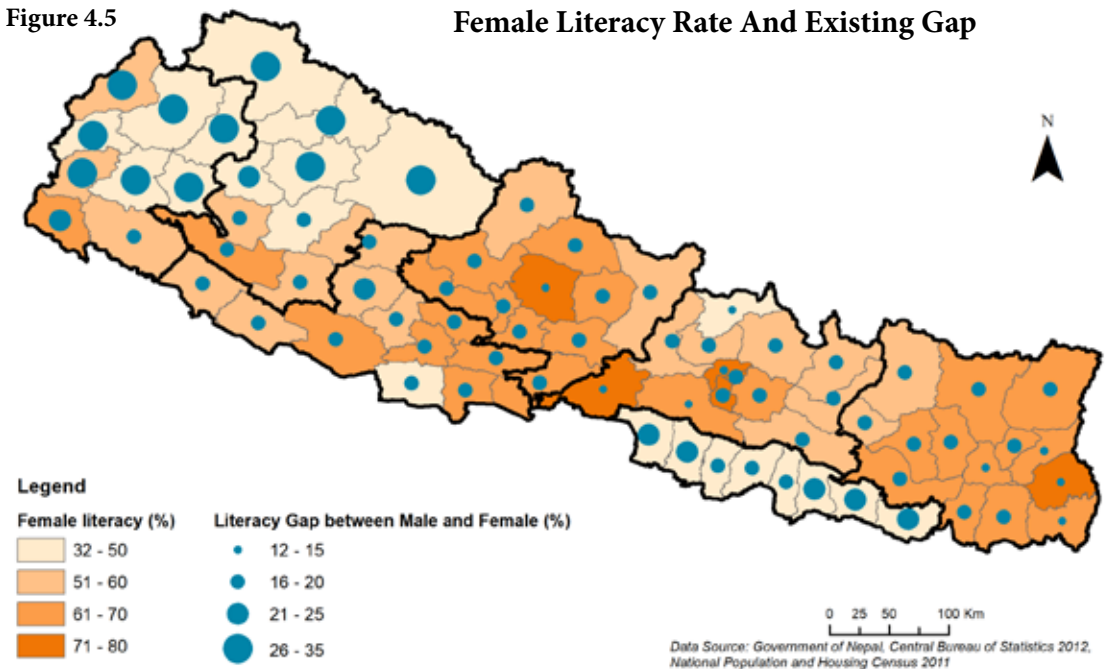


Figure 4.5 Female Literacy Rate And Existing Gap



4. Nepal's People



DISABILITY

Differently-abled people, who may have physical or mental disabilities, often have limited employment opportunities and significant healthcare-related expenses, rendering them more vulnerable. In Nepal the overall prevalence of disability as of the 2011 Census was 2%. Disability among rural residents is more prevalent (2.1%) than among their urban counterparts (1.2%), and the Mountain region has notably higher incidence of disability (3%) than the Hill (2.2%) or Terai (1.6%) regions.

EMPLOYMENT

About a half million young people enter Nepal's labor market every year. The unemployment rate is 11.4% (male 10.3%, female 13.1%).⁵ About two thirds of the total population in Nepal is involved in agriculture. The labor force survey 2017/18 reveals that one in every five employed persons in Nepal are involved in agriculture, which is the largest working industry. The trade industry comes next with 17.5%, followed by construction with 13.8%. However, the biggest employment sector is the informal sector with 62.2%. About one-fourth of all employed people (23.8%) were involved in sales and services, followed by elementary



works with around 20%.⁶ Some 4.3 million youth have sought employment abroad through formal and informal channels,⁷ sending remittances back into the country.

GENDER

Gender inequality is one of the drivers of food insecurity, as the consistent social and economic marginalization of women and girls results in lower access to food and less autonomy to make the right choices regarding feeding and caregiving practices. Women in Nepal have on average less access to education and employment opportunities, and less control over productive resources than do men. In addition, women's ownership of key resources like land and housing, and their decision-making power within the

household has traditionally been limited.³ Though officially outlawed and punishable by fines and imprisonment, practices such as *chhaupadi*, the physical isolation of women and girls during menstruation, persist in parts of the country. These practices also deny women and girls a nutritious diet during this period, exacerbating nutrition-related health issues.

There has been some gradual progress made in evening out this gender imbalance. The gender gaps in education, health and in political representation have improved over time. Women's ownership of fixed assets increased to about 20% from 10.8% in 2001. These advances have signaled a lowering of gender inequalities, although stark regional disparities still exist.

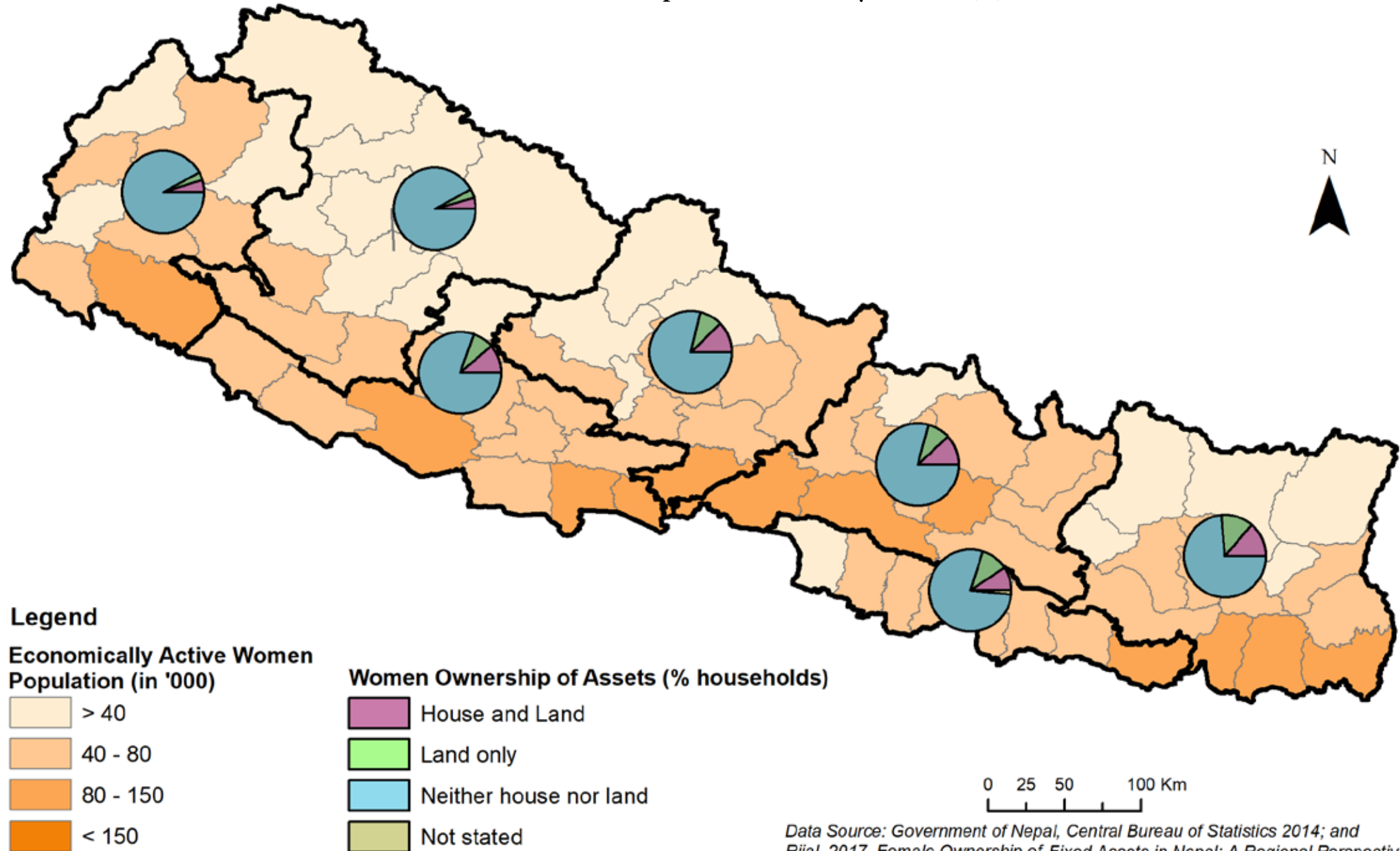




4. Nepal's People

Figure 4.6

Female Ownership Of Fixed Assets By Province (%)



5. Agriculture in Nepal



Two-thirds of the population of Nepal is engaged in agriculture, contributing to 26% of national GDP. Due to its flat lands, rivers and fertile soil, most of the country's agriculture takes place in the Terai area, though each of Nepal's ecological belts has its more favored crops and crop calendars.

While Nepal's overall demand for food increases over time, unregulated urbanization of plains and fertile land, particularly in the Terai, has put downward pressure on the food supply in the country. Nepal is importing

more agricultural goods than ever (food imports have increased fourfold from 2011 to 2018¹), and this makes domestic agriculture crucial to the country's food security.

LAND RESOURCES

About 43% of Nepal is covered in forest and 24% (3.56 million ha) is agricultural land,² but over half of all farmers cultivate on less than a hectare of land.³ The land distribution per person however is varied across Districts and also depends on the ecological region (Figure 5.18).

1. AGRICULTURAL PRODUCTION

A. CEREAL PRODUCTION AND PRODUCTIVITY

Rice, wheat and maize are vital cereal crops for food security in Nepal, with annual paddy production of 4.3 million tons (MT) (Figure 5.2), 2.2 MT of maize and 1.7 MT of wheat in 2015/16. The productivity of rice, wheat and maize stays about 2.9, 2.05, and 2.00 t/ha respectively. Wheat and Rice are predominantly grown in the Valley, Tar, Terai, and irrigated land in the Mountains

(Figure 5.3 and Figure 5.4), while maize is dominantly grown in the middle hills of the country (Figure 5.5). Millet (Figure 5.6), buckwheat (Figure 5.8), barley (Figure 5.9) and other crops are often grown in the hills and mountains.

Despite efforts to increase access to irrigation and fertilizer, Nepal has not been able to meet the demand for rice grain in the country: it had a predicted deficit of 750,000 tons of only rice in 2019, a trend that is projected to continue through 2030. Negligible exports and rapidly growing imports have driven a trade deficit in agricultural goods which has worsened since 2011.

Figure 5.1 Food Self Sufficiency Status (2015/16)

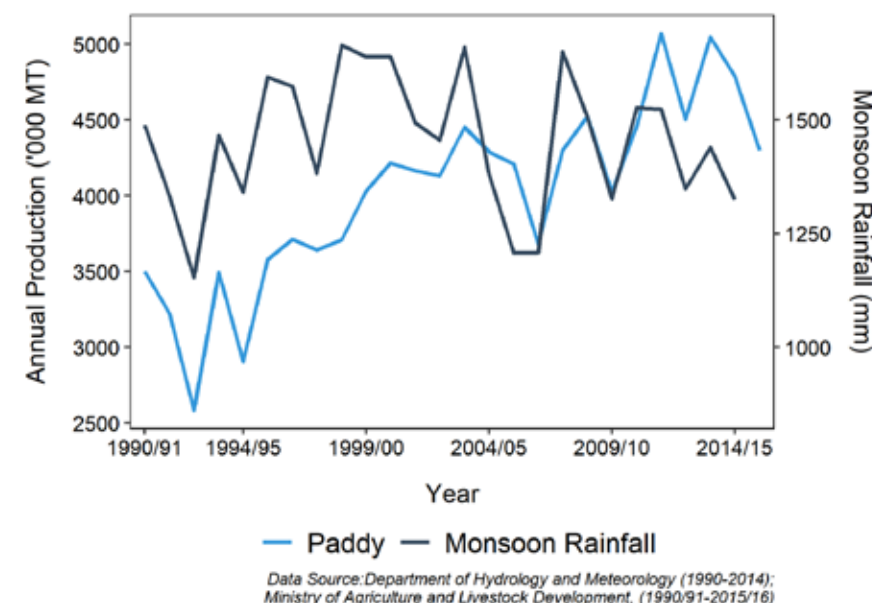
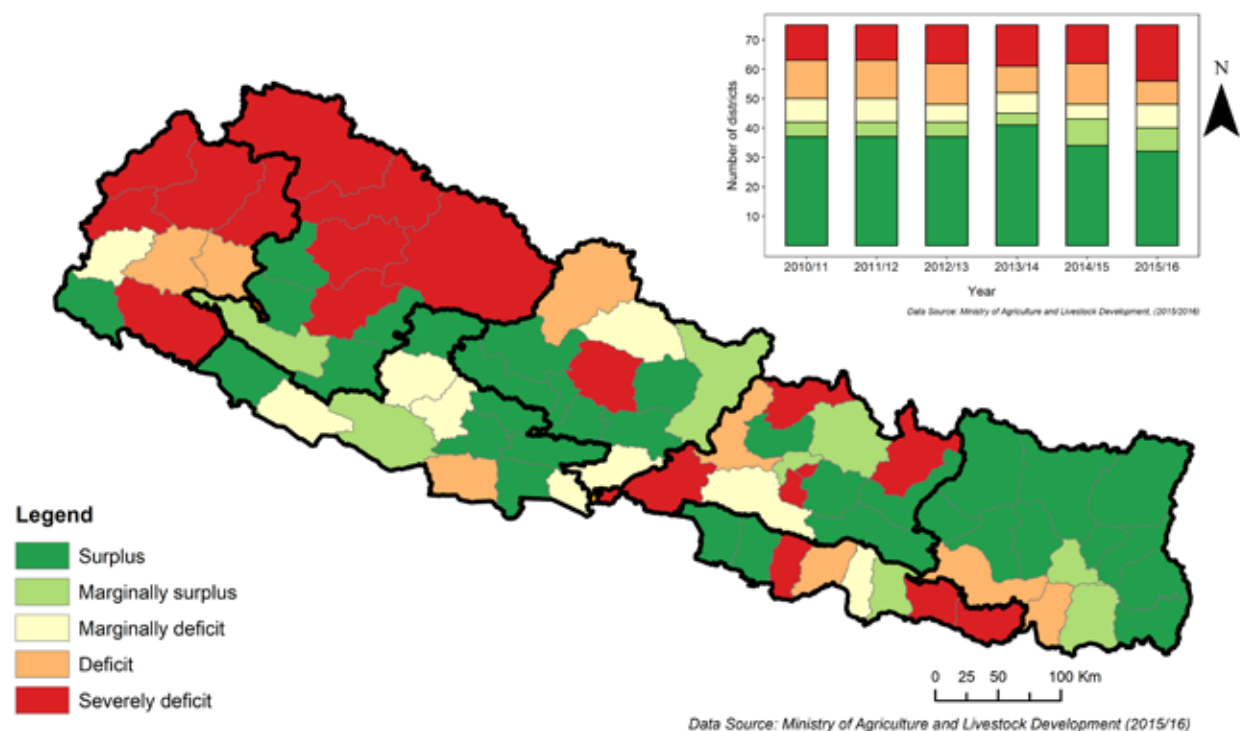


Figure 5.2 Annual Paddy Production and monsoon precipitation (June – Sept)



5. Agriculture in Nepal

Figure 5.3 Total Wheat Production and Yield (2016/17)

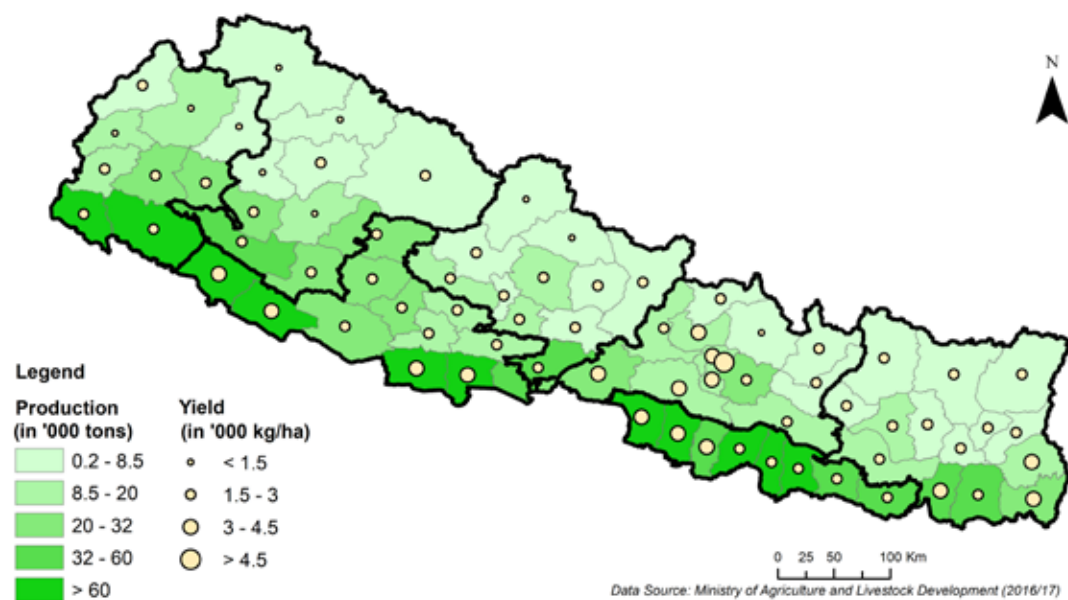


Figure 5.5 Total Maize Production and Yield (2016/17)

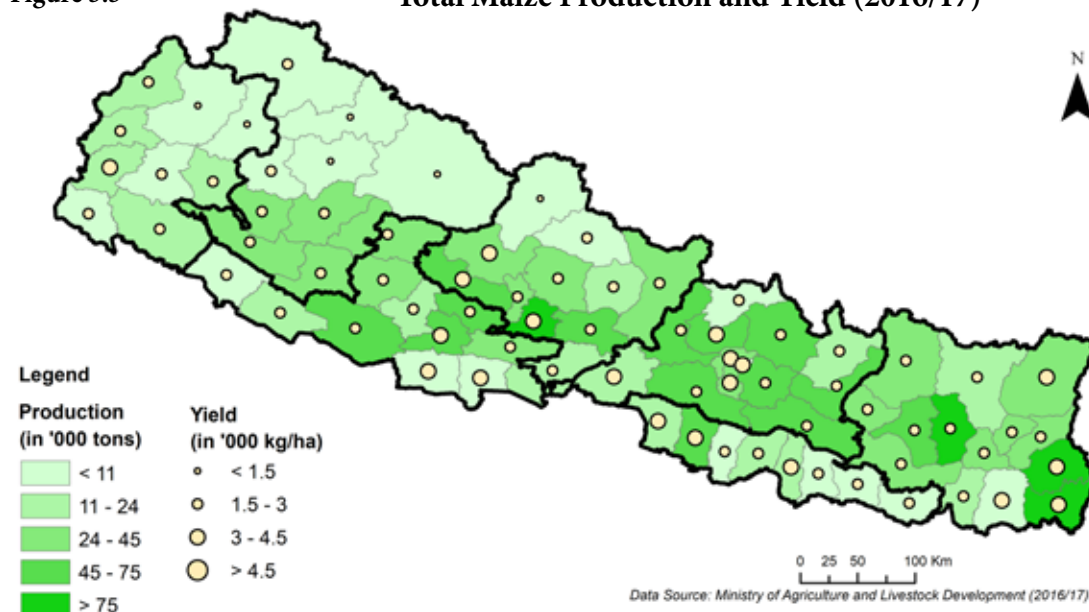


Figure 5.4 Total Paddy Production and Yield (2016/17)

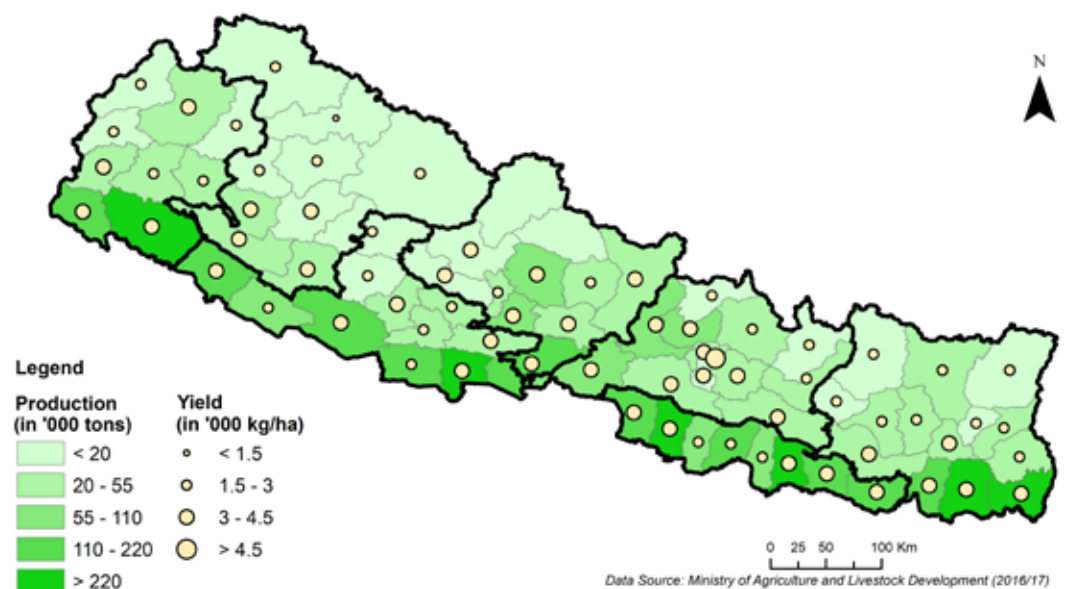
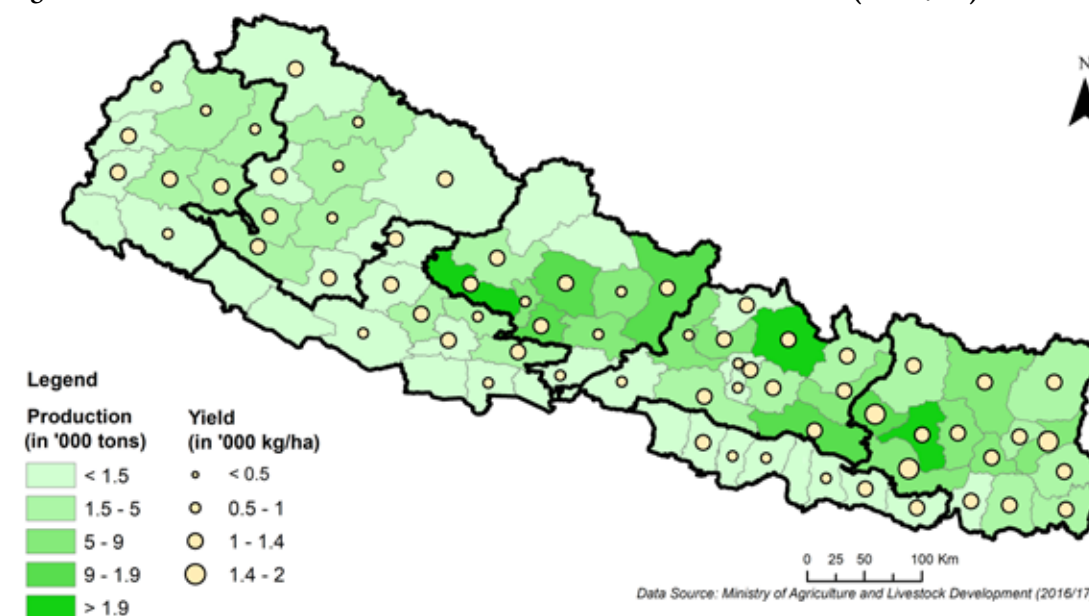


Figure 5.6 Total Millet Production and Yield (2016/17)



5. Agriculture in Nepal



B. FRUITS, VEGETABLES AND SPICES

The climate in Nepal, ranging from tropical to temperate, favors the growing of diverse fruits (Figure 5.10). Depending upon the season, the ripening of fruit varies in Nepal. Summer fruits such as mango, lychee, watermelon, guava, peach, pear, and pineapple become ripe typically during summer season. Likewise, winter fruits such as apple, tangerine, grapefruit, mandarin, and (sweet) orange ripen mostly during winter season.

The production and consumption of vegetables in Nepal has risen over the last few decades: the average person consumes 105

kg of vegetables in a year, up from 60 kg two decades ago.⁴

Cardamom, chilli powder, *akabare* chilly, ginger, garlic and turmeric are some of the more popular herbs and spices cultivated, processed and sold by micro entrepreneurs in Nepal. Some common pulses grown in Nepal are cowpeas, grasspeas, lentils, chickpeas, pigeonpeas, soybeans and black gram.

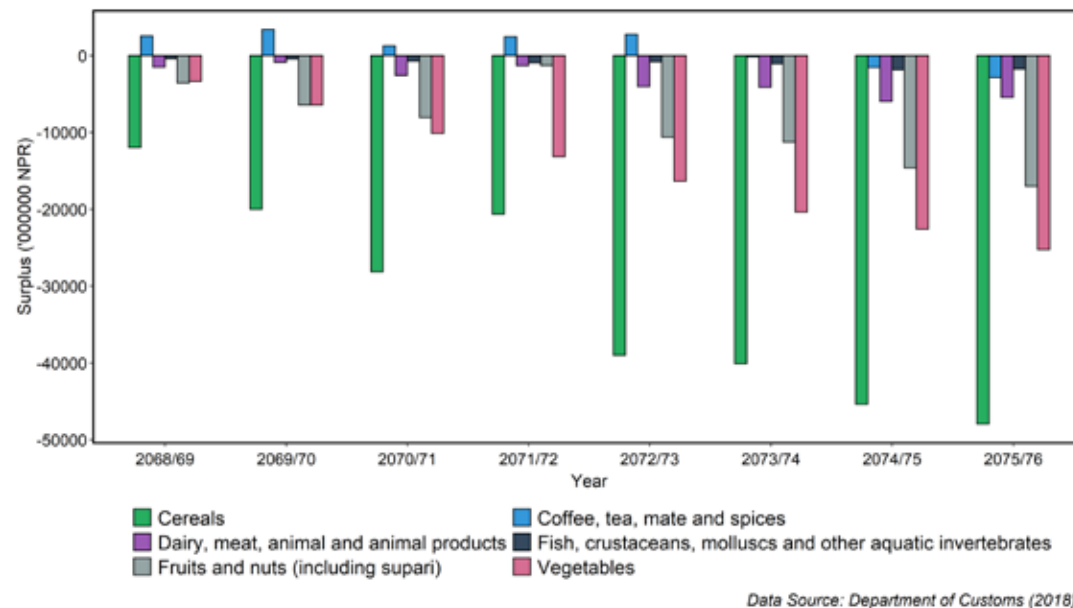


Figure 5.7 Export- import of selected commodities in Nepal in the last eight years



5. Agriculture in Nepal

Figure 5.8 Total Buckwheat Production and Yield (2016/17)

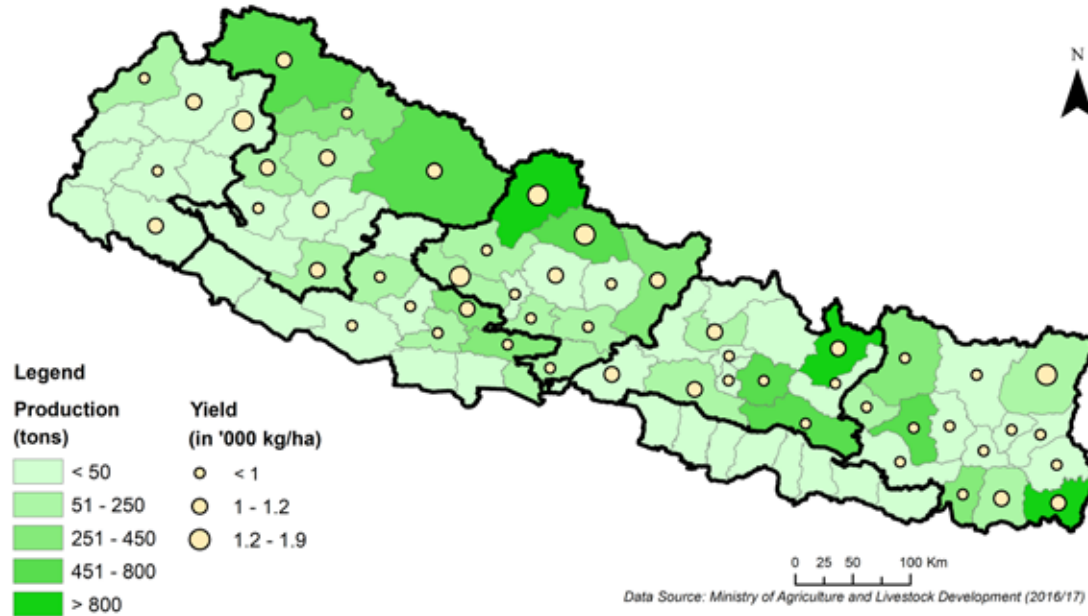


Figure 5.10 Different Fruit Production and Yield (2016/17)

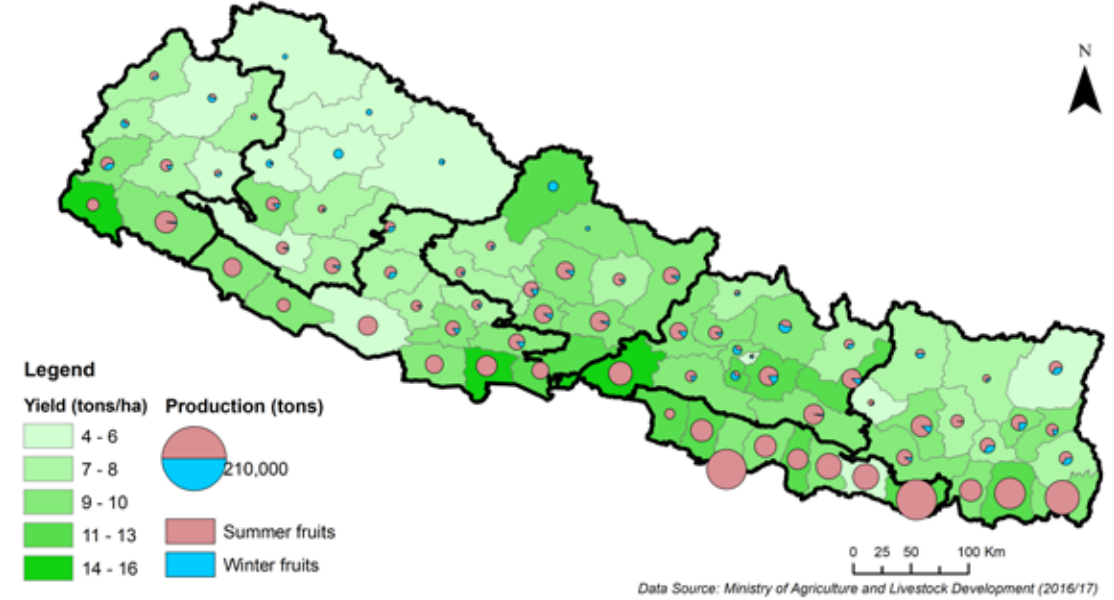


Figure 5.9 Total Barley Production and Yield (2016/17)

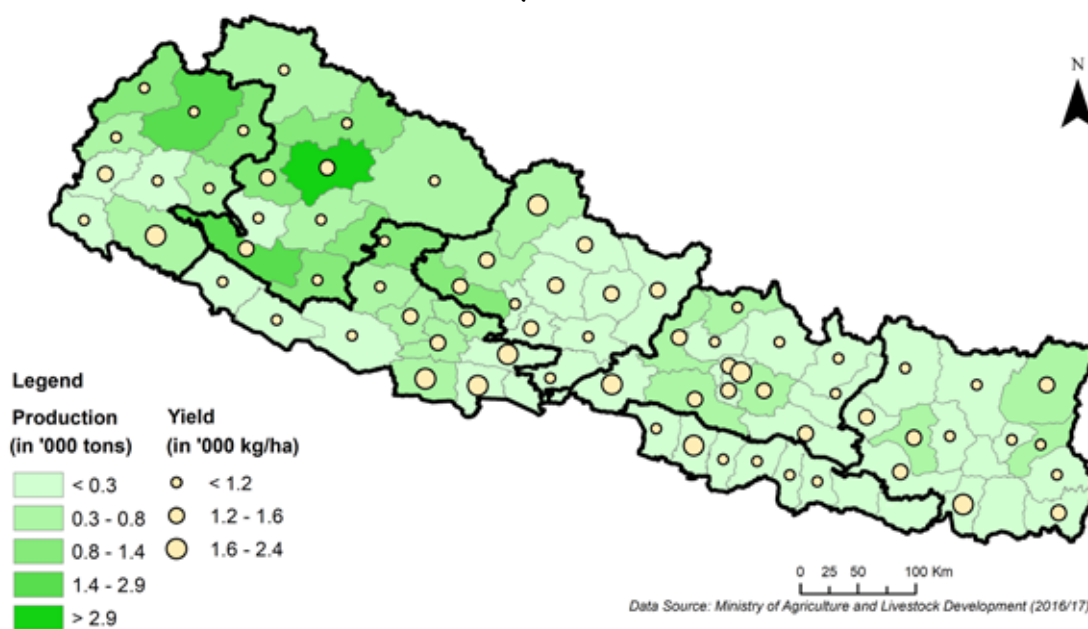
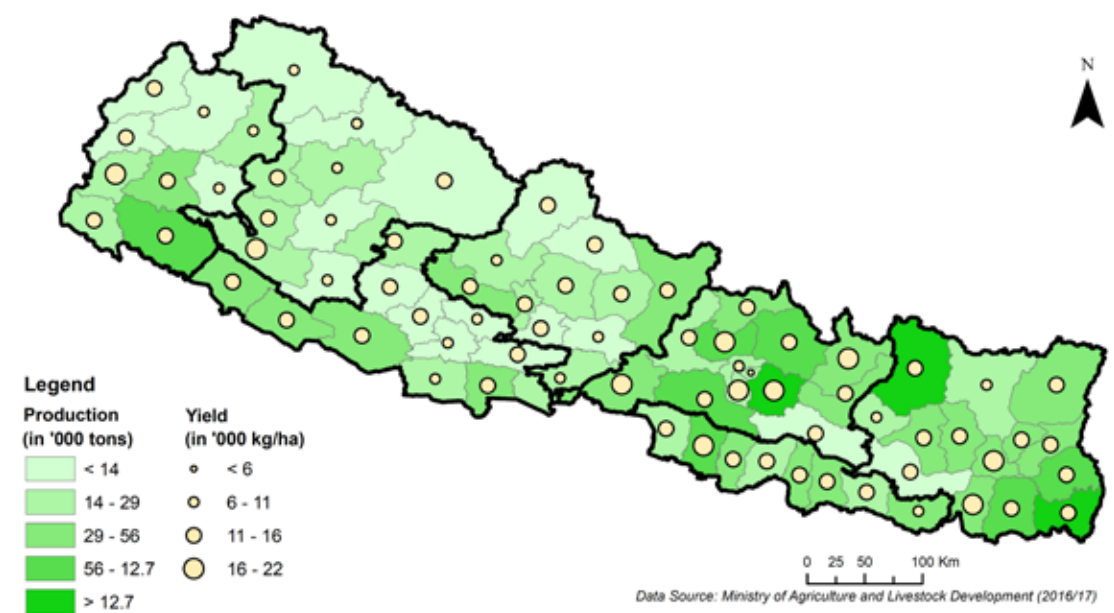


Figure 5.11 Total Potato Production and Yield (2016/17)



5. Agriculture in Nepal



C. NEGLECTED AND UNDERUTILIZED CROPS

Neglected and Underutilized Food Crops (NUFCs) have high nutritional value and can help in improving food security, especially in the mountain regions. Their role is curtailed however by a lack of focus on them in existing policies and programs. Low consumption of micronutrient-rich NUFCs is attributed to



Amaranthus spp

food habits, lack of knowledge about their nutritional value and shifting food habits. Some of the nutrient-rich underutilized crops are millet, amaranthus, naked barley, black gram, yam, and sesame.^{5,6}

2. LIVESTOCK, FISHERIES AND POULTRIES PRODUCTION

Livestock is an integral part of Nepalese farming systems. Livestock and Poultry provide meat, dairy products, eggs, wool and are the main source of natural fertilizer for crop production. At 11 and 6 million goats and cows total, there is about one goat and cow for every 3 and 5 people (Figure 5.12).

Fisheries have been increasing in recent years particularly in the Terai region and close to urban areas (Figure 5.17). There are about 48 million fowl in Nepal, of which 28.3% are laying hens, which together produce 887.24 million table eggs annually.

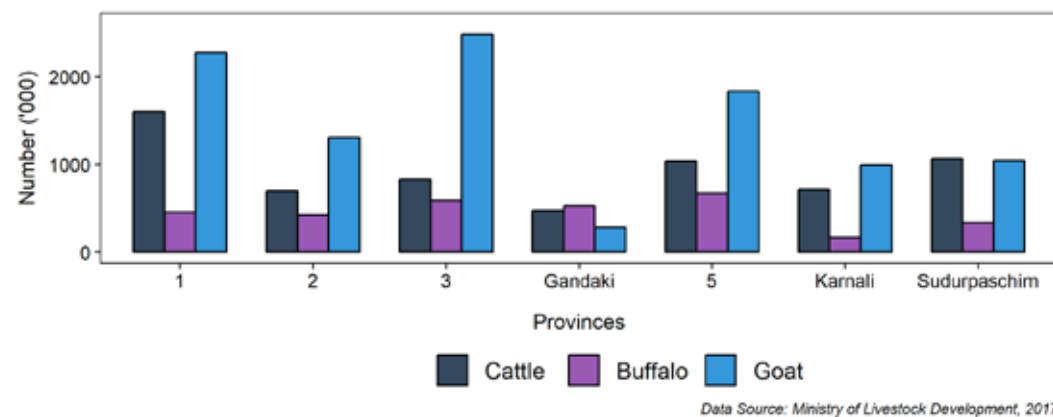


Figure 5.12 Numbers of Cattles, Buffaloes and Goats by Province in Nepal, 2017



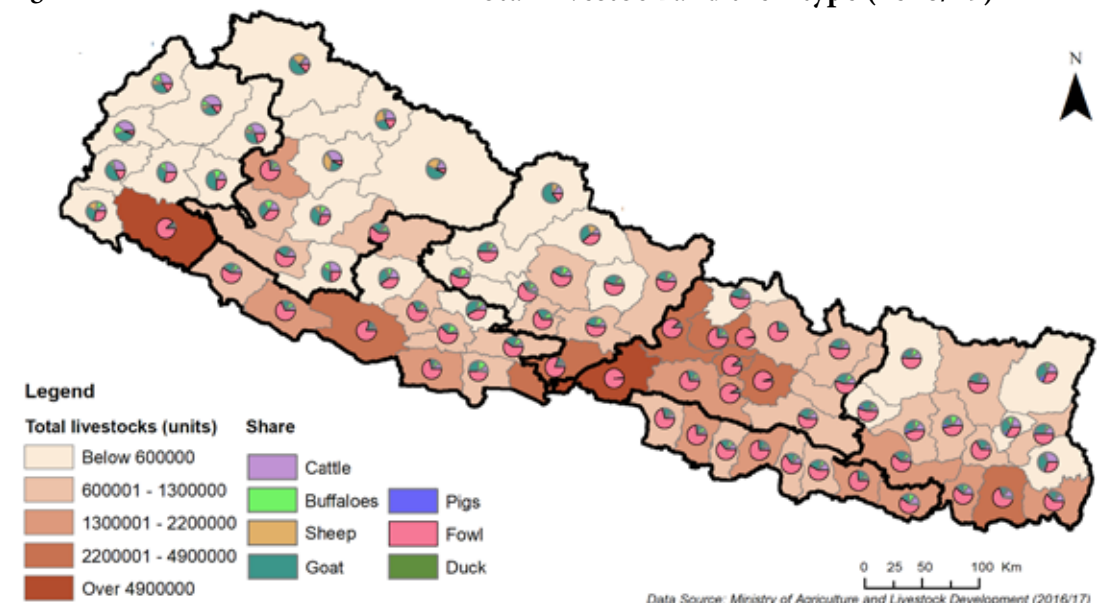
Foxtail millets



Yam

Figure 5.13

Total Livestock and their type (2016/17)





5. Agriculture in Nepal

Figure 5.14 Total Pulses Production and Yield (2016/17)

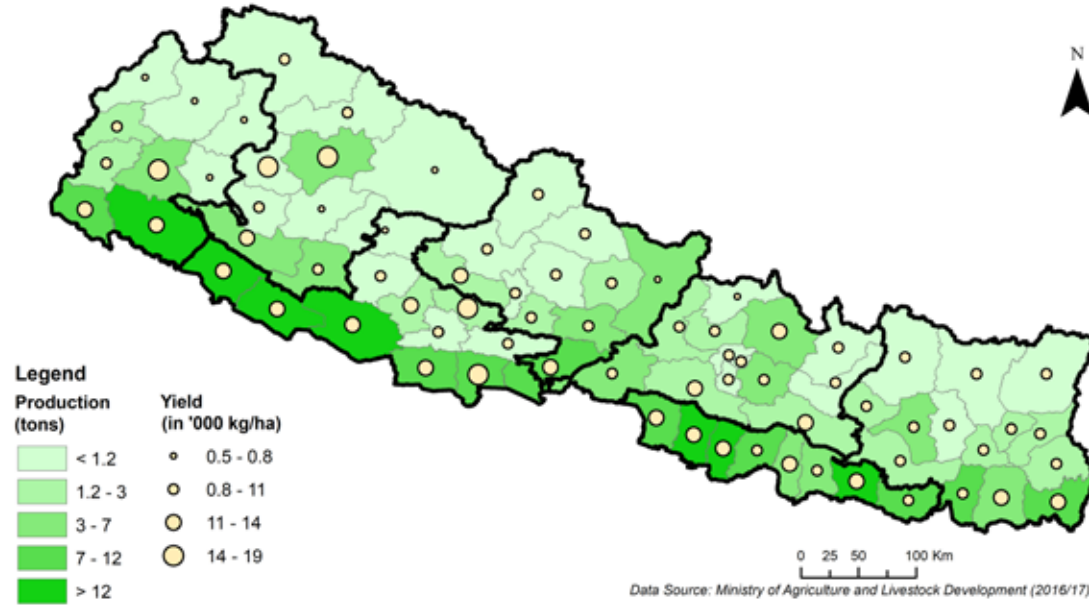


Figure 5.16 Total Spices Production and their Type (2016/17)

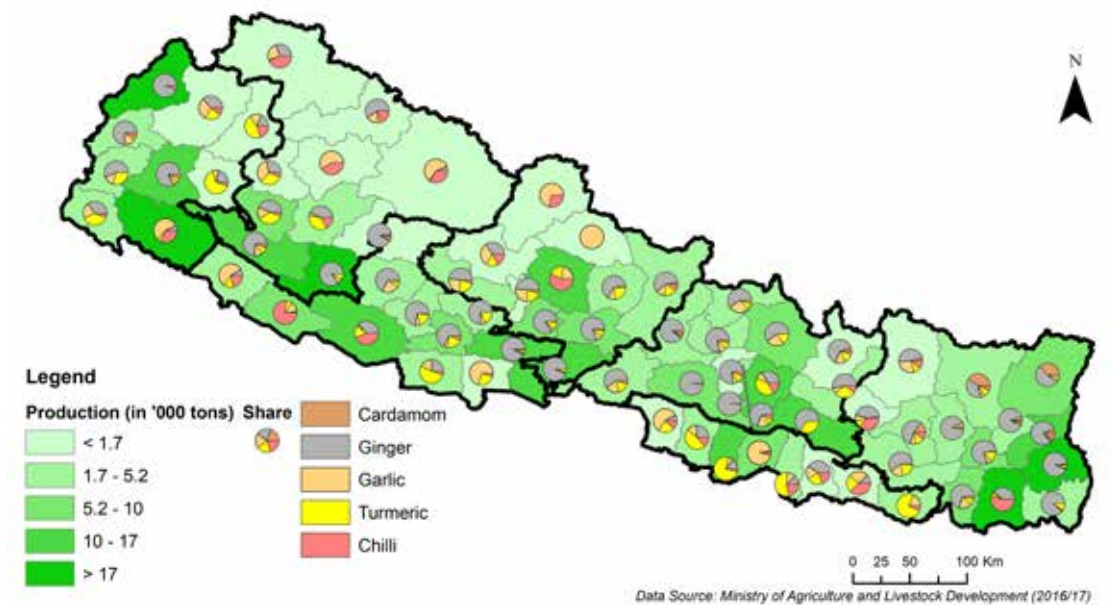


Figure 5.15 Total Vegetables Production and Yield (2016/17)

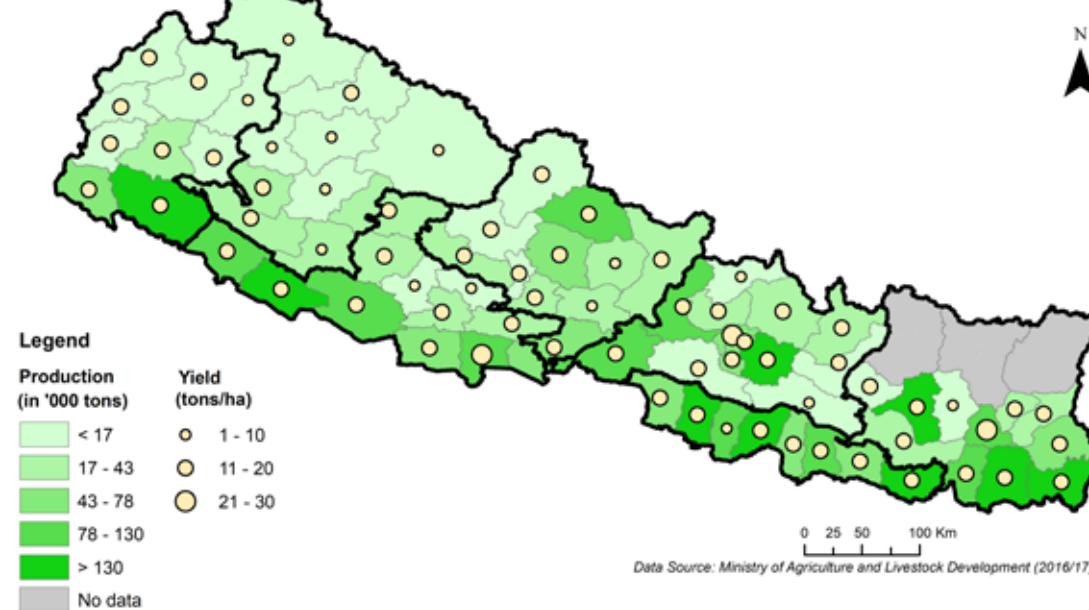
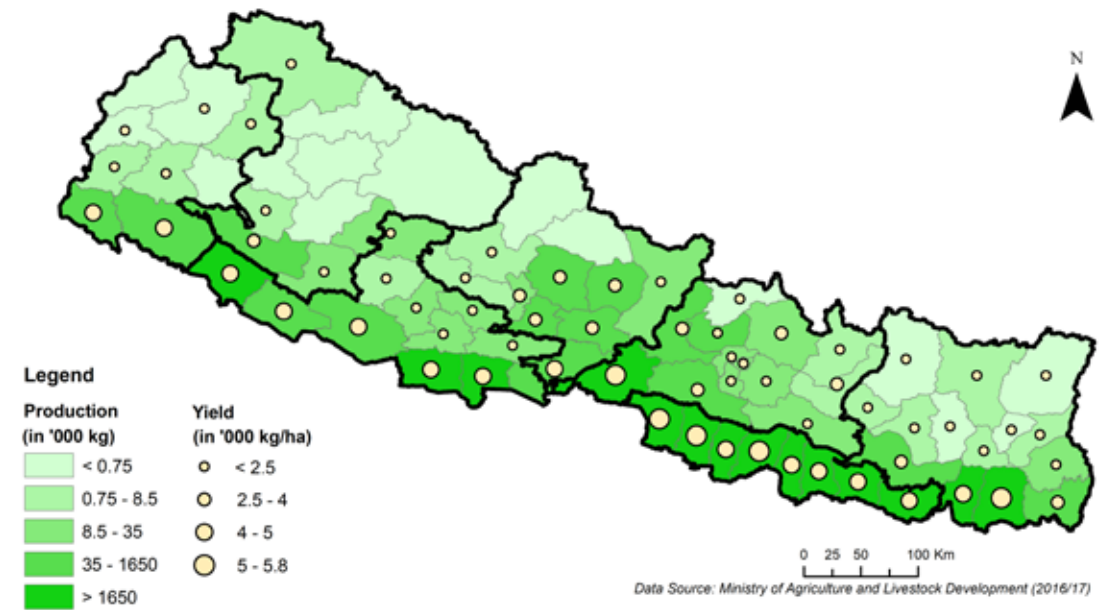


Figure 5.17 Total Fisheries Production and Yield (2016/17)

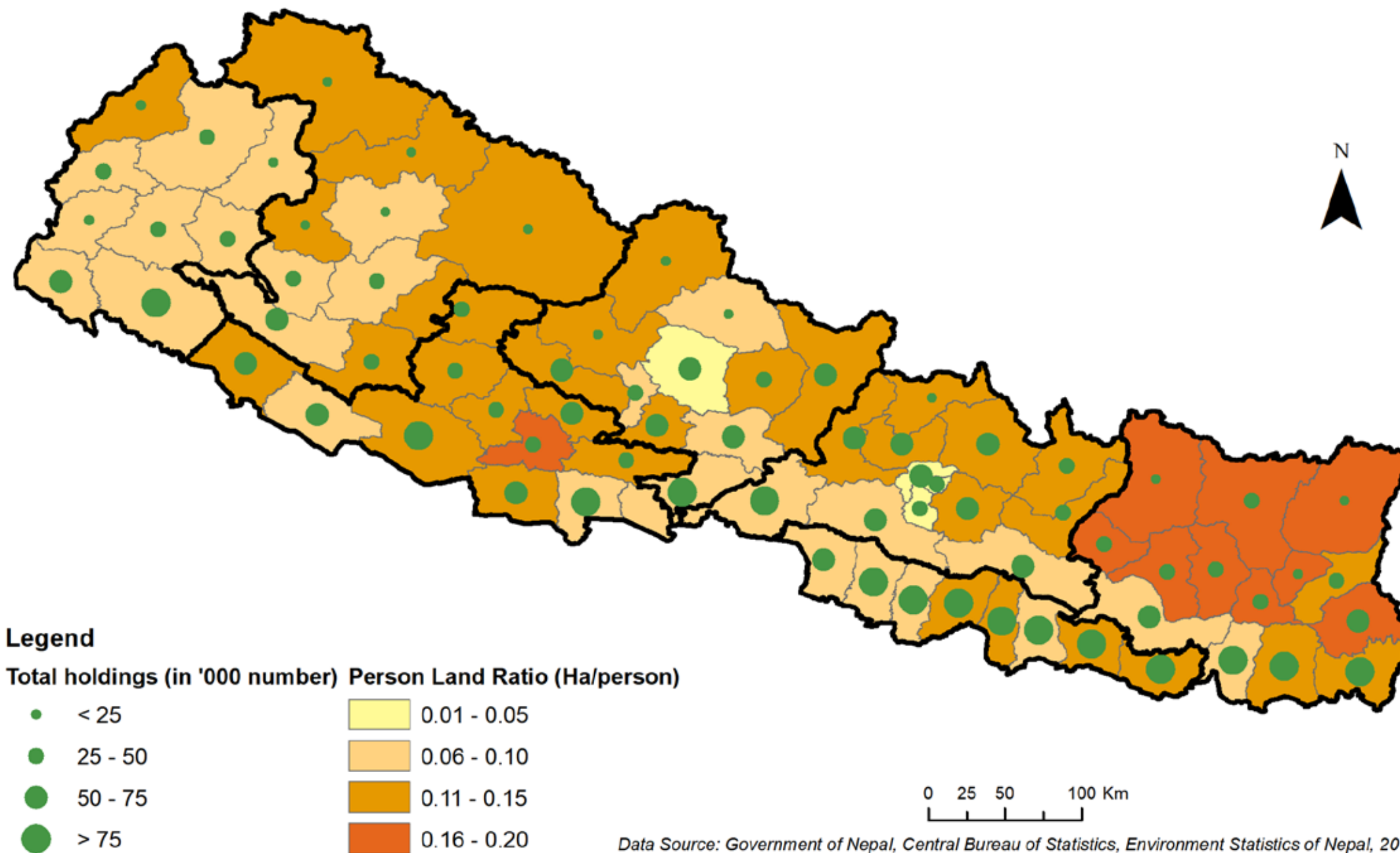


5. Agriculture in Nepal



Figure 5.18

Total Holdings and Agriculture Land Availability

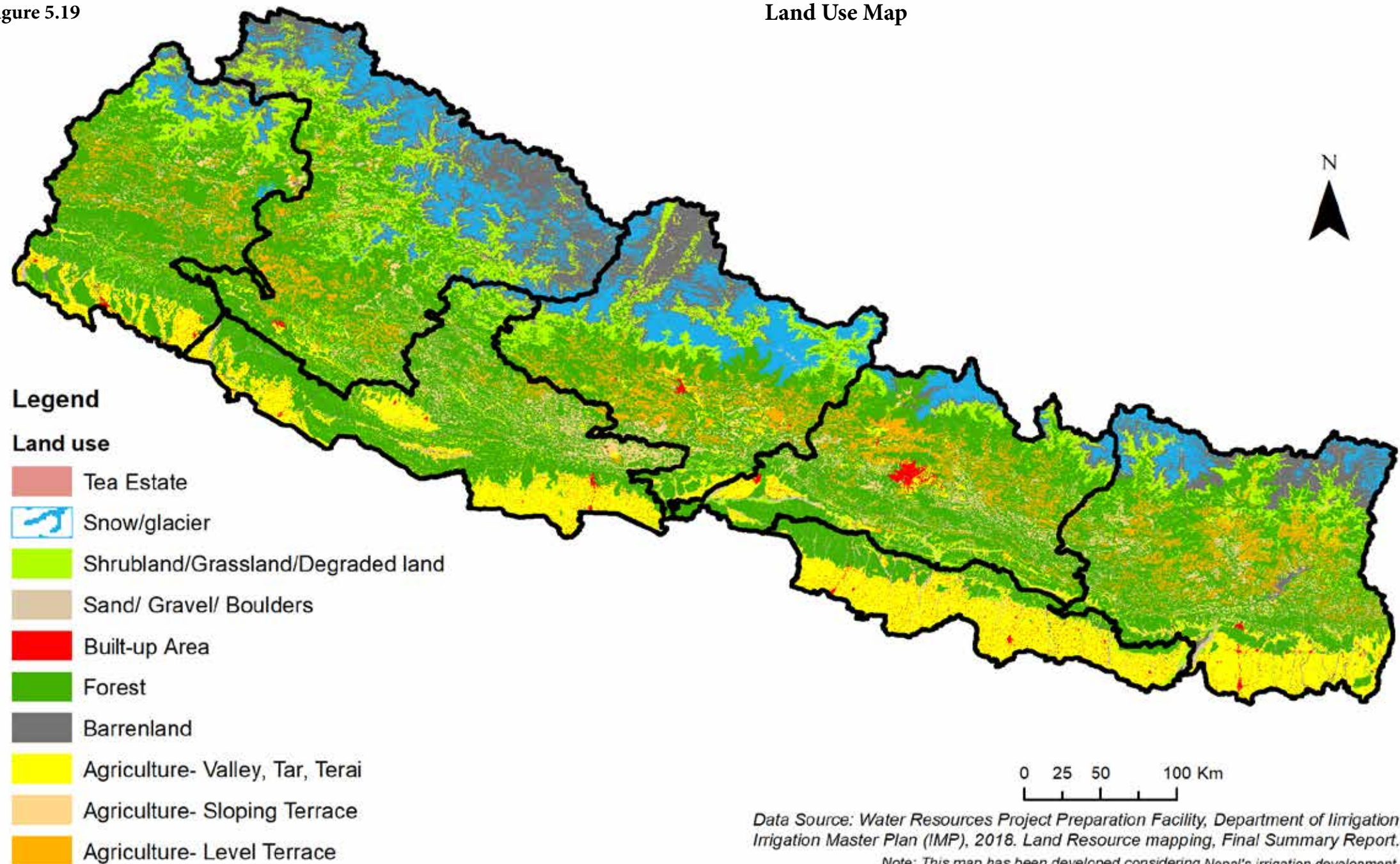




5. Agriculture in Nepal

Land Use Map

Figure 5.19



Data Source: Water Resources Project Preparation Facility, Department of Irrigation, Irrigation Master Plan (IMP), 2018. Land Resource mapping, Final Summary Report.
Note: This map has been developed considering Nepal's irrigation development.

5. Agriculture in Nepal



3. IRRIGATION

Irrigation is an important factor in food security in Nepal, as high variability in rainfall within the year and from one year to another underscores the need for more reliable sources of water for growing crops. The current area of



irrigated land is 1.454 million hectares, with a potential to expand by another 0.811 million hectares. The majority (65%) of irrigable land is located in the Terai (Figure 5.20), 1.479 million hectares, of which about 1.209 million hectares are irrigated.² In total, 64% of all agricultural land is irrigable of which a majority of irrigable land lies in Province 2 and the least lies in Karnali Province.²

CLIMATE AND RAINFALL

The climate of Nepal is highly variable, with 80% of annual precipitation falling during monsoon season (from June to September) (Figure 5.22), and with annual precipitation ranging from less than 700 mm to over 3,000 mm across the country (Figure 5.21).

The annual production of paddy largely depends on precipitation during monsoon season (Figure 5.2), while other crops like wheat and maize depend on precipitation in the other months. Crop yields vary from the Terai to the mountains, mainly due to highly variable, unpredictable rainfall as well as lack of reliable irrigation, among other inputs like improved seeds and fertilizers.

Crop conditions in the Far Western regions of the country are fragile and very susceptible to weather changes. This was the case in early 2016 as low rainfall had adverse effects on crop growth. The Standardized Precipitation Index (SPI) based on a 3-month interval is considered a good measure of agricultural

drought. The SPI during winter (Dec to Feb) of 2015-2016 (Figure 5.25) shows 'Extreme' drought conditions mostly in the Far-Western Regions in parts of Mugu, Humla, Jumla and Surkhet districts and 'Severe' drought conditions in parts of many districts in mid-western and far-western regions.

Over this period, crop health in these areas starkly deteriorated. The Normalized Difference Vegetation Index (NDVI) characterizes the health condition of vegetation. In normal years, January is considered the peak of greenness for wheat. The vegetation condition for January 2016 indicates weak vegetation—i.e. more brown areas (Figure 5.24).

Table 5.1 Command Area under Surface and Ground Water Irrigation by Province (IMP-2018)

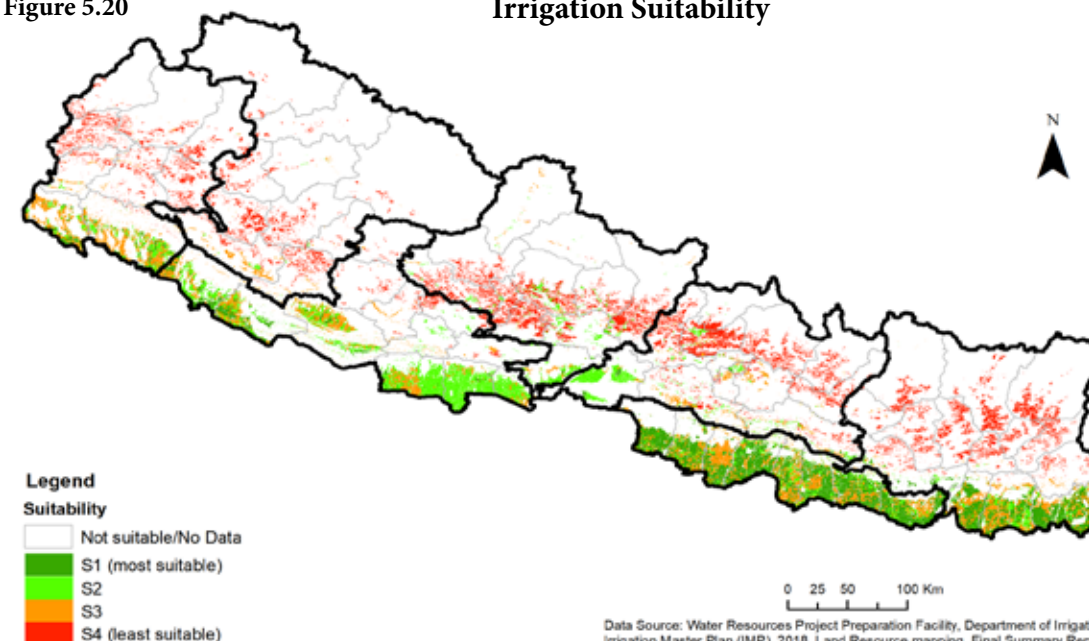
Province	Surface Irrigation (ha)	Ground-water Irrigation (ha)	Total (ha)	Percentage (%)
1	199,200	99,700	298,900	21
2	282,900	183,100	466,000	32
3	73,300	15,300	88,500	6
Gandaki	64,000	21,100	85,200	6
5	217,100	118,500	335,600	23
Karnali	33,600	500	34,100	2
Sudur-pashchim	90,700	55,700	146,300	10
Total	960,800	493,800	1,454,600	100

Data Source: Department of Irrigation, Irrigation Master Plan, 2018

Note: The numbers are rounded up to the nearest 100 units

Figure 5.20

Irrigation Suitability



Data Source: Water Resources Project Preparation Facility, Department of Irrigation, Irrigation Master Plan (IMP), 2018. Land Resource mapping, Final Summary Report.



5. Agriculture in Nepal

Figure 5.21 Annual Precipitation

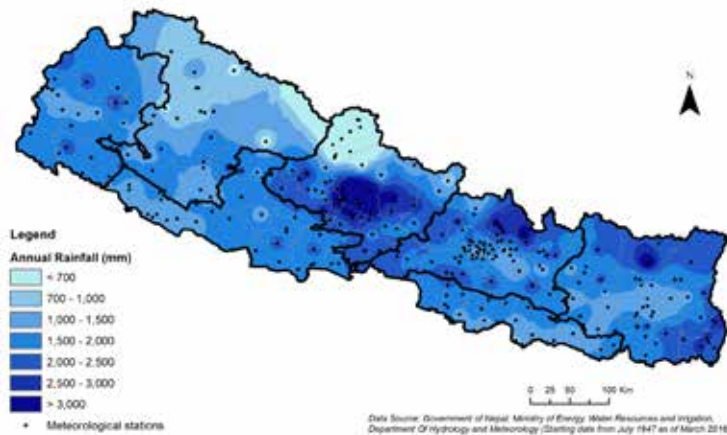


Figure 5.22 Monsoon (June – September) Precipitation

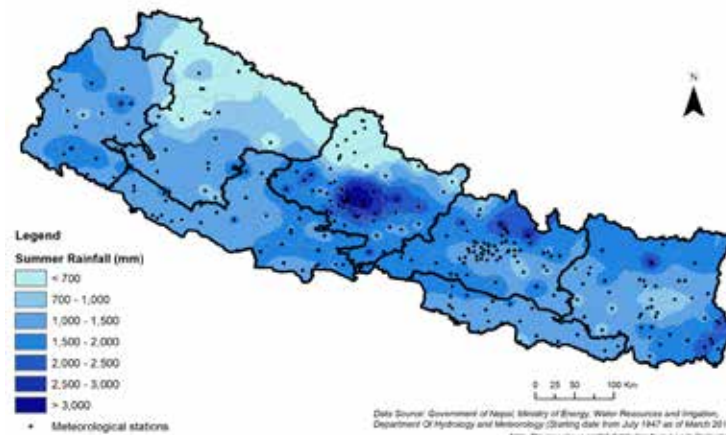


Figure 5.23 Winter (December -March) Precipitation

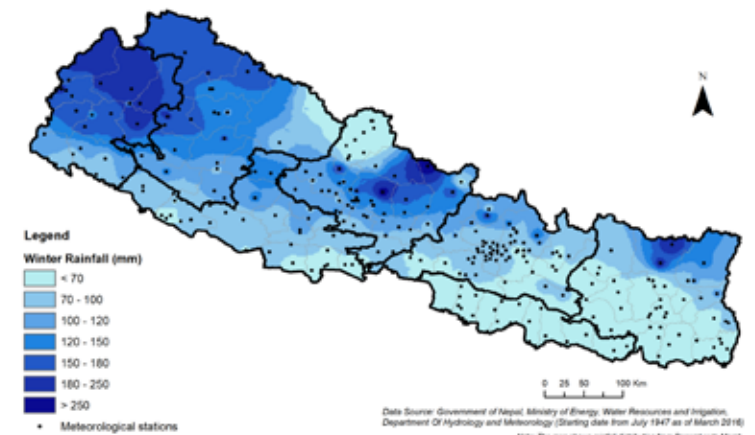


Figure 5.24 Vegetation conditions in agriculture and rangeland areas (Jan 2016)

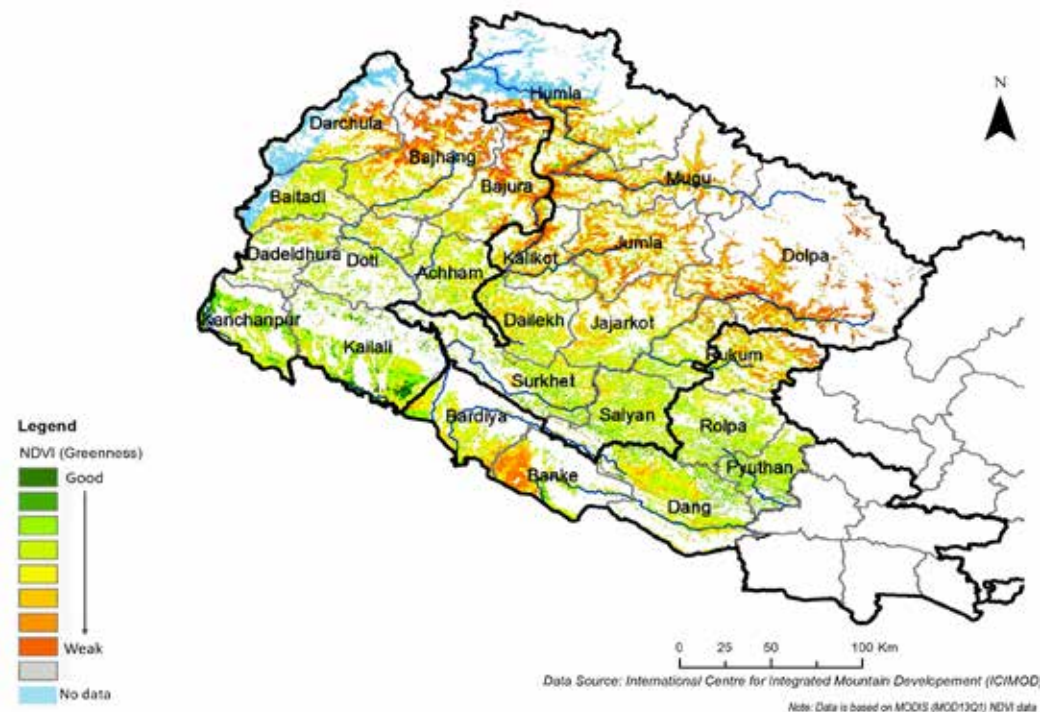
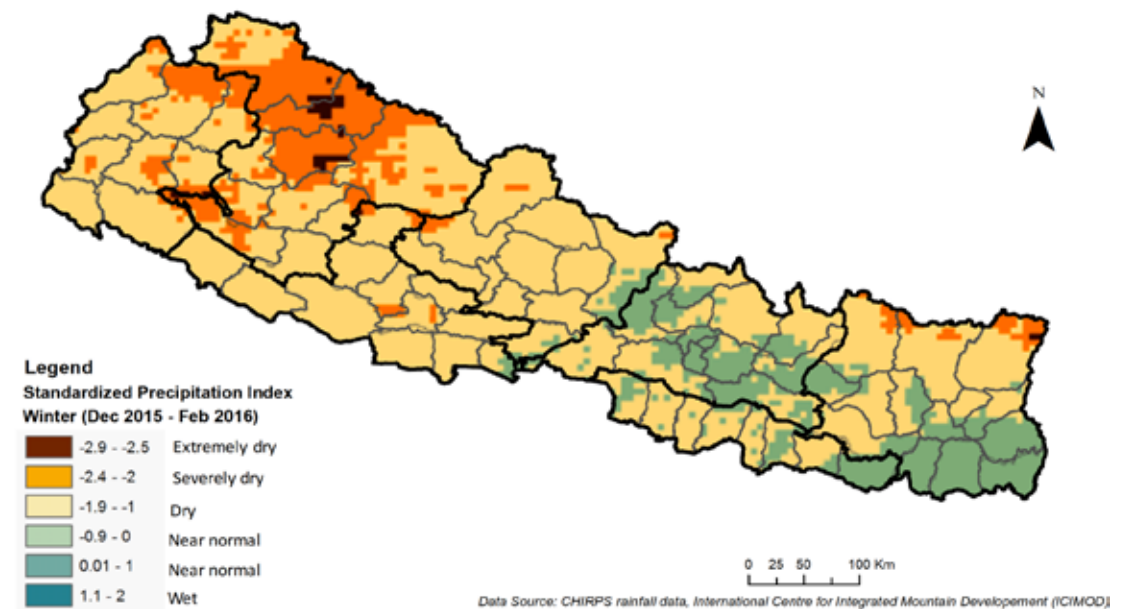


Figure 5.25 Standardized Precipitation Index for Winter (Dec 2015 to Feb 2016)



6. Nutrition and Health



Proper nutrition is vital to a healthy, food secure people. Malnutrition can affect physical and cognitive development, impeding one's ability to lead a healthy, productive life. Nutrition is not only driven by food security (including the access to and consumption of healthy foods), but also by feeding practices and the adequacy of health and sanitation services.

Despite high overall levels of child malnutrition, Nepal was able to lower malnutrition rates substantially over the past two decades. The prevalence of stunting (short height for age) among children under five decreased from 57% in 1996 to 36% in 2016 (Figure 6.2). During the same period, the prevalence of underweight (low weight for age) reduced to 27% from 42% and child wasting (low weight for height) from 15% to 10%.^{1,2} District and province wise data depicts

that stunting is highest in Karnali, underweight in Province 2 and districts of Karnali; and wasting in Province 2 and districts of Karnali, and Sudurpaschim (Figures 6.2, 6.4, 6.5, 6.6 and 6.7).

NUTRITIONAL STATUS AND PRACTICES

The reduction in stunting in children can be attributed to increased awareness on nutrition and support from the government and non-governmental sectors. Many children (95%) now consume iodized salt in Nepal. Similarly, Vitamin A prophylaxis coverage for children aged 6 to 59 months stands at 86%.

Children consuming foods rich in iron and iron supplements are low across provinces. Province 2, and Province 1 and 2 have the lowest percentage in the case of women and children respectively. Women and children



in Province 1 and 2 were also found the most anemic in the country, which could be due to less or no iron intake (Figure 6.9).

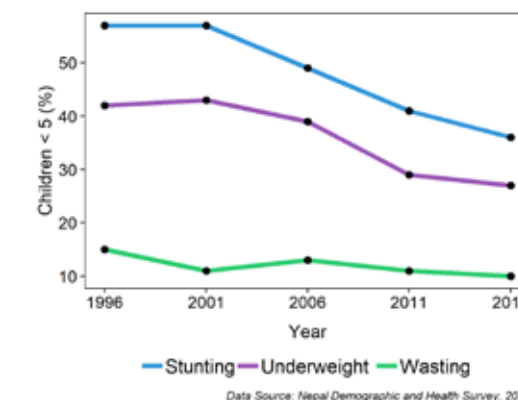


Figure 6.2 Stunting, wasting and underweight in children

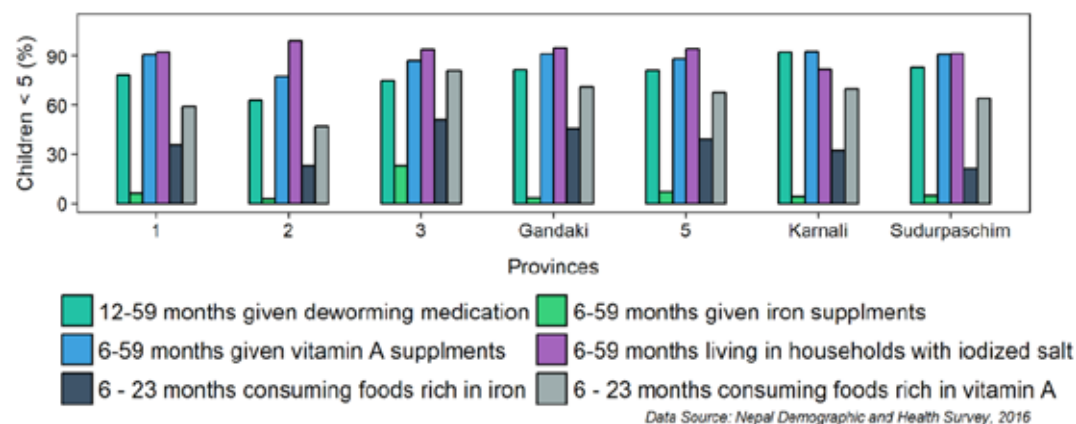


Figure 6.1 Micronutrients consumption in children

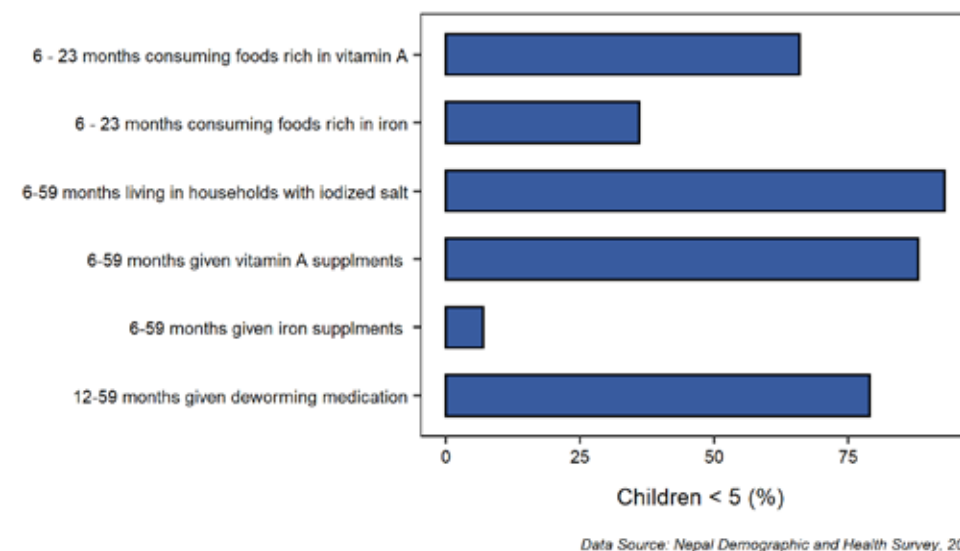


Figure 6.3 Micronutrients consumption in children (National Average)



6. Nutrition and Health

Figure 6.4

Stunting in Children Under 5

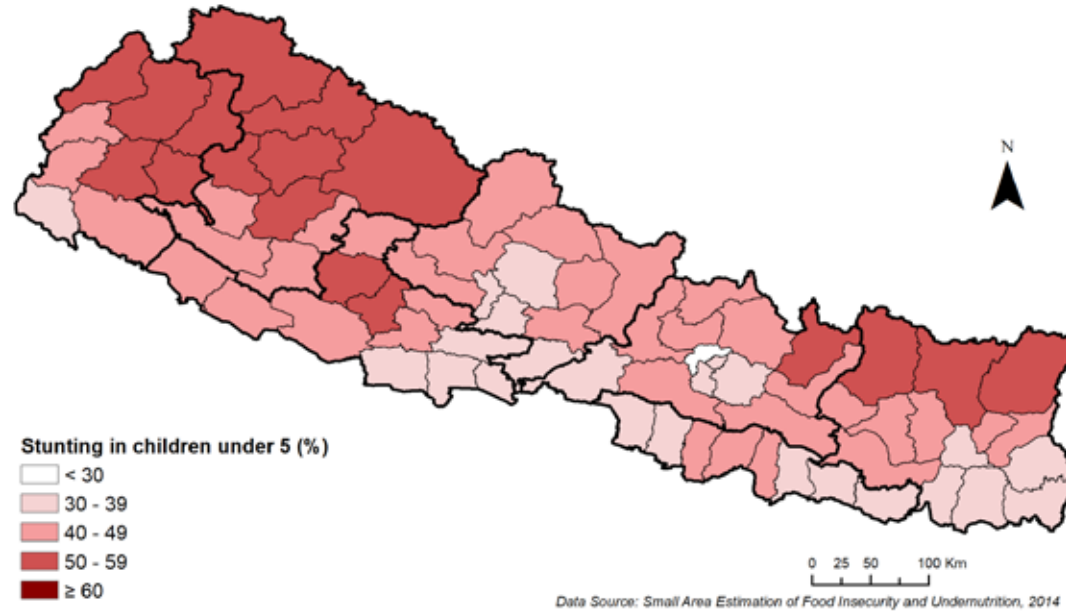


Figure 6.6

Underweight in Children Under 5

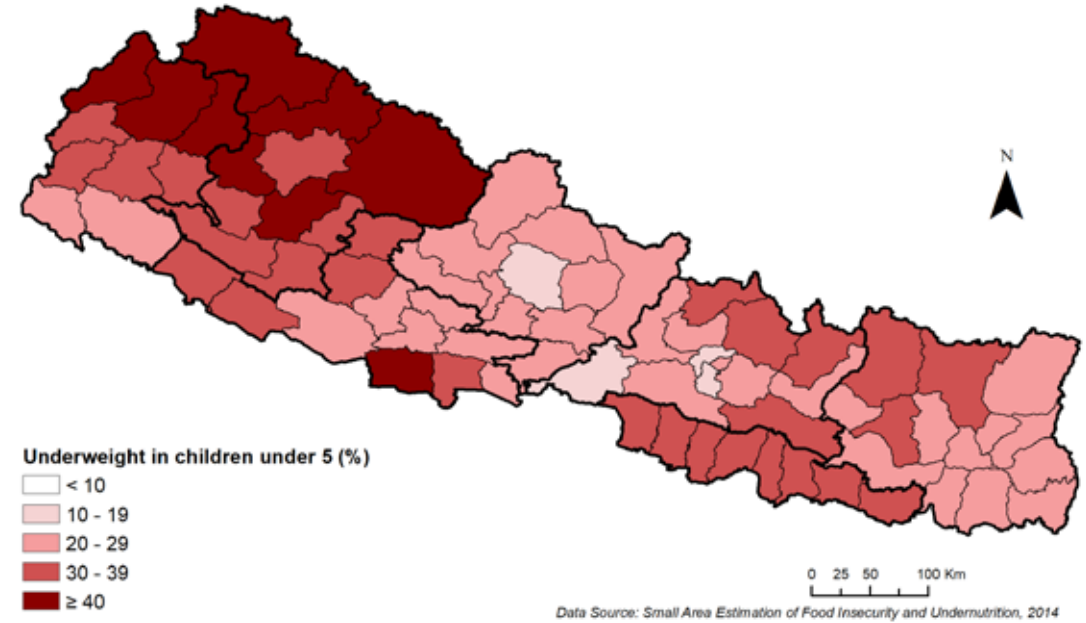


Figure 6.5

Wasting in Children Under 5

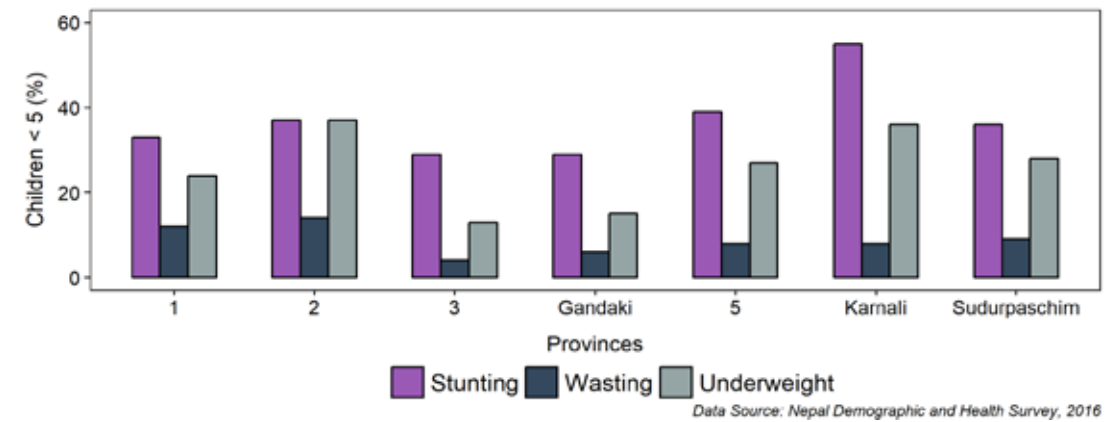
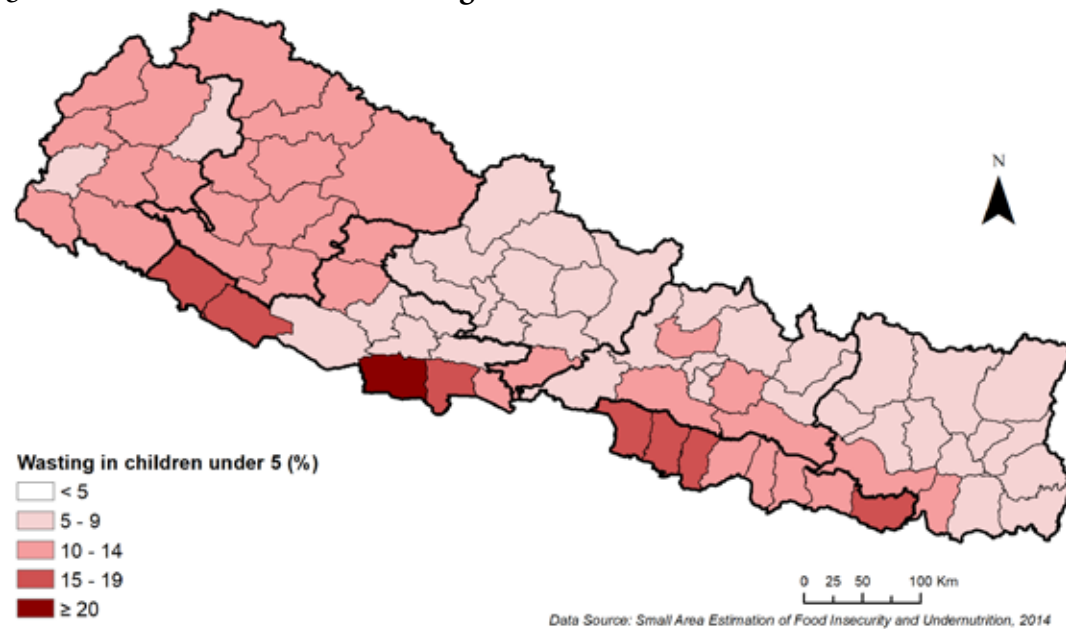


Figure 6.7 Province wise stunting, wasting and underweight prevalence in children under 5

6. Nutrition and Health



Children belonging to educated (above Secondary Education Examination) mothers received more frequent diet than the children belonging to mothers without a Secondary Education Examination degree.¹ Body weight and food consumptions are linked. The highest percentage of overly thin population was found to be in Province 2. Provinces 1, 3 and Gandaki have relatively fewer overly thin people, whereas those rates are higher in Provinces 2, 5, Karnali and Sudurpaschim (Figure 6.11). Provinces with higher levels of urbanization also contain higher proportions of obese people.

Overall, malnutrition and the prevalence of anemia are still public health concerns in Nepal despite the country having come a long way in reducing its malnutrition levels. Work on micronutrient fortification (rice and flour

fortification with iron and folic acid) – a cost-efficient intervention – has been initiated to tackle the micronutrient deficiency in the country.³ There have been multiple other programs led by different ministries designed to combat hidden hunger in Nepal, including the Multi-Sector Nutrition Plan (MSNP) which brings together health, education, social welfare, WASH, and agriculture and livestock sectors to address malnutrition in the country.

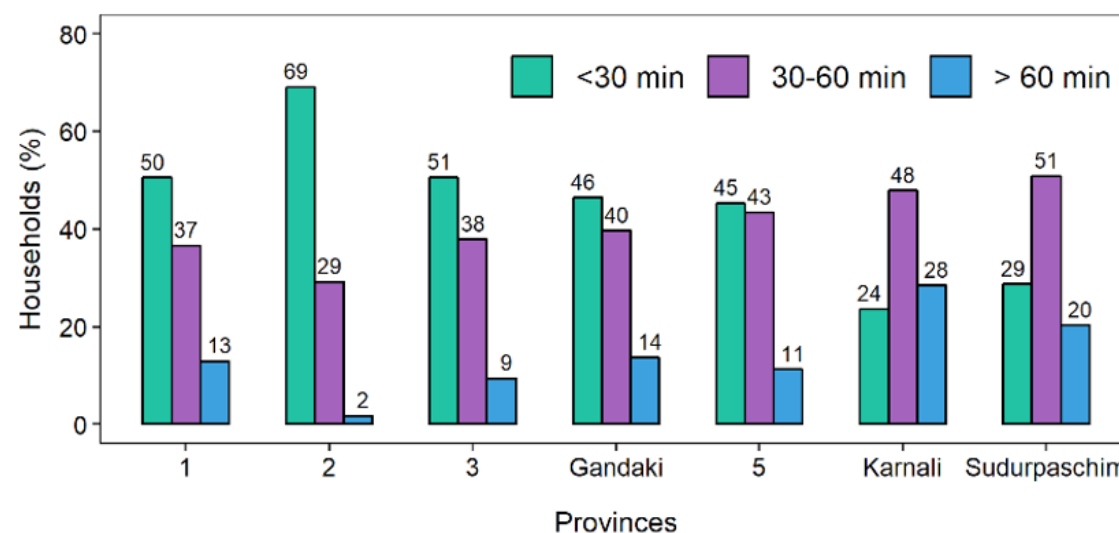
HEALTH FACILITIES AND ACCESS

Hospitals, health posts, community health unit, primary health care and urban health centres are the government-operated primary health service providers in the country. Province 3 has the highest number of both public and non-public health facilities among

all provinces.¹ The other facilities beyond community health units and primary health care and urban health centres are still below 1000 in all provinces, with the lowest being in Karnali province.¹

The total number of doctors in Nepal is above 16,432 and most of them are male (67%). One doctor has to look after 1,724 people on average. Kathmandu Valley has one doctor for every 850 people, but in rural areas, there is only one doctor for every 150,000 people. The doctor-population density in Kathmandu is estimated to be about 40 times higher than in rural Nepal. In a similar manner, access time to the nearest health facility varies across the provinces in Nepal. About 69% of households take less than 30 minutes to travel to the nearest health centre in Province 2 (which could be due to the plain terrain, making for

easy travelling compared to other provinces), whereas only 25% of households travel within the same amount of time to health centres in Karnali Province.



Data Source: Nepal Demographic and Health Survey, 2016

Figure 6.8 Access time to the nearest health facility



6. Nutrition and Health

Figure 6.9 Anemia in Children and Women

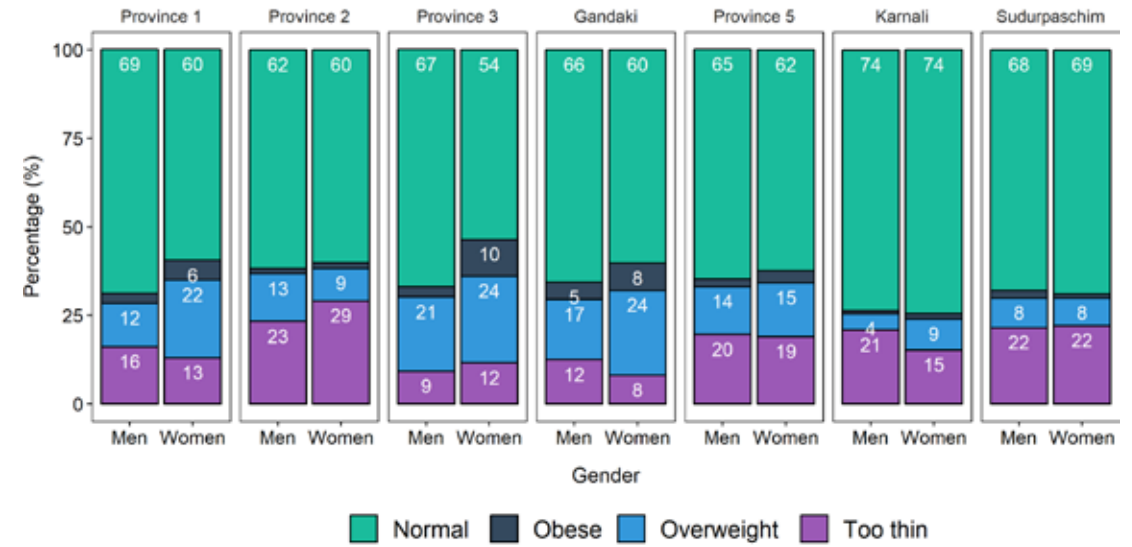
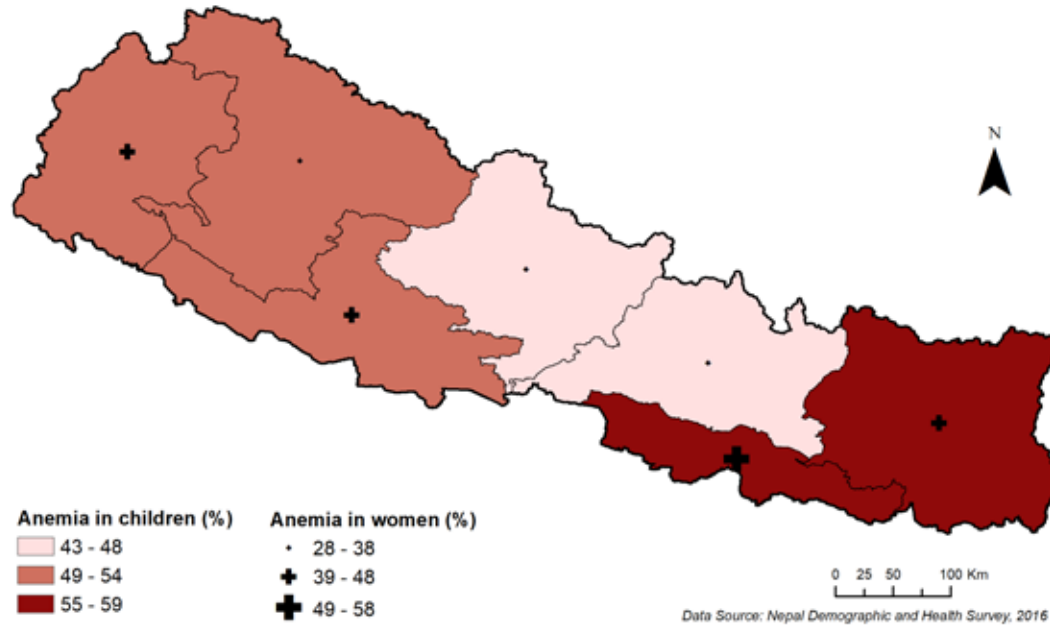


Figure 6.11 Province-wise body weights category of men and women

Figure 6.10 Malnutrition in Province 2

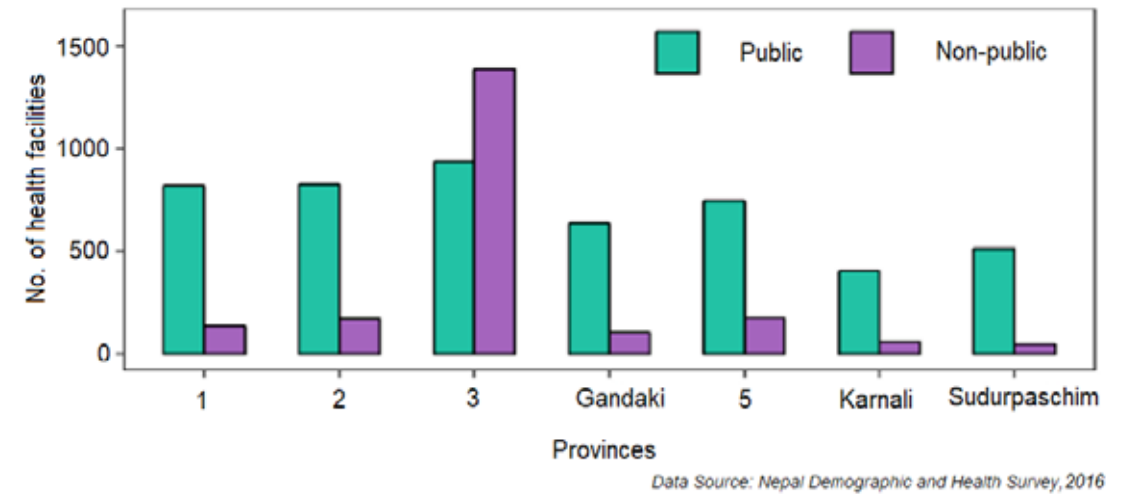
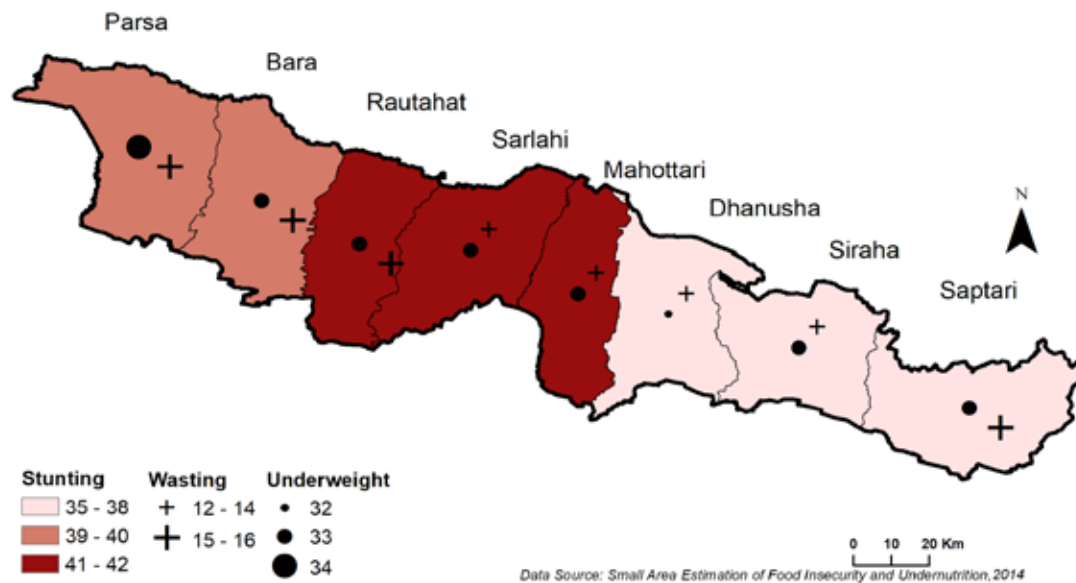


Figure 6.12 Number of health facilities

7. Access and Roads



Many of Nepal's development challenges emanate from poor physical access across the country.¹ Access issues are especially important in Nepal given its varied and often forbidding topography; in fact economic and physical access to food depend on the stable movement of people and goods. Improved access is associated with a lower likelihood of being poor; expanding access to paved roads could lift as many as half of all newly-reached poor households above the poverty threshold, spur economic growth, food production, and reduce malnutrition.²

NEPAL'S ROAD NETWORK

Nepal's Strategic Road Network, the main network of roads ensuring country-wide physical connectivity, has consistently

expanded over the years, adding an additional 1,987 kilometres of roads in the last 15 years, to stand at 6,979 km in total in 2017/18. The total proportion of lower-quality earthen roads also reduced over this period, most significantly among the mid-hill roads connecting once-isolated districts to the rest of the country.

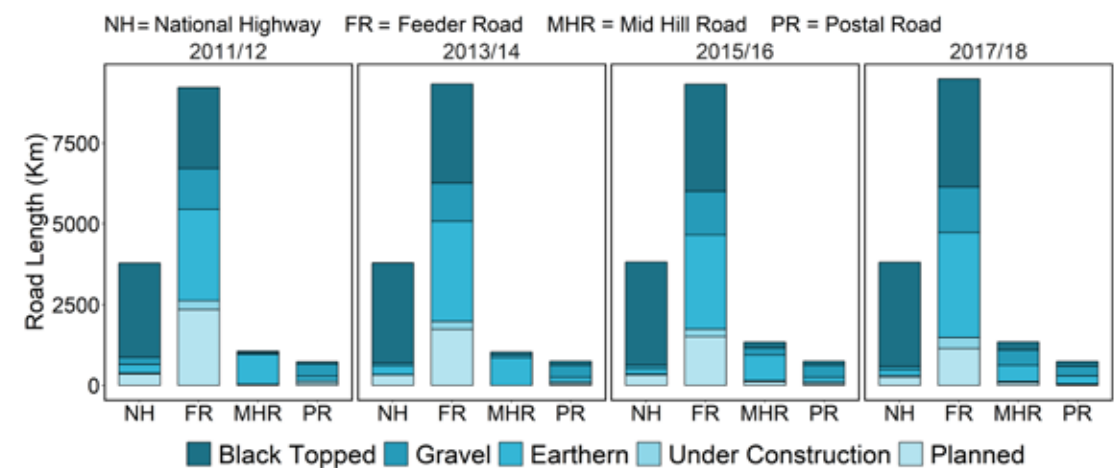
Provincial disparities are apparent however. Province 3 boasts the longest road network (2,380 km), while Province 6 has the shortest (1,132 km). Province 3 also encompasses the longest black topped road network (1,512 km) followed by Province 5 (1,241 km) while Province 6 ranks last (470 km) (Figure 7.2) Presently, only one out of 77 district headquarters – Humla – lacks road connectivity; in terms of municipalities, 42 out of 753 (5.6%) lack road connectivity.

Where road connectivity is absent or lacking, alternative transportation from mules to helicopters, ensure the last mile of access.

FOOD STORAGE AND STOCKS

Traditionally, the Nepal Food Corporation (NFC) maintained stocks of milled rice for the SAARC Food Bank project (8,000 MT spread across five locations) and the National Food Security Stocks (25,000 MT in eight locations). In case of emergency, these food stocks would be transmitted to various storage warehouses in all Districts. Presently, with the formation of the Food Management and Trading Company (FMTC), a merger between NFC and National Trading Limited, all the warehouses are consequently managed by FMTC. However, 30 districts have less than 500 MT of storage available, and only 10 districts have over 5,000 MT of storage available (Figure 7.6) with the largest

facility located in Parsa (31,000 MT) followed by Kathmandu (20,400 MT). 17 Districts, though well connected by roads, do not have any storage facilities. These gaps could affect the FMTC's ability to effectively distribute a sufficient quantity of strategic stocks when most needed.



Data Source: Department of Roads (2018)

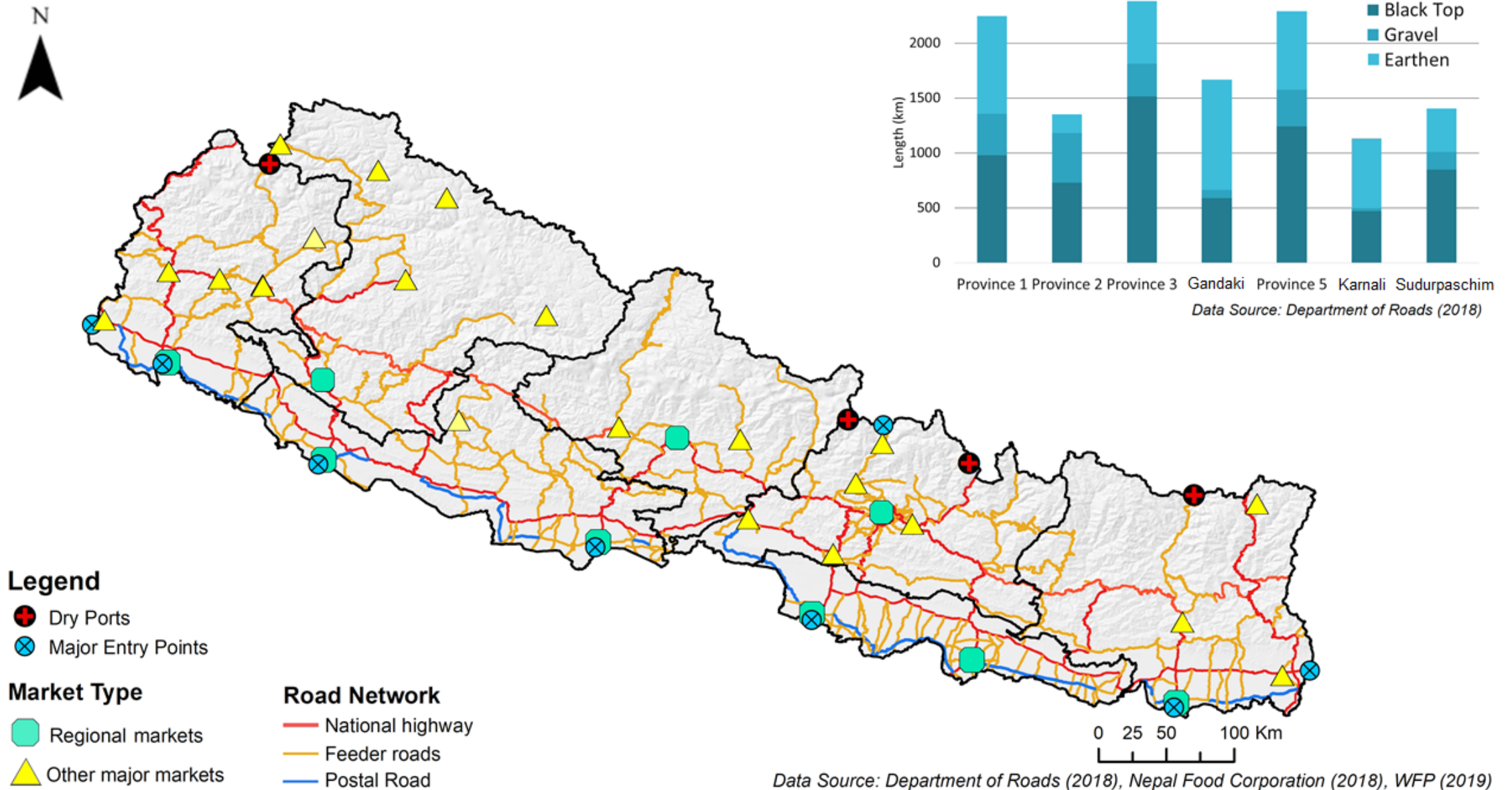
Figure 7.1 The development of Strategic Road Network



7. Access and Roads

Figure 7.2

The Strategic Road Network of Nepal (2018)



Data Source: Department of Roads (2018), Nepal Food Corporation (2018), WFP (2019)

7. Access and Roads



AIRPORTS

In addition to their role connecting people across the country and internationally, airports are heavily used in rural areas in times of distress where road connectivity is limited. Presently, province 2 has the least number of airports (3) while province 1 has the most at 13. The domestic cargo movement was estimated to be 3693 MT in 2018. Out of 44 domestic airports, 16 are no longer in operation. Additionally, 3 international and 6 domestic airports are under construction (Figure 7.7).³

MARKET PROFILES

Nepal has six regional market hubs located in the Terai (Nepalgunj, Janakpur, Dhangadhi, Biratnagar, Birgunj and Bhairahawa) that supply other markets located in the hills and mountains (Figure 7.2). Kathmandu and

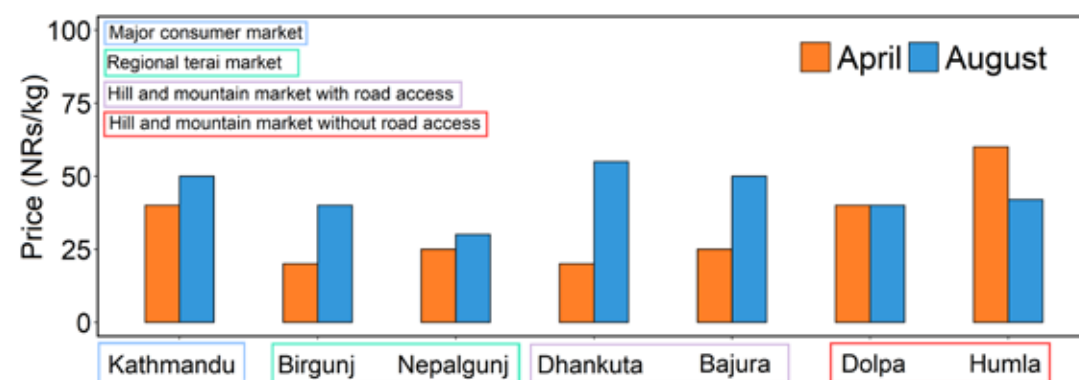
Pokhara are classified as major consumer markets. Sanfebagar, Bajura, Dhankuta, Jumla, Makwanpur and Rolpa, and Dolpa and Humla are classified as hill and mountain markets with and without road access respectively.

FOOD PRICES

Generally, in mountain and hill areas, food prices are heavily determined by transportation costs, which, in-turn are determined by the level of accessibility. As depicted in Figures 7.3, 7.4 and 7.5 in the far mountain Districts of Dolpa and Humla, the price of coarse rice and wheat flour in 2018 reached as high as Rs. 165/kg and Rs.100-170/kg respectively; the same commodities would be available for up to four times less in source markets in the Terai. The price of locally produced foods such as potato, on the other hand, do not vary much.

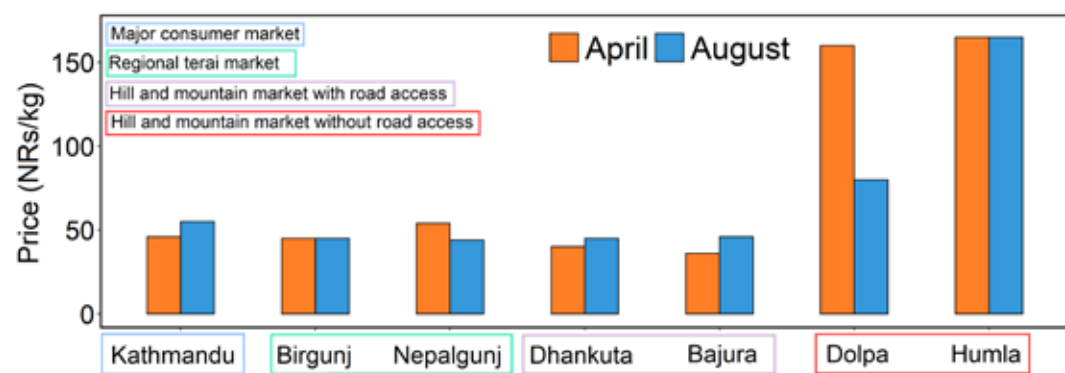
Food can be transported to the markets by different means. Helicopters (generally reserved for government food airdrops in emergencies) are the most expensive, but are able to land in rough terrain. Trucks can carry 7-10 MT loads but require reasonably paved roads. In addition to having low carrying

capacity (around 50 kg), mule transport is generally expensive, though it is able to pass through rough terrain. On many hills and mountain highways, tractors, having a carrying capacity of up to 3 MT, are the main mode of transport.



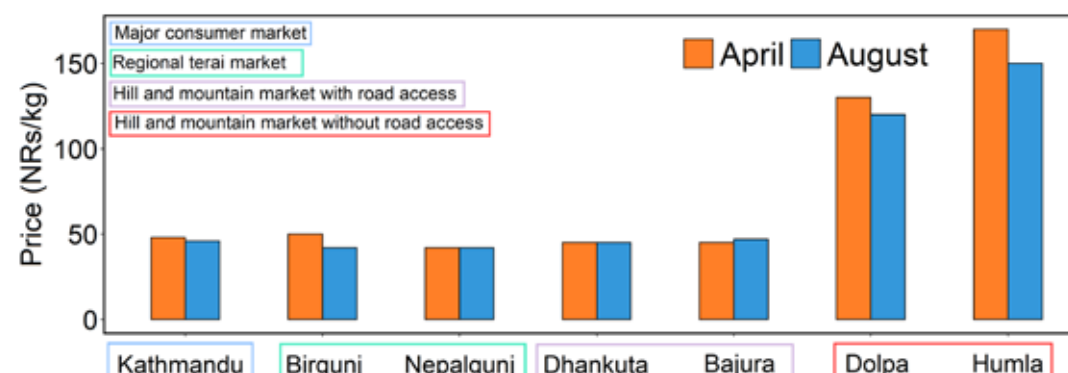
Data Source: NeKSAP Market Watch (2018)

Figure 7.4 Price of potato in 2018



Data Source: NeKSAP Market Watch (2018)

Figure 7.3 Price of coarse rice in 2018)



Data Source: NeKSAP Market Watch (2018)

Figure 7.5 Price of wheat flour in 2018



7. Access and Roads

Figure 7.6 Food Management and Trading Company's Storage Warehouses

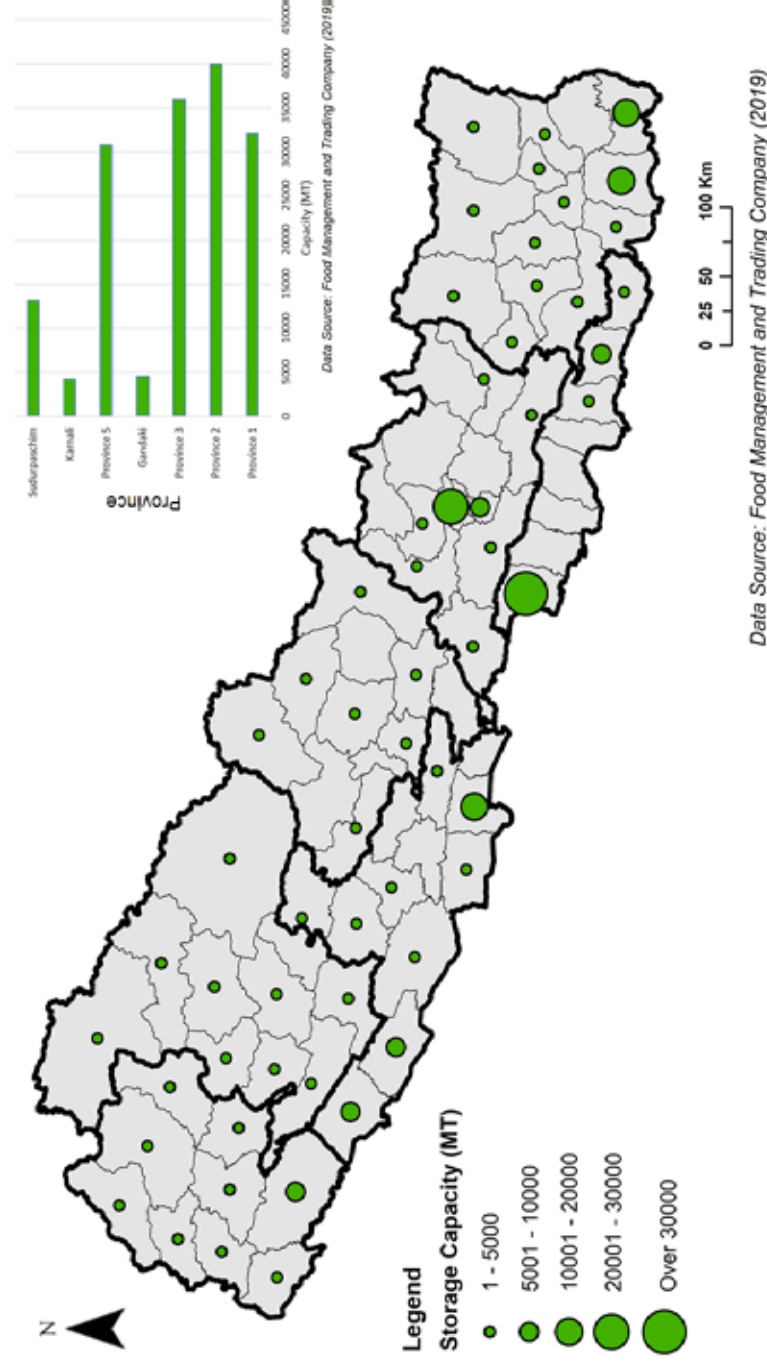


Figure 7.7 Airports of Nepal



8. Migration and Remittances



Migration – both internal and external – is a traditional practice families use to cope with various forms of (transitional and chronic) food insecurity. Over the past decade, Nepal has seen a generally increasing trend in external migration (Figure 8.1).

WHY MIGRATE?

Migration is a way to diversify livelihood opportunities, infusing households with a more regular source of additional income, and in so doing minimizing certain risks inherent in existing, often agrarian livelihoods.¹ The most pressing issues that trigger migration are: unproductive agricultural activities and limited non-agricultural jobs,² high debt burdens, and declines in food production due to the generational fragmentation of land holdings. Migrants are also attracted to the prospect of relatively better employment, income opportunities, wage rates and increased commodity consumption in foreign lands.¹

LINK TO FOOD INSECURITY

Seasonal migration patterns are historically linked to the success of local agricultural production and the availability of other forms of employment. The most food insecure months are March, July and August. Prior to the start of these lean periods, migrants tend to leave home, returning in time for crop harvests or before major festival periods.

WHO MIGRATES?

While the bulk of migrants remain men, more women are gradually choosing to migrate; their numbers rose from 3.9 percent of all migrants in 2008/2009 to 5.4 percent in 2017/18. 93% of all migrants fall within the 15 to 45-year age group.³ By Province, flows from Karnali and Sudurpaschim have greatly reduced since 2016, while they have increased by large margins in Provinces 1 and 2. Though Province 3 has historically been the number one sender of migrants, surrounding Provinces (1, 2, 4, and 5) have caught up or surpassed it in recent years (Figure 8.2).

DESTINATIONS

India is traditionally the most popular migration destination for the poor and the food insecure. Migration to India positively correlates with head of the household being illiterate, with the household being predominantly dependent on agricultural wage employment, and having smaller land holdings.⁴ More recently, increased demand for Nepali labor has brought a considerable amount of migrants to Malaysia, South

Korea and Gulf Cooperation Council (GCC) countries (Saudi Arabia, UAE, Qatar, Oman, Bahrain and Kuwait) (Figure 8.1).

REMITTANCES

Remittances are one of the central reasons for Nepal's fall in poverty from 42 per cent in 1995/96 to 21.6 per cent in 2016.⁵ Nepal has one of the highest shares of GDP from remittances in the world: in 2016/17, remittances contributed to 26.3 percent of the national GDP.⁶ While remittances, along with increased access to credit and loans, can help improve migrants' household food purchases and meet their immediate needs, they are often infrequent, insufficient and unreliable.² Further, remittances do vary, sometimes significantly, between households and regions. The most desperate and unskilled of migrants generally receive the lowest remittances.

LIVING AWAY

A migrant will generally try to maximize his/her savings by minimizing expenses abroad. For the poor and unskilled, this usually implies sharing cramped and unhygienic living quarters. Migrants also frequently report undignified, unsafe and difficult working conditions, and the ubiquitous threat of contracting contagious diseases – a high cost to pay for the limited monetary benefits.²

Deaths, accidents and disabilities among migrants abroad are on the rise as well. Government data depicts an increasing trend of abroad deaths from 2008/9 to 2014/15 (see Figure 8.3).³ Cardiac arrests and heart attacks

are identified to be the major causes, followed by natural death, traffic accident, suicide and workplace accidents.

CONSEQUENCES AT HOME

While increased mobility by migration has made women (especially from the Dalit community) feel less dependent on higher caste household for economic matters,¹ migration still takes a toll on family members back home - women and children are often left to cope with limited access to food and resources for extended periods while children grow up without their father.² Additionally, children attend school less frequently and perform more poorly in the absence of the migrant.⁷ Agriculture may also suffer; in some instances, agricultural productivity and sustainability may fall as people start to consider migrant labor as the primary or only source of household income.⁸

ADDRESSING MIGRATION

Addressing the underlying causes of labor migration could help to build a more resilient society. Transforming the agricultural sector to higher-value production, expanding markets and ensuring that benefits are distributed equitably is important. Supporting the poorest and most vulnerable farmers could be done through alternative employment, micro-credit, food or cash-for-work programmes aligned with periods of food insecurity, and could drastically reduce migration while improving livelihoods.⁷



8. Migration and Remittances

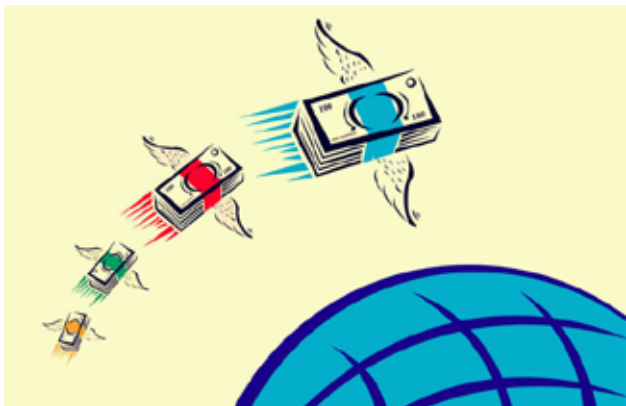


Figure 8.2 Source Districts of Migrants in 2017/18 and Total Labor Permits since 2012/13 to 2017/18

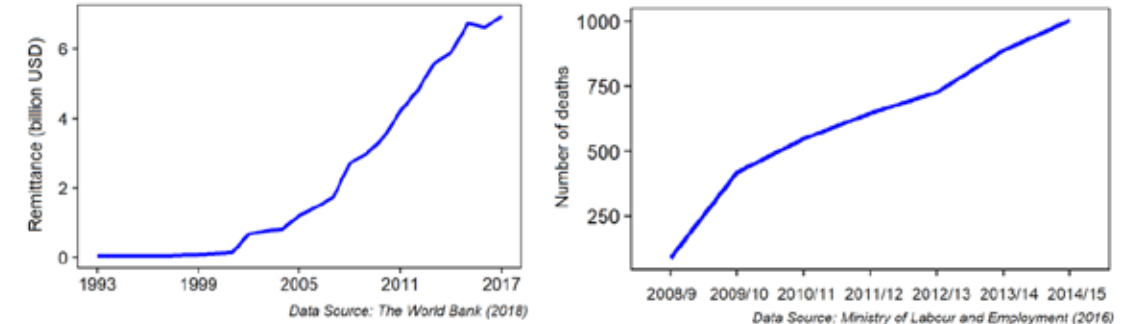
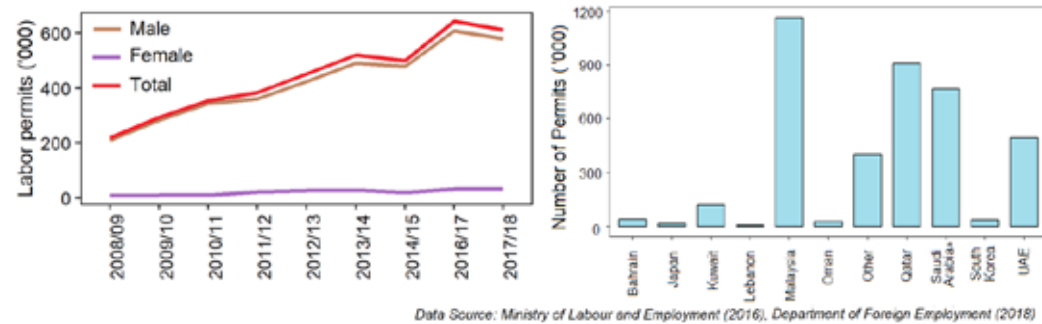
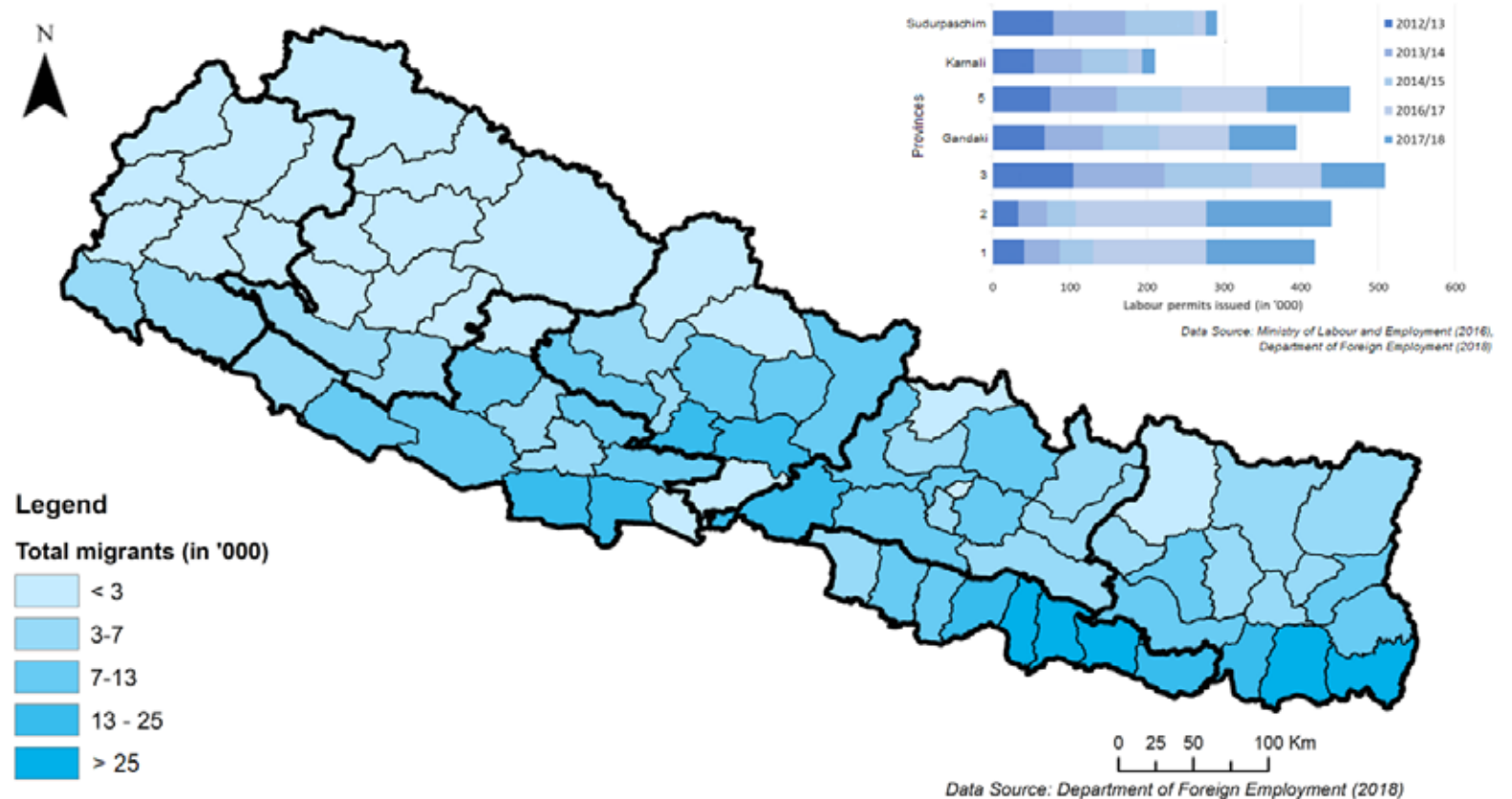


Figure 8.1 Trends in obtaining labour permits (left) and top destination countries for migration (right) from 2008/9 to 2017/18 except the year 2015/16 (Permits are not required for labor migration to India)

Figure 8.3 Remittance received from 1993 to 2017 (left) and migrant deaths abroad (right)

9. Climate and Natural Hazards



Nepal is among the most vulnerable countries in the world to natural hazards.¹ Weak geology, steep terrain, very high rainfall especially during the monsoon season, and its position in an active earthquake zone make the country highly vulnerable to geological and climate-related hazards, that affect the lives and livelihoods of the communities from the mountains, hills to the southern plains (Terai).

The highly variable climate and natural hazards in the country, projected to be further exacerbated by climate change, affect all four pillars of food security, from the quantity and timing of cropping, to the quality and stability of livelihoods, community and social makeup.

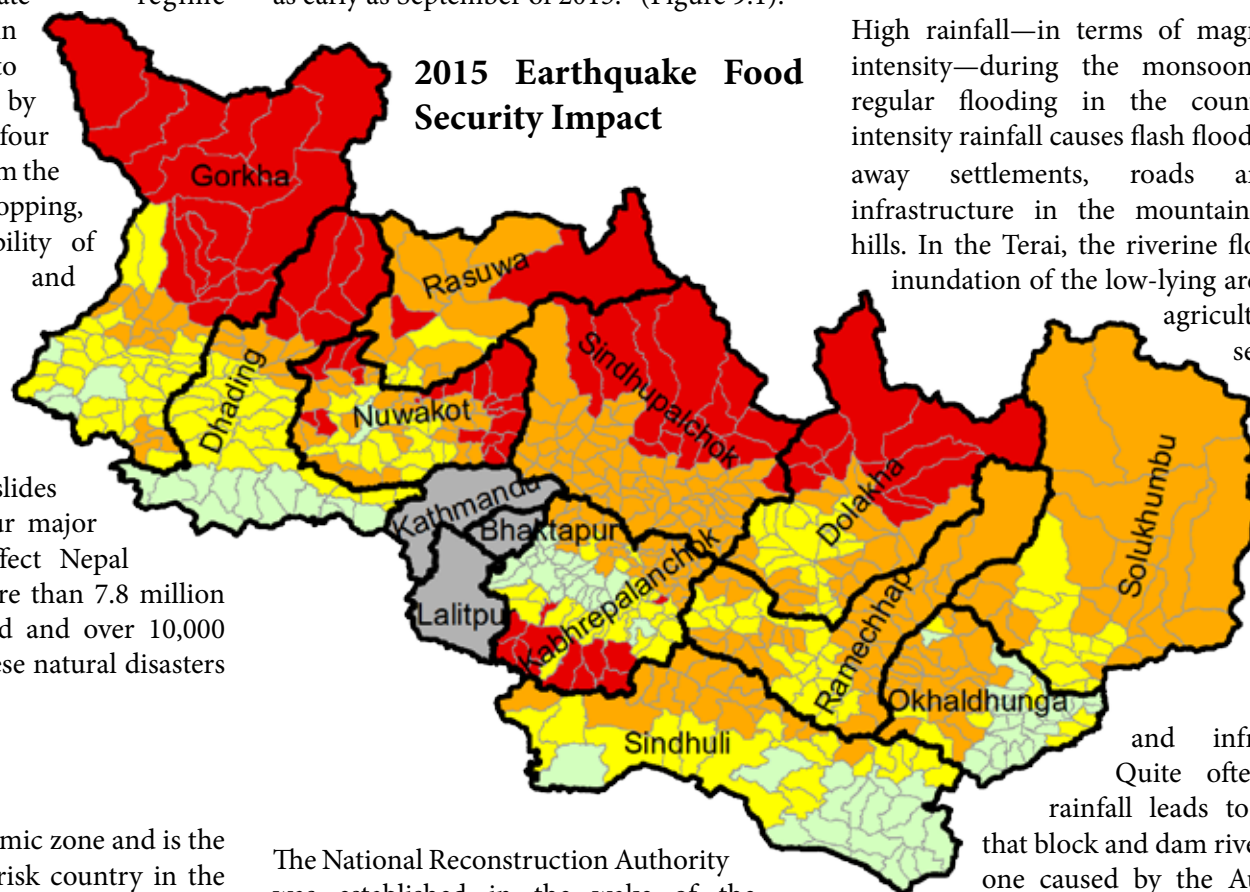
HAZARDS AND DISASTERS

Earthquake, floods, landslides and droughts are the four major natural disasters that affect Nepal in terms of damages. More than 7.8 million people have been affected and over 10,000 lives have been lost by these natural disasters since 2005.²

1. EARTHQUAKE

Nepal lies in an active seismic zone and is the 11th highest earthquake risk country in the world.³ Earthquakes have occurred regularly, with the most recent major earthquakes being

in 1934, 1950, 2005 and 2015. The April 2015 mega earthquake affected 31 districts, with 14 districts categorized as highly affected, and resulted in about 9,000 deaths and more than 23,000 people injured. While the direct impact on food security in affected areas lasted over a year and were most severe in remote locations and among rural populations and socially marginalized groups, inflows of humanitarian aid, crop harvests and improvements in market functionality drove a strong recovery as early as September of 2015.⁴ (Figure 9.1).



2015 Earthquake Food Security Impact

The National Reconstruction Authority was established in the wake of the earthquake to rebuild damaged or destroyed

structures across 32 districts in the country. In addition to government buildings, schools, health institutions and national heritage sites, this has included residential housing, with some 780,000 homes identified for repair or reconstruction. By the end of 2019, 62 percent of households had benefitted from home reconstruction, with another 24 percent in progress.⁵

2. FLOODING

High rainfall—in terms of magnitude and intensity—during the monsoon leads to regular flooding in the country. High-intensity rainfall causes flash floods that wash away settlements, roads and other infrastructure in the mountains and the hills. In the Terai, the riverine flooding and inundation of the low-lying areas damage agricultural crops, settlements

and infrastructure. Quite often, intense rainfall leads to landslides that block and dam rivers (like the one caused by the August 2014 Jure Landslide in Sindhupalchok District, Sun Koshi River), which eventually

lead to floods when these landslide-induced dams are breached. The floods that occurred from 1971 to 2015 led to more than 4,300 deaths. The most recent disastrous flood events were the floods due to the cloudburst in Kulekhani area in 1993, the 2017 flood that affected 32 districts across Nepal,⁶ and the recent July 2019 flood that affected most of the districts of Provinces 1, 2 and 3.

During the recent July 2019 flooding due to the torrential rainfall in different parts of Nepal, more than 117 people lost their lives, 80 were injured and many were reported to be missing. Further, 19,974 houses were completely damaged, 41,343 houses were partially damaged and 413,572 people were affected.⁷ The total financial loss was estimated to be more than one billion NRs.

Of all climate-related disaster events in Nepal, floods have had the largest impact on lives, livelihoods and food security.





9. Climate and Natural Hazards

Figure 9.1 Food Security Phases- Earthquake Impact (March 2015 to March 2016)

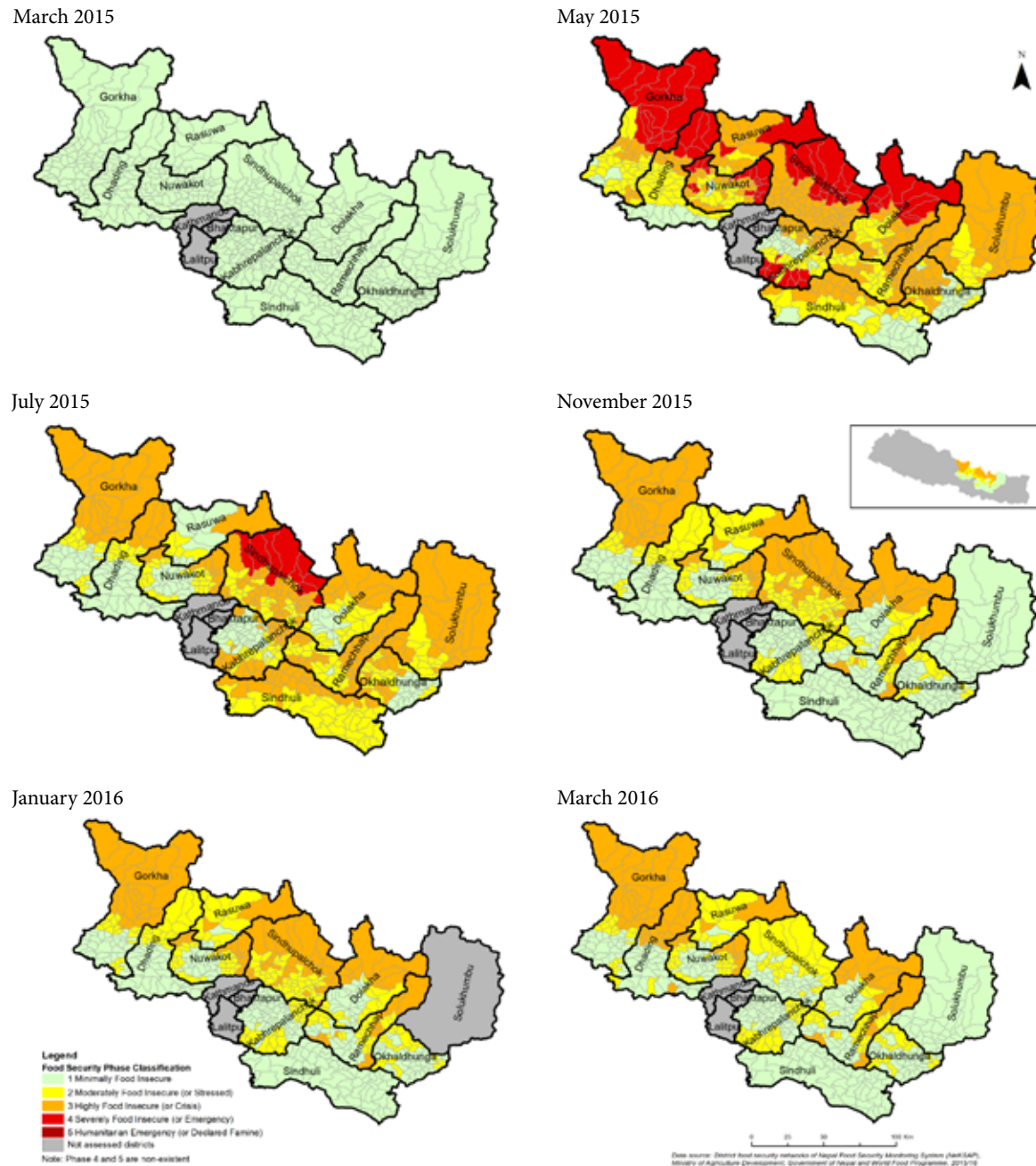


Figure 9.2 Total Estimated Loss and Death from Flood (2011-2019)

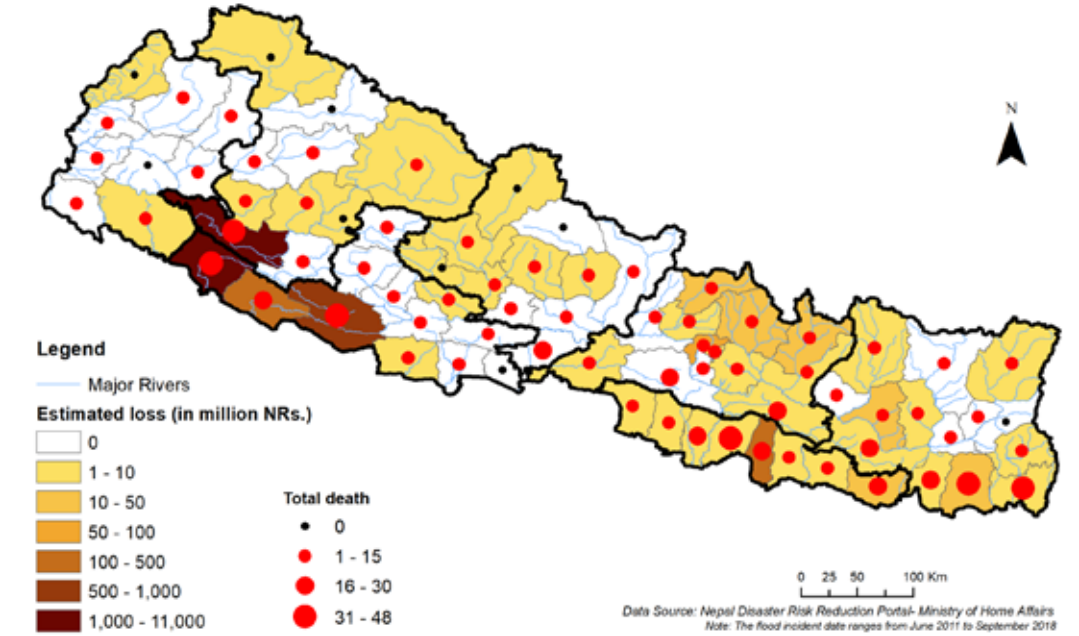
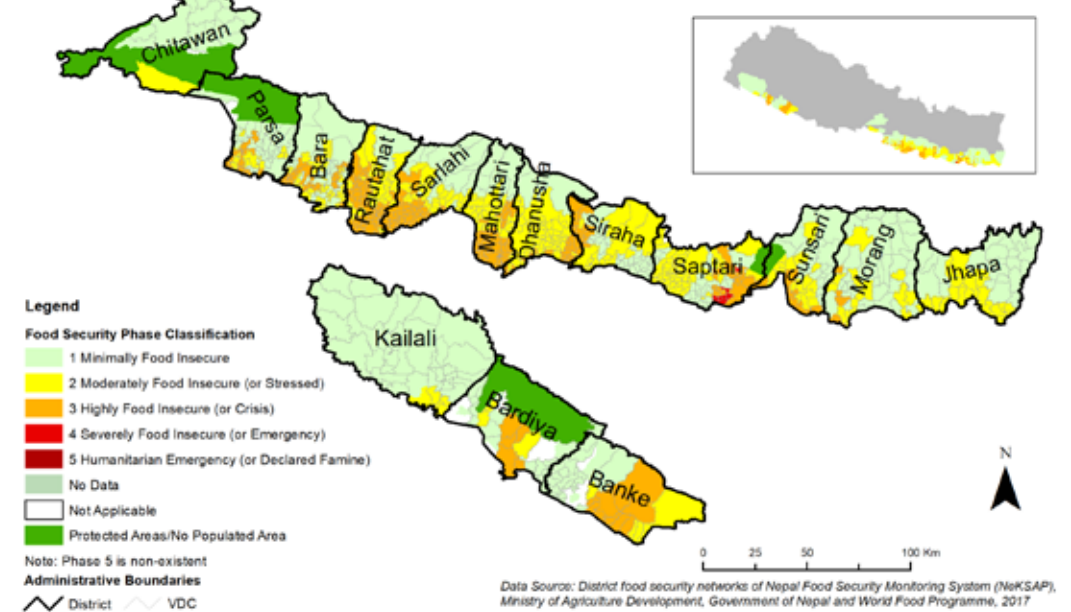


Figure 9.3 Food Security Phase Classification of August 2017 Flood



9. Climate and Natural Hazards



3. LANDSLIDE

Landslides are another common natural disaster that affect the mountainous and hilly regions of Nepal. The steep terrain, weak geology and high-intensity rainfall, compounded by man-made factors like unplanned development, deforestation and land use changes, have all contributed to the recurrent, widespread occurrence of landslides. The landslides lead to significant losses in terms of deaths, damages to settlements and infrastructure. Between 1971 to 2015, more than 4,800 deaths were recorded due to landslides. These landslides also bring heavy sediments and debris to the rivers, further aggravating flooding in the rivers downstream.

4. DROUGHT

Rapid onset hazards like flood and landslides receive more attention, but the impacts of droughts can last longer. Western Nepal experiences a higher impact of drought than Central and Eastern Nepal.⁸ Erratic rainfall patterns, including the late onset of the monsoon season, and poor rainfall distribution are the major causes of droughts. As more than 60% of the agriculture land has no irrigation infrastructure and is still dependent on rainfall, agricultural productivity, and therefore food security, are directly affected by drought. Extreme droughts cause food shortages and have led to a rise in food prices by up to 300% in some locations in the past.

Major droughts occurred in 1972, 1979, 1994, 2006, 2008/2009, 2012 and 2016.

The 2008/2009 winter drought, caused by precipitation levels less than 50% of long-term averages from November 2008 to February 2009, resulted in food insecurity in 27 districts in the far and mid-western hill and mountain districts of Nepal. The annual production of wheat and barley contracted by 14.5% and 17.3%, respectively. Despite the strong summer harvest, this led to a negative balance of cereal for the whole country.¹¹ Most recently, in 2016, the Karnali region encountered drought, leading to 150,000 people requiring food assistance.² The food security situation worsened due to the poor harvest of summer crops, lowered incomes and winter drought.⁹

5. GLACIAL LAKE OUTBURST FLOODS (GLOFs)

Glacial lakes are formed when glaciers are dammed by moraines and debris. The sudden breaching of these moraine dams by rock slides, ice avalanches or earthquakes leads to what is termed as glacial lake outburst floods (GLOFs). These are characterized by high peak discharge, high velocity, and very high sediment/debris loads. Twenty-four GLOF events have been recorded and 21 potentially dangerous glacial lakes are currently identified in Nepal¹⁰ (Figure 9.6). The damages caused by GLOF events, especially in areas just downstream of the lakes, can be extensive and poses serious threat to lives, community, property, and infrastructure downstream.

Figure 9.4 Food Security Phases – Drought (Mid-Nov 2015 to Mid-Mar 2016)

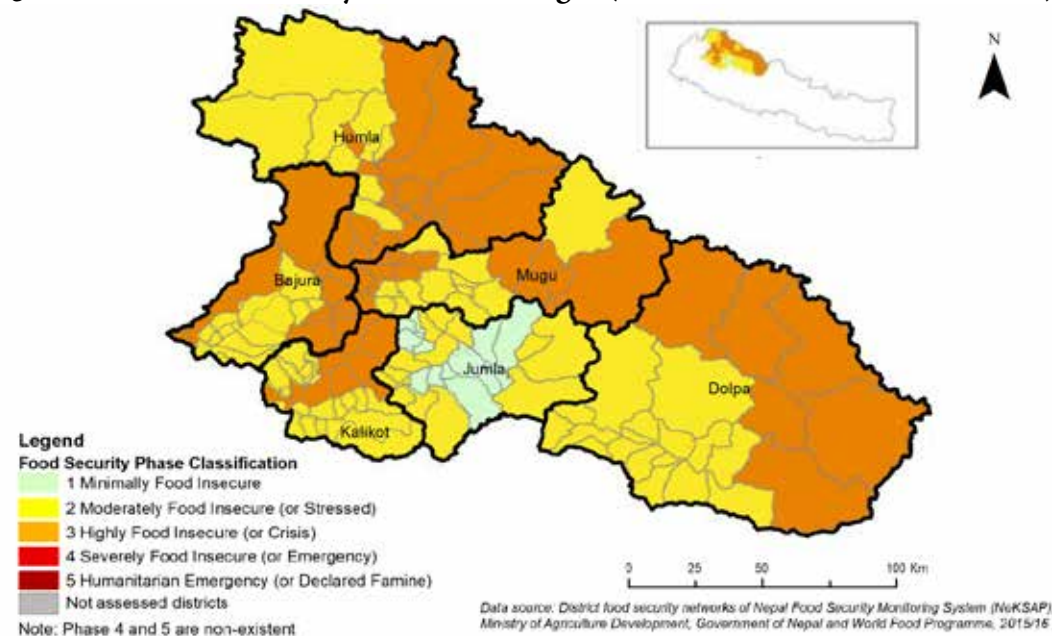
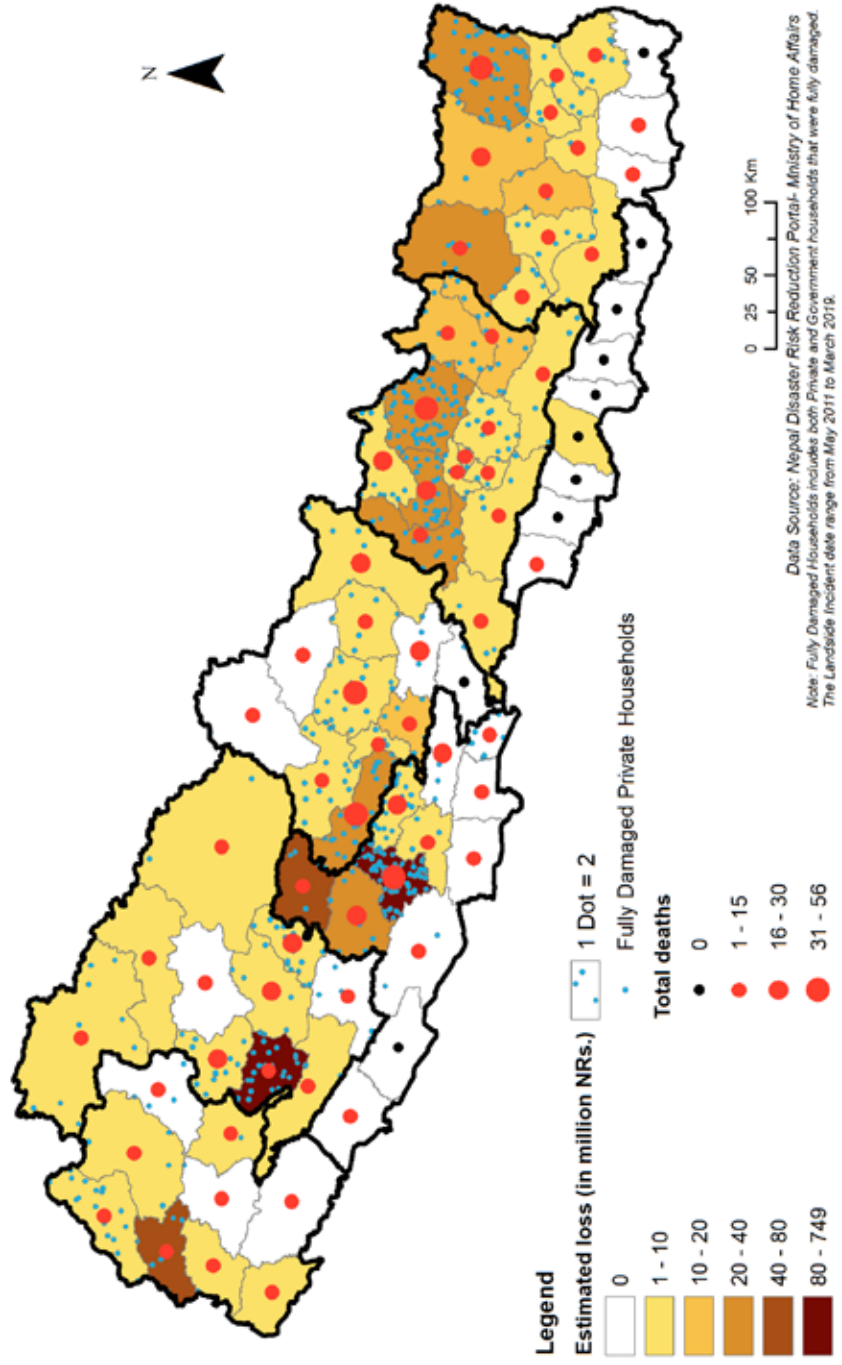


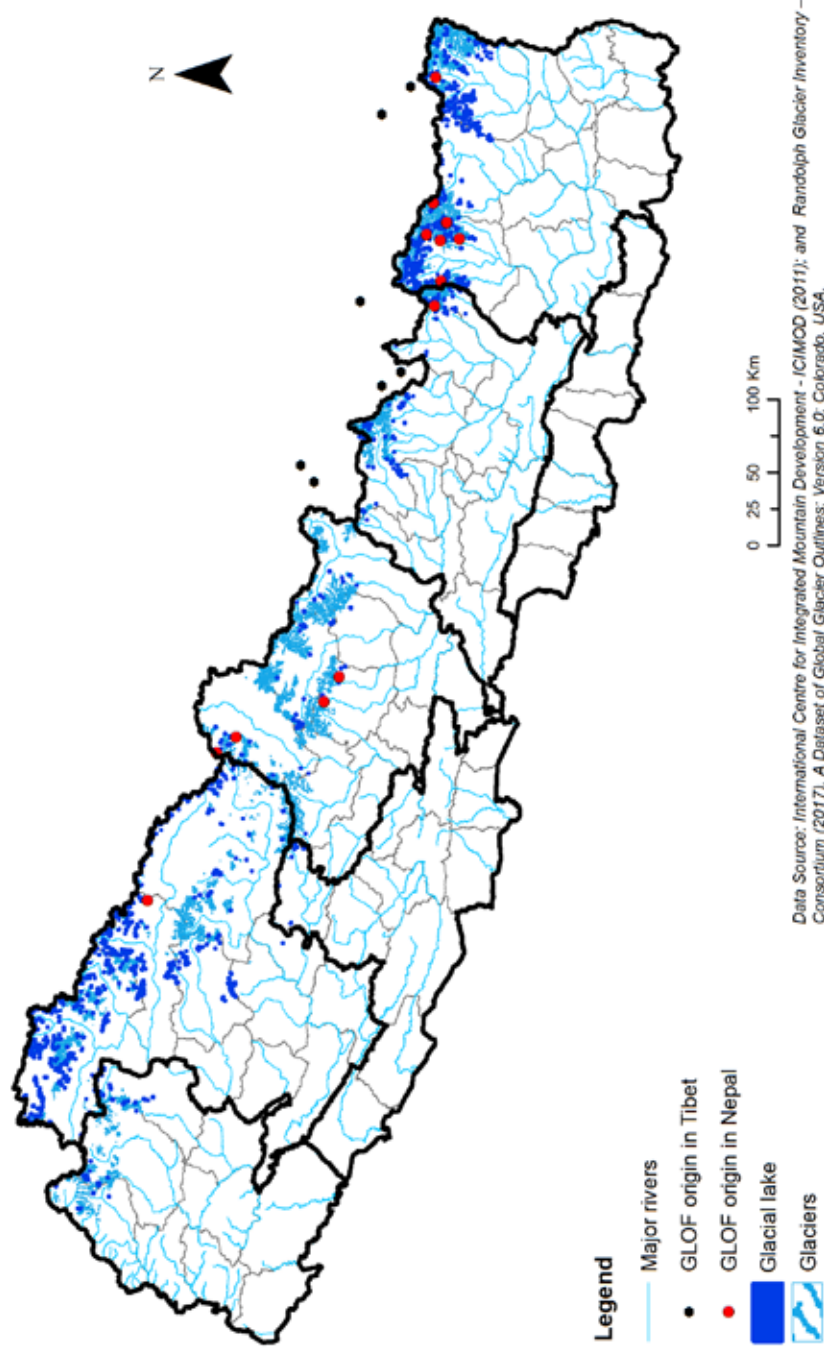


Figure 9.5 Total Estimated Loss, Fully Damaged Private HHs and Death from Landslide (2011-2019)



9. Climate and Natural Hazards

Figure 9.6 Glacial Lakes and Location of GLOF Events Recorded



9. Climate and Natural Hazards



CLIMATE RISKS AND CLIMATE CHANGE SCENARIO

Climate change is already affecting food security through increasing temperatures, changing precipitation patterns, and greater frequency of extreme weather events.¹¹ Climate risks directly impact agricultural production, and are brought about by factors such as late onset of, or early end to monsoon rains, heavy rains in October, deficient winter (November-March) rainfall, cold waves in December-January and hailstorms and thunderstorms from March to May.¹²

The global climate models (GCMs) project a rise in temperatures in the future, but the magnitude of that rise is uncertain.

The models are more uncertain in the case of precipitation, and especially winter precipitation: some project an increase while others project a decrease. The study under the National Adaptation Plan (NAP)¹³ analyzed the climate change scenarios of Nepal using selected GCMs. It suggests, on an average, that “the climate in all of Nepal will be significantly warmer and wetter in the future, except for a decrease in precipitation during the pre-monsoon season”, and “more (precipitation and temperature) extreme events are likely in the future”.

DISASTER RISK MANAGEMENT

The Government of Nepal has enacted several legal, institutional and policy measures in

disaster risk management over the last few years. The Disaster Risk Reduction and Management Act of 2017 covers all aspects of disaster management. The Act focuses on protecting people’s life, property, religious and cultural heritage, and reducing disaster risks. Nepal’s commitment to international frameworks such as Hyogo, Sendai and the SDGs has resulted in an increased focus on risk reduction, as evident in the National DRR Strategic Action Plan (2018 – 2030). These frameworks empower local governments under the federal system, as a crucial body to deal with disaster risk reduction and management activities.





9. Climate and Natural Hazards

Figure 9.7

Projected Changes (%) in Average Annual Precipitation for RCP 4.5 Model (2016-2045)

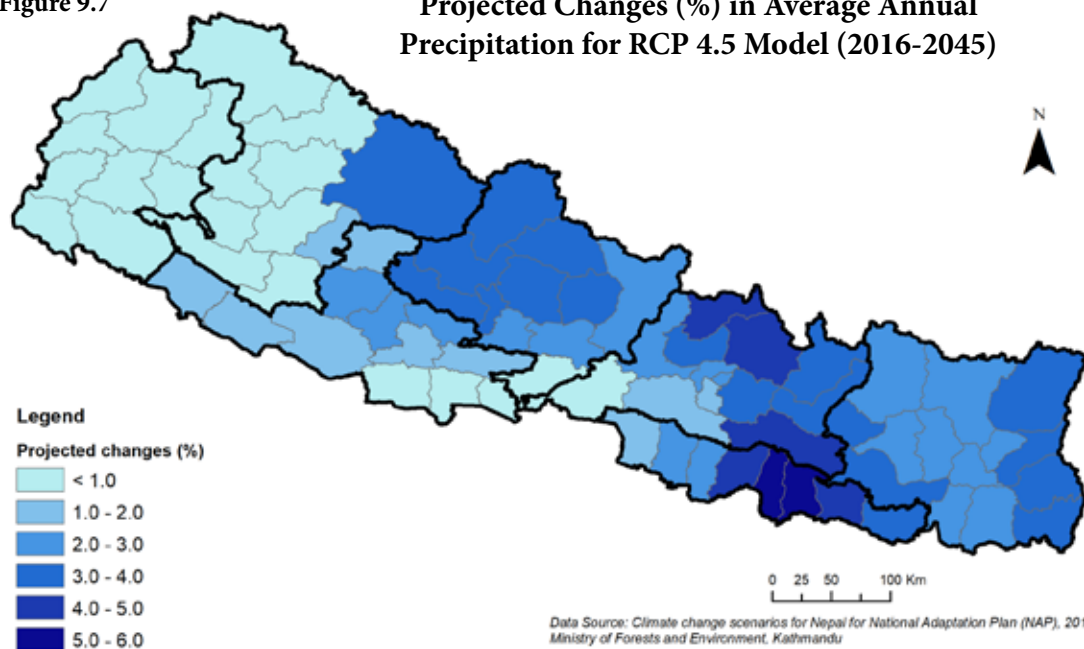


Figure 9.9

Projected Changes (°C) in Average Annual Mean Temperature for RCP 4.5 Model (2016-2045)

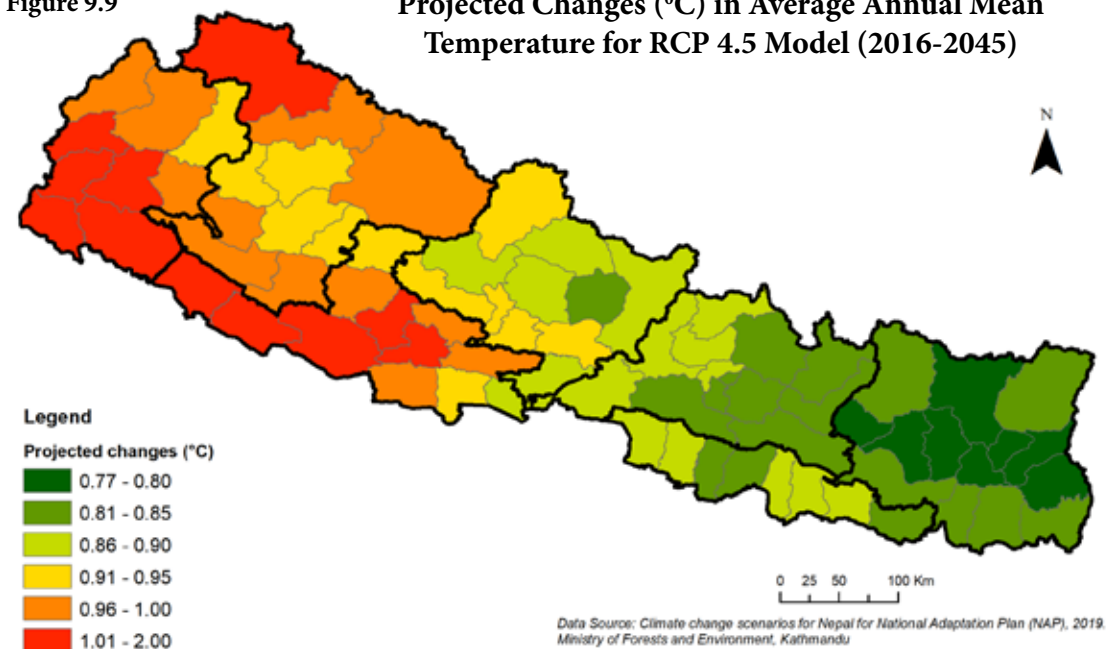


Figure 9.8

Projected Changes (%) in Average Annual Precipitation for RCP 4.5 Model (2036-2065)

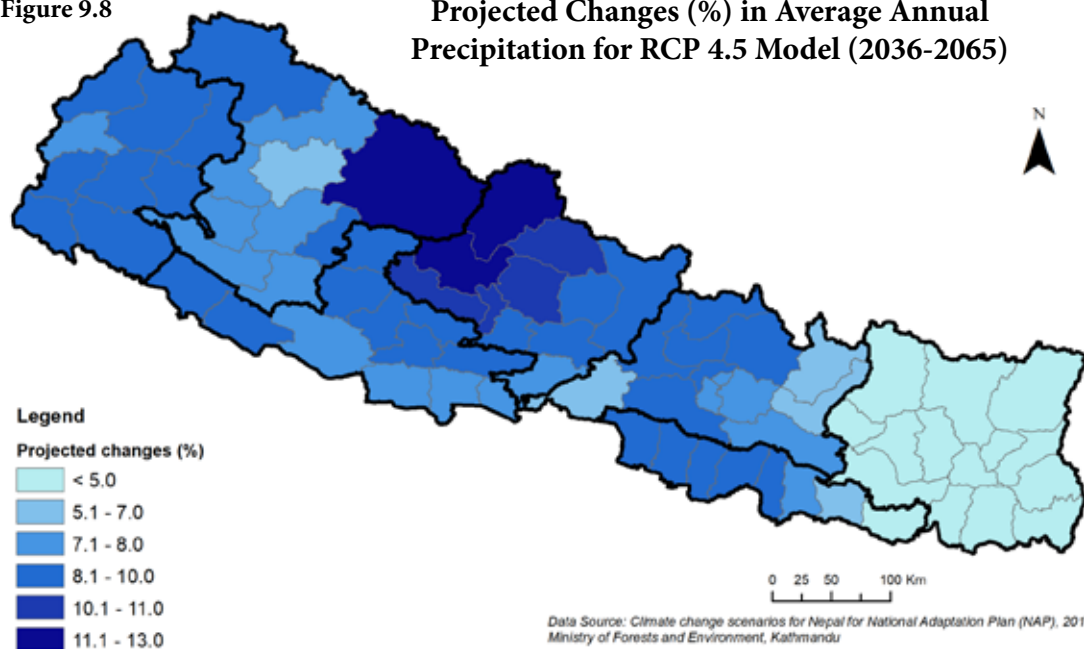
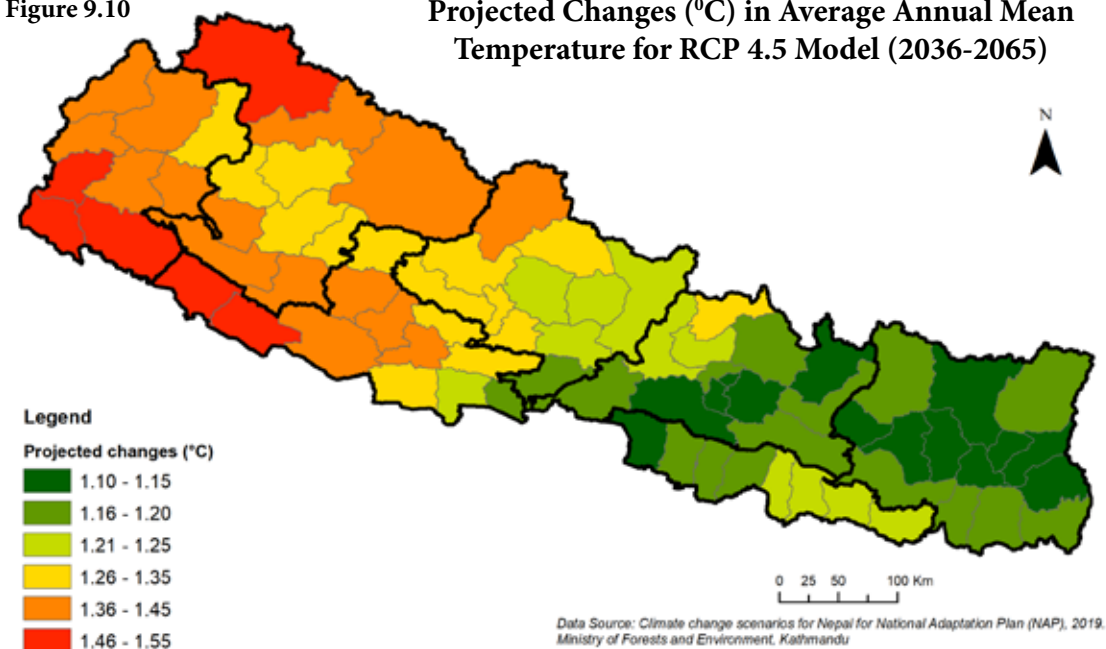
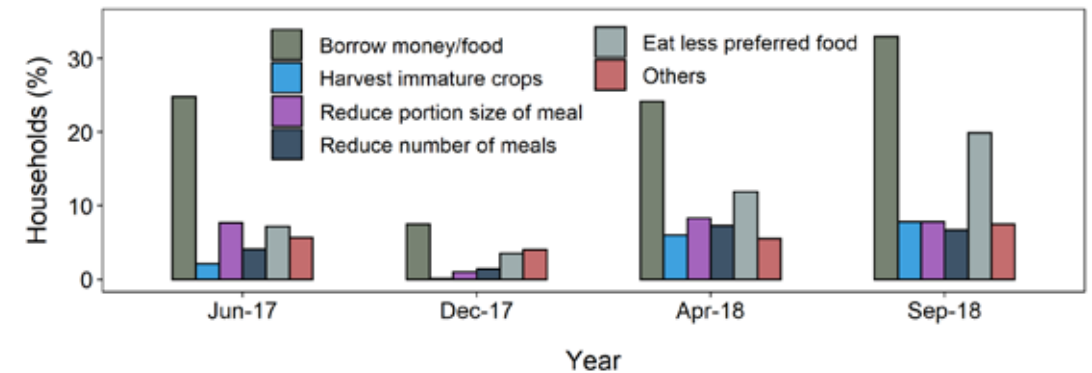


Figure 9.10

Projected Changes (°C) in Average Annual Mean Temperature for RCP 4.5 Model (2036-2065)



10. Household Food Insecurity and Coping Strategies



Data Source: Ministry of Agriculture and Livestock Development (2018), Nepal Food Security Monitoring System (2018), Vulnerability Analysis and Mapping (2018)

Figure 10.1 Various coping strategies by households in study area

Nepal's progress in combating food insecurity over the past two decade has been encouraging. However, chronic food insecurity remains an issue in several areas of the country.

The Ministry of Agriculture and Livestock Development works with the United Nations World Food Programme to monitor household food security in the Mid and Far Western Mountain region of the country, in Karnali and Sudurpaschim Provinces. Using remote monitoring via mobile phones, rapid updates are possible on household food consumption, shocks faced, livelihoods and market conditions. Monitoring rounds were started in November 2016 and continued on a trimesterly basis, with the most recent rounds also including the non-Mountain Districts of Karnali Province.

FOOD CONSUMPTION AND DIETARY DIVERSITY

A central measure of food security is the frequency of foods consumed, and the diversity those foods bring to one's diet. These are captured in the Food Consumption Score and Dietary Diversity Score measures. Both these measures have large seasonal fluctuations across areas, though Karnali Province has a consistently higher proportion of households with inadequate consumption and poor diet than the Far Western Mountain region above. This divergence is in part due to the different livelihood profiles and coping strategies in these two areas.

Despite these differences, all three regions studied had notably high rates of food insecurity; nearly one in three households in the whole study area were found to have

inadequate food consumption.¹ The key drivers of household food insecurity are the location/remoteness of the area, the type of livelihood strategy employed, productive asset ownership and the gender of the head of household.²

HOUSEHOLD SHOCKS

Households' ability to limit exposure to and recover from shocks is closely linked to their overall welfare and food security. The main shocks faced by households in the Mountain regions are disease/illness, loss of livestock and crop losses. The Sudurpaschim Mountain Districts overall face fewer shocks than Karnali Province's Mountain Districts; in Karnali's Mountains, over half of all households have faced at least one shock in the past six months. Households' vulnerability to shocks often reflects deeper structural issues; waterborne diseases and poor sanitation infrastructure exacerbate the incidence of human sickness, while livestock diseases and low livestock

vaccination rates drive livestock losses. Shocks are important because they directly impact households' productivity by reducing their assets, the time, intensity or effectiveness of their work. The burden of care, especially in the case of chronic illness or disability, can also greatly impact how productive a household's members are. All these factors weigh heavily on food security and nutrition.

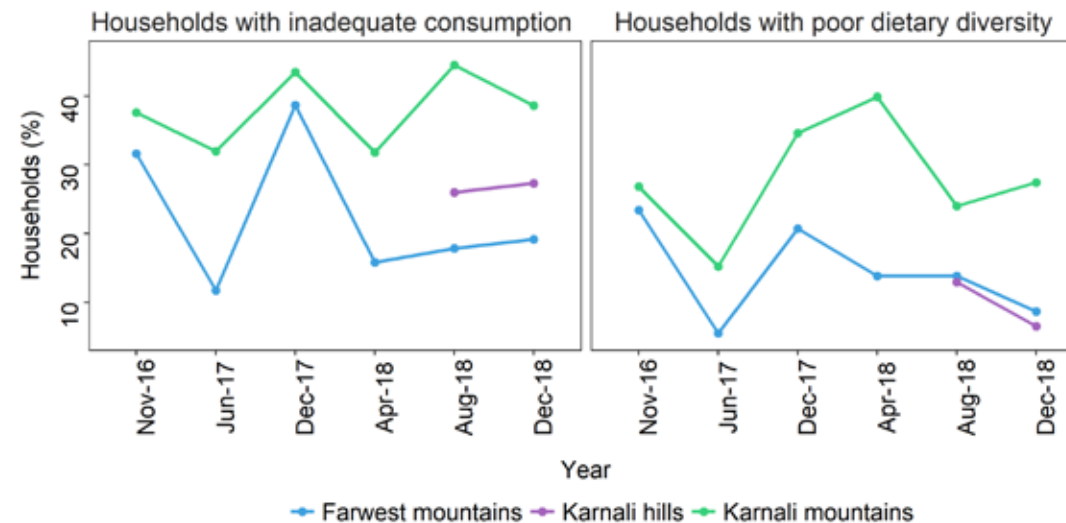




10. Household Food Insecurity and Coping Strategies

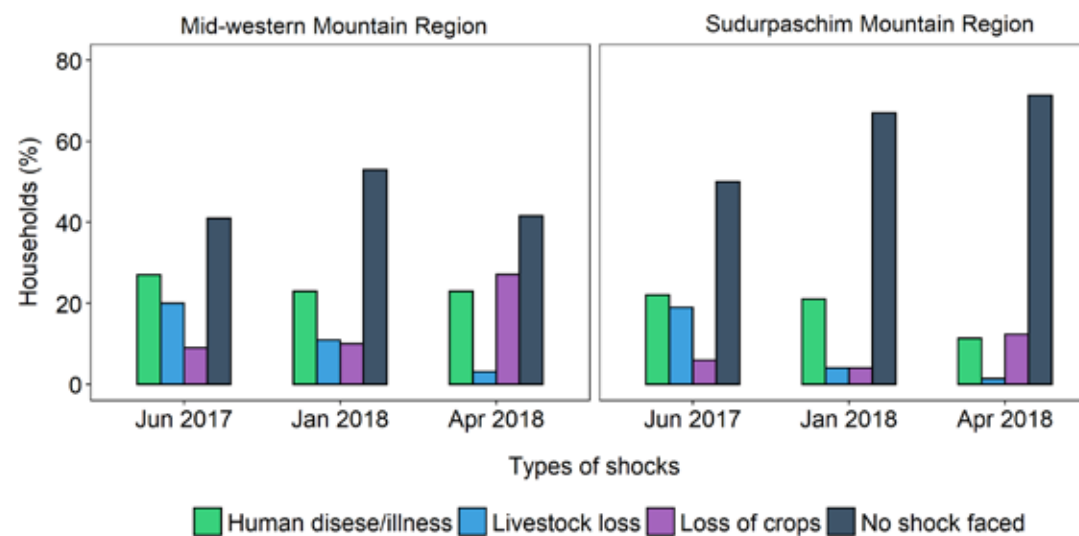
Figure 10.2

Study Areas of mVAM



Data Source: Ministry of Agriculture and Livestock Development (2018), Nepal Food Security Monitoring System (2018), Vulnerability Analysis and Mapping (2018)

Figure 10.3 Households (in %) with inadequate food consumption and poor dietary diversity



Data Source: Ministry of Agriculture and Livestock Development (2018), Nepal Food Security Monitoring System (2018), Vulnerability Analysis and Mapping (2018)

Figure 10.4 Types of shocks



10. Household Food Insecurity and Coping Strategies



COPING STRATEGIES

Coping strategies are how households deal with shocks and low food security. Not all coping strategies are equal however. Some are adopted to bridge particularly hard parts of the year, such as borrowing money or eating less preferred foods. Others, like the sale of productive assets or the last female animal, can provide short term relief to a household while also crippling its ability to recover in the long term.

The adoption of coping strategies is lowest just after the harvest of the summer crop, in months like December (Figure 10.1). In other months, a quarter to a third of households in Karnali Province and Sudurpashchim Mountains report borrowing food or money to make ends meet. Eating less preferred foods is the second most common coping

strategy. Other coping strategies indicative of higher stress, such as the sale of productive assets or withdrawal of children from school, are generally low.

Coping strategies reflect a household's inability to access sufficient food either from its own production or through the markets. Roads and physical access play a pivotal role in food security in these areas, because they allow the cheaper, more reliable supply of much-needed food commodities to remote locations. In fact, for every hour reduction in travel time to a market centre household poverty prevalence is estimated to fall by 1%.¹

In areas of low physical access, food commodity availability is lower and more seasonal, and food prices are higher and can be more volatile. Figure 10.5 illustrates that in the most remote Districts of Dolpa,

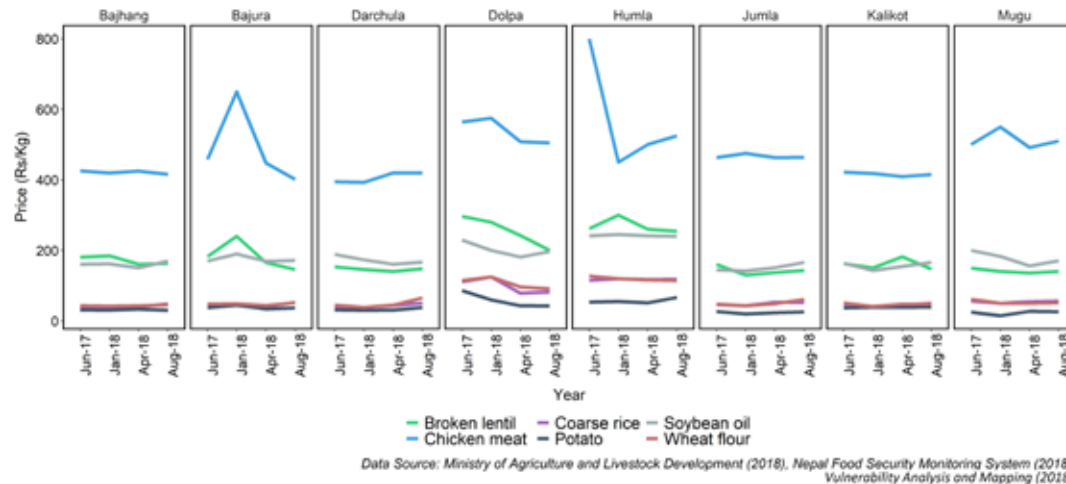


Figure 10.5 Price of some food commodities in some districts

Humla and Bajura, prices of chicken, lentils and oil are not only higher, but more volatile. Districts like Jumla and Kalikot have much steadier price trends, owing in large part to their better road access.¹

On the other hand, commodities like potatoes have steady trends across all Districts, as they tend to be grown locally. The local supply of some food commodities can also be an important element of food security, especially in more remote locations.

MALNOURISHMENT IN PROVINCE 2

Despite it being the food production centre of the country, malnutrition in Province 2 is a serious challenge. The prevalence of wasting

is above the national average, and the Global Acute Malnutrition rates among children under 5 are of 14.4% – a severe level that is just under the WHO's 15% threshold for 'critical' malnutrition. This situation is further worsened on a cyclical basis with the advent of flooding in the Terai (see Chapter 9).

Province 2's sanitation infrastructure and coverage are also underperforming: a significant portion of the population, most often the socially marginalized, do not have adequate access to sanitation facilities. This, along with difficulties in access to other services like health facilities and education and practices on health and nutrition, contribute to malnutrition in Province 2.



10. Household Food Insecurity and Coping Strategies

Figure 10.6 Major road networks in Sudurpaschim and Karnali Provinces



Figure 10.7 Underweight in Province 2

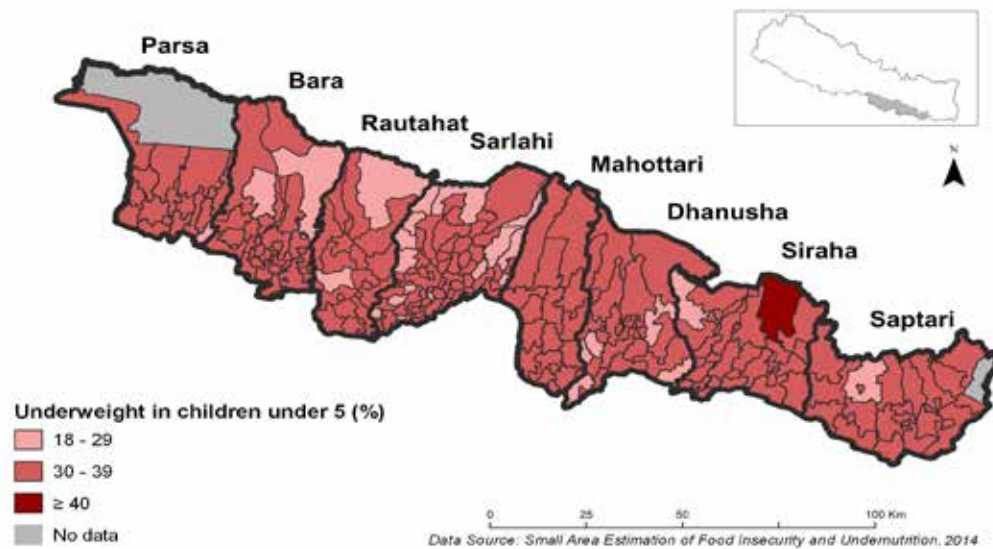
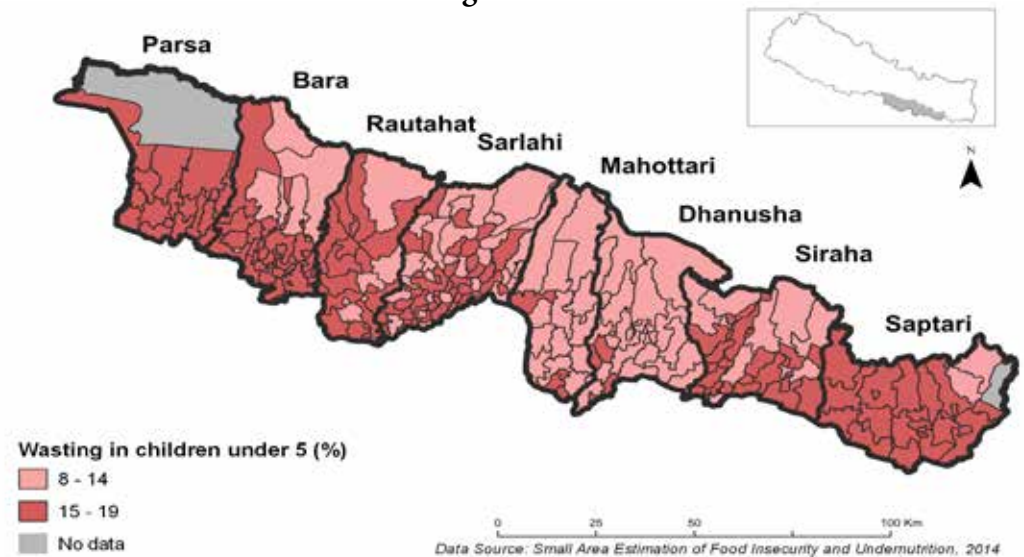


Figure 10.8 Wasting in Province 2



10. Household Food Insecurity and Coping Strategies

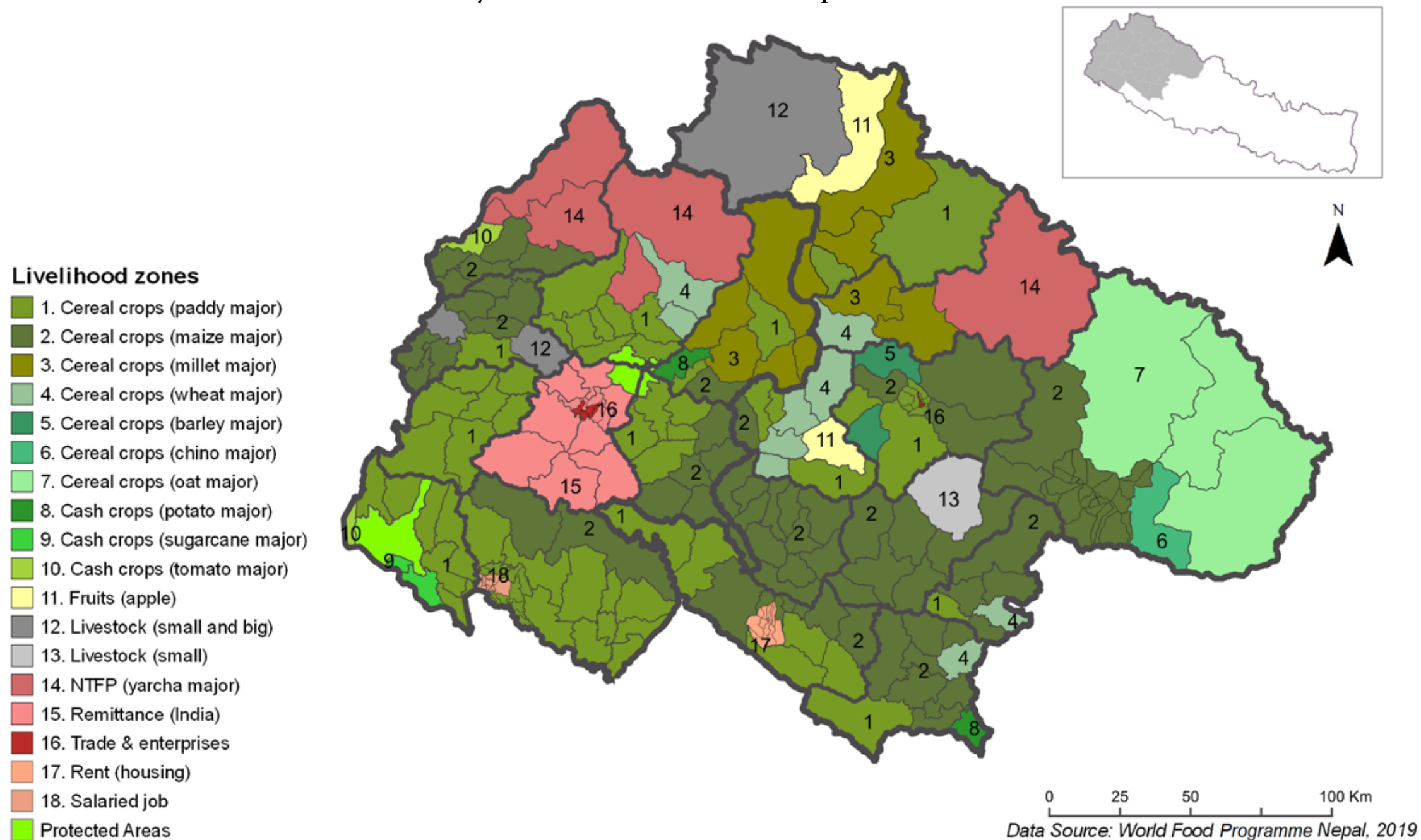




10. Household Food Insecurity and Coping Strategies

Figure 10.9

Primary Livelihoods in Karnali and Sudurpaschim Provinces



11. Addressing Food Security



The challenges to food security in Nepal are multifaceted and complex; they involve the country's topography and climate, agriculture and livelihoods, poverty and access to social services, but also gender equality and social inclusion, migration and the risk of disasters, all against a backdrop of federalism and a fundamental change in the way the Government of Nepal works.

Despite having a long road ahead to Zero Hunger, Nepal has made significant progress. The last two decades have seen substantial reductions in poverty and malnutrition especially, as Nepal went from one of the highest stunting rates in the world down to its current levels, and as it brought the prevalence of poverty down from 25.2% to 21.6% in just four years from 2011 to 2015. The devastating 2015 earthquake proved a significant setback to these trends across the country, though as Nepal continues to recover and rebuild, progress also continues.



This progress is underpinned by a new federal system of government, able to wield more power at local levels, and which has the opportunity to more clearly reflect the voices of its people. Nepal's new organization may better reflect needs, be flexible and adapted through its local governments, while the federal government provides the vision, strategic and technical support to address those needs.

The transition to Federalism following the promulgation of a new Constitution in 2072 (2015) has however exposed certain gaps in government policy, planning and programmes. These include gaps in data and evidence provision, capacity gaps in local governments, and coordination gaps across the three spheres of government. Support from development partners and civil society is key to ensuring these gaps are properly addressed so that federalism may live up to its full potential.

Nepal is going through fundamental shifts which will change the nature of food security and nutrition in the country, their effects and how they are addressed in the years to come. Urbanization will drastically change how food security and malnutrition are thought of. Nepal is one of the ten least urbanized countries in the world, with 80% of its population still living in rural areas. However it is also one of the most rapidly urbanizing, with urban areas seeing growth rates of 4 percent and above in many cases.

As more food insecure people begin to relocate to urban areas, the traditional



toolbox to address hunger, with its emphasis on agriculture and rural livelihoods, will need to be adapted. New methods to safeguard lives and livelihoods for the severely food insecure will need to be devised, from assessment methodologies to support programmes. It will fall increasingly on city governments to refine strategies for service delivery and social protection in a food security and nutrition-sensitive lens.

Climate change will also drive fundamental shifts in the food security landscape in Nepal. As average temperatures rise and rainfall patterns shift over the coming decades, the impact will be felt on agriculture as well as on disaster risk.

Agricultural practices, including planting seasons, choices of crop and cultivation

methods will have to adapt to these changes, a significant shift in Nepal where two-thirds of the population is directly engaged in farming. Support to agricultural livelihoods will also need to adapt, carrying implications for food security. With a change in weather patterns and more extreme weather events, Nepal's risk profile is also likely to change. The incidence of drought and flooding may grow, meaning that more people are exposed and affected. The extent of weather events may also become more extreme, increasing the adverse impact on already-food insecure people.

These challenges underscore the need for a multisectoral approach to food security in Nepal, adapted to the country's present and future reality.

Agricultural production itself is not enough. Food availability is crucially important, but addressing food security and nutrition for 2030 and beyond requires a balanced understanding of the topics addressed in this Atlas.

Similarly, economic growth is not enough. Ensuring high growth and income gains must go hand in hand with addressing social and economic inequality, preserving the environment and ensuring that food security as a fundamental right of all Nepalis is actively protected.

Understanding and internalizing the multisector, multidimensional nature of food security and nutrition in Nepal will enable more effective governments and partners, and more active citizens.



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