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Covid-19 Pandemic and Nepal: Issues and Perspectives

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COVID-19 PANDEMIC AND NEPAL: ISSUES AND PERSPECTIVES

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Foreword

As the Covid-19 virus that began in late 2019 in Wuhan, China, has reached 215 countries and territories infecting 32,083,273 people and claiming 981,219 lives globally as of September 23, 2020, we at Asta-Ja extend our heartfelt condolences to the families who have lost their loved ones. We salute doctors and nurses and all individuals in the front lines fighting against this pandemic. We wish safe and healthy life to every individual.

While the first case of Covid-19 in Nepal was reported on January 23, 2020 on a student who had recently returned to Kathmandu from Wuhan, China, the first case of the local transmission in Nepal was reported on April 4, 2020. Despites serious containment measures that were taken by the Nepali government, such as banning international flights, four-month long lockdown, many restrictions on businesses, social distancing, use of masks, and limit on the number of people in a group, over the past several months, the total number of infections in the country, as of September 23, 2020, is 67,804 with 436 deaths. The disease has spread all over Nepal and the infection rate has been increasing. The Covid-19 pandemic declared by the World Health Organization (WHO) on March 11, 2020, shows no sign of abatement as of September 23, 2020.

Realizing the potential catastrophic impacts of Covid-19 pandemic in Nepal, Asta-Ja International Coordination Council (Asta-Ja ICC) organized a Global Virtual Meeting of Asta-Ja ICC members on March 28, 2020, which decided three actions: 1) Establishment of Covid-19 Emergency Funds, 2) Documentation of global pandemic, and 3) Post Covid-19 Resilient Nepal Convention, in relation to Covid-19 pandemic in Nepal. Following the meeting, Asta-Ja USA immediately launched a fundraising campaign for

relief work in Nepal. Through the generous support of Asta-Ja members and supporters, Asta-Ja USA in collaboration with Asta-Ja Research and Development Center, was able to support 175 needy families with relief packages in Kathmandu Valley.

This book comes as an output of the decision taken by Asta-Ja ICC on March 28, 2020. This book is a collection of twelve articles from Asta-Ja members on Covid-19 impacts. These articles are developed by experts in various discipline, such as, engineering, agriculture, environment, geology, economics, businesses, and planning.

I appreciate the work of all contributors, reviewers, and editors of the book, who took the challenge of developing quality research-based articles during this pandemic and within such a short time.

I would like to congratulate the editors of the book, Dr. Basu Sharma and Dr. Ambika P. Adhikari, and reviewers, Dr. Keshav Bhattarai, Dr. Dinesh Gajurel, and Dr. Prasamsa Singh, for such a timely completion of this high-quality publication. Also, thanks are due to Dr. Rosina Poudel, MD, for designing the cover page of this book.

I am sure the findings presented in this book will benefit the policy makers and other stakeholders in the post-Covid-19 developmental planning and implementation programs in Nepal.

We brought this book as a part of Asta-Ja Occasional Book Series rather than a fully peer-reviewed book to make the important research findings available to the readers in a timely manner.

Dr. Durga D. Poudel
Founding President, Asta-Ja USA

Preface and Acknowledgements

When the board members of Asta-Ja USA asked us to compile and prepare a volume as a part of Asta-Ja occasional book series, they also gave us a short time frame to produce the book. It was done so that the volume could reach the readers quick enough to be of value in the rapidly evolving pandemic scenario. Accordingly, the editors provided shorter than usual deadlines to the prospective authors to submit their papers for the compendium. We are thankful that so many authors were able to provide us their valuable papers in a short period of time.

The editors are grateful to Prof. Keshav Bhattarai, Dr. Prasamsa Singh, Prof. Durga D. Poudel and Prof. Dinesh Gajurel for reviewing several papers in this book. The editors greatly appreciate their contribution also in following up with the authors and finalizing the manuscripts for this book. Without their support, this book would not have seen the light of the day.

Prof. Durga D. Poudel not only helped in the review process, but also in reaching out to the potential authors and ensuring the timeliness of their submissions. He continuously provided encouragement and support in this effort.

The editors are grateful to all the contributing authors, who responded to our requests, and in spite of their busy schedules, submitted their papers on time. They prepared the papers in a short period of time, as the editors wanted to publish the book quickly to offer suggestions and advice to the Nepali policy-makers, academics, students and concerned common citizens.

As the information about the Covid-19 pandemic is rapidly emerging, this book was assembled for a timely publication so that interested readers could refer to the ideas in this book. For this reason, the editors treated each article as an

independent paper with its own formatting, structure and style. The reviewers and editors have edited the language of the papers for clarity only.

To provide an overview of the book, the editors have synthesized the main points of each paper in the introductory essay entitled "Issues and Perspective on the Covid-19 and Nepal: An Introduction".

We owe our heartfelt thanks to the officials and members of Asta-Ja USA for asking us to undertake this task. We also thank them for providing encouragement in our efforts to complete this book on time so that it will have a timely use for the readers.

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Issues and Perspective on the Covid-19 and Nepal: An Introduction

Basu Sharma and Ambika P. Adhikari

1. Introduction

Asta-Ja is a non-profit organization dedicated to community capacity-building through training, technology transfer, logistic support, policy advocacy, and research and development. Its goal is to develop partnership with research and developmental institutions, governmental agencies, community organizations, universities, and other stakeholders and work collaboratively in agricultural, natural resources, environmental and other research and developmental projects.

This document is a publication of Asta-Ja as a part of its Occasional Paper Series to discuss some key impacts of the ongoing Covid-19 pandemic in Nepal, and propose some policy recommendations to mitigate those impacts. Asta-Ja occasional series publications are designed to discuss contemporary issues related to agriculture, environment, infrastructure and planning that relate to economic development particularly in developing countries.

According to Johns Hopkins University database (2020) on Covid-19, the number of people infected by coronavirus related disease had exceeded 32 million, of which over 980,000 had died as of September 24, 2020. The outbreak is a pandemic, the highest level of health emergency that has spread over 213 countries (WHO, 2020). It is the third exogenous shock of this century after 9/11 and the global financial crisis of 2008. But this shock is different from the earlier ones because it has burdened the world economy by creating supply, demand and policy shocks concurrently. Governments around the world invoked emergency laws and adopted such measures as border controls, stay-at- home orders, social distancing, quarantine, and lockdowns to protect people from the ravages of the virus. While helping to constraint the transmission of the virus, these measures have caused serious social and

economic consequences for individuals, societies and businesses around the world.

Against this background, Asta-Ja International Coordination Council (Asta-Ja ICC), an assembly of affiliated scholars and professionals consisting of several hundred professionals in 17 countries, hosted on March 28, 2020 its First Global Virtual Meeting and discussed COVID-19 pandemic and Asta-Ja initiatives to fight against the pandemic. One of the decisions of the meeting was to produce and publish a document on issues and perspectives pertaining to Nepal in reference to global experience on COVID-19 pandemic. The document could be useful for planners, policy makers, professional, academics and political and business leaders in Nepal who are interested on the impact of the pandemic in Nepal. Basu Sharma and Ambika P. Adhikari, both Asta-Ja Board members, were given the responsibility to implement this project by becoming editors of the document. The editors decided that a document consisting of articles from interested Asta-Ja affiliated scholars should be compiled and published by Asta-Ja as an occasional paper series document. To mobilize additional support, the original two editors approached four other individuals – Prof. Keshav Bhattarai, Prof. Durga Poudel, Dr. Prasamsa Singh and Prof. Dinesh Gajurel – to help review the papers and support in the publication of the book. All three accepted the request and became part of the efforts for this publication.

The editors issued a call for papers in May 2020 asking for the commitment from potential authors to contribute to the projected volume. The editors received commitments from various scholars for 17 papers. However, only 10 papers were received by the deadline stipulated in the initial call for papers and subsequently extended. These papers were reviewed by the members of the review committee, and subsequently revised by authors to address concerns raised by reviewers. This volume is the product of compiling the papers through this process.

Even though Nepal has relatively fewer Covid-19 cases as of 24 September 2020 (about 70,000 cases and more than 450 deaths), the numbers are on the rise. If this trend continues for a while, the likely consequences of the Pandemic would be no less severe than elsewhere. Further, Nepal's next-door neighbor India is now experiencing a rapid rise in the virus infection rate and virus-related death toll. In fact, as of 24 September, 2020, India is seeing some about six million total Covid-19 cases, and more than 92,000 deaths. As India and Nepal have open borders, and as India is the only viable land connection for Nepal to the outside world, cross border transmission of the diseases is inevitable.

Nonetheless, we assume that the disease will eventually be managed successfully either through vaccination, anti-viral drugs, and the development of herd immunity in the population or a combination thereof. When Nepal, like many other countries, slowly emerges from the lockdowns and the viral disease burden as the Covid-19 pandemic begins to recede, one crucial problem for the government, policy makers and businesses will be to figure out ways to mitigate and reverse its negative effects to bring the country back to a normal situation.

The authors of the papers included in this volume discuss and analyze key issues facing the country to make thoughtful and evidence-based policy recommendations to inform decision makers in Nepal.

How various segments and sectors are affected by the Covid-19, and what can be done to restore a new normal in the post-Covid-19 era are the key questions directly or indirectly addressed by the authors of these papers. So, what we find in the authors' answers to these questions is clear articulations of what the challenges are and how the pandemic has also opened doors for new opportunities. To organize the renderings of our authors, we have used a concentric circles framework (Math Open Reference, 2020) as both the challenges and opportunities are the result of the Covid-19 being at the front and centre of this problem. In section 2 below, we briefly describe key characteristics of the concentric circles from geometry--the framework we are using for organizing summary of the papers included in this volume. For convenience, we have grouped the papers into three segments--each belonging to a unique circle in the concentric framework-- and presented the summary report subsequently.

2. An Organizing Framework

The volume contains a number of papers related to various sectors of the economy and different segments of the Nepalese society. An organizing framework becomes necessary to discuss the issues and the perspectives the authors have advanced in this collection. As mentioned above, we use a scheme of concentric circles framework for this purpose.

In geometry, when two or more objects share the same center or axis, they are said to be concentric or coaxial. The circumferences of the concentric circles never meet but are parallel to each other. They will have the same center but different radii. The Covid-19 is the center in our case. There are

several concentric circles with the circumferences parallel to each other. In terms of the papers included in this volume, we have put them into three broad categories—food and agriculture; education, environment and urban planning; and tourism, incomes distribution and the general economy. The categorization is based on the broad thematic thrust of the papers.

Putting the Covid-19 at the center and the three categories as objects, we can visualize the concentric circles as shown in the following diagram.

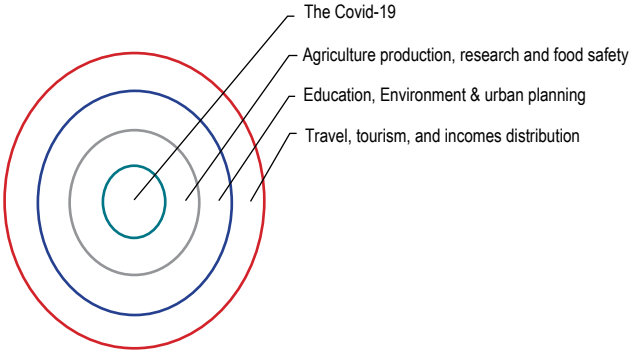

Figure 1: A Concentric Model of the Covid-19 and Its Impact

Of course, the circles do not cover all the affected areas of the Nepalese economy and society. We have designed the concentric circles model in view of the papers submitted, accepted after review and included for publication in the inaugural volume of the Asta-Ja Occasional Papers Series. Let us now turn to an overview of the issues and perspectives of these papers.

3. Issues, Perspectives, and Policies

The concentric model presented above is a general framework to examine multi-layer impacts of the Covid-19. Papers included in this volume address such multi-layer impacts in a limited number of sectors. Reading the papers from this lens, we have categorized them into three groups for discussion purpose.

3.1. Agricultural Production, Research and Food Safety

Food and agriculture are the foundation for meeting the basic survival needs of everyone. Research and program development are important elements not only for increasing agricultural productivity but also for determining

and ensuring food safety. The Covid-19 has affected various aspects of this foundation ranging from production to distribution to consumption. Scholars have analyzed and discussed many key objects belonging to this circle in their contributions to this volume.

Aditya Khanal examines demand and supply shocks in the food supply chain in the U.S. His main finding is that the pandemic has had adverse impacts on the food sector as it has affected the supply chain and altered consumption patterns. More and more people are getting accustomed to home delivery of groceries and prepared meals, and curbside pickups are becoming common in many places. However, increased cost of food due to disruption in supply chains has made many families and individuals face food shortage. On the positive side, the Covid-19 has promoted growth of online food business and perhaps the consumer's appreciation for the importance of "local" food supply chains. Policy makers in Nepal can certainly take a page or two from the U.S. experience while crafting their post-Covid-19 food and agricultural policies.

In another insightful paper, Kalidas Subedi analyses both the demand and supply shocks facing food security in Nepal. There is scarcity of input supplies such as seed and fertilizer on the one hand, and demand destruction because of high unemployment, income inequality and lockdown on the other. He has noted that the post-Covid-19 phase can bring an opportunity for reshaping the agri-food sector, provided government policies are directed towards fully engaging the unemployed youth and returnee migrant population. What is needed is facilities for year-round irrigation, availability of farm inputs such as quality seeds, fertilizers and financial credit, and use of cutting-edge production technology for farm mechanization. He is of the view that Covid-19 pandemic can become a transformative force for the development of this sector in bringing food sufficiency, developing agro-business industry and creating employment. His policy recommendations are along these lines.

Suroj Pokhrel's paper examines supply-demand imbalance in food situation arising from the Covid-19 pandemic. The supply of food has decreased because of lockdown and input constraints, whereas demand for food has increased due partly to migrants returning home. Pokhrel pleads for action to link agriculture to national Covid-19 mitigating program so that the issues related to supply constraints and demand management can be addressed appropriately. The author also recommends that educational programs and on-line counselling services to create awareness about food consumption, food wastage, and nutrition patterns are urgently needed as part of food security program.

Dilip Panthee and Khusi Tiwari explore agricultural research issues in the context of the Covid-19 pandemic. They argue that the Covid-19 has affected work schedules, lab operation, field operation and greenhouse operation, among others. More importantly, it has affected grant writing and submission timelines that could adversely affect the timing of overall agriculture research. They ask granting agencies and others concerned with grant administration to pay attention to this particular consideration. Their findings in the US are a good lesson for the agro-researchers in Nepal too.

Pushpa Lal Moktan and Durga Poudel describe disruption in the supply-chain for both perishable and non-perishable agricultural products. Using published data and specific cases, they show how smallholder producers of perishable products have suffered the most from this pandemic. While there was oversupply of perishable products due to demand destruction, there was shortage of agricultural inputs such as seeds, fertilizers and pesticides due to lockdown and logistic problems. In addition, the pandemic also affected exports of such popular products as cardamon, ginger, and tea, among others. However, one of the positive spinoffs of the pandemic has been return of a large number of Nepali migrant workers many of whom have indicated that they will try to find work at home. And some local governments have come up with plans to provide incentives to help them. These incentives range from cash payouts to making uncultivated lands available for farming. Moktan and Poudel recommend that the governments at all three levels (federal, provincial, and local) should develop and coordinate concrete policies to address market disequilibrium and to promote employment opportunities in the agricultural sector.

3.2. Education, Environment and Urban Planning

Once hunger and poverty issues are addressed, quality of life becomes an important component of human development. Education and environment become nurturing forces for human development. Given the rapid pace of urbanization, designing urban space properly and managing its infrastructure efficiently to meet the public demand become additional the additional nurturing forces. However, the Covid-19 has brought obstacles and vulnerabilities on both counts. Papers by Udhab Khadka and Durga Poudel, and by Ambika Adhikari and Keshav Bhattarai analyze these vulnerabilities and provide policy pathways to overcome them in the post-Covid-19 era.

Khadka and Poudel argue that education plays a central role in bringing prosperity in today's knowledge dominated economy. As Nepal aspires to climb

economic development ladder faster, making education accessible to everyone is vital. However, the Covid-19 has presented obstacles for accessibility and delivery. Khadka and Poudel analyze remote delivery methods used to redress the problem created by the Covid-19 in the higher education sector. They find that remote delivery platforms have become a marvelous alternative medium for bringing together teachers and learners during this pandemic, despite missing live on-campus activities and experiences. They point out that even in normal situation remote learning could complement the face-to-face learning process. Their key policy recommendation is that both teachers and students should be provided with both (a) special package of internet connectivity with higher bandwidth, and (b) required training for remote delivery and learning.

Adhikari and Bhattarai elaborate on the theme of planning and design approaches "that help counter the pandemic, promote public health and improve the quality of urban life." They argue that planning deficiencies, economic and spatial inequities, high mobility, and high population density have contributed towards increasing Covid-19 vulnerability in Nepal's cities. The authors review the current thinking on the topic by global experts who are analyzing the impact of densities on Covid-19, and how elements such as transit and occupants per dwelling units can be planned to ensure public health. Adhikari and Bhattarai, see a strong role for urban planners and policy makers in improving public health through planning and design.

They analyze the current urban environment in Nepal and propose new planning and design ideas to make the cities and urban areas public health friendly and resilient of any Covid-19 like pandemics in future. Drawing on insights and evidence from emerging ideas on planning for pandemics from around the world, they recommend public policies that are geared towards ensuring regular and clean water supply, reliable sanitary services, proper space configuration and design of buildings keeping social distancing requirement in mind, creation of "therapeutic garden" like public space facilities, development of a 20-minute city where possible, and availability of safe public transit system, among others. These policy measures are vitally important if Nepal's urbanization is to be environment friendly and people centric.

Another important aspect of urban environment is air quality. How air quality is being affected by the Covid-19 pandemic is an important question. Hari Kandel and Arjun Aryal examine the effect of the pandemic on air pollution in two major cities of Nepal—Kathmandu and Pokhara. Their research findings show that air quality significantly improved as a

result of the Covid-19 pandemic. The lockdown used by the Government of Nepal to minimize the spread of the Covid-19 virus reduced human mobility, curtailed on pollution creating activities such as driving and flying, and made people aware of healthy living. All these have contributed to reduce air pollution. Despite many challenges brought by the pandemic, this is one positive externality of the pandemic. Kandel and Aryal have masterfully demonstrated how behaviour changes, whether by necessity or externally mandated, can contribute to improvements in the environment, especially air quality.

3.3. Travel, Tourism and Incomes Inequality

Incomes inequality around the world is one of the major problems of the twenty-first century. Nepal is no exception. Remittance and public policies helped to reduce poverty level in Nepal in recent years. But the Covid-19 is like to bring a reversal to this situation as income from activities such as tourism begins to disappear and income from remittances begins to dry up. The Covid-19 suddenly appears as the disease of poor and the weak in the society. What to do to help restore some basic level of survival and preserve dignity of the poor and the weak becomes and important question.

Monika Ghimire and Udhab Khadka examine the effect of the Covid-19 on the tourism sector. Worldwide, tourism is one of the hardest hit sectors of the economy. Especially in the case of Nepal, tourism is one of the important sources of foreign currency earnings and employment creation. The authors show that travel restrictions and nationwide lockdown have adversely affected Nepal's tourism industry by making local tourism entrepreneurs, hotel businesses, souvenir sellers, tour guides, and porters jobless. The Covid-19 has drastically and adversely impacted the employees in the tourism industry in Nepal. The policy recommendation the authors make in the face of these adversities is to promote domestic tourism for sustaining the sector and build trust for safety and security of the international travelers which ultimately would contribute to the survival and revival of the sector.

Romy Karna in her paper notes that the effect of the Covid-19 has been disproportionately adverse on marginal communities, women and children. It is because they are more likely to be exposed to the disease, and more likely to have a higher mortality rate as many of them are deprived of the means of livelihood. In addition, women are predominantly in the informal sector; they bear brunt of widespread loss of livelihood; and some of them become victim

of domestic violence as stress levels rise in the house as everyone is forced to retreat in the house all day. Children from the marginal communities already suffer from malnutrition and hunger. The situation worsens with thousands of migrant workers returning from India and Middle-east, who need to be reintegrated with the family after quarantine and rehabilitated in the economy after the pandemic subsides. Das' policy prescriptions to address the problems include expanding testing, providing financial help, strengthening workplace safety, and working with the private sector to help returning migrants reintegrate.

Kanchan Joshi and Kalpana Khanal bring a political economy perspective to understand and evaluate the macroeconomic interventions used by governments around the world for mitigating financial and health-related problems created by the Covid-19 pandemic. They compare and contrast the approaches taken by the governments of developed countries with those of the governments of developing countries, particularly the South Asian ones. The authors provide comprehensive and comparative data related to the impact of the Covid-19 on the national economies, employment, production, and supply. In particular, the authors note that the vast majority of small businesses and individuals in the South Asian economies lie in the informal sector, which is not connected to formal financial and regulatory regime of the economy. When the current pandemic hit, the individuals working in the informal sectors were the worst hit as they had no fallback mechanisms such as insurance, credit line and cash reserves.

The authors find that firm and calculative actions to ameliorate the situation were taken by the former whereas they were lacking in the case of the latter. The authors ask for immediate policy interventions by governments to financially support and health-wise protect needy households and informal sector workers in South Asian countries such as India and Nepal. In addition, they recommend that the global North and international financial institutions help countries in the global South to tackle debt and financial crises as well as pandemic induced health crises.

While Joshi and Khanal explore North-South differences in tackling the effects of the Covid-19 on the needy households and informal sector workers, Karna focuses on the socio-economic impact of the pandemic on the poor of Nepal. Both papers bring important insights on how the Covid-19 pandemic has exposed and expanded vulnerabilities of the poor in developing countries like Nepal.

4. Concluding Remarks

This volume is the result of our initial curiosity for finding out the nature and extent of ravages of the Covid-19 pandemic in Nepal and how the Nepali diaspora academics are assessing the pandemic situation in Nepal. There is hardly any segment of the society and economy left untouched, directly or indirectly, by this disease. The impact of the Covid-19 in Nepal's society, economy and culture is enormous. The summary presented in section three above makes this clear.

The volume was published in a short time period to be of value to the individuals interested in reviewing the dynamics of the situation brought about by the Covid-19 in Nepal. For this purpose, the editors had to shrink the time period to collect, review and compile the papers to publish this document. The nature of the current pandemic is such that people will need to learn as they go forward. The editors and Asta-Ja believes that this volume will provide some good reference in this dynamic and fast-changing situation.

In the papers, the authors have attempted to capture those micro and macro effects and cast the stories in light of an evolving future where things also can become better if appropriate policy and program interventions are carried out by the government and businesses. Recommendations coming out of these well-researched and well thought-through papers add significantly to the public policy space in Nepal. The government of Nepal can certainly consider some of them, if deemed appropriate, in addressing the problems of the post-Covid-19 era. Similarly, this Occasional Series Paper can also be a useful reference to those researchers, professionals and students, who are interested to review the impacts of the Covid-19 in Nepal, and explore possible solutions to help Nepal face the impacts of the pandemic. It is our hope that this small volume will prove to be a meaningful contribution in this respect.

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Covid-19 Pandemic and U.S. Food Supply Chains: Disruptions, Resilience, and Beyond

Aditya R. Khanal

1. Introduction

Food supply chain refers to a series of steps of how food from a farm or producer reaches to consumers. Several systematic sequential steps are involved in this food chain process. Food moves from a producer to consumers while the money paid from consumers flows back to producers. Consumers create demand for food while producers or processors supply it. Any disturbances in any step leads to a consequential larger effect to the entire chain or food system. The Covid-19 pandemic induced shocks on both demand and supply sides leading to disruptions in food supply chains. The absorption of these shocks and the magnitude of these chain effects ranged from smaller to larger scales depending on different dimensions of these connections. These include the type of produce, and their input and output relationship in an industry while accommodating these shocks. Holistically, these shocks induced due to Covid-19 pandemic could generate ripple effects on different dimensions of agri-food systems with direct and indirect consequences in food chains in short- and long-term.

2. Demand side shocks and disruptions

Demand side shocks are reflected from the consumers' behaviors or market responses. With the incidence of Covid-19 Pandemic, two noticeable demand-side effects were induced: a) at the initial phase, consumers panicked to hoard food materials fearing market shortages in the near future, and b) with Covid-19 situations, consumption patterns changed from food service (consume away from home) to meal prepared and consumed at home. At early stages of the Covid-19 pandemic, US market retails, grocery stores, supermarkets, and retails experienced emptied shelves on key food items and household items

like rice, dried beans, canned and frozen foods, flour, and bottled water (Hobbs, 2020; National Post, 2020; 680 News, 2020). The stock piling led to almost 50 percent higher spending in the American market between the last week of February and the first week of March; grocery spending was three times higher in areas with stay-at-home or safer-at-home orders (Baker et al. 2020). However, spending dropped significantly after second half of March as people became adjusted to new reality, specifically in areas with shelter-in-place orders (Baker et al., 2020). As people stayed at home, there was low spending on food service sector while higher spending on food items and materials prepared and consumed at home. As a result, consumers in initial shelter-in-place mandated states cut restaurant spending by around 32 percent while those in other states cut by 12 percent (Baker et al. 2020). Closure of restaurants, bars, and food service sectors created adverse economic impacts as many people stayed and worked from home. The vast majority of demand to food service sector was also directed now to food retails because people demand retail foods or food materials suitable to eat at home or prepare at home. This created additional demand for food items in retails. Additionally, there were remarkable increases in online shopping and/or practices like "curb-side pickups" in order to maintain physical distance.

Most of the disruptions due to demand shocks were experienced for only the short-run in the US, except for the impacts on food service sector (like restaurant, food catering). With a sudden unexpected spike in demand (associated with panicking stockpiling behavior, change in consumption and shopping patterns), it was usual to have disturbance on normal food distribution systems built for on-time manufacturing and delivery. This created short-run difficulties as stocks in supercenters, warehouses, and retails ran out (Mussell, Bilyea, & Hedley, 2020). However, US consumers and retailers adapted different practices to ease the effects in response to these shocks over time. Retailers eventually responded with short run rationing strategies like purchase limits on key food items, specific hours or days dedicated for elderly or vulnerable customers at grocery shopping. These strategies were slowly relaxed or removed with smoother product flow.

3. Supply side shocks and disruptions

Supply side disruptions resulted from the pandemic's effect on the following three broad aspects: a) labor shortages and closure of food processing facilities, b) disruptions to transportation networks, and c) restrictions across States and Country borders. As seasonal labors (both internal and immigrants)

were restricted to travel, there was a shortage of farm workers. However, the seasonal farm labor supply is beyond the scope of this paper and Covid-19 only partly contributed to this scarcity in seasonal labor. The labor shortages and closure of food processing and distribution facilities, due to worker illness, isolation, and movement restrictions were the direct effects of the Covid-19 pandemic. Mainly meat processing and packaging sectors were directly affected. These facilities experienced significant labor shortages and closure of the facilities. Some food processor and provider announced production cuts as they temporarily (some permanently) closed their processing plants and facilities in some regions. Food processors like Smithfield Foods Inc., Tyson Foods Inc., JBS USA Food Co., Cargill Inc. temporarily shut down their facility. As a significant contributor of pork, chicken, and beef to grocery retails in the U.S., these closures disrupted market supply of these items.

Due to disruption in processing facilities and interruption in transportation, farmers and growers experienced adverse effects. As an adaptation strategy, grower needed to reconfigure their supply chains to make it shorter or directed to local, direct-to-consumer sales, and sales to local grocery stores or outlets. While some small farmers could adapt to this quickly, this adjustment in short period was not feasible to the larger extent. Typically, ready to deliver consumer commercial products go through many steps between farm gate to consumers. Disruption in these intermediate steps adversely affected farmers which even led them to destroy these food items, specifically the perishable and fresh produce, on their own expenses. Fitchette (April 2020, farmprogress.com) reports *"milk prices that were above $18 per hundredweight in January have tanked in the wake of COVID-19, trading at least $5 lower as restaurant demand for butter and cheese is gone and schools no longer need fluid milk";* "*oversupply of milk is forcing dairies to dump large amounts of milk.*" Ellis (May 2020) further reports New York dairy farmers' struggles during Covid-19 pandemic.

Macias (June, 2020) indicates the sign of increasing price on food items due to nation's unstable food supply system induced and exacerbated by Covid-19 pandemic. For example, using data from United States Department of Agriculture, Macias (June, 2020) presented that the average benchmark

wholesale price for dozen eggs in California rose from $1.73 per dozen on March 13 to a nearly double the price to $3.47 by April 10. Using Bureau of Labor Statistics data, same report shows that average consumers paid 2.6 percent more for groceries in April.

This direct impact on source of food production is the most concerning supply-side impact. With an unexpected long-term incidence of the pandemic, this impact has direct economic consequences including overall rise in food prices.

4. Obstruction in the product flow and management

Due to Covid-19 pandemic, regular product flow and logistics have been hampered. These include the adverse effects in transportation, shipment, warehouse management, and delivery services. Amazon Sales jumped 26 percent in the quarter that ended March 31 (to $75.5 billion) (Mattioli and Herrera, April 2020). Due to unexpected high demand for online items while obstructed work flow on transportation and warehouses, Amazon's delivery mechanism was severely affected with the Covid-19 incidence. A well-known Amazon prime delivery could not maintain efficiency like it is known for. Some news during initial first month of Covid-19 Pandemic in The US covered this severe impact. For example, "*Amazon Prime Delivery delays are now as long as a month"*, *"Some Amazon Prime shipments won't arrive for a month due to coronavirus"* (Morris, March 2020) *"Ordering from Amazon has been so unpredictable during coronavirus crisis"* (Palmer, May 2020). However, these product flow obstructions slowly diminished as producers and buyers both adapt to the new reality.

5. Food price volatility

The U.S. food market experienced an increase in price volatility due to Covid-19 pandemic. Demand shocks, supply shocks and disrupted supply chains contributed to the volatility in import/export, consumer, and producer prices. Comparing 3-month prices (March 2020 to June 2020) among food items, meat, fish, dairy, and eggs have the highest price volatility following the incidence of pandemic (U.S. Bureau of Labor Statistics).

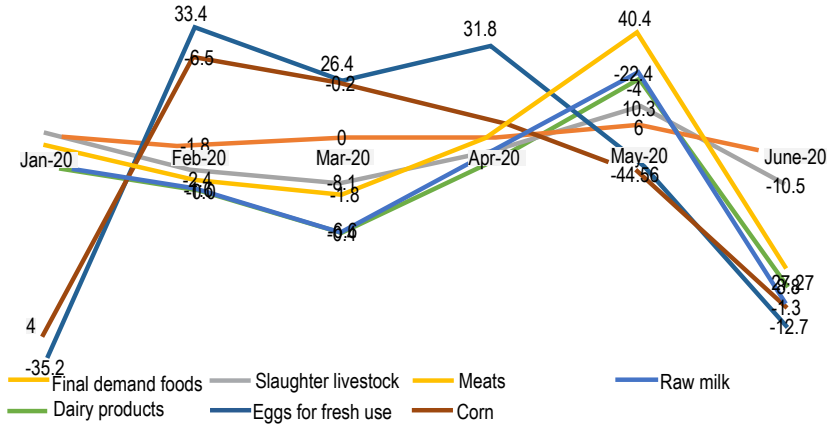

Figure 1: Changes in producer price indexes, monthly percentage changes, on the months following Covid-19 pandemic (Data source: Mead et al., 2020; U.S. Bureau of Labor Statistics)

Figure 1 shows monthly percentage changes on producer price index (PPI) on selected food items for each month from January to June, 2020. Some noticeable price movements are seen in corn, meat items, eggs, slaughter livestock, and dairy products. In April 2020, the prices for corn dropped 19.1 percent, prices for dairy products declined 4.4 percent but prices for final demand foods were fairly unchanged. However, the PPI for final-demand foods increased by 6.0 percent in May when a significant 40.4 percent surge in meat prices contributed to add on overall prices. In June 2020, the PPI for final-demand foods fell by 5.2 percent as prices for meats dropped 27.7 percent and the PPI for eggs fell 12.7 percent (figure 1). This volatility in producer price index indicates volatility in input prices, disrupted upstream and downstream supply chains linked with food and agricultural input and output markets and increased cost of production. This in-turn contributes to volatilities and price hikes in final food items available to consumers. Figure 2 shows changes in consumer prices of selected food items.

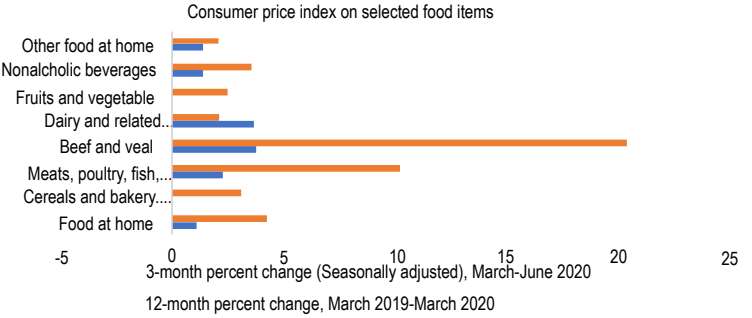

Figure 2: Changes in consumer price indexes on select food items, comparison of annual and 3-month percentage changes following Covid-19 pandemic (Data source: Mead et al., 2020; U.S. Bureau of Labor Statistics)

Figure 2 presents volatility in consumer price index, indicator of changes in the prices paid by consumers for final goods in the market. Remarkably, U.S. food market experienced around 20 percent changes in consumer prices for beef and veal and around 11 percent changes in meat, poultry, and eggs in three months between March and June of 2020. Overall, U.S. consumers experienced around 5 percent increased prices for food at home items (figure 2) between March and June of 2020. This indicates for potential severe food price surge and cumulative adverse consequences even on longer-term.

6. Conclusion

Covid-19 pandemic has created disruptions in food supply chains and food consumption behaviors resulting in short and long-term (run) consequences to food and agribusiness sector. US markets and food sectors have experienced both demand and supply side shocks and disruptions. However, some level of resilient food system support in the US has contributed to prevent severe shortages of food items in the US. Overall, the Covid-19 pandemic has adverse economic impacts on the food sector as it has affected the nature of food supply chain, and has altered consumption and shopping patterns. As the pandemic prolongs, we anticipate adverse long-run consequences of severe labor shortage, increased cost of production, and price surge on food items

and agricultural inputs. On a positive note, it has contributed to some extent to push growth of the online grocery delivery sector, and perhaps the consumer's appreciation for the importance of "local" food supply chains.

The incidence of shocks due to pandemic are unexpected and unprecedented. However, the resilient food system can prepare further with adequate support systems to prevent severity of the crises. First, increase in efficiency and capacity in domestic and local production and distribution systems of the food items could play a greater role to absorb these shocks. Since export and import pathways are severally affected due to pandemics, government policy and support could emphasize on enhancing domestic and local short supply chains to mitigate obstructed supplies. Moreover, the development of resilient food system is a holistic approach. Research and development activities should be directed to innovative marketing channels, direct to consumer delivery, and mechanisms to smoothen on-line shopping logistics. For emergency management of food crisis, State and Federal government could emphasize on community food support facilities, community food banks, and community vegetable gardens. Support for alternative food service businesses and caterings—such as, on-demand food preparation and delivery on food-trucks could be one of the new emerging business ventures feasible in some communities. Finally, government's policy instruments can help stabilize the commodity and food prices. Some support to ease the producers' added cost of production resulted from increased food safety and social-distance mandates (or similar other Covid-19 created situations) could help mitigate the food price hikes.

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3

COVID-19: Impacts and Opportunities for Agriculture and Food Security in Nepal

Kalidas Subedi

1. Introduction

Agriculture plays a vital role in Nepal's economy, employment and livelihoods, contributing nearly 28% to GDP, 66% to employment, and 50% to export (Babu and Sah, 2019). Agriculture in Nepal is in subsistence in nature and crop is mostly integrated with livestock (FAO, 2003). Most farmers grow diversified crops and livestock in an effort to meet their household requirements and to endure against uncertain and unfavourable growing conditions. Agriculture is the pillar of rural economy, therefore, its growth is vital for the livelihoods of the majority of people. Smallholders and marginal farmers predominate Nepalese agriculture with the average holding size of 0.8 hectare (ha); nearly a half of all farms have less than 0.5 ha of land, while those with less than 1 ha of land constitute nearly three-fourths of all holdings (Paudel, 2011). Land holding size per family has decreased markedly during recent years (Deshar, 2013). For example, the average size of holding declined by 28 percent between 1961 and 2001 (Paudel, 2011).

Farm productivity is inherently low because of small and fragmented lands that are predominately rain-fed, in which farmers practice traditional ways of agriculture. It has been widely recognised that there is a shortage of farm labours due to increased migration of farm labourers. Therefore, majority of the farmers are unable to produce enough food to meet their year-round food requirements. Consequently, Nepal is in its food insecure state. It has to import increasingly high volumes of cereal grains, oilseed, meat, fruits and vegetables. Low productivity coupled with increasing population, changing lifestyle of people, increasing number of food processing and feed companies, high cost of production, diversion of agricultural loan to non-productive sector and lack of storage are major reasons that are supporting to increasing agricultural import (Simkhada, 2019). In the fiscal year 2019/20, Nepal imported agricultural

commodities worth Rs 216 billion (Prasain, 2020), which accounts to an approximately five-fold increase in the last 10 years (Rs 44 billion in fiscal year 2009/10). Cereal grains top the list of agricultural imports followed by edible oil, vegetables, fruits, nuts and seeds. It is widely recognised that expanding population and stagnant local agricultural production has been the primary cause of amplified food imports in Nepal. It is also widely accepted that agriculture development interventions in the past have not been very fruitful. The country is facing a severe food insecurity, which has resulted in hunger, malnutrition and thrilling poverty.

Although livestock, poultry and fishery are also important components of agriculture and agri-food systems in Nepal, they are not included in this paper and only crop-based agri-food sector is taken into consideration. This paper describes the current food production situation, state of food security, impacts of COVID-19 pandemic on agriculture and food security. Opportunities and actions for the transformation of agricultural sector in order to achieve food security, import substation and eventually the prosperity of Nepal are outlined.

2. Food Production

Agriculture in Nepal is predominantly at subsistence level. It is estimated that only about 25% of farmers are doing commercial farming, whereas the rest are at the subsistence level (Simkhada, 2019). Majority of the farmers are small holders, who have weather-dependent and marginal lands, practice traditional low input but labour-intensive farming. Agricultural development has been sluggish, and has failed to keep pace with population growth (Deshar, 2013). Despite farmers spend a considerable amount of time and effort, crop yields are low because of poor technical knowledge and resources, and erratic climatic events (e.g. floods, droughts, water limitation). Only about 31% of agricultural land has year-round access to irrigation and remaining arable land is rain-fed (ADB, 2020). Dependence on external and costly inputs make small holder farmers vulnerable to frequent supply breaks and rising costs, such as the case of chemical fertilizer (Paudel, 2011). In recent years, because of outmigration of youths to foreign jobs or to the urban areas, there is a shortage of farm labours. As a result, agricultural lands, especially in rural and hilly regions, are left barren or abandoned.

Deshar (2013) reported an interesting trend that the area under major crops was reduced in 2011 Agriculture Census as compared to the previous Census of 2001. For example, the overall area under cereal crops was reduced by

9%, pulses by 21% and oilseed crops by 13%. Of particular interest, the area under two important crops of the mountain region, barley and buckwheat were reduced by 35% and 40%, respectively. In one hand, greater amounts of productive lands in the rural areas are being abandoned because of shortage of farm labours, on the other hand, the agricultural land in the fertile valleys and plains are shirked as occupied by urban settlements and industries. Both of the causes have direct impacts on food production. In a recent study however, KC and Race (2020) reported that the underutilization of farmland is a common and widespread phenomenon occurring in rural landscapes, much more so than the widely reported abandonment of farmland. The productivity of major staple crops in Nepal has either stagnant or increased marginally; see Table 1.

Table 1: Area (000, ha), production (000 Mt) and productivity (t/ha) of major cereal crops and potato in Nepal during 2000–2015.

Crop	Parameters	Year		Annual growth rate % (2000–2015)
		2000	2015	
Rice	Area	1542	1425	−0.5
	Production	3985	4712	1.1
	Yield	2.6	3.3	1.7
Maize	Area	815	901	0.7
	Production	1425	2220	3.0
	Yield	1.8	2.5	2.3
Millet	Area	262	269	0.2
	Production	290	305	0.3
	Yield	1.1	1.1	0.2
Wheat	Area	647	757	1.1
	Production	1143	1890	4.1
	Yield	1.8	2.5	3.4
Potato	Area	123	197	4.5
	Production	1196	2845	6.8
	Yield	9.7	14.5	2.2

Source: *Adopted from Pokhrel (2019).*

For example, the production area of rice seems to have declined in the last 15 years. The yields of rice largely depend on monsoon rain, while that of wheat on winter rain. The yields of other major staple crops and potatoes have increased just slightly. Erratic weather patterns such as droughts or flooding, pest epidemics, and a lack of input supplies such as fertilizers and improved seeds are responsible for low and fluctuating crop yields (Subedi and Dhital, 2007). Mechanization is limited primarily in the *terai* and plain areas. The labour-intensive production system is pre-dominant, which increases the production cost, therefore, it cannot compete with the foods produced in India or elsewhere.

Agricultural programs and investments have not been equally distributed across the country. In the inherently low productive lands in the mountain region, efforts on research and technology transfer are also scarce. New technologies, inputs, markets, and services are less accessible in the remote hills and mountains due to limited roads, as well as limited institutional connectivity for research and development (Babu and Sah, 2019). As a result, the agricultural productivity is very low. The low and declining farm productivity in a country results in a greater need to import of food from elsewhere to feed its people. There is an increasing trend of foods import in recent years. Prasain (2019) reported that agricultural import in Nepal exceeded Rs 220 billion in the fiscal 2019/20; about 16% higher than in the previous year. Cereals (rice, maize

and wheat) tops the list (Rs 52 billion) of food imports followed by edible oil, vegetables, fruits and nuts and seeds. Such an increasing trend of imports of food commodities in an agricultural country is worrying. According to a recent news report in the Rising Nepal, the country's imported agricultural and livestock products constitute 16 % of total imports in the fiscal year 2019/20; contributing to the mounting trade deficits in the country.

3. Food Security

Food security prevails when all people at all times have access to sufficient, safe and nutritious food to maintain a healthy and active life

(FAO, 2003). A perfect food secured condition is where all people at all times have physical and financial access to enough, safe and nutritious food to meet their dietary needs for an active and healthy life. Like health, education and public safety, food security is also a fundamental right of people and the government's key responsibility (Subedi and KC, 2001). Food security can be articulated at the global, regional, national, local and household levels (Figure 1).

Globally, there is more than enough food to feed everyone (FAO.org), however, this does not mean that everyone is food secure. Even if a country is food-sufficient, all of its citizens are not necessarily food secure. For an individual, food security at the levels higher than the household does not help. Even within a household, certain members of family such a family head or male often have preference over women and children for food. Therefore, in a perfectly food secure situation, it is imperative that all members of the household, including women, children, and elderly have access to adequate food (Subedi and Dhital, 2007). In a country like Nepal, there is already a shortage of food availability, and thus a large segment of households remains food insecure for most part of the year.

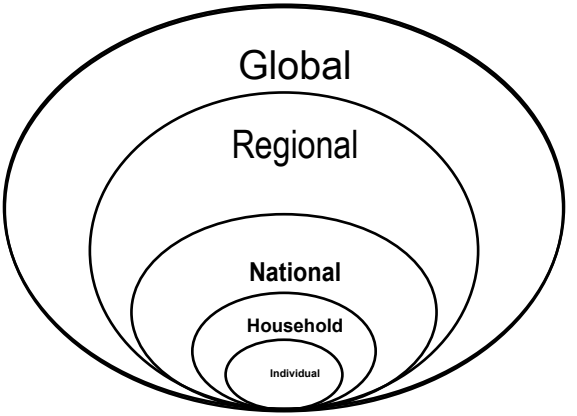

Figure 1. Illustration of food security at different levels
(After Subedi and Dhital, 2007).

Food security at the household level depends primarily on (i) foods produced at the household, (ii) access to or availability of foods in the local market and (ii) purchasing power or availability of money or cash. If families have no source of income or cash, they cannot have access of food even if food is available locally. In the context of the pre-Covid situation, majority of the marginalized households in remote mountain region, who are landless, who have limited land to produce enough food for year-round, and those who have lack of income or employment were food-deficit. The food production and distribution are highly skewed to plain areas and availability is greater in areas connected to roads. Therefore, in the remote mountain areas, the production is inherently low, and distribution is constrained. Even if foods are available at the district or village level, poor or low-income households are unable to financially afford food and therefore, are more prone to food insecurity.

According to the 2016 Nepal Demographic and Health Survey (DHS) , although the food security situation in Nepal has improved in recent years, still 4.6 million people were food-unsecured. More specifically, 20% of households reported being mildly food-insecure, 22% moderately food-insecure, and 10% severely food-insecure (USAID 2019). Overall, households in rural areas of the country where food prices tend to be higher are more likely to be food-insecure than people living in urban areas. The Food and Agriculture Organization (FAO) in its

Country Brief of May, 2020 reported that there are an estimated 4.6 million food insecure people in Nepal, accounting for 15% of the total population. These food insecure populations

are mostly concentrated in the remote northern parts of Far−Western and Mid−Western mountainous regions. In these regions, generally low agricultural productivity, low income opportunities of people and poorly functioning markets limit the access to food for the most vulnerable population. It is a matter of great concern that in a predominantly agricultural country, a large section of population still remains in food-insecure situation.

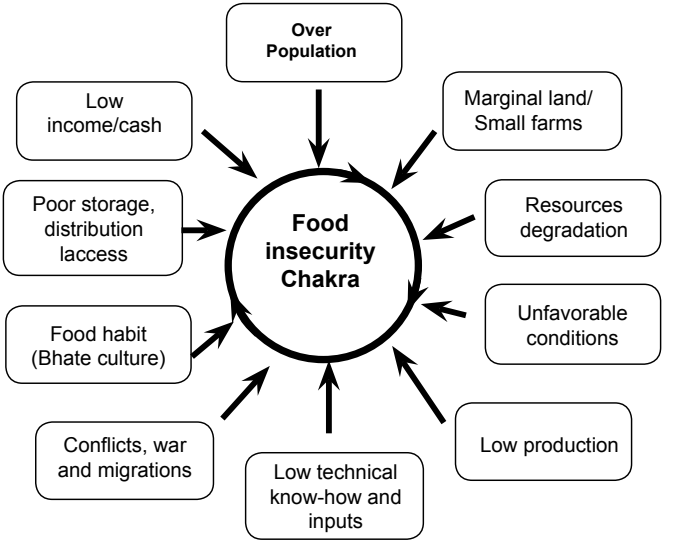

Figure 2. Factors contributing to food-insecurity in Nepal
(After Subedi and Dhital, 2007).

The key factors causing food insecurity in Nepal are as illustrated in Figure 2. The increasing

population, small sized farms and weather dependant farming that are unable to produce enough food and low income-generating opportunities thereby lack of money to purchase food are the important drivers for food insecurity. Moreover, our agriculture is highly prone to natural adversities such as seasonal drought, floods and landslides. Crop yields are highly variable because they are mostly weather dependent. In addition, other contributing factors to Nepal's amplified food insecurity include political unrests and obstructions, natural calamities such as earthquake, floods prolonged drought, and price hikes of foods and fuel.

4. Impact of COVID-19 on Agriculture and Food Security

The COVID-19 pandemic will have direct and immediate impacts on (i) production (ii) distribution, (iii) and access of food at the household level. The primary impact of COVID-19 was on farm labour and inputs supply system during the critical planting season of the year. The harvest of wheat, spring rice, vegetables, and care of dairy and poultry operations were coincided with the lock-down. The restriction of movement of people and goods limited access to markets and hampered them from selling farm produce. Similarly, planting of maize and rice were affected by lack of farm labour and access to seeds and inputs, particularly chemical fertilisers as the major predicament during this planting season. The overall impact will be reflected in crop yields to be harvested. The blockages to transport routes or the closure/restrictions disrupted the food supply chains especially for the high value commodities such as fresh vegetables, fruits, milk and meat. Shortage of farm produce in addition to the price hikes and loss of jobs or unemployment were significant difficulties for usual consumers to purchase food. As expected, the FAO (Fao.org) predicts that the poorest and most vulnerable segments of the population will be the most affected ones due to COVID-19.

The other negative effect of COVID-19 is the surge in unemployment and subsequently decrease in income generation opportunities to the people in Nepal. As in many developing countries, the labour market of Nepal has been highly affected by the COVID-19 Crisis (WFP, 2020). Shortages of farm labour has disrupted production, processing and transportation of foods. In addition, the remittance that Nepalese people highly rely on has severely declined. Even

if food is available, the families who depend on day-to-day earning for survival or those who have lost their jobs are expected to suffer the most in terms of food security.

5. Opportunities

Although the COVID-19 has had numerous adverse effects on public health, livelihoods and food security of people, this pandemic will force the country to adapt to more rigorous plans and strategies to deal with this adversity. Since agriculture is the backbone of economy and people's livelihood, there is no other option than improving this sector in the immediate future. Almost everybody in Nepal (policy makers, planners, agriculturists, farmers, and ordinary people) believe that agriculture is the foundation of Nepal's development. Currently, there are no concrete and focussed plans and policies for the transformation of this sector. Resources allocated to agriculture development are inadequate and more importantly, they are too sparse and ambiguous. Research and technology transfer systems highlight room from improvement as they are currently too conventional or customary. There is a need to overhaul agricultural system in order to transform this sector so that farmers can receive the returns they deserve, and the country can attain its prosperity goal.

The post-COVID period is a high time to focus on agriculture and to transform it to a highly productive and competitive sector. The country has the prospect to convert from a food-deficit to a food sufficient country and from a food importer to net food exporter country. Although it could be argued but with some concrete and committed efforts, it can be accomplished.

How does Nepal can overcome this food-deficit problem? Nepal offers tremendous opportunities and great potential for agriculture development. It has an agro-ecological advantage that allows to grow up to three crops in a year, suitable for growing a wide variety of crop species, available water resources, and hardworking farmers. Although there is not much room left to expand the agricultural land in Nepal, the consolidation of fragmented farms and scientific land utilization have no substitution. Not all the farmers have to grow crops. The poor or land-less farmers should be provided with other options for their employment and livelihoods such as industries, tourism or commerce. Nepal can easily meet its food requirements, provide employment, and sustain its agro-environment by properly using its potentials. There are several lessons to be learnt from our past experiences and successful examples from elsewhere. The post-COVID era forces the country to capitalise, adopt and follow

rigorous actions to boost agricultural production. This should be taken as an opportunity for agricultural transformation. Unlike the dispersed and scattered programs and investments in the past, Nepal must focus its efforts and invest in the following priority areas in order to increase agricultural productivity, raise farm income and attain food security and overall prosperity of the country:

i. **Irrigation:** For a successful crop production, we need solar radiation (light), temperature (heat), water and essential plant nutrients. Temperature and solar radiation are not the limiting factors in the lower mountains, foot-hills and *terai* region of Nepal throughout the year. Until now, the yield of several crops depends on favourable weather conditions. Therefore, producing three crops in a year with full yield potential is possible given the year-round supply of water.

   The Asian Development Bank (ADB) reports that about 1.80 million hectares of total agricultural land in Nepal (2.64 million hectare) is irrigable, of which only about 0.55 million hectares are provided with irrigation suitable for year-round cultivation (ADB, 2020). The irrigation efficiency is estimated at 35%, and water productivity is low. Still a large area of Nepal in the foot-hills, river basins, *tars* and *terai* has a potential to convert into irrigable lands under assured irrigation. There are ample sources of water for irrigation. Depending on the suitability and source of water, small to large irrigation projects including canals, tube wells, water harvest and reservoirs, and drip irrigation technologies should be constructed. We should learn lessons from other successful examples elsewhere such as from California, Egypt, Israel, and Punjab and Haryana of India how dissert like lands have been converted into most productive lands. If we seriously talk about the agriculture development in Nepal, the era of weather-dependent farming should be ended. Once year-round water supply is assured, farmers become encouraged to best utilize their land with appropriate crops/varieties, fertilizers and management practices. No doubts should be raised here.

   With the assured irrigation combined with supply of agricultural inputs (fertilizers, improved quality seeds, tools and pest control products), agricultural production can be boosted significantly, and Nepal can easily produce sufficient foods to meet its domestic requirements. Therefore, the scattered or diluted resources in the name of agriculture development must be invested on irrigation aiming to convert all irrigable agricultural lands under irrigation. To be realistic and practical, the irrigation sector should must be brought under Ministry of Agriculture umbrella.

ii. **Manufacturing Fertilizers:** For improved farm production, fertilizers combined with assured irrigation and improved production practices are the key constituents. Crop production in Nepal was

entirely dependent on locally available organic manure until chemical fertilizers were introduced in the early 1960s. Systemic import and distribution of fertilisers started in Nepal with the establishment of then Agriculture Input Corporation in 1966. The demand of chemical fertilizers is ever increasing and there is always a scarcity of supplies during the critical times. In 2018, the potential demand of chemical fertilizers in Nepal was estimated to be 700,000 tonnes (Pant, 2018).

Nepal imports fertilizers at an increasing trend and the volume of import fluctuates in some years because of tendering, shipment and distribution difficulties. According to Panta (2018), a total of 30,771 metric tonnes of chemical fertilizers were imported in Nepal during the fiscal year 2016/17, costing 12.3 billion Nepalese rupees. The government has to pay about 5 billion rupees as a subsidy for the fertilizer. Not only this is an economic burden, but importing, supplying and distributing fertilizer is always a challenge. The required amounts of fertilizers are never attained, which is apparent from the chaos of fertilizers demand during the critical crops planting seasons of year. Assured supply of quality fertilizer in time is more important, than the price of fertilizer (Pant, 2018).

Although the organic manure is the traditional source of plant nutrients, because of the shortage of farm labours, increased crop intensity, reduced livestock number per household and several other factors make the organic sources no more able to meet the demand of plant nutrients. Therefore, there is no substitute of combining chemical fertilizers with the available organic sources. The government and policy makers are not unaware of this reality. However, manufacturing of fertilizers in the country has never been well-thought-out, which is a serious policy flaw. Nitrogenous fertilizers such as urea has the highest demand in the country. Nepal should establish fertilizer manufacturing plants especially for nitrogenous fertilizers without further deferrals. It is well-known that the fertilizer, particularly urea, manufacturing demands high electric power. Given Nepal's ability to generate more power, this should not be considered as a restrictive factor anymore.

iii. **Commercialization of Agriculture:** Days have gone for the traditional subsistence farming. There is a need to transform the out-dated subsistence way of farming to commercial farming. There have been some positive trends in Nepal towards the production of more cash crops in areas connected to roads/markets and with assured irrigation facilities. The expansion in the production of high-value agricultural products such as fruits, vegetables, livestock and fishery

sub-sectors are at the expense of cereal crops such as rice, maize and wheat (Pokhrel, 2019). It is an encouraging sign but there is much more to be achieved. Based on the potentiality, commercialization of agri-food products should be the priority. The competitiveness of Nepalese products should be enhanced through lowering the cost of production, quality control and promotional activities. Based on the suitability, commercial production pockets for specialized crops should be identified and developed. Substituting the import of vegetables alone saves almost Rs 30 billion annually. The aim should not be only to substitute the import but to export. Nepal has an advantage of two huge neighbouring markets for its products.

As stated above, these production areas should be provided with assured water and inputs supply. Again, the example of California should be followed where vast areas are devoted to specialized crops. For example, the Salinas Valley is named as 'World's Salad Bowl". Similarly, there are identified citrus zone, walnut zone, almond zone, wine region and so on. Of course, the major portions of *terai* and plain areas can be devoted for intensive cereal crops production. Other areas should be dedicated to fresh vegetables, fruit (e.g. citrus zone, temperate fruit zone, and tropical fruit zone), potato zone, onion zone, floriculture zone, tea, coffee and so on. Looking at the domestic needs and imports volumes especially of onions, garlic, fresh vegetables, and cut flowers, there is an urgent need for consolidated production of these commodities in order to substitute their import. The growers should be organized so that farm credits, access to market, storage, processing and transportation services can be better provided for these producers. Irrigation facilities and land consolidation should be organized, where necessary. The growers should be assured of all production inputs, technologies and sale of their produce. Such production pockets should have cold storage and processing facilities. More importantly, the Nepalese speciality produces should be aggressively promoted to international markets. The aim should be not only substituting the import but to expert Nepalese farm products to the international markets. To achieve this, the competitiveness in terms of quality and price should be assured.

iv. **High Value Crops for Export**: Nepal is gifted for its unique growing environments for a variety of high value crops. Especially, the entire middle hill region has a potential for high value cash crops, such as tea, coffee, ginger, cardamom, turmeric, avocado, olive, kiwi and more. These crops enjoy both domestic as well as international demand. Similarly, Nepal is rich in numerous medicinal herbs and aromatic plants species. The higher mountain and Himalayan region

are known for a variety of traditional medicinal herbs that are being in healing purposes such as in preparation of *Ayurvedic* medicines and plant based essential oils. Such plant species are either under-utilized or over-exploited. The search, conservation, and proper utilization of these plant species should be given a priority. Cultivation of such plant high-value, low-volume species in the remote and marginal areas will provide cash generating opportunities in the remote areas. Cultivation of food crops in such marginal areas should be gradually substituted with such commodities.

In addition, where technically feasible, some production pockets should be designated as 'organic production zones" and provide all necessary services especially quality control, certification, processing, storage facilities and assured export market. The "organic crop production areas' should be gradually expanded to all potential areas of the country. Promotion of Nepalese commodities in the international market should be another thrust by the government through establishing necessary infrastructure and markets. Value addition and quality control of such produce will have better competitiveness in the international markets.

v. **Specialized Production Technologies:** As agricultural lands in the urban areas are shrinking while the consumption/demand of fresh vegetables is in an increasing trend. As in the industrialized countries, some specialized and high-tech production practices such as greenhouse, hydroponic (soil-less cultivation), and plastic house technologies can be developed. In particular, fresh vegetables can be grown commercially in adverse growing conditions such as in the winter months or where heat and lights are limited. These are high input practices but can be useful in producing crops in off-season where market values of the produce are high. Recently, some of the farmers have started to grow vegetables successfully in plastic tunnels and greenhouses. Modernization of agriculture through such technologies should be a priority especially in the urban and peri-urban areas, where productive lands are limited and there is an opportunity for quick sale of produce.

vi. **Retention and Integration of Youth Force in Farming:** Outmigration has become a key livelihood strategy for an increasing number of rural households, which in turn has a profound effect on land management (KC and Race, 2020). In the past two decades, because of lack of employment opportunities in the country, political insurgency and traditional farming being unable to meet for the living an increasing number of youth migration occurred to different countries and urban cities in search of employment. Although the country collects

considerable amounts of remittance, it has several social and longer-term economic consequences. Of these, there is an acute shortage of farm labourers in the rural areas resulting in more workload to women and elderly people. Abandoning of productive agricultural lands is another issue. Nepal is likely to be exacerbated if the current course of underutilization and abandonment of farmland continues (KC and Race, 2020). Agricultural production has been reduced as a result, more and more money is being spent for foods import. The COVID-19 may have positive impacts on the outmigration issue, given that a large number of youths are returning home. This is high time to retain this force in the country and engage them in farming operations. Some of these youth who bring valuable knowledge of farming should be properly utilized. Therefore, the government should develop a policy to retain this force in the country and employ them in production practices. Policies and programs should be oriented toward encouraging youths to modern and competitive agriculture through supportive programs, financial investment, technical and logistic supports as needed.

6. Conclusions

Nepal, a predominately agriculture-based economy, is still dominated by subsistence nature of farming. It is unfortunate that in a country which has abundant water resources, crop production is still weather-dependant. Farm productivity is stagnant and not able to meet the country's food requirement and economic growth. Import of foods and fertilizers make a significant share of total imports and contribute towards the trade deficits in the country. A large section of population is under-employed, has low or no income, rural distress, food-insecurity and malnutrition. As a result, a major proportion of youth force is out-migrated, resulting in the shortage of farming labour.

Agriculture development plans and interventions in the past have not been very productive because they were not properly prioritised. Further, resource allocation was not optimal as it was too scattered and did not reach the populations who were most in need. As a result, farm productivity has been diminishing, imports of foods have been substantially increased and agriculture as a profession has become less and less attractive. It is a prime time to realise the past mistakes reshape for future.

The COVID-19 pandemic will have major and immediate impacts on public health, agriculture and economy. However, this can also be an opportunity

for the transformation of agricultural sector in Nepal. With the lessons from past plans and policies, the agricultural sector should be totally reshaped. I am optimistic that from its current state of net importer of foods, Nepal can become self-sufficient in food production, and potentially a food secured country. It has diverse agro-ecologies and niches suitable for the production of a variety food grains, fruits, vegetables and high-value commercial crops, livestock, poultry, and aquaculture. Interventions should prioritise consolidating agricultural lands based on their production potentials and markets, and designating them as production zones or pockets. Emphasis should also be given to retain and engage more and more youths in agricultural sector and make agriculture as an attractive profession. All agricultural lands should be brought under assured irrigation followed by fertilizer manufacturing in the country, assured agricultural inputs supply systems, road connectivity to production sites, storage and processing facilities at the production regions. Farm mechanization where feasible and modern production practices such as greenhouse, tunnel farming, hydroponics and high-tech production practice can be practiced in urban and peri-urban areas. Nepalese specialized agricultural products should reach to the international markets, for which competitiveness of Nepalese products in terms of quality, price and guaranteed supply system should be enhanced. Therefore, attention and investment should be given to quality control, processing, value addition and market promotion.

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4

Mitigating the Impact of Covid-19 Lockdown in Relation to Developing Strategies for Sustained Food Production and Supply: Special Focus on Nepal

Suroj Pokhrel

1. Introduction and Literature review

The plague of Justinian struck of 6th century, black death of 14th century, smallpox of 20th century, influenza/flu and HIV pandemic of 19-21th centuries were the devastating pandemic disasters in the history. The novel corona virus, known as Covid-19 is a highly infectious disease noticed first time in October 2019, from Wuhan, China. It became pandemic, infecting and killing millions of people within few months (Bryan, 2020). Communicable or infectious diseases are also natural or man-made disasters (Thomas et.al., 2012). Such disasters pose a huge economic challenge to nations, communities, and corporations worldwide (Reddy et.al., 2016). The global health impact of influenza pandemic is affecting food production and supply. Such a disaster quickly creates food shortage because of restrictions on transportation and disruptions in the markets (Patho. Org., 2019). Therefore, the establishment and management of an emergency supply chain during the containment effort are of paramount importance (Thomas et.al., 2012). The resilience of the food supply chain to disruptions is the issue for extended, globalised, and complex network of modern food chain (Reddy et.al., 2016). Agriculture is one of the sectors most affected by natural disasters, fluctuating in food production, food trade and food supply chains (Reddy et.al., 2016).

Municipalities can help reduce possible food emergencies by paying close attention to the problem. Pre-purchasing and stockpiling or buffer stocking for the emergencies can help food supply during emergency period. The municipality may restrict the export of locally produced food to feed the population during pandemic (Patho. Org., 2019). It is necessary to educate the

public for home production, canning, and food preservation for the period of the pandemic. The government needs to encourage household and community food production by distributing seeds, tools, and fertilizers for small rural farms and urban gardens, provide local technical services for the production and local use of foods (Patho. Org., 2019). There should be deployment of a crisis team, development of a project plan and execution during a pandemic (The FIA, 2020). There is a need to develop a plan for communication, establish safe transportation, supply and distribution system (The FIA, 2020).

There is going to be a supply shock in terms of logistics of movement of food due to Covid-19 pandemic in 2020. Upstream staple supply chain is less vulnerable because it is capital intensive than high value supply chain (Cullen, 2020). Food shortage may be there from lower production, lower freight rates, lower capacity use and disrupted supply chains. Developing countries/Africa may have reduction in labor force, affecting agriculture production, reduced access to animal feed and diminished capacity of slaughterhouses in China. Transport restrictions and quarantine measures are likely to impede farmers' access to input and output markets, curbing productive capacities and denying a point of sale for produce. This has the potential to raise food shortages (Cullen, 2020). At the beginning of 2020 the food demand significantly increased with the diffusion of Covid-19. Later on, the dietary patterns changed with decline in meat consumption (implication from its zoonotic origins) and other higher-valued products (likely to cause price slumps). Food demand in poorer countries is more income elastic and loss of income-earning opportunities could cause consumption to contract. Aversion behavior (fear of contagion) could exacerbate effect on food consumption through reduced visits to food markets. Expect shift in purchasing modalities: lower restaurant traffic, increased e-commerce deliveries (as evidenced in China), and rise in consumption at home. Big problem is for import dependent countries (Cullen, 2020).

There is a need of more accessible food systems and the nutritional support for the Corona vulnerable population. Emergency food assistance, nutrition interventions and safety nets enhanced and made more accessible are important. The use of food banks could be an option through not only direct provision of food by government, but also donations from individuals, solidarity networks, non-governmental organizations. We can learn from Peru on this (Cullen, 2020). Road closures/blockages are slowing down agricultural services, access to inputs, delivery of goods, and marketing, leading to income decline and accumulation of produce at farms. An increased demand in both staple food and ready-to-eat food resulted in

Italy. The demand for flour increased by 80%, canned meat by 60%, canned beans by 55%, and tomato sauce by 22% (Cullen, 2020). These trends lead to difficulties to sell perishable produce resulting in loss of income. There is an immediate need to review the government subsidy and food policies on use of food buffer stocks, food trade, food markets and change on food habits. In this connection, study on the *impact of Covid-19 lockdown* on food production and distribution is needed to m*itigate the impact* in relation to developing strategies for sustained food production and supply. A special focus is urgently needed in the case of Nepal.

2. Materials and method

Available reports, scientific papers, journal articles related to pandemics and the possible impact on agriculture, food and nutrition supply and availability were reviewed. Present situation of Nepal on food production, distribution and service delivery in relation to Covid-19 lockdown were closely observed. Web pages were visited. The agriculture statistics like crop area, livestock population, food productions, import and export were taken from the secondary sources mainly from Statistical Information on Nepalese Agriculture, Ministry of Agriculture Development. Finally, the future strategy needed for the sustainable food production and supply for mitigation against the impact of Covid-19 lockdown is recommended.

3. Results and Discussion

3.1 Overall agriculture situation during Covid-19 lockdown

Every segment of the economy including food production, processing and distribution is affected by the Covid-19 Lockdown. The schedule of food production, collection and distribution especially, livestock management, crop harvesting, procurement, transportation and marketing has been disturbed. Labor shortage and distorted supply system has led to hassling, and product wastage with price fluctuations. Food system/availability especially in urban areas is distorted severely. Agriculture extension support from public sector institutions is ruined/broken because of the lockdown. Import of food stuffs from rural areas to cities and in the country from aboard has been completely stopped. The returnee population in home country from other countries has suddenly increased, raising food demands. There have been delays on next season planting and livestock stocking, manuring/fertilizer, irrigation, and other farm operations and agro harvesting. They will most likely lead to food

deficit and price hike in the days ahead. Daily wage labors, poor and peasants are the ones most severely affected by these developments.

3.2 Need of linking agriculture to Covid-19 national mitigating program

There is an immense need for preparing the safety guidelines and its immediate dissemination for creating awareness and breaking the chain of infection among farmers, agri-workers and the agro-entrepreneurs. The safety guidelines shall contribute to minimize the movement and social gathering but support continued farm operation. The safety guidelines shall be annexed with the route map that shows the infected areas, quarantine areas, isolation centers, health centers/hospitals, settlements, and agriculture areas. Distribution of safety materials/equipment to farmers, agri-workers and agro-entrepreneurs such as masks, sanitizers and personal protection equipment is necessary. Every food production and distribution activities shall be linked with overall Covid-19 lockdown impact mitigating program. The program especially shall tie up with the quarantine and isolation procedure, healthcare scheme, door step medicines supply at village level and linked to referral hospitals. In addition, the program can be linked with loans distribution for rescue and farm operation, job creation with focus on rural areas and free provision of food grains, pulses, sugar and essential commodities to all needy households including resource poor agriculture labors and the poor farmers.

3.3 Immediate agriculture extension support to mitigate impact of Covid-19 lockdown

It is necessary to permit movement of vehicles and harvesters for farm-related operations by observing adequate social distancing measures. For example, wheat harvesting and marketing is an immediate need of the day. Priority shall be given for harvesting of winter crops like wheat, lentil, rajma, winter maize and spring planting/transplanting of summer crops like early rice, spring maize and stocking of chickens and fish fingerlings. Extensive arrangements to harvest and procure the perishables like milk, meat, egg, fish, vegetables, honey, green maize cobs and fruits from village level to existing cluster markets is necessary. We need several operational cluster markets across the country. In addition, it is necessary to linked agro-products (both perishable and non-perishables) to online home delivery to customers in cities and suburban centers. Delivery can be arranged by the distributing agencies and volunteers. Facilitating transportation of agro-products to major outlets in other provinces, cities and municipalities is equally important.

Seed management is one of the challenges during the lockdown period. Seed harvesting of winter plantings, wheat, lentil, rajma etc. in time is an issue because of restriction on transportation, vehicle and harvester movement and the unavailability of labor. There are hurdles on seed harvesting, threshing, collection, transportation, processing and storage. Distribution of seeds for next season planting/transplanting of spring and summer crops like early rice, spring maize and others need to facilitated. The seed production initiatives already stepping ahead should not be geared back. Lower seed replacement rate should be accelerated through the continued seed support services, supporting quality inputs and source seeds, improved seed regulation and linking farmers/entrepreneurs to seed markets and ensuring seed self-sufficiency.

Cereals are the staple foods in many countries. Rice is the staple food in South Asia and maize the second most widely used grain for both food and feed. Governments should facilitate planting of these crops. The self-sufficiency ratio (SSR) of cereals in Nepal is 97.4% (MoAD, 2017/018) and there may not be importing cereals at present. South Asia, especially Nepal, has deficit on vegetable consumption based on ICMR (1985) and WHO (1986) recommendations where, the SSR of vegetables is about 65.9%. If there is no continuation of import, consumption will further decrease, leading to nutrition problems. So, government should take an immediate action for helping the farmers for the spring and summer planting of major cereals and vegetables.

Nepal is almost self-sufficient on poultry eggs, and poultry is one of the most promising enterprises in Nepal (MoAD, 2017/018). The SSR of meat is 61% and the milk 79%. Where, the SSR of fish is only 17.2%. However, the per capita consumption of fish meat and milk in Nepal is also below the ICMR (1985) and WHO (1986) recommendations. Thus, immediate action is needed for stocking the poultry chicks and fishery fingerlings. In addition, government should facilitate harvesting, transportation and distribution of animal source foods so that there is no supply problem.

Spring is one of the most favorable times for the beekeepers. Blossoming spring flora invite beekeepers to migrate their honeybee colonies and increase harvesting of hive products like honey. The SSR of honey is estimated 24.6%, if taken 0.5kg honey/year/person (MoAD, 2017/018). Government should support beekeepers in this season in managing colony migration and collection of honey and consumption that enhance immunity against Covid-19.

Establishment of nationwide helpline network with a number of helpline numbers to answer queries and provide agriculture advisories on crop cultivation and livestock, fishery and apiary management practices is necessary.

The federal, provincial and the local governments should prepare Covid-19 lockdown agriculture impact mitigation action plan that covers immediate, intermediate and post Covid-19 lockdown period to improve the food supply situation in the country. Governments should allocate sufficient resources or make budget transformation from any budget headings for the priority of basic food availability.

3.4 Intermediate agriculture extension support to mitigate impact of Covid-19 lockdown

Intermediately, urban agriculture and massive small-scale farming should be prioritized. Small scale farming covers small and family farms, home gardening, nutrition gardening, kitchen gardening and urban agriculture that lead to home or local scale food availability and nutrition. Small scale farming and urban agriculture are the ways of better utilizing agriculture land, vertical farming, roof top farming, use of high tech, high density intensive farming that covers hydroponics, aquaponics, etc. to enhance local foods supply. It can substitute the food imports (FAO, 2020). The city demand of entire vegetable could be produced through urban agriculture. Close proximity to the customers allows for same-day harvest and delivery of fresh vegetables through adopting rooftop poly-culture farms with larger/commercial greenhouses with hydroponics technique. It requires low water use because of rain water capturing and its recirculation. Thus, minimum inputs can give maximum yields round the year (Smart city, 2019). In Berlin, there are aquaponic farm on the roof of the building that produces both fish and vegetables (Fuzzmag, et. al. 2012). However, establishing a professionalized workforce with greater labor efficiency may be an issue (Robert, et.al., 2020). Waste can be effectively recycled to fertilize in these urban farms that can add on food availability (News.fr.msn, 2012). There are commercial larger Aero Farms (vertical farms) growing leafy greens, tomatoes and cucumbers around the year with 390 times higher yields/sq. ft. Milan is the pioneering city for commercial urban agriculture in larger green houses and vertical farming (Smart city, 2019).

It is necessary to create awareness of small-scale farming, urban agriculture and small-scale family farming among a large population, through the extension materials. It needs to distribute millions of vegetable seed packets, breed chickens, honeybee colonies, and small-scale fishery for home/nutrition gardening on a massive scale to households. The agriculture workers and the community volunteers can be mobilized for this purpose.

3.5 Post lockdown agriculture extension support to mitigate impact of Covid-19 lockdown

Resumption of full-fledged farming operations and revival of agri-based enterprises should be the priority for the livelihood recovery and agriculture resilience. Agriculture is also a means for rural employment and food security. It needs the following steps:

3.6 Policy support and priority setting

Nations and municipalities have their own land and food policy and regulation (Sushma, 2018). Policy amendment is needed for land use and improved food production, food self-sufficiency, commercialization and strengthening agro-business. Nepal is committed for food and nutrition security, right to food, food sovereignty, and zero hunger initiative. Department of Food Technology and Quality Control is placed for food quality control and Ministry of Supply is in place for to insure food supply. However, the live coordination between the food production, processing, quality regulation and supply system need to be strengthened. It is most important to have a food policy reform in Nepal for strengthening food production system for domestic consumption, import substitution or for export promotion or to support the food industries from supplying the raw materials. The illegal export of paddy and other cereals from Terai boarder just after their harvesting is frequently reported from Nepal. So, it needs to stop and maintain at least 50% food deficit as buffer stocks and stop cane/sugar import to restore national food sufficiency in Nepal (Pokhrel, 2020). Government should fix the priority and set production target of major agriculture commodities based on the demand, import dependency and production potentiality. Local governments should emphasize on the production of the commodities for local food self- sufficiency and the provincial and federal governments for the commercial production and economic resilience, tying up the agriculture research, education, extension and infrastructure development activities. China introduced a series of "vegetable basket" policies even during the Covid-19 lockdown period to stabilize production and supply, combining conventional channels and emergency channels, combining traditional circulation and new business formats, and working to reduce the impact of the epidemic on the purchase and sale of agricultural products to small farmers (Cullen, 2020).

3.7 Establishment of new agriculture farms and area/heard expansion

The federal, provincial and local governments should emphasize on the activities to establishment of new commercial agriculture farms or to expand the

cultivated area and farm sizes for the prioritized commodities. It should provide support to increase the production and productivity of the foods targeting the commodities with higher IDR like fruits, pulses, fish, sugar, oilseed and other daily needs. However, expansion of area for a particular commodity can reduce the production of others. Countries like US, China and Brazil either have larger land masses or they are part of bigger economic unions which have scope for the expansion of the cultivated areas and herd/farm sizes for the commercial production (Sushma, 2018). In Japan, municipalities prepare the land-use plans in accordance with national and prefectural laws and regulations and pass auxiliary regulations guiding land use in their jurisdictions (OECD, 2017). In Japan, the land use policies are supported for the expansion and commercial production of livestock and pasture use in Hokkaido and for paddy, soybean, onion, wheat, barley, sugar beet and starch potato on rest of the uplands. The priority has been given based on their competitive price, domestic demand, soil health and industrial use (OECD, 2009). The expansion of the cultivated areas/herd size is not feasible for all the commodities in Nepal. Thus, it needs to prioritize the commodities to allocate the cultivated land areas for crop farming, fish ponds, apiary or the livestock farm or pasture. Moreover, establishment of large size, high tech farms like buffalo fattening farms, goat farms, piggery, poultry farms, apiary, fish farms, high density fruit orchards and commercial organic vegetable farms is necessary to continue national food sufficiency. It can also generate employment and income for the economic resilience.

3.8 Program for raising the food productivity

An increased productivity increases the farm incomes, fueling the linkages between farm and non-farm poverty reduction programs, which are the consequences of agricultural growth (Dhital, 2017). The average cereal productivity in the world is 4.0t/ha (The World Bank Group, 2019), vegetables 13.9t/ha and fruits 12.04t/ha (FAO, 2010). The crop and animal productivity in several other countries are very high. The productivity of corn alone in USA is 10.07t/ha (Wikipedia, 2020). In Denmark, the vegetables yield was 31.3t/ha (Knoema, 2018) and the cereals yield 5.5t/ha (Martin, 2018) in 2018. In addition, the average dairy farm has 160 cows and the average milk yield per cow was 10,300kg/yr. in Denmark in 2015 (Henrik, 2015). The food productivity is comparatively very low in Nepal (MoAD, 2017/018). In this connection, Nepal should invest for improved farming for raising the food productivity. However, the food productivity cannot increase beyond a limit. The productivity can only increase with a strong research and technical back up, technology, infrastructure, funding support and an enabling environment. So, for restoring food self-sufficiency, a combined effort with the scope of

area/heard expansion with predominantly an increase in food productivity is needed.

3.9 Infrastructures support

Infrastructure provides basic foundation for modernizing the agriculture. Community refrigerators have helped reduce food wastage in the UAE, Germany and France (Sushma, 2018). Many other countries having higher animal and crop yield like the USA and India have developed, popularized and scaled up the high-tech initiative for higher and quality yields (World Bank Group, 2020). Similarly, Nepal needs to develop sufficient farm structures, irrigation structures, custom hiring centres, community seed banks, community storages, cold storages and cold chains, high tech nurseries, green houses, collection/processing/packaging units, agro-industries and the market structures to restore the food self-sufficiency in the country. Cold chain has been promoted for the supply of perishables in many countries (Cullen, 2020) but it is still lacking in Nepal.

3.10 Farmer's welfare scheme and financial support

Agriculture must make an attractive business. Farmer's welfare scheme that covers output/production-based subsidy distribution, crop/livestock insurance, soft loan and interest subsidy programs are necessary to make the agriculture competitive and profitable. Input subsidy should be provided on voucher system; land banking is necessary for land pulling; and the long run subsidy including pension scheme for the farmers welfare are equally important.

Recent commitments of the African countries like Ghana, Ethiopia and Rwanda devoted larger shares of government budgets and attracted new private investment on agricultural Input Subsidy Programs (ISPs) in the last decade. The ISPs have raised the rate of purchasing agriculture inputs including fertilizer in prior seasons and has improved national food production and farmer's income (Food Tank, 2018). There are public subsidies on agriculture production inputs like improve seeds, fertilizers and machineries in Nepal too. However, the accesses of local farmers on these inputs are frequently questioned. The short-term farm subsidies on production inputs shall be continued by the municipalities for improving the agriculture productivity. However, the long-term agriculture subsidy that covers overall support framework, better infrastructure, research, knowledge dissemination, capacity building, market support, institutional strengthening, farmer's welfare scheme, insurance and agriculture risk reduction are important to be addressed to hold food self-sufficiency and national food security (Pokhrel, 2020).

3.11 Food buffer stocking

Food security and crisis management need to maintain at least 25% of needs as the buffer stock in case of non-perishable like cereals, pulses, oil seeds, and the seeds in Nepal. The community food banks should be established in provinces and municipalities. Illegal export of rice and cereals from Tarai should be stopped in time to buffer stocks and supply it in crisis. Maintenance of cold chains and cold storages for perishables are also important.

3.12 Food education

Food education is needed to improve the food consumption and nutrition pattern and balancing diet in Nepal (NeKSAP, 2011/012). India has its own per capita diet/food recommendation (ICMR, 1985). However, Nepal lacks such food/diet recommendation. The per capita consumption of energy in Nepal is very high with lower uptake of protein and edible oil/fat. It seems the source of our food is mostly from plant sources dominated by cereals (NeKSAP, 2011/012). It needs to decrease the cereals, mostly rice, and increase the consumption of pulses, fruits, vegetables, milk, meat, fish, oil and fats (ICMR, 1985 and MoAD, 2017/018). The staple food and the food habit are changing globally. Rice is the staple food in South Asia. There is a need of changing food habit to minimize the rice consumption and balancing the calories uptake in Nepal (Pokhrel, 2020). Increased calories uptake can be reduced by the increased consumption of the neglected foods, non-cereals and the animal products. Rice consumption also can be minimized through consumption of potato, wheat and other cereals. Reducing the food waste at all stages especially in cities may also help on restoring food security. Food diversification from nutritious local foods also can be the alternative substitutes of rice in Nepal (Pokhrel, 2020).

3.13 Research and technology support

Nepal should focus on agriculture research for developing high yielding breed and varieties which can enhance food sufficiency (EU, 2015). Various countries are adopting modern and advanced technologies to secure food security. The seed improvement, breed improvement and hybridization program helped commercial agriculture in the USA (Wilde, 2018). Farmers in India also are benefitting from the advanced technologies to increase their yields from farming and livestock rearing (Sharma and Mungrawal, 2019). However, use of high-tech agriculture is still not advanced in Nepal. But using it could lead the country toward self sufficiency in many of the agriculture commodities.

3.14 Reform and strengthen agriculture extension

The ruined/broken extension support of the public sector institutions during the lockdown of Covid-19 needs reorientation. Establishment of a tele-counseling

service center and application of mobile app on farming practices on crops and livestock for extensive use by the farmers is also important. Mobilization of agriculture extension workers, public sector organizations, privet sectors, and cooperatives network and community volunteers are needed. It should also emphasize on social mobilization, strengthening farmers groups, cooperatives and farmers organizations. The agriculture extension materials especially on high tech agriculture, urban agriculture and vertical farming and small-scale family farming should be produced and distributed widely.

There is a need to replace the domination of supply driven agriculture extension approaches by the demand driven services (Birner & Anderson, 2007). The extension services are based on donor's interest and less on the concerns of farmers. This should be improved/changed (Dhital, 2017). A good demand driven extension service is possible when there is commercialization and privatization of the extension services (Birner and Anderson, 2007). Recent political transformation has brought changes on service delivery system in agriculture development in Nepal. Human resource development (technical) and training is a challenge for the R/Municipalities. There are a number of priority-based production projects like Prime Minister Agriculture Modernization Project (PMAMP), Food and Nutrition Security Enhancement Project (FANSEP), implementing for the commercialization of agriculture in Nepal. These projects must play a role to restore food self-sufficiency in the country.

3.15 Improve the supply chain

Strengthening agriculture markets are necessary. However, the post harvests operations: collection, processing, packaging, transportation, storage and distribution/supply system should be a priority. Cullen (2020) pointed on the need of establishing the interconnection mechanism of farmers and merchants for improving the agricultural supply chain system. It included grains, oils, vegetables, meat, eggs, milk, and aquatic products in the scope of daily necessities during the epidemic prevention and control period. And it should continue afterward. E-marketing and home delivery system should be continuing after the lock down as well.

3.16 Budget management

Tax exemptions and food add have been given to the jobless in Italy, Australia and the USA (Cullen, 2020). The local, provincial and federal governments should immediately manage the budget transfer from any of the budget

against possible food crisis due to Covid-19. Restoring food self-sufficiency on crisis may need a huge investment/budget on agriculture as indicated by Birner & Anderson (2007). Funding on agriculture sector has a declining trend in Nepal (Dhital, 2017). There is a lack of integrated approaches to public-public partnership. Majority of private funds are being mobilized separately against public-private partnership. Private-private partnership has not materialized enough as projected by ADS. Thus, it is recommended to have improved agriculture funding through increasing public investment and attraction of the private fund for restoring food security in Nepal (Pokhrel, 2019).

4. Conclusion and Recommendations

The schedule of food production, collection and distribution has been affected by the Covid-19 pandemic leading to product wastage and price fluctuations. Imports have been limited and food demands have increased because of returnee migrant population and ensuing unemployment problem. There is a need to link agriculture to national Covid-19 mitigating program to maintain the food system and safety of the farmers and agri-workers. *Immediate action* needed for free movement of vehicles for crop harvesting and transportation, safe farm operations, establishment of cluster markets linked with online home delivery of agro-products (both perishable and non-perishables) to cities and suburban customers, collection of seeds from winter planting and storage, distribution of seeds for spring and summer planting and stocking the poultry chicks and fishery's fingerlings should be facilitated. Establishment of nationwide helpline network and online/mobile advisories is necessary. Food education should be started to improve the production and to minimize the food waste. A Covid-19 agriculture impact mitigation plan should be prepared and implemented. Governments should allocate the sufficient resources, even transforming the budget from any budget headings for the priority of basic foods.

Intermediately, the massive small-scale family farming and the urban agriculture (vertical farming, aero farms, rooftop agriculture.) and use of larger green houses, high tech, high density, poly-culture, intensive farming need to be enhanced for waste recycling and local foods supply. Massive distributions of extension materials, vegetable seed packets, breed chickens, honeybee colonies, and small-scale fishery through mobilizing the agriculture workers and the community volunteers should be a priority.

Resumption of full-fledged farming operations and revival of agri-based enterprises is only a means for the livelihood recovery and economic resilience in post lockdown period. For this, it is necessary to build a land and food friendly environment through policy reform and priority settings for improved food production and distribution. Local governments should emphasize on local food self-sufficiency and the provincial and federal governments for the commercial production and economic resilience. Continuation of small-scale family farming with establishment of new agriculture farms and area/heard expansion establishment of large size, high tech buffalo fattening farms, goat farms, piggery, poultry farms, apiary, fish farms, high density fruit orchards and commercial organic vegetable farms to continue national food sufficiency for economic resilience may be needed. Improved farming for raising the food productivity is necessary. It is impossible to achieve these goals without a strong research and technical back up, as well as appropriate technology, infrastructure, funding support and an enabling environment. Agriculture must make an attractive business. For that, the farmer's welfare scheme that covers output/production-based subsidy support, crop/livestock insurance, soft loan and interest subsidy programs are necessary. Only then the agriculture sector can be made competitive and profitable. Input subsidy should be provided on voucher system; land banking is necessary for land pulling; and the long run subsidy including pension scheme for farmers' welfare are equally important. However, the long-term agriculture subsidy that covers overall support framework, better infrastructure, research, knowledge dissemination, capacity building, market support, institutional strengthening, farmer's welfare scheme, insurance and agriculture risk reduction are important to be addressed to have food self-sufficiency and food security. Food buffer stocking of at least 25-50% of non-perishable and maintenance of cold chains and cold storages for perishables are important. Moreover, food education is needed to improve the food consumption and nutrition pattern, balancing diet and minimizing the waste. Rice consumption can be minimized with potato, wheat and other cereals. Food diversification from nutritious local foods also can become the alternatives. Agriculture extension reform from establishment of tele-counseling services to application of mobile app, farmer's advisory services and integrated extension service delivery through commercialization and privatization is needed. Nepal may need a huge investment/budget through public sector funding and attraction of the private funds for restoring food self-sufficiency after the Covid-19 lockdown,

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The Impact of COVID-19 on Agricultural Research

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1. Introduction

The Corona Virus (COVID-19) first seen in Wuhan, China in December 2019 spread gradually to other countries in Asia, Europe, North America, and eventually throughout the world in a short period. As of September 16, 2020, more than 6.6 million people have been infected, and more than 196,000 people have lost their life in the USA. The updated number of infection and death at the national, regional, and global levels due to COVID-19 is available at https://coronavirus.jhu.edu/map.html on a real-time basis. While several pharmaceutical companies have already started working towards vaccine development, and some of them have started the trial in the human population, none of them have been able to produce a successful vaccine as of now. Russia has claimed to have developed the first successful vaccine against COVID-19. However, reliability and effectiveness of this vaccine has been questioned. The outbreak of the virus has caused changes not only in social interaction but also in agriculture research and production paradigm at the global level (Cardenas-Gonzalez and Alvarez-Buylla, 2020). Until and unless there is a vaccine available for the public, people are not able to conduct regular work, and it has impacted many aspects of their lives, including in research, education, business, industry, and others. In this article, we will focus on how the pandemic can impact agriculture and related research operations in public and private research institutions. The observations will be applicable in agricultural research in Nepal also.

Generally, food systems need to focus on public health, prosperity, and environmental sustainability. A team should work in coordination to bring about these components to work together. However, with the current situation of the COVID-19 pandemic, it is regarded as not only an unrealistic expectation but also having a negative impact on agriculture research (Hellin et al., 2020).

Thus, it may lead to the food crisis not only at present but also in the future by interrupting the supply chain system (Savary et al., 2020). It is because the production materials that the agriculture system relies on may fall on disarray. If the food system is disrupted, hunger crisis will take place. Because of the food crisis, it is also anticipated that there may be another pandemic in the world related to food quality (Waitzkin, 2020). To avoid food crisis at local level, available food access was improved by various means in Italy (Cattivelli and Rusciano, 2020). Other aspects such as food supply and demand, labor, food security, food safety, and agriculture trade at the global level might also be affected by this pandemic as indicated by Jambor et al. (2020). In this paper, we attempt to highlight the impact we are experiencing on agriculture research in general. Similar impacts are likely to be felt in Nepal too.

2. Institutional Responses

Research institutes and universities in the USA and around the world did not waste any time responding to the pandemic. They started having a series of meetings one after another to take the right course of action. Nobody knew what was going to happen in a month or two or six months. However, the institutions tried their best to take the correct decision as far as possible. The following actions were taken to expedite research and development during the pandemic.

2.1 Schedule adjustments

They identified the 'essential' and 'non-essential' research activities based on the priority of the research. The working schedule of employees was adjusted so that there is a limited number of employees per square area (720 sq ft lab space per person). The working schedule was adjusted so that there was enough space available in the lab, greenhouse, or office building.

2.2 Limit on the number of employees

In each program or department, only 'essential' staff were allowed to come to work, and a strong record keeping was required to maintain by signing in and signing out every day. This system was enforced strictly so that the total number of employees reduced drastically, working in the research institutions, laboratories and university campuses.

2.3 Postponement of field trials

Field experiments were prioritized in such a way that only the urgent and high priority field experiments were conducted during the pandemic period.

After the prioritization, an approval process was implemented by the research committees of the universities and the research institutions. Low priority field experiments were either cancelled or significantly scaled down due to lack of manpower and safety concerns. These strict measures resulted in postponing a significant number of field trials.

2.4 Extra compensation

Employees who were coming to work were at higher risk because of the exposure to the virus due to interaction with the colleagues. Because of this risk factor involved, they were compensated by 1.6 times of their salary until May, 2020 in some research institutions. Then, as the pandemic situation seemed improved to some extent, the compensation was reduced to normal payment levels. However, the COVID-19 infection rate continued to go up beyond August 2020.

3. Impacts: Short-term

3.1 Changes in regular schedule

One of the first impacts we observed was changes in the regular work schedule. It has many implications not only for work productivity but also for personal health, including physical and psychological (de Sousa et al. 2020; Gupta et al., 2020; Xu et al., 2020). This has reduced personal interactions, collaborative work, and has significantly reduced work productivity in different aspects of agricultural research.

3.2 Impact on research grant cycle

Reduced planting and operations in the greenhouse and field trials mean there will be fewer data available for reporting in the next cycle. We had to make changes in the grant cycle to adjust the current situation. This has a considerable impact on the grant cycle as well as the number of grant submissions.

3.3 Impact on lab operation

Agriculture research activities were categorized into 'essential' and 'non-essential.' Essential activities are those that are needed to maintain the genetic materials or plant materials, and non-essential activities were those that could be kept either in the seed cooler or elsewhere that can be regenerated or experiment can be conducted in the future. This classification resulted in changes in lab operations. There are limited lab activities even until six months into the Pandemic in several labs, and some labs are running with a significantly reduced capacity.

3.4 Impact on field operation

We were asked to plant only the essential crops and vegetables that was urgent to plant this year. We were asked to postpone the trials as far as possible. This resulted in the planting of only about 20 to 30% of the total trials in some cases. In other cases, field operations have been reduced to about 60 to 75% capacity during this summer, and the plan is to continue to a similarly reduced capacity level during the winter planting season into 2020/2021.

3.5 Impact on greenhouse operation

When COVID-19 cases were first reported in North Carolina, USA, greenhouse experiments were going on. We were asked to limit the visit to the greenhouse effective immediately. It impacted the research in terms of collecting data from the on-going experiments. We focused mainly on maintenance mode. In this case, we decided to maintain the seed of the germplasm so that we could repeat the experiment next year if necessary. Other greenhouses have been running in a 60-70% capacity due to reduced availability of employees and the need for them to maintain social distance.

3.6 Timely delivery of research outputs

Most of the grant-funded projects that were planned earlier continued to be planted in the field. However, additional new breeding projects were delayed. The pandemic shifted the proposed timeline to perform the research activities and deliver the outputs. It is still uncertain when these activities can be implemented successfully, and targeted outputs can be realized. However, researchers are committed to deliver the final outputs as it was planned before.

3.7 Impact on employees

A minimum number of employees were tasked to keep the plants in the greenhouse alive, and the remaining activities were suspended for an indefinite period. As a result, most employees started working from home. In some cases, there was not enough work to do from home for technicians, creating financial challenges for them.

Several employees faced hardships including in the work environment, family adjustments, working hours, and so on. While some employees enjoyed working from home, it was a challenge for others. Employees with children of school age faced challenges so that they had to adjust their schedule at home. Furthermore, some of the employees lost their jobs because of the nature of their job.

3.8 Research papers

Some research groups took the opportunity to write more research papers and grant proposals when the required data was available before the onset

of COVID-19 in the region. This is a positive aspect of writing papers by utilizing available time during the pandemic period. However, if there were some follow-up experiments to complete for the manuscripts, they were still waiting as the pandemic situation has not improved yet.

3.9 Data disruption

If there were experiments that are yet to be repeated to confirm the results before writing the manuscripts, this situation has significantly impacted the outcomes. The pandemic has disrupted the experiments and created uncertainty. The crop or seed samples stored at the freezer could be analyzed while the pandemic was ravaging the society. On the whole, the flow of research work has been disrupted.

3.10 Research outputs

A mixed level of research output is evident for the reasons explained above. Some research groups may have the opportunity to the completed experiments results published, while some are with pending data whereas some experiments have been interrupted.

4. Impact: Long-term

4.1 Diseases break up

Outcomes of the breeding research include the development of the resistant varieties capable of coping up with the new diseases. With the discontinuation in the breeding research, there may be an outbreak of some new plant diseases in the future. In that case, it will need further research to manage the diseases which may need a considerable amount of time.

4.2 Food shortages and hunger

Agriculture research has not been operated in full capacity. It will result in the delay in the development of technologies, including the development of new varieties of crops. Thus, it may not only take extra time to take the new varieties to the market but, the pandemic may also delay the marketing of the novel varieties possibly causing future food shortage. Savary et al. (2020) believe that the current situation also impacts not only research but also general production because it may lead to the weakening of infrastructures required for agriculture production. This is very important in developed counties. They even believe that if the pandemic continues, there may be a fear of 'hunger pandemic' (Savary et al., 2020). Similarly, Waitzkin (2020) believes that the agriculture system of the developed country is more vulnerable than peasant agriculture. If the pandemic continues, it may create even more agricultural

challenges in developed countries. Based on the research conducted in Peru, Zimmerer and de Haan, (2020) argue that COVID-19 is making food insecurity worse. The Asian Productivity Organization (APO) member countries want to have assured supply of quality seeds and fertilizers to reverse the effect of COVID-19 (Hossain, 2020). Agriculture labor was identified to be the limiting factor in reviving the economic crisis in Russia (Rastvortseva and Snitko, 2020). In China, it has been estimated that Chinese agriculture production may be reduced by 0.4 to 2.0% (Zhang et al., 2020).

4.3 Economic impact

There was an economic impact to the agricultural program when employees were not allowed to come to work, they were supposed to work from home. Furthermore, whoever were allowed to come to the offices were supposed to get additional compensation for working under a risky environment. There was travel restriction to have only one person per vehicle, which also increased the research cost. More importantly, most of the research will have to be implemented next year or in the future, which will increase the research cost. One positive economic impact has been in the travel budget savings- travel has been significantly restricted due to safety concerns. Several big in-person meetings have been cancelled and there has been saving on the travel budget which can be spent in other areas. Lin et al. (2020) have examined the survival ability of agri-business and e-commerce in this pandemic situation under the Chinese context. E-commerce was found to be more suitable and is likely to foster and be more sustainable in this situation. Future potential economic impacts are assessed considering the past economic disasters in 2001 due to foot and mouth disease and financial crisis in 2008 by Phillipson et al. (2020).

4.4 Potential impact on crop production

Overall research activities have been pushed back throughout the world. If there is an outbreak of unexpected disease or pests in plants, there may be a potential disaster in the agriculture sector. We have witnessed a similar situation in the past.

5. Resiliency in Agriculture Research

It may not take that long for the resiliency in agriculture research to break down. The major factors involved in research include human resources, research funds and equipment. It may not be in the same pattern as before, and priority areas might change. For example, whether we should prioritize food production or vaccine production, both are possible. While the current food insecurity is getting worse because of COVID-19, it can be improved

if agro-biodiversity and food can be diversified (Zimmerer et al., 2020; Zimmerer and de Haan, 2020). This is based on the research conducted in Peru. They emphasize the informal food chain system and seed distribution system for improving resiliency in the agriculture research system. This may be one of the approaches, while we may have to explore the others. Barcaccia et al. (2020) have eluded the idea of utilizing science and culture for the sustainable resilience of agriculture in Italy. Their concept is also close to the diversification of the crop plants that may help to revive the agriculture. In Nepal, practice of traditional small-scale agriculture, and diverse and rotating crop farming may help maintain resilience in the agriculture sector. Also, the organic farming practices, and keeping the symbiotic relationship between live stock and agriculture will also help in making agriculture sustainable.

6. Summary and Conclusions

The current pandemic has impacted several aspects of agriculture research, including field research, greenhouse and laboratory work with significant economic and social impacts. Both, public and private research institutions are significantly impacted in terms of running a normal operation. In the US, employees are reporting compromised health (physical and psychological) situation, which will have even long-term impact in quality and quantity of research. Due to this unexpected and hard to control situation, grant writing and submission timelines have been changed or postponed. These aspects will have long-term effects on agriculture research and the agriculture community in general throughout the world. It will also take a significant time and resources for organizations to recover from this impact. In the meantime, agriculture research in Nepal should focus to improve the resilience of agricultural system by falling back on traditional practices in some areas.

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6

Impact of COVID-19 Pandemic on Nepalese Agriculture

Pushpa L. Moktan and Durga D. Poudel

1. Background

Nepal is an agrarian country where 60% of the working population is engaged in agriculture, contributing around 27% of the gross domestic product. Agriculture accounts for 13% of the country's international trade. Nepalese agriculture relies on small holder farmers with the average land holding size of less than 0.5 hectares per household. It is mostly subsistence farming with a mix of livestock and agricultural crops. Only 21% of Nepal's total land is cultivated. Despite Nepal is very rich in natural resources (Poudel, 2008), it is seriously deficient in food production especially in recent decades. Nepal imported farm products worth Rs.224 billion in the fiscal year 2018/19, which accounted for 16 percent of the country's total import bill. The list of agriculture import products includes cereals, edible oil, vegetables, animal feeds and fodder, fruits and nuts.

COVID-19 infection was first reported On December, 2019, in Wuhan, Hubei, China, which was declared global pandemic on March 11, 2020, by the World Health Organization. The first case of Covid-19 in Nepal was reported on January 23, 2020. As of September 6, 2020, total COVID-19 infection worldwide had reached 27,272,165 with total deaths 887,022. On September 6, 2020, total COVID-19 infection cases in Nepal was 46,257 with total deaths 289. The cases were still rising as of September 6, 2020.

2. Governmental Response to Covid-19 Pandemic

Photo 1. Rice, maize and vegetable cultivation in Lalitpur district, Nepal. Photo: PL Moktan.

As elsewhere in the world, the devastating impacts of COVID-19 pandemic is widespread in Nepal, affecting the livelihood of people, agriculture, health, education, markets, industries and tourism. In order to control the spread of COVID-19, the first nationwide lockdown in Nepal was imposed on 24 March, 2020, which ended on 22 July, 2020. The four-month lockdown was lifted when the number of coronavirus infection cases were under control and, meanwhile, there was immense pressure from the general public and business communities, who were suffering badly from financial losses. Sadly, soon after the lockdown was relaxed, COVID-19 cases started rising.

This time, instead of enforcing nationwide lockdown, the federal government delegated authorities to local governments (provincial and local governments) to impose prohibitory orders as needed in their respective provinces and municipalities and to restrict the movement of people and goods and services and conducting businesses. This approach was taken to minimize adverse impacts on the economy. Recently, many districts/cities including three districts in Kathmandu valley (administrative and business hub of the country) are under prohibitory orders to stop the transmission of the COVID-19. This paper presents the impact of COVID-19 pandemic on Nepalese agriculture including the potential of agriculture sector in employing returnee migrants from abroad and the workers who have lost jobs in the country due to the pandemic.

3. COVID-19 Impact on Agriculture

The negative impacts were mainly observed on market demand of agriculture products, access to agriculture inputs, and export of agriculture products.

3.1 Reduced demand for produce

Box 1. Tara Pandey, a fish farmer from Siyari-5, Siddhapur in Rupandehi, has been engaged in fish farming for 19 years. She used to sell up to 4 quintals of fish daily, sending her produce to Syangja, Pokhara, Parasi, even to Sunauli in India. After lockdown, her sales have dropped to around 70 kg a day. Her income was up to Rs 150,000 a month. But now, she has not been able to pay salaries for her nine employees, and sometimes she even cannot afford fuel expenses to take her fish to the market.
Source: Poudel, 2020.

The closure of hotels, restaurants, cafes, supermarkets, party palaces, banquets, schools and colleges during COVID-19 pandemic resulted in reduced demand for agricultural products. This has disrupted food supply chain creating imbalance in supply and demand of agriculture products. Farmers producing perishable commodities such as fruits, vegetables, fish, poultry and dairy products were most severely affected. Many farmers destroyed or left unharvested their vegetables in their fields because of lack of markets. A rapid market assessment conducted by CASA program Nepal in late April 2020 indicated that demand for dairy products has decreased by 70–80% and the demand for processed milk has shrunk by almost 50% (Khadka, 2020). Overall, almost one thirds of the milk cooperatives reported over 50% decline in their revenues. Likewise, almost 70% of the vegetable markets/ cooperatives reported sales decrease by over 50%. More than two thirds of the Vegetable Collection Centres reported decrease in collection volumes by 50%. Dairy Development Corporation (DDC), a government-owned dairy company, also reported decline of its market volume by 44% during COVID-19 pandemic (Khabarhub, 2020). DDC used to sell 172,000 liters of milk in the Kathmandu valley, which has decreased to 96,320 liters after the outbreak. The president of the Nepal Dairy Association reported that the demand for milk has plummeted by 70 percent during pandemic. Just within 20 days of lockdown, the dairy sector has suffered an estimated loss of at least Rs. 2 billion (Prasain, 2020b). According to the President of the National Poultry Entrepreneurs Association, the poultry business has also declined by 40% (Khabarhub, 2020).

The excess agricultural produces were either sold at low prices or dumped / destroyed in the fields or roadside areas. In April 2020, farmers from Kapilvastu threw milk on the road while farmers in Nawalparasi and Rupandehi distributed

Box 2. Tej Bahadur Lama, a farmer from Chhaimale, Dakshinkali, Lalitpur earned Rs. 90,000 selling 200 sacks of pear from 34 trees in his orchard last year. This year he expects the same quantity of harvest, but he is worried that the fruits will rot and go waste as there is no demand of his produce due to COVID-19 pandemic.
Source: https://www.onlinekhabar.com/2020/09/893319 (In Nepali language)

the milk free of cost (The Himalayan Times, 2020). Many poultry farmers in Kathmandu and Terai had to destroy their flocks after not being able to ship them to their markets. This has led to huge losses in revenue for not only farmers, but also for processors and agriculture entrepreneurs. The outbreak of COVID-19 has severely impacted smallholder producers, particularly producers of perishable products.

Farmers in Nepal have also suffered economic losses after not being able to travel to market places to sell their produce. Due to travel restrictions during nationwide lockdown, vegetables were sold at lower prices. For example, in April 2020, farmers in nearby districts of Kathmandu city had to sell off-season vegetables like cauliflower and cucumbers as low as Rs 20 per kilo, when the price of the same was around Rs 130 a kilo last year (Aryal, 2020). The intermediaries, who collect agriculture produce from farmers and sell them, were also affected by the travel restrictions disrupting the links between value chain actors (farmers, wholesaler, retailers, and processors).

3.2 Shortages of agricultural inputs

Box 3. Nabin Karki, a farmer from Sana Gaun, Lalitpur, lost about 1,200 chickens out of his total 4,200 chickens in his poultry farm because he could not buy medicines and feed for them. Out of a total requirement of 8-9 sacks of feed daily for his chickens, he could manage only 3-4 sacks. In terms of monetary losses, his loss accounts for more than RS 7 lakhs in that particular batch of his chickens.
Source: Prasain, 2020a.

Although Government of Nepal included agricultural inputs (e.g. seeds, fertilizers, pesticides, machineries, agricultural tools) on the list of essential goods and permitted their free movement during lockdown, many farmers were not receiving these supplies on time and in sufficient quantities due to transportation and other logistic problems faced by the traders. The Agrovets and Cooperatives are the major suppliers of seeds, pesticides, animal feeds, and fertilizer to farmers in Nepal. However, they were opened only for fewer hours during lockdown and were not able to play their roles on agricultural supplies. A rapid assessment conducted in April 2020 by the International Maize and Wheat Improvement Center (CIMMYT) revealed that about 86%

of Agrovets had problem of obtaining materials from their suppliers due to travel restrictions resulting in a 50-90% drop in their agribusinesses (Pradhan, 2020). Many poultry farmers lost their birds because they were not able to buy necessary medicines and feed for their poultries. Similarly, dairy farmers also lost their milk production due to feed shortages. During COVID-19 pandemic, the feed companies had their own difficulties finding raw materials and labors for the production of animal/poultry feeds.

Farmers are facing serious shortages of chemical fertilizers at the critical time of paddy cultivation in Nepal due to COVID-19 pandemic. The government has not been able to ensure supply of chemical fertilizers to the farmers as 150,000 tons of fertilizers is stuck at the Indian ports due to lockdown and travel restrictions (Onlinekhabar, 2020). As a result, farmers in various districts in Nepal had to wait in a long queue to buy chemical fertilizer for their paddy cultivation amid corona virus threat (Prasain and Giri, 2020). Fertilizer shortage will certainly adversely impact the production of major crops like rice, maize, potatoes and some vegetable crop this year. Similarly, farmers also experienced serious shortage of maize seeds in the planting month of April 2020 as the majority of Agrovets (suppliers) were either closed or partially closed due to lockdown (Pradhan, 2020). Transport restrictions also disrupted the supply of animal breeding materials such as semen and replacement of poultry stocks (day-old chicks). Agricultural extension services are also severely disrupted due to travel restrictions and stay-at-home orders imposed for the containment of coronavirus.

3.3 Reduced export of high value products

Nepal's exports of high value products in the last fiscal year (that ended in mid-July 2020) was plunged to Rs 30.11 billion, nearly Rs 7 billion less than the previous year because of the trade restrictions caused by the COVID-19 pandemic (Prasain, 2020c). Major export items of Nepal include herbs, large cardamom, pashmina, tea, ginger, fabric, textile, yarn and rope, carpet and footwear. Large cardamom export declined by 6.19 percent to Rs 4 billion from Rs 4.28 billion, while tea export decreased by 13.14 percent to Rs 2.78 billion from Rs 3.20 billion. Ginger export declined by 14.94 percent to Rs 435 million from Rs. 512 million.

4. Agriculture: A Potential Sector for Creating New Jobs

A government task force formed to study the impact of Covid-19 on foreign employment sector estimated that around 700,000 Nepali migrant workers

Box 4. Various Incentive Packages Promoted by Local governments to Encourage and Retain Youth in Agriculture Sector:

1. Purbachauki Rural Municipality, Doti district

To encourage youths to farming, the rural municipality has introduced a reward scheme based on the annual sales and income of the farmers. If farmers sell local produce of Rs50,000, they will be rewarded with a cash prize of Rs5,000. Similarly, farmers selling produce of Rs100,000, and more than Rs100,000 will receive prize of Rs10,000 and Rs15,000, respectively.

2. Phedikhola Rural Municipality, Syangja district

To employ returnee migrant workers and those who have lost their jobs in the country due to coronavirus, the rural municipality has developed a plan for utilizing uncultivated lands for farming. Out of the total uncultivated land of around 4,000 ropanis, it plans to use at least 2,000 ropanis of land for employment generation program. Around 324 people are already working in various farming-based enterprises on 1,738 ropanis of land.

Source: Mandal, 2020.

from overseas and around 300,000 people from India will return to Nepal over the next year due to job loss and increased anxiety about their health (Shrestha, 2020). A recent survey conducted by Nepal Rastra Bank to assess the effects of Covid-19 on Nepal's economy indicated that 61 percent of businesses closed their operations completely causing a massive disruption in the production and supply chains during the four-month-long lockdown. The survey, which involved 674 firms from 52 districts, revealed that 22.5 percent of employees were laid off by businesses, including in the manufacturing and service sectors. The largest layoffs were in the hotel and restaurant sector, followed by small and medium scale enterprises which laid off 30.5 percent of their employees (The Kathmandu Post, 2020).

In order to address this massive unemployment issue, the federal government of Nepal has developed the Prime Minister Employment Program, while considering other new programs. Some local governments have come up with innovative plans to create jobs in agriculture in the rural areas both for the returning migrants from abroad and those who lost jobs in the country. Promotional strategies range from providing cash incentives based on their annual sales and income of agriculture produce, best farmer awards for growing quality produce to utilising uncultivated/ barren lands for farming.

5. Summary and Recommendations

Nepalese agriculture has been severely impacted by COVID-19 pandemic, especially lockdowns and social distancing measures enforced to contain the spread of the coronavirus. Market closures have resulted on severe decline on the demand for agricultural products, leading to dumping of milk,

vegetables, fruits, fish and chickens, thereby making huge losses to farmers and the economy. Similarly, disruption on supply of agricultural inputs has caused shortages of seeds, fertilizers, pesticides, veterinary medicines, and feed for animals affecting agricultural production adversely. In case the situation persists and the restrictions on movements of goods and services continue, which seem to be very likely until the time of this writing, the impact of COVID-19 pandemic on agricultural production and food supply would be seriously exacerbated leading to malnutrition and hunger in the society. Therefore, in order to effectively address the impact of COVID-19 on Nepalese agriculture and food supply, we recommend Government of Nepal, businesses, nongovernmental organizations, farming communities, and other stakeholders to take a highly coordinated initiative in relation to compensations, agricultural reliefs and supports, transportation and storage, and other necessary measures to fight against this pandemic and safeguard agricultural producers, consumers, businessmen, and related industries. We strongly recommend that the government at all three levels (federal, provincial and municipality/village) develop agricultural plans with incentive packages immediately and implement these programs without any delay so that employment opportunities in agriculture sector can be generated while producing much needed food for the country.

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7

Remote Delivery in Higher Education following the COVID-19 Pandemic: Lessons Learned

Udhab R Khadka and **Durga D. Poudel**

1. Introduction

Nepal has adopted 12 years secondary level education followed by six years of university, i.e. four-year undergraduate and two-year graduate (Masters') program. In Nepal, at present, 11 universities namely Tribhuvan University, Kathmandu University, Purbanchal University, Nepal Sanskrit University, Lumbini Buddhist University, Agriculture and Forestry University, Far Western University, Mid Western University, Pokhara University, Nepal Open University, and Rajarshi Janak University, and four deemed universities namely B.P. Koirala Institute of Health Sciences, National Academy of Health Sciences, Patan Academy of Health Sciences, and Karnali Academy of Health Sciences have been offering various programs in higher education (UGC, 2018). Among these institutions, except Nepal Open University, all universities and institutions have opted conventional face-to-face mode of teaching-learning and evaluation. The teaching-learning activities at graduate level include classroom teaching, writing and presenting assignments and project works and thesis/dissertation individually in physical presence. All the project works and theses have to be accomplished under the direct supervision of the assigned mentor. In science streams, in addition, students have to accomplish some laboratory experiments guided by the curriculum and have to submit laboratory reports in hardcopies. At the end of each semester or year, the students have to sit in for final written examination for final evaluation and up-gradation.

The Nepal Open University, though established with the impetus from diaspora members and with the vision of providing higher education opportunity to those dedicated learners who are not able to appear in face-to-face classes because of their other obligations, has also adopted hybrid mode of teaching and delivery

with provision of online classes with at least three contact sessions in each semester and end exams in physical presence.

2. Global pandemic and lockdown in Nepal

The present global corona virus disease 2019 (Covid-19) pandemic has spread across the world and Nepal is no exception. The outbreak was first recognized in Wuhan, Hubei, China in December 2019. The disease was declared pandemic by the World Health Organization (WHO) on 11 March 2020. The first case in Nepal was reported on 23rd January 2020, when a 32-year student who returned to Kathmandu from Wuhan, China tested positive (Bastola et al., 2020; MoHP, 2020 Jan 24). The first case of the local transmission was reported on 4th April 2020 in Kailali District (MoHP, 2020). Over the period, the disease was reported to have spread across the country, i.e. seven provinces and 77 districts. Keeping in view the possibility of spreading the pandemic, the Government of Nepal declared banning all the international flights from 22 March 2020 (CAAN, 2020) followed by restricting all the long route vehicular movements from 23 March 2020 (DoTM, 2020 March 21), and finally declared countrywide lockdown since 24 March, 2020 halting all the economic and educational activities. As of August 19, 2020, Nepal had 28,938 infections with 120 deaths from COVID-19, while the global infection had reached 22,362, 935 with 785,412 deaths (Worldometers, 2020).

3. Impact on Education Sector

In education sector, the countrywide lockdown imposed by the Government of Nepal resulted into closure of all the educational institutions forcing out students from their class room activities as well as halting their scheduled exams. The Secondary Education Examination (SEE) which was supposed to be held during 19-30 March, 2020, to be attended by 482,707 students, was cancelled at the eleventh hour, on 18 March 2020 (NEB, 2020 March 18). Likewise, the lockdown caused cancellation of the grade 12 and grade 11 examinations scheduled to be held during 20-30 April, 2020 and 3-13 May, 2020, respectively (OCE, 2020 January 21).

In the higher education, the pandemic has caused disruptions in universities and higher education institutions across the country. All the universities and campuses have not been able to run classes and conduct exams in normal physical classrooms and consequently they have not been able to follow their academic calendars. Regular face-to-face classes, scheduled examinations at

undergraduate and graduate levels, and other research activities have been halted completely due to the Covid-19 pandemic, affecting adversely more than 400,000 students enrolled at various programs of the universities (UGC, 2020 July 31). Thus, engaging students in higher education institutions was considered critical in order to reduce possible psychological impacts on students and their families (UGC, 2020 July 31).

4. Response to the Pandemic

Considering the uncertainty of the pandemic situation and resuming educational institutions for normal face-to-face classes and conducting deferred exams, adopting alternative methods of teaching-learning, evaluation and up-gradation have been greatly realized. Accordingly, at school level, remote classes in radio, television and virtual classes have been conducted. Likewise, at university level, remote delivery platforms like zoom and Microsoft Teams are in operation for virtual classrooms.

In terms of school level exams, the meeting of the Ministerial Council, Government of Nepal, held on 19 June 2020 has decided upgrading the students based on the score secured in their internal examinations at respective schools (NEB, 2020). Likewise, Government of Nepal has decided upgrading class 11 students to grade 12 based on their internal marks. The class 12 exam is still uncertain.

In higher education, in order to facilitate alternative mode of learning amidst the Covid-19 pandemic, the University Grants Commission (UGC) of Nepal realized urgency of switching to online platforms from the face-to-face mode and issued the Guideline for Facilitating Alternative Mode of Learning in Higher Education that is considered to be the initiative of the UGC for organizing classes through alternative e-learning platforms in response to the pandemic (UGC, 2020 July 31). Following the UGC guideline, Tribhuvan University has framed online class operation guideline 2020 giving mandate to run online classes in various departments, schools and campuses/colleges. The guideline also provides clear code of conducts to be followed by concerned institutions, instructors and students (TU, 2020). In addition to conducting regular classes, different departments have conducted internal exams, Masters' level Dissertation defense and PhD pre-defense as well. However, use of these online platforms seems to be limited within certain streams of the graduate levels in the central campuses of the universities. At undergraduate levels, and constituents and affiliated campuses, the online classes seem practiced in very

few programs. Those streams/subjects and levels, where regular classes have been offered online, the modality of their final exam is still not clear making it difficult in meeting academic calendar of the universities. Kathmandu University has also adopted online classes using various platforms and evaluation of students complying with the UGC regulation (KU 2020 April 17; KU, 2020 June 5). The Nepal Open University, where in normal condition regular classes are carried out online with at least three face-to-face contact sessions, has switched their face-to-face contact sessions to the online sessions. It is also planning to conduct end semester exams online (NOU, 2020).

5. Students' Experience and Perception

In reference to learners/student's perspective, some representative views have been discussed. A student of Tribhuvan University, Mr. Mahesh Prasad Awasthi, who comes from one of the remote areas of Baitadi District of Sudur Paschim (Far Western) Province, shared his views that he missed his online classes for more than three months due to internet connectivity problem at his home. As he was very much concerned and conscious of his study/career, amidst uncertain situation, he could not remain at home ever missing classes. Thus, he decided to go back to Kathmandu by any means. For this, he travelled five days for two days route during regular situation and paid three times more fare than the normal. In the absence of public transportation during national lockdown due to COVID-19 pandemic, he traveled on a truck that was carrying goods and he had to hide from the security personals, otherwise they will not let him travel. When he reached to his rented residence in Kathmandu, he was not allowed by the house owner and had to pledge for staying in personal quarantine. This is a representative story and there are many other students facing similar situations. With respect to the online classes, Mr. Awasthi expressed that it has provided good opportunity to the students to get acquainted with the technology as well as platform to continue their education during this pandemic. At the same time, he also opined that in the online class students miss interactive classroom environment and learning from the peers. One Master's research student (Miss Monika Ghimire) describes her experience of presenting dissertation seminar online where she finds herself convenient, confident and comfortable without any mass phobia, despite other limitations. She also feels the platform to be effective means of establishing connection with the mentors from home without losing time for commuting. Agreeing with this statement, a PhD scholar (Mr. Buddhi Kumal) further adds that online platform provides recording facility that can be retrieved later which is quite beneficial for the learners, especially the absentees of that particular session.

In addition, he expressed online platform can reduce unnecessary travel time and fossil fuel consumption. However, he mentions about difficulty in deriving and explaining long equations as in the live class, missing peer learning, and network connectivity problems during the class as some of the limitations of virtual mode.

6. Faculty's Experience and Perception

In the present context of Covid-19 pandemic, the remote delivery platform offers an alternative mode of teaching-learning and has been used widely. From teachers' perspective, the online platform is an alternative method to get connected and be engaged with the students in the present corona crisis. It offers opportunity for both teachers and learners to get acquainted with the technology used in teaching-learning process. Some faculty members, who were enjoying conventional classroom, expressed that the use of online platform has given them opportunities to learn the modern digital teaching-learning technology and manage education/teaching materials in digital devise. Some respondent faculties also expressed that the online platform have provided opportunity for outsourcing or disseminating knowledge across the world. However, at the same time they also expressed that the distant learning limits the teachers-learners' activities- such as eye contact, discussion, and immediate feedback that could be practiced in face-to-face classroom learning. Besides, in online method, there is limited space for teachers to learn about the learners and monitor their active participation. At the same time, in developing countries like Nepal where connectivity coverage is not sufficient, technologies are beyond the reach of common people and affordability is still a question and there is possibility of digital divide. Testing in the absence of designated test rooms or other technologies to ensure clean testing environment has been a major problem of remote delivery. Similarly, student's interest during remote delivery has been very low as they often opt to put off their videos or they simply lack videos on their computers. Group studies and joint class projects are other activities that have been compromised in remote delivery.

7. Conclusion and Policy Recommendations

Education is one of the badly affected sectors due to the Covid-19 pandemic in Nepal. In the higher education, it has forced nearly 400,000 students from their higher education out of their classes and regular learning activities and there seems no sign of ending this pandemic any time soon. Considering uncertainty of the situation, regulating institution in higher education (i.e. UGC) realized the

need for switching from conventional face-to-face mode of teaching-learning to online mode and put forward the Guideline for Facilitating Alternative Mode of Learning in Higher Education. Complying with the guideline, the universities have framed online class operation guideline to conduct online classes. Accordingly, different schools, departments and campuses have started classes, conducted internal exams, and have done research seminars and dissertation defenses. The faculties and students are enjoying the online platform as an opportunity amidst present pandemic situation despite having its limitation. Both on-campus face-to-face and online teaching-learning processes have their strength and limitations.

In order to ensure the optimum performance of online teaching-learning, all faculties and students should be provided with adequate training and technical knowhow along with appropriate supportive policies. All the faculties including non-teaching staffs and the learners across the nation should be made well aware and trained about the online teaching-learning platforms. While internet access to the common citizens especially in the cities and towns has increased remarkably in recent years, there is still a huge rural population without access to internet in Nepal. This gap in access to internet has created a big digital divide in the country. Therefore, in order to bring larger population under the umbrella of online-education it is critical to provide internet facilities across Nepal. Due to their poor economic conditions, many individuals may not be able to afford computers and other software necessary for online education. Special packages should be offered for education purpose to both teachers and learners. Appropriate testing and evaluation mechanisms should be developed for online courses. As on campus face-to-face class and online class both have some strengths and limitations, both systems should be considered as complementary to each other rather than thinking one system as the alternative of the other, even in normal condition.

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Urban Development in Nepal and the Impacts of Covid-19

Ambika P. Adhikari and **Keshav Bhattarai**

1. Introduction

The Coronavirus (Covid-19) pandemic has created a public health crisis worldwide and is impacting the way we plan and design cities. While much is still being learned about Covid-19, we have seen that the virus spreads quickly and its fatality rate is also significant. The virus has already seriously impacted the global economies and most urban activities.

During pandemics, regular public interactions in the city can be the cause for spread of communicable diseases. In this context, urban planning should include approached to help mitigate the spread of virus. Designs of facilities should help the residents to physically distance themselves from each other. Cities need to adopt planning and design approaches that help counter the pandemic, promote public health and improve the quality of urban life. Covid-19 will affect the way urban open spaces, transit systems, public amenities, multifamily housing, and urban infrastructure is planned.

Nepali cities and towns already face several planning and management problems as most lack adequate infrastructure, open spaces and many other urban amenities. The pandemic caused by the Covid-19 has exacerbated the problems already faced by the Nepali urban centers.

This article provides a review of some emerging ideas on planning for the pandemic, and offers some recommendations for a public health-friendly urban planning and design that can be applicable in Nepal.

2. Some Emerging Ideas on Planning for Pandemics

As the pandemic spreads around the world, planners, economists, designers, municipal leaders and the concerned policy makers are trying to understand

the implications of the disease on the design and planning of cities and its infrastructure. As a disease with unknown impacts and many other uncertainties related to the pandemic, the new ideas have been often tentative only.

The following paragraphs show some examples of the emerging ideas internationally related to the planning for the current pandemic.

In the New York Times article "Just Because You Can Afford to Leave the City Doesn't Mean You Should", author Dr. Mary T. Bassett, argues that the spread of the coronavirus is more than the correlation between population density and viral transmission. "That disease [COVID-19] is devastating cities like New York because of the structure of health care, the housing market and the labor market, not because of their density," she says. "The spread of the coronavirus didn't require cities — we have also seen small towns ravaged. Rather, cities were merely the front door, the first stop."

She further finds that it is not the large number of residents in the cities that creates a fertile ground for the spread of the virus. But the virus ravages the residents mercilessly as many of their residents are poor, and vulnerable minority population.

Michael Hooper of Harvard University in the article "Pandemics and the future of urban density" speaks about the concerns that the current Covid-19 pandemic may influence people's attitudes away from urban residential density. He cites a study that suggests that residents' density preferences are not significantly altered by the public health concerns. However, because of the perceptions of the citizens, planners may find it difficult to propose higher density development in light of the pandemic concerns.

In the piece "Pandemics Are Also an Urban Planning Problem" published in City Lab, Ian Klaus talks about the importance of the digital response during the current pandemic and that it didn't exist at the time of most of our historic pandemics. Digital response existed a little bit during the Ebola crisis, but not in the current scale. The digital system now can help track the coivd-19 cases, and pinpoint areas where the disease has already spread. The data and information provided by the internet, phones and computers is now being used by the authorities and professionals to treat patients, to contain the transmission, and to focus on certain areas aggressively for quarantine and other methods of slowing the spread of the virus.

Klaus states that "modern planning and civil engineering were born out of the mid-19th century development of sanitation in response to the spread of malaria and cholera in cities. Digital infrastructure might be the sanitation of our time."

Glen Miller in "Density can work post-COVID-19, with good urban planning" published in Policy Options, IRPP, Canada, emphasizes the role of transit during the pandemic and says "concerns about the next pandemic should spark a push for good city planning and policy rather than a backlash against density and transit upgrades". He believes that providing for physical distancing will result in the transit vehicles carrying fewer passengers. He recommends that the transit system in urban areas such as Toronto must be given the financial flexibility to maintain or even increase service levels during the public health crisis. He recommends staggering the workday in shifts to ease the traffic and provide flexibility to the workers. Such arrangement will help deflate the pressure on office spaces, and provide both the employees and employers different choices to get the work done.

The Government of Singapore, National Parks has been promoting the value of "Therapeutic Gardens" in helping the residents to de-stress during the public health crisis like the current one. Singapore has been actively building "outdoor gardens designed to meet the physical, psychological and social needs of park users, incorporating design principles derived from scientific evidence". Singapore experience has shown that the therapeutic gardens and horticulture programs that offer plants and nature can impart "a range of health benefits such as the relief of mental fatigue, reduced stress and an overall improvement to emotional well-being."

Cities should support the mobility for the essential workers to safely travel to jobs, home and shopping. As the pandemic can also cause mental problems to the residents, urban areas should provide enhanced opportunities for outdoor activities and recreation.

3. An Assessment of the Situation in Nepal

Nepal has been rapidly urbanizing in the past three decades. The official number of municipalities has increased from 105 in 2014 to 256 with 3,176 Hamlets (Wards) in 2017 (LLRC 2015). The 256 urban jurisdictions include 241 municipalities, 9 sub-metropolitan cities and 6-metropolitan cities. Of these metropolises, 3 are in province 3, and one each in provinces 1, 2, and 4.

These metropolises have several high-density settlements with limited amount of urban open spaces in them. Likewise, the sub-metropolises are mainly concentrated in the inner-Tarai and outer-Tarai plain areas where the population density is already high. Provinces 1 and 3 each has three sub-metropolises, provinces 3 and 7 each have one, while province 5 has four.

According to Nepal's official definitions, a metropolis consists of a minimum 300,000 people, whereas a sub-metropolis must have a minimum 150,000 people. Likewise, to be a municipal unit, the size of the population would vary. The minimum population threshold for a municipality in the Mountains is 17,000, for Mid Hills 31,000, and for Inner Tarai and Outer Tarai, it is 60,000 (LLRC 2015; MoUD 2020).

The geographic size of the urban area varies in different geographic regions depending upon the land availability. Often, some residents may exert pressure on politicians to annex their areas with the municipality. They would do so to increase the property valuation and to have urban facilities. However, low-income people are generally reluctant to annex their lands with the municipalities because they have to meet certain urban standards, and possibly pay additional taxes. Details of the population and revenue income thresholds for different geographic regions at various urban hierarchy are given in Fig. 1, Map of Nepal showing provinces, districts, and data related to the municipalities.

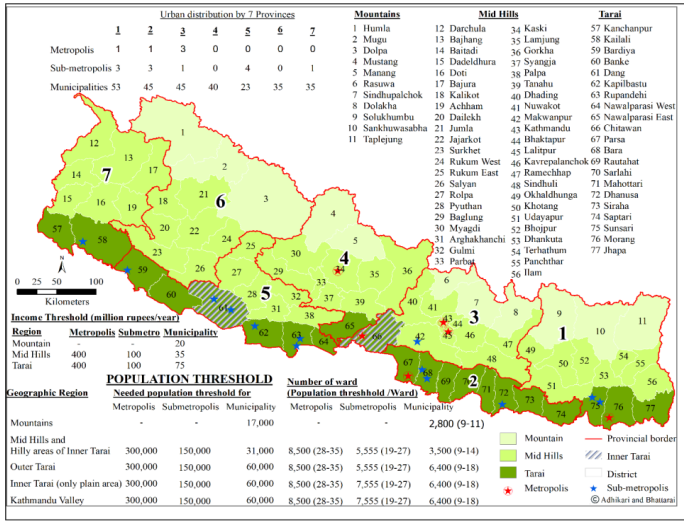

Figure 1. Map of Nepal showing provinces, districts and data on municipality. Map by K. Bhattarai with data from LLRC and others.

Figure 1 is created using the basic data published in LLRC (2015), and the periodic updates available from some national newspapers such as MyRepublica, The Kathmandu Post, Onlinekhabar, Naya Patrika and Setopati.

It is seen that many Nepali towns and cities are quite new, and many among them are just nominal urban centers as they still retain village characteristic and lack urban infrastructure, services and amenities.

Since most Nepali cities face planning deficiencies, their vulnerability to pandemic disease like Covid-19 is high. Covid-19 spread quickly in high density settlements meaning that when the population of virus increases in per unit area, its spread can accelerate. The multiple layers of social, economic and spatial inequities among the urban dwellers also contribute to enhance vulnerability of the city dwellers.

The mobility of people is another factor that is contributing to the spread of the disease. Further, large urban areas are already overburdened with pollution, and weak infrastructure and service levels. This situation has exacerbated the rapid expansion of Covid-19 pandemic in Nepal.

Though Covid-19 was slow in its spread in Nepal until the end of March 2020. Many political leaders were claiming that the Nepali people perhaps enjoyed high levels of the high immunity against the virus. Unfortunately, the Covid cases have increased over 10-fold since the last week of July 2020 partly as migrant workers began returning home from India (Gill and Sapkota 2020). Many middle-class youths took to the streets in Kathmandu and other cities to "protest perceived government apathy, incompetence, and corruption" (Gill and Sapkota 2020). The urban areas became the hub of the returnees and Covid-19 got a favorable environment to spread quickly. With rapid spread of the Covid-19 in Nepal, people are experiencing rising levels of anxiety and frustration regarding the government's healthcare and economic response to the pandemic. Assemblies in religious centers and in social gathering without following physical distances has contributed to the increase in the virus density per unit area infecting thousands of people.

The pandemic has added numerous problems to the long-standing problems in the public healthcare system of Nepal. Many health centers are understaffed and under-resourced. Government medical personnel who are assigned to work in such areas have abandoned their jobs for fear of being infected.

The designated isolation centers have poor facilities. These designated isolation centers themselves are contributing to the spread of Covid-19 among people

who inhabit them. These ad-hoc isolation centers, often set up in schools lacked cooking and bathing facilities and where detainees often have to sleep on the floor or on students' benches. Many facilities lack trained medical personnel or ambulances to take patients to a hospital if needed. It is likely that many would die without treatment (Gill and Sapkota 2020).

Most Nepali urban areas lack safe drinking water, sewerage services, and open areas for safe escape from crowded urban areas in case natural disasters like earthquakes happen. Many residential units are not easily accessible by life-saving service, such as fire and ambulance vehicles. Since many residential units are overcrowded, possible spread of the Covid-19 virus has become a serious issue.

Overcrowding of residential units is caused by many factors including the issue of housing affordability by the residents. While renting apartments in urban areas, a family can spend up to 60 percent of its annual incomes on the rent because the supply if urban dwelling units is limited. As a rule, housing is considered unaffordable if the housing cost exceeds 30 percent of the gross income of a family.

Rental regulations to protect the renters are almost non-existent in Nepal. Since many urban residents cannot afford to rent a dwelling unit with adequate space for the family, they are bound to share smaller units creating an overcrowding situation. Anecdotal information suggests that in several cities such as Biratnagar, Kathmandu, Janakpur, Birgunj, Bharatpur, and Pokhara, in extreme cases, up to six individuals can be found sharing a dwelling unit of less than 500 square feet.

Though open spaces are abundantly available in rural settings, most urban areas lack adequate amount of open spaces. Most Nepali cities have high densities and only limited publicly accessible opens paces. For example, Kathmandu has a population density of 53,000 residents per square mile in 2020 according to the World Population Review website. This is comparable to highly dense cities such as Mumbai and Kolkata. High density and overcrowding in the Nepali cities coupled with the rampant inadequacy of sanitary services can help accelerate the spread of communicable diseases such as Covid-19.

In the long term, investment in improving the water supply, sanitation and housing quality and affordability should be the top priorities for the Nepali cities and towns.

Fig. 2. A High-Density Residential Area in Kathmandu. Pic. A. Adhikari

4. Some Recommendations

As Nepal is a rapidly urbanizing and a low-income country (2019 per-capita income $1,090/capita as per the World Bank), Nepali cities face several challenges related to infrastructure, investment, housing, economic development and urban management. Nepali policy makers and leaders have realized the importance of the cities, and have been working to increase the investments needed for the infrastructure sector. However, the investment is still inadequate.

For the long-term health of the urban areas, such infrastructure investments need to be kept at a high rate. The current pandemic has shown us that a clean and regular water supply and reliable sanitary services are top priorities to help manage public health during the pandemics.

Some recommendations for public health friendly urban planning and design approaches for Nepal can include the following.

Continue to make significant investment to improve urban infrastructure, especially for mobility, water supply and sanitation. Explore ways of harvesting and collecting rainwater for on-site and community water supply systems.

Urban residential densities are important to promote compact development, encourage walking and biking, support mixed use, and public transit, and make

more public spaces available to the residents. However, from a public health perspective, proper space configuration and design of buildings is important to allow enough space for a physical separation of at least six feet between individuals to reduce the spread of communicable diseases. Adequate space to facilitate physical distancing should be provided in buildings that include communal living spaces.

1. Create affordable housing programs for the cities. The federal, provincial and local government agencies can cooperate to develop housing programs by leveraging public lands, and utilizing public funds to support the development of affordable housing. Provide walk up residential units when feasible, touchless technologies in elevators, and interior common spaces to enable physical distancing of at least six feet. When possible, design the common exterior walls and floors with washable materials that can be easily disinfected and washed to reduce the spread of any communicable diseases.

2. Handwashing stations are recommended throughout the urban areas and should be strategically placed in areas where people gather such as in parks, public bathrooms, transit stations, public and private plazas, courtyards, squares, sidewalks, and terraces of public buildings. To organize adequate water supply for these uses, the Nepali cities and towns will need to promote on-site water harvesting systems.

3. Providing adequate open space throughout neighborhoods, and commercial, office and institutional areas is particularly important to promote public health. Open spaces provide opportunities for people to seek recreation, obtain fresh air, and to ease their mental health burdens. Open spaces could also be used as staging grounds for make-shift medical facilities such as testing, vaccination and distribution areas when necessary. In warmer climate, open spaces must include shaded areas for the comfort and health of the users. Open spaces are severely lacking in many big Nepali cities, especially in the Kathmandu Valley cities. An aggressive policy and regulatory regimen need to be implemented to create adequate opens paces in new develop and redevelopment projects.

4. Some publicly accessible open spaces including urban parks, plazas, community gardens, and public squares can be designed as "Therapeutic Gardens" having aesthetically pleasant combination of flowers, greeneries, water elements, opens spaces and seating areas to provide a relaxing and stress reducing ambience for the visitors. See Fig 3 for an example of a Therapeutic Garden with elements that can help people de-stress.

Fig 3. A Therapeutic Garden in Phoenix, UAS. Pic. A. Adhikari

5. Promote increased self-sufficiency in the cities for fruits, vegetables and some grains such as through roof gardens, urban farming, and community gardens. On-site production of food is valuable during a pandemic. Nepali towns evolved with agricultural production. This should help in continuing the agro-friendly urban planning.

6. Promote the concept of a 20-minute city, creating localized and self-sufficient communities where residents can access amenities such as shopping, recreation and other daily needs (except the places of employment) that can be reached within 20-minutes by biking, walking or riding public transit. This will help in making cities more self-sufficient and resilient during pandemics and other disasters.

7. Promote public transit while implementing stringent sanitary protocols such as cleaning the vehicles frequently, disinfecting the surfaces, requiring passengers to wear masks, and reducing the passenger load per vehicle to help maintain physical distance.

8. Nepali cities are already mostly walkable and bike friendly. Continue to promote walking and biking as a critical component of an urban transportation system. Walking and biking also help improve public health and quality of life for the residents. Wide sidewalks are encouraged in urban environments that allow people to physically distance themselves from others, and also to queue outside essential businesses and at transit stops. Detached sidewalks are recommended for the safety of the pedestrian. See Figure 4 for an example of a wide, shaded and detached sidewalk.

Fig. 4. A detached and wide sidewalk in urban Honolulu, USA. Pic. A. Adhikari

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9

Impact of COVID-19 Pandemic on Air Pollution in Kathmandu and Pokhara Valleys

Hari Kandel and **Arjun Aryal**

1. Introduction

A person on average inhales more than 11,000 liters of air every day. If the air we breathe is of bad quality, it can affect our health. Particulate matter (PM), which is a collective term for suspended solid and liquid substances in the air with aerodynamic diameter 1 μm- 10 μm, can be inhaled and can cause serious health impacts. Particulate matter, commonly known as aerosols, are derived both from natural and anthropogenic sources. Human activities such as combustion of fossil fuels, biomass burning and suspended dust particles from road and cleared lands account for ~20% of total particulate matters in the global atmosphere (Wallace and Hobbs, 2006). In urban areas, majority of particulate matters come from human activities. Therefore, human activities especially in large population centers have direct link to ambient air quality. Covid-19 pandemic and the decreased human activities in the cities due to temporary closures and curfews has shown some evidences of reduced pollutant levels in the atmosphere (Quiros *et al.*, 2013; Morawska *et al.*, 2002). A global recession that commenced in mid-2008 was also found to be associated with a decreased emission of ozone precursor pollutants in European countries (EEA, 2015) and with reduced surface-level ozone in US (Tong et al., 2016). After the World Health Organization (WHO)'s declaration of COVID-19 as a global pandemic, peoples' activities across the world swiftly diminished which increased the curiosity to analyze the impact of lockdown on air quality in various parts of the world. In a recent global symposium on climatological, meteorological and environmental factors in COVID-19 pandemic, authors from various regions around the world presented evidences on stronger air quality impact of lockdown in the respective regions (Zaitchik, 2020).

Kathmandu, the capital city of Nepal and home for an estimated 1.71 million city-dweller population (World Population Review, 2020), is in a highly urbanized valley extending about 600 sq. km. that encompasses three districts: Kathmandu, Bhaktapur, and Lalitpur. As an intermountain valley, Kathmandu is surrounded by tall mountains which provide a unique setting for analyzing localized effect of reduced human activities on air quality during COVID-19 lockdown. With nearly 7% of the country's population, 30% of registered vehicles, nearly one-fourth of manufacturing establishments, and about 40% of commercial businesses (hotels, colleges, hospitals, and financial institutions), the city of Kathmandu remains an economic and population hub of the country (Sadavarte *et al.*, 2019). As a result, the valley represents about 50% of national gasoline consumption and 27% of diesel consumption. Burning of these fossil fuels produces ozone precursor gases, such as volatile organic compounds (VOC) and NOx (NO and NO_2), and emits tiny particulate matter in the atmosphere.

In the third week of March, after the confirmation of second positive case of COVID-19 in the country and after noting episodes of influx of migrant workers returning home from India, the Government of Nepal enacted its countrywide lockdown on March 24, 2020, that lasted until July 21, 2020. During lockdown and even since early March, most of the activities such as movement of public vehicles and industrial operation that emit bulk of the atmospheric pollutants were halted. Kathmandu valley again imposed restrictive orders for activities and services that involved public movement starting 15th of August, 2020 (Pradhan and Prasain, 2020). The operation of the three areas that were disrupted mainly during the lockdown– transportation, industries, and commercial sector – collectively carry more than half of the energy use load in Kathmandu valley. According to Sadavarte *et al.* (2019), transportation (26%) is the second leading sector of energy use after residential (41%) followed by industrial (22%) and commercial (10%). Also, households in the Kathmandu valley alone consume 41% of the national consumption of liquified petroleum gas (LPG) for cooking. Even though we do not know the exact figures, we believe this proportion of LPG use was reduced significantly during the lockdown as most of the people living in Kathmandu from outside districts returned to their home in the lockdown. Data from 2011 shows that Kathmandu valley alone has 76 brick manufacturing units that share a huge portion of SO_2 emission into the atmosphere (Sadavarte *et al.*, 2019). From the emission standpoint, transportation in Kathmandu valley alone share 30-55% of the national estimates of major pollutants. Two-wheeler gasoline vehicles, brick production kilns, and heavy-duty freight vehicles are considered as high emitters in Kathmandu. Emissions from the valley alone were 3-6% for the total estimates and 13% for the NOx which is attributed to the high use of diesel.

In order to get a clear insight on changes in air quality over Kathmandu and Pokhara valleys as a result of COVID-19 lockdown, we analyzed $PM_{2.5}$, tropospheric ozone, and aerosol optical depth.

2. Methodology

This section briefly summarizes the dataset and the analysis of $PM_{2.5}$, aerosol optical depth, and ground-level ozone.

2.1. *$PM_{2.5}$*

Particulates finer than 2.5 μm ($PM_{2.5}$) may contain easily respirable toxic or mutagenic components. These are considered potentially harmful because they are difficult to expel from lungs and can accumulate in alveoli (Ryan, 2014). Prevalent compounds of urban aerosols are sulfates, nitrates, ammonium, trace metals, carbonaceous materials, and water. In this study, we obtained hourly $PM_{2.5}$ and AQI measured at US Embassy station in Maharajgunj and Government of Nepal's station in Ratnapark, Kathmandu. $PM_{2.5}$ is measured using high volume samplers and AQI is a value calculated based on monitored air quality parameters ($PM_{2.5}$ in this case) in order to communicate easily to public. Table 1 from US EPA summarizes how 24-hour average $PM_{2.5}$, AQI value and AQI categories are related.

Table 1. US EPA $PM_{2.5}$ AQI

24-hour average PM2.5 concentration (μg/m^3)	AQI value	AQI category
0 - 15.4	0 - 50	Good
15.5 – 40.4	51 - 100	Moderate
40.5 – 65.4	101 - 150	Unhealthy for sensitive group
65.5 – 150.4	151 - 200	Unhealthy
150.5 – 250.4	201 - 300	Very unhealthy
250.5 – 500.4	301 - 500	Hazardous

We plotted 24-hour average values of $PM_{2.5}$ concentration for Ratna Park station, and $PM_{2.5}$ AQI for US Embassy site in Maharajgunj.

2.2. *Aerosol Optical Depth (AOD)*

Aerosol Optical Depth (AOD) is a satellite-based measure of aerosols, which are tiny solid and liquid particles suspended in the atmosphere. Absorption and scattering of incoming solar radiation by these aerosol particles reduce the visibility and increases the optical thickness of the atmosphere. An optical

thickness (depth) of less than 0.1 indicates a crystal-clear sky with maximum visibility, whereas a value of 1 indicates dense presence of aerosols (NEO, 2020).

Daily average AOD measured at 550 nm using MODIS Terra over Kathmandu were plotted. A sun photometer installed on the roof of Shangri-La Village Resort (Lat: 28.18664°, Long: 83.97518°, and Elevation: 800 m), located at a south-western outskirt of Pokhara City, measured the voltage proportional to the spectral irradiance. The same voltage was used to calculate total aerosol optical depth using Beer-Lamber-Bouger law. AERONET provides aerosol optical thickness in three quality levels, and we used cloud-cleared total aerosol optical depth (1.5 level) data for which a real-time quality control was applied.

1.3. *Ground-level Ozone*

zone in the lower troposphere form when pollutants such as VOCs and NOx react in the presence of sunlight. Sources of these pollutants include gasoline-powered vehicle, diesel engine exhaust, and stationary industrial fuel-burning sources and represent the main contributors to the ground level ozone. Ground-level ozone concentration of 70 ppb averaged over an 8-hour period is considered safe for public health and welfare. Unsafe level of ozone in atmosphere can damage health of humans, animals, trees and plants. It can also contribute to acid rain and the greenhouse effect.

We plotted and performed basic statistical analysis of ground-level ozone for the years 2018 and 2020 measured at US Embassy station in Maharajgunj Kathmandu, and satellite estimated ozone using Moderate Resolution Imaging Spectroradiometer (MODIS) extracted for Kathmandu valley.

3. Results and Discussion

3.4. *$PM_{2.5}$ and Air Quality Index (AQI)*

A plot of the daily average $PM_{2.5}$ concentration with five-day moving average line for 2019 and 2020 at Ratnapark station is presented in figure 1. This plot indicates that $PM_{2.5}$ concentration from mid-April to the end of May in 2020 were lower compared to the concentration during the same time period in 2019. Similarly, US Embassy station data and fitted least square polynomials for the average of 2018 and 2019 and 2020 from January-June show that $PM_{2.5}$ AQI in 2020, specifically after mid-February, was distinctly better compared to the average value of 2018 and 2019 (Fig 2). Both $PM_{2.5}$ and AQI were known to vary with other factors such as rainfall. Daily average AQI from January to June and the least square fit of each data (Fig 2) showed consistently unhealthy for

sensitive groups: $PM_{2.5}$ AQI (> 100) for combined 2018 and 2019 which seemed improved to moderate (51-100) and even good (< 50) $PM_{2.5}$ AQI in 2020. AQI values which were comparable in January and February for all the years but distinctly lower for later months in 2020 corresponding to the lockdown/ reduced-activity period reflects the role of lockdown and/or reduced activities. Kathmandu experienced some unusual rain in late February to early March of 2020 and that might have also have been the primary cause of improved AQI before the beginning of the actual lockdown. The 2020 AQI was significantly improved (AQI < 100) compared to 2018 and 2019 when AQI is higher than 100 (Fig 2). Therefore, we attribute this better AQI to COVID-19 lockdown.

Previous studies have shown a seasonal variation of $PM_{2.5}$ in Kathmandu valley with a lowest value (30 μgm^{-3}) in monsoon to the highest (90 μgm^{-3}) in winter attributed to varying sources and changing meteorology (Aryal et al., 2009). A comparison of the emission data between 2011 and 2016 in the valley showed that SO_2, N_2O and NO_x emission had all doubled from 2011 to 2016. Our data from Ratnapark station showed an average value of 43.67 $\mu g/m^3$ for the duration of March-May in 2019, which dropped to 30.39 $\mu g/m^3$ for the same period in 2020. Because the seasonal averages were not directly comparable, our slightly lower values from Ratnapark station needed further link with other meteorological factors. Nonetheless, lower values in 2020 compared to 2019 for the duration of lockdown showed some indication of the positive effects of lockdown in the reduction of particulate emission in Kathmandu valley.

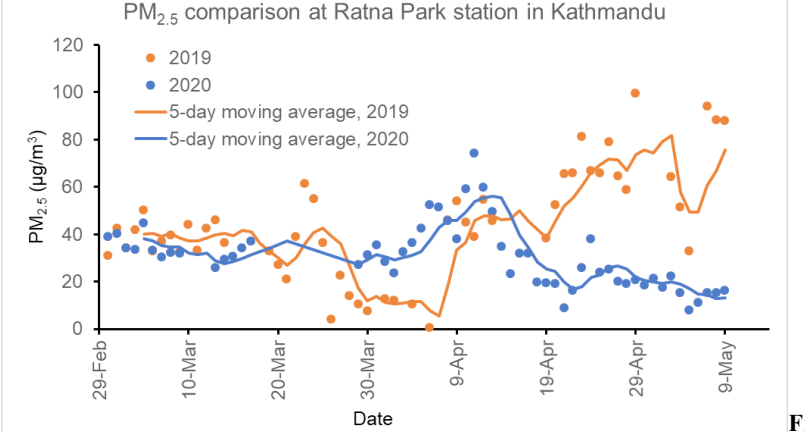

Figure 1. Comparison of daily-average and 5-day moving average PM2.5 concentrations at Ratnapark Station, Kathmandu, between 2019 and 2020. The plots that show the data starting immediately before the onset of reduced public activities until the 2nd week of May (the latest date for the availability of data for 2020). Data source: opendatanepal.com which fetch the data from pollution.gov.np.

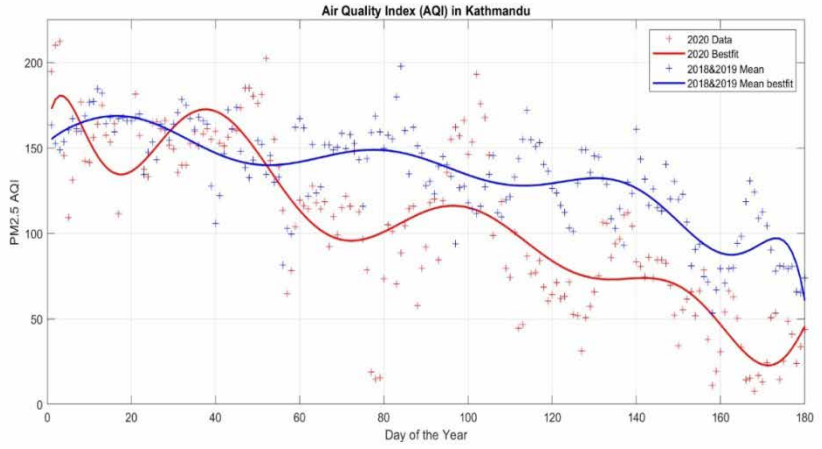

Figure 2. Air quality index (AQI) based on PM2.5 concentration measured at US Embassy station in Kathmandu, Nepal.

3.5. *Ground-level Ozone*

Increasing concentration of ground-level zone in the winter months reaching its peak during late March to early April (Figure 3) indicates the role of sunlight in the formation of ozone in lower level atmosphere. The concentration declines thereafter in both the compared years of 2018 and 2020. Considerably lower ozone concentration in the near surface atmosphere during these pre-monsoon months than what is observed in March and April of those same years may be the result of the ventilating and scavenging effect of pre-monsoon rain and wind as these both erode the pollution episodes of winter and summer (Murazaki and Hess, 2006). The steeper slope of the best fit line in the declining portion of the plot in 2020 is probably indicating the sharper decline of ozone level in 2020 because of the low emission of ozone precursors during the lockdown. As illustrated in figure 4, the wide gap between ozone concentrations of the years 2018, 2019 and the year 2020 during the time corresponding with the period of valley-wide restrictions on peoples' mobility and services (starting on August 16) may reflect low emission of ozone precursor gasses during the lockdown period. Studies have proved that even with the presence of abundant amount of volatile organic carbona decrease in NOx emission results in a decreased ozone formation. However, in the low VOC condition, a decrease in NOx may lead to an increased ozone formation. With the already accumulated abundant VOCs in the surface-layer atmosphere, the early period decline of O_3 may be associated with the effect of decreasing NOx. While both VOCs and NOx production

remains low as the diesel and gasoline burning decreases with the progress of lockdown and increased restrictions, ozone may have started to build up towards the latter half of restricted period. The distinct low ozone during this specific window need to be confirmed with precipitation events for that period.

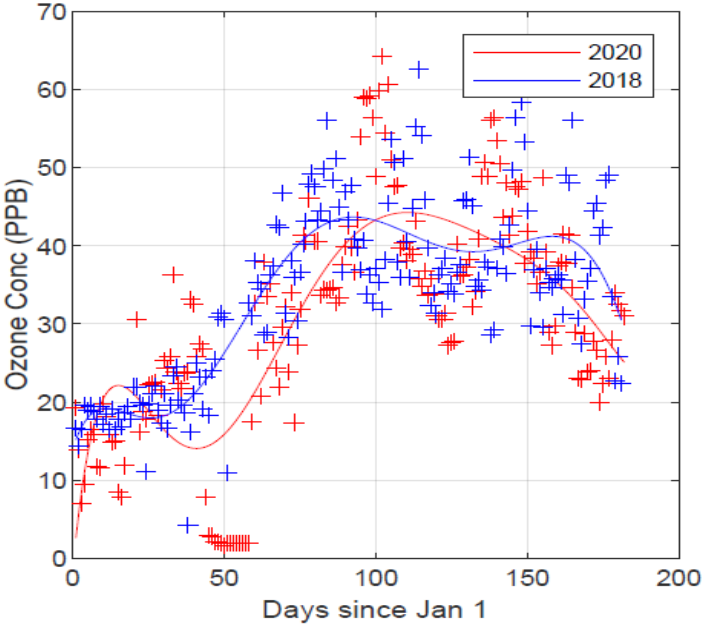

Figure 3. Comparison of ground-level ozone measured at US Embassy station at Maharajgunj, Kathmandu.

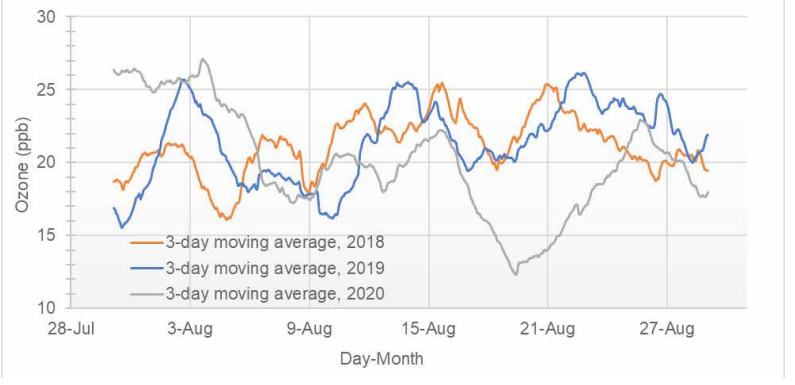

Figure 4: Hourly concentration of Ozone (ppb) at US Embassy station in Kathmandu during July29-August 29, 2020.

3.6. *Aerosol Optical Depth (AOD)*

Daily average AOD values extracted from MODIS satellite for the coordinates of Kathmandu valley during the time equivalent to lockdown period are plotted for the years 2018 and 2020 in figure 5. Lower AOD values from early March to May of 2020 shows some improvement in the concentration of aerosol in the lower troposphere over Kathmandu. However, the increasing trend and higher values after May do not support a conclusive AOD improvement associated with lockdown. Also, the values higher than 0.5 after May, 2020, suggest that there is a relatively denser presence of aerosols in Kathmandu's sky. This statement concords with another study based on MODIS data which has reported increasing trend of aerosol depth over Kathmandu valley between 2002 and 2015 (Mahapatra *et al.*, 2019).

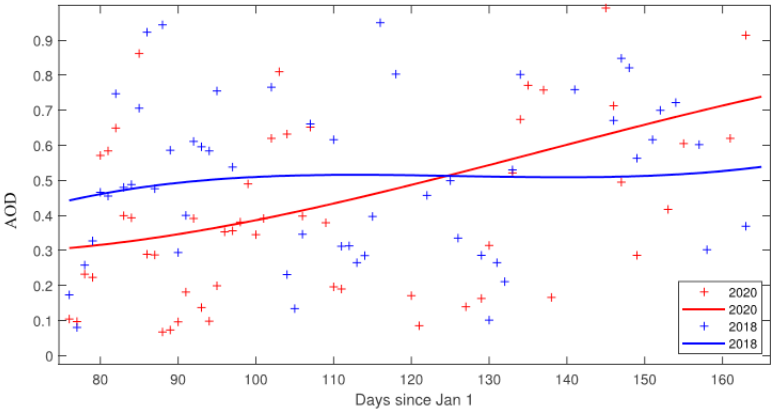

Figure 5. Time series AOD measured at 550 nm using MODIS Terra over Kathmandu.

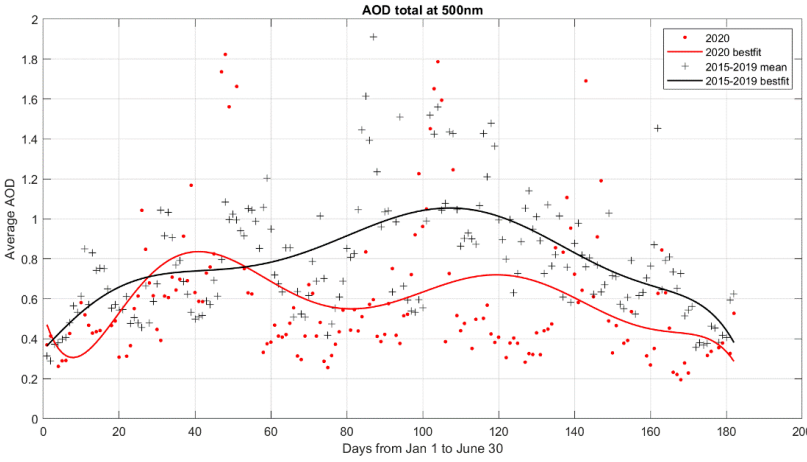

Figure 6. Total aerosol optical depth based on 500 nm AOD measured at Pokhara, Nepal.

Source: Aerosol Robotic Network (AERONET), NASA.

A plot of daily average values of total aerosol depth measured at an outskirt location of Pokhara valley is presented in figure 6. The average AOD for Pokhara for the lockdown-equivalent period (March-late June) for prior-years was increasing from 0.57 (2017) to 0.69 (2019) which dropped to 0.51 for the same period of 2020 showing a slight improvement in air quality over Pokhara during the lockdown period. The distinct departure with lower daily AOD values and least-squared polynomials for the year 2020 after late February compared to the average of 205-2019 of the same period clearly shows the diminished presence of aerosol particles in the atmosphere of Pokhara city during the lockdown following COVID-19 pandemic. The gap between two fit lines getting closer towards the end of June may again explain the erasing effects of meteorological factors.

3. Conclusion

With the onset and continuation of COVID-19 lockdown (March-July) and during the restriction-enforced period in August, AQI derived from station-observed $PM_{2.5}$, and station-observed O_3 from US embassy in Kathmandu both exhibited an improved air quality attributable to reduced human activity implying a cut in the production of particulate matter and ozone precursors (VOC and NOx). Despite the lack of a very consistent trend, remotely sensed AOD

(MODIS-data for Kathmandu and robotic measurement at Pokhara) showed that the lockdown period helped decrease aerosol loading to the atmosphere of these two megacities in Nepal. A detailed study to assess these preliminary findings against other related factors, such as atmospheric dynamics, cloud cover, temperature, water vapor, and precipitation would further corroborate the results that we highlighted here. Furthermore, spatial resolution of MODIS data has a limitation to use in small geographical areas.

Acknowledgement:

We thank all the data sources, namely NASA GES DISC for MODIS AOD, USEPA at US Embassy Kathmandu for AQI and $PM_{2.5}$, Department of Environment, Government of Nepal for $PM_{2.5}$, and project PI, Arnico Panday of AERONET site of Pokhara for their effort in establishing and maintaining the data collection process and making it web-accessible at no cost. We also would like to thank Dr. Pasang Yangjee Sherpa and Dr. Anobha Gurung for their help in directing us to the sources of air quality data of Nepal.

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10

Impacts of Covid-19 Pandemic on the Tourism and Hospitality Sector of Nepal

Monika Ghimire and **Udhab Raj Khadka**

1. Introduction

Tourism refers to the activity of individuals traveling to and staying in places outside their usual place of living for less than a year for recreational, leisure, business and other purposes. It is a powerful way to advance inclusive economic growth (Hoque, 2020; UNWTO, 1999). It creates job opportunities and provides livelihoods in the remotest corners of the country. In addition, it promotes social mobility, develops critical infrastructure, connects economies to global value chains, increases trade and investment, and when performed carefully, protects the environment and preserves the cultural heritages. Its transformative impact can drive the country on the path of shared prosperity.

With its breathtaking landscapes, pristine lakes and rivers, mighty mountains, and diverse culture and traditions, Nepal has always been a famous backpacker's destination. With many vacationers visiting the area consistently, tourism in Nepal has taken off higher than ever and has become a mainstream vacationer hotspot. Nepal, with its rich ancient culture set against the most dramatic scenery in the world, is a land of discovery and unique experience. Its diversity ranging from rich forests in Terai to the icy peaks of the world's highest mountain offers a range of activities like trekking, Mountaineering, rafting, jungle safaris, bird watching, micro light flight, paragliding and many other recreational facilities. Additionally, Nepal is also well-known for the Hindu, Buddhist and other cultural heritage sites and their traditions and hospitality (MoFA, 2020).

The tourism industry in Nepal is one of the major sources of foreign exchange and revenue. According to Asian Development Bank (ADB) (2019), tourism industry has a distinctive place in Nepal's economy and the industry earns on

an average 25% of the total foreign exchange and provides direct employment to more than 2,00,000 people. The direct average tourism contribution to the national economy has hovered around 3.9% of the GDP from 2008 to 2018 (ADB, 2019). The gross foreign currency exchange for 2018\19 stood at around NRs 75,808.56 million (670.6 million USD) which is 4.3% higher than the previous fiscal year. In 2019/2020, it was USD 375.7 only. The average daily spending of tourist in Nepal is USD 48 (MoCTCA, 2019). Gross foreign exchange earnings from fiscal year 2010/11 to 2019/20 are presented in Figure 1.

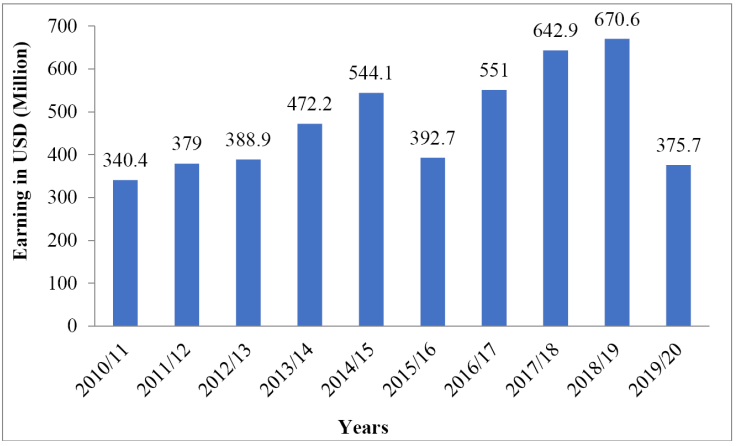

Figure 1 Gross foreign exchange earnings from fiscal year 2010/11 to 2019/20 (Data source: MoCTCA, 2019)

The ongoing pandemic of coronavirus disease 2019 (Covid-19) is caused by severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2). The outbreak was first identified in Wuhan city, Hubei, China in December 2019 and recognized as the pandemic by the World Health Organization (WHO) on 11 March 2020. In Nepal, the first case was confirmed on 23 January 2020 on a 31-year student returned to Kathmandu from Wuhan on 9 January (Bastola et al., 2020). The first case of the local transmission was confirmed on 4 April 2020 in Kailali District (MoHP, 2020). Over the period, the disease has been detected in all the provinces and districts of the country with south bordering district being the worst-hit areas.

The Government of Nepal imposed lockdown since 24 March 2020. All the international flights were stopped from 22 March 2020 (CAAN, 2020) and vehicular movement on the long routes was closed from 23 March, 2020 (DoTM, 2020). The imposition of the lockdown has severe implication on the

tourism sector of Nepal. Thus, the present paper is an effort to analyze the impact of the coronavirus pandemic on the tourism industry in Nepal based on the information collected from various published and unpublished sources.

2. Historical Trend of Tourism in Nepal

The saint Manjushree is considered as the first tourist visiting Nepal. Thus, the beginning of tourism in Nepal dates back to the Manjushree period. The Licchavi period that started from 400 A.D. played a very significant role from tourism viewpoint, as this period had made enormous progress on the art and culture, architecture, and paintings and sculpture (Sharma, 1976; Shrestha & Shrestha, 2012). Despite having a long history, the tourism sector in Nepal seems to be developed only after the end of the Rana regime in 1950s. The construction of the first road system in 1950 connected Nepal's cities with the Indian border in the south. Then the flow of tourist started to come to Nepal mainly for mountaineering purpose (Shrestha & Shrestha, 2012). However, tourism boomed after the successful ascent of the Mount Everest by Sir Edmund Hillary and Tenzing Norgay Sherpa in 1953. Tourism industry tends to be highly sensitive to negative environmental factors such as natural disasters, epidemics, social conflict, war, economic crises and terrorism acts (Hung et al., 2007). These kinds of events influence mobility and traveler's motivation affecting tourism industry. Over the past decade, Nepal has had its ups and downs in tourism sector. The year 2015 witnessed 31% decline in the tourism industry compared to the preceding year due to the devastating Gorkha Earthquake. However, the country observed a strong rebound in tourist arrivals jumping by 40% in the following year (2016). The momentum continued with tourist arrivals growing by 24.86% in 2017 and 24.76% in 2018. In 2019, approximately 1.2 million tourists visited Nepal. This represented only 2% increase over 2018 with 11,73,072 tourists visit (Fig. 2; MoCTCA, 2019). The major reason for less increment this year was due to shut down of the major international airlines and a decrease in TIA operation hours due to runway maintenance (MoCTCA, 2019).

In Nepal, the last decade's average length of stay of tourists ranged from 11 to 13 days. In 2019, the average length of stay was 12.4 days, a slight increase in comparison to the 2018. In 2019, 83.19% tourists arrived by air and 16.81% through land routes (Fig. 3). Out of the total tourist arrivals, five countries, namely China, India, Sri Lanka, the United Kingdom and the United States of America account for almost 50% (MoCTCA, 2019). These developments are depicted in Figures 2 and 3 below.

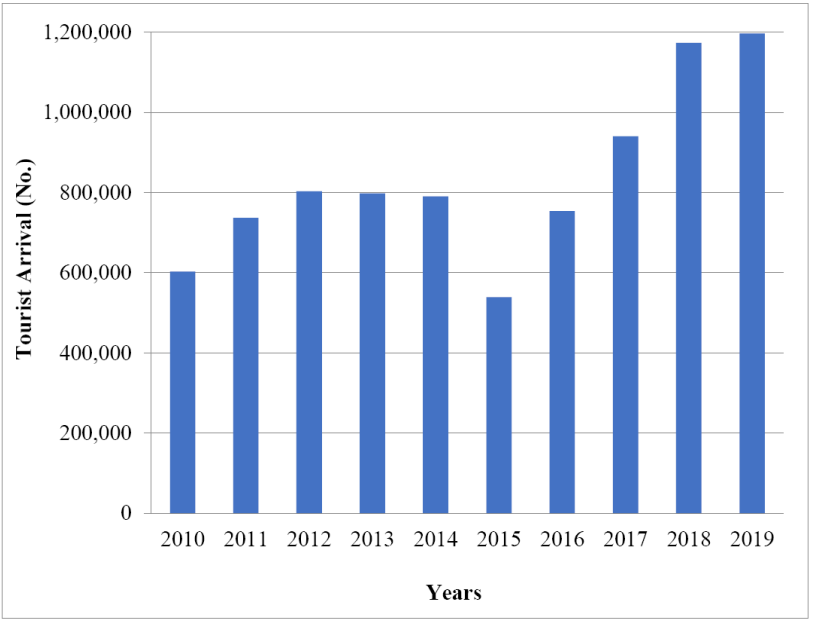

Figure 2 Total tourist arrival from 2010 to 2019 (Data source: MoCTCA, 2019)

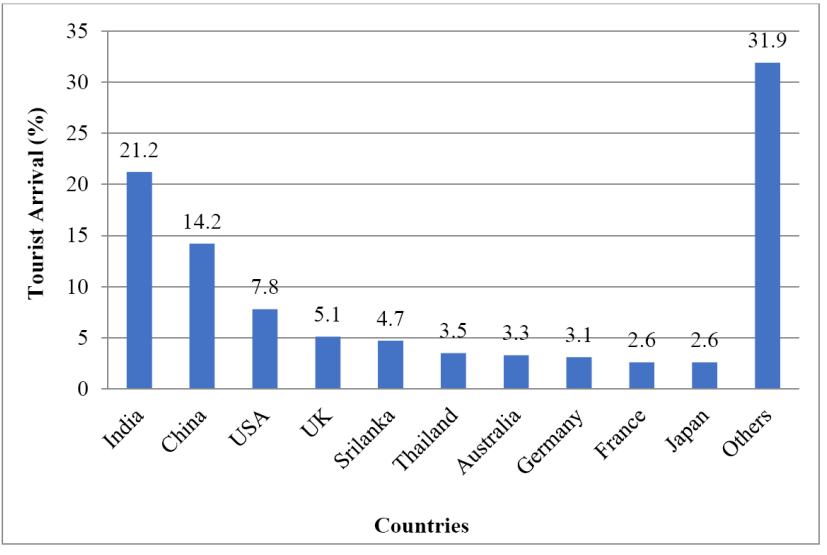

Figure 3 Tourist arrivals by major nationalities in 2019 (Data ource: MoCTCA, 2019)

Nepal has different distinct seasons and tourist arrival depends on the seasonality. The higher number of arrivals has been observed in October-November (Fig. 4). The tourist arrival by month, from 2010 to 2019, shows that the peak tourism seasons in Nepal are autumn (September-November) and spring (March-May) when the weather is warm, skies are generally clear and conditions are best for outdoor activities. The monsoon season (June-August) and the winter (December-February) are considered as the off seasons (Fig. 4).

According to MoCTCA (2019), more than 65% of tourists visit Nepal with the purpose of holiday celebration, 16.25% for adventures like trekking and mountaineering, 14.36% for pilgrimage, and remaining for other purposes.

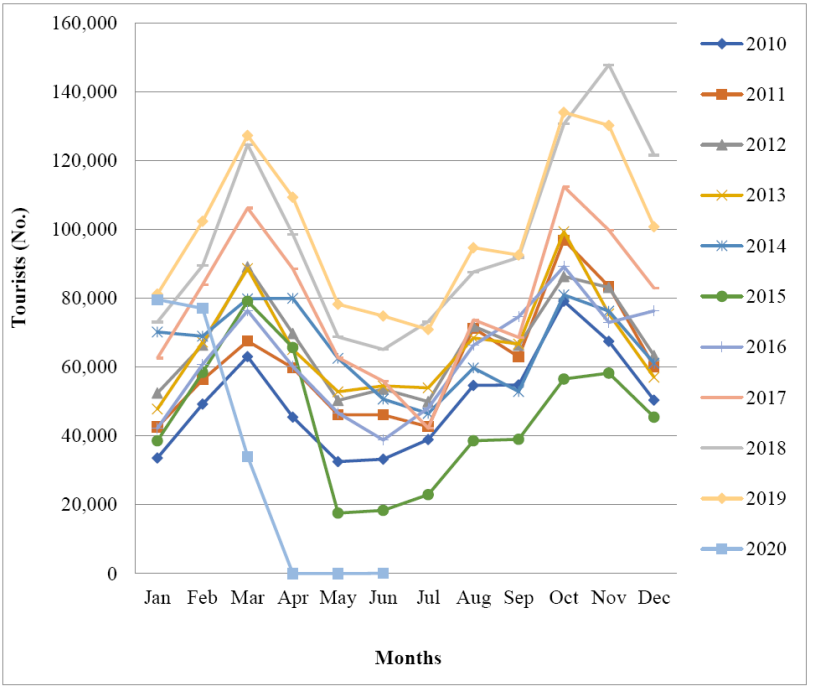

Figure 4 Tourist arrival by season from 2010 to 2019 (**Data source:** MoCTCA, 2019)

3. Impact of Covid-19 on Tourism Sectors

The ongoing pandemic, travel restriction and the countrywide lockdown have brought the entire tourism industry to a standstill, and unlike other sectors, tourism will take longer period to recover, especially leisure tourism (Baral,

2020). This will have severe impacts on the major trekking areas, National Parks and Conservation areas, pilgrimages and tourist hotspots urban areas like Kathmandu, Pokhara and Bardia. The food and hospitality sector, transportation sectors and travel agencies are reeling under pressure due to the closure of business due to Covid-19. From the biggest airlines to the smallest hotels and home-stays in the rural communities associated with the sector have been halted. The impact is economic as well as social affecting the livelihoods of tourism and transport workers and suppliers, their families and whole communities (UNWTO, 2020). The World Travel and Tourism Council (2020) has warned about the possibility of 50 million jobs in the global travel and tourism sector to be at risk. The present Covid-19 pandemic is one of the worst crises ever to hit the tourism industry impacting all its geographical segments– inbound, outbound and domestic, almost all tourism verticals– leisure, adventure, heritage, MICE (Meetings, Incentives, Conferences and Exhibitions), corporate and niche segments (Lamichhane, 2020). The impact is likely to have a deeper and far-reaching than the natural disasters like the 2015 earthquakes, as it is difficult to predict when the pandemic would be over and when tourist will feel safe to travel again. Thus, in Nepalese context, the present pandemic has caused a severe impact on tourism and associated sectors affecting the livelihood and overall economy of the country.

3.1 Economy

Nepal's tourism-based economy is being severely impacted due to travel restrictions imposed by the Government of Nepal and other countries, and airlines cancelling flights (Subba, 2020). The sector contributes 14.37% to the economy (Shrestha, 2020; Ulak, 2020). Nepal had announced "Visit Nepal 2020" campaign with a target of bringing in at least two million tourists in 2020. The government had allocated NRs 650 million (5.4 million USD) for the campaign for the fiscal year 2019-2020. In 2018 and 2019, tourism sector has generated NRs. 240.7 billion (2.18 billion USD) and NRs 231 billion (2.07 billion USD), respectively (WTTC, 2020). This shows that the national economy is severely impacted by the Covid-19 pandemic. In the first six months (Jan-Jun) of 2019, Nepal had received a total of 5,73,658 tourists; whereas in 2020, the country received only 1,90,918 tourists during the same period which is by number 3,82,740 less than the preceding year (Fig. 5). Based on the first six months tourist number from 2015 to 2019, the number for the same period in 2020 can be projected to be around 6,63,000 (Fig. 5). According to UNDP (2020), tourism receipts in Nepal have been projected to fall by 60% in 2020 resulting in a loss of foreign currency worth USD 400 million. According to MoCTCA (2019), a tourist on average expends 48

USD with the average length of stay of 12 days. This accounts for a minimum loss of NRs 26 billion (220 million USD) in the first six months of 2020. ADB (2020) estimated tourism revenue decline by -0.033% of the GDP, i.e. NRs 1.1 billion (9.7 million USD) in the best case, -0.050% of GDP, i.e. NRs 1.74 billion (14.5 Million USD) in moderate case and -0.100% of GDP, i.e. NRs 3.4 billion (29.1 million USD) in the worst case. Likewise, UNWTO (2020) estimated 20% to 30% decline in the international tourist arrivals in 2020.

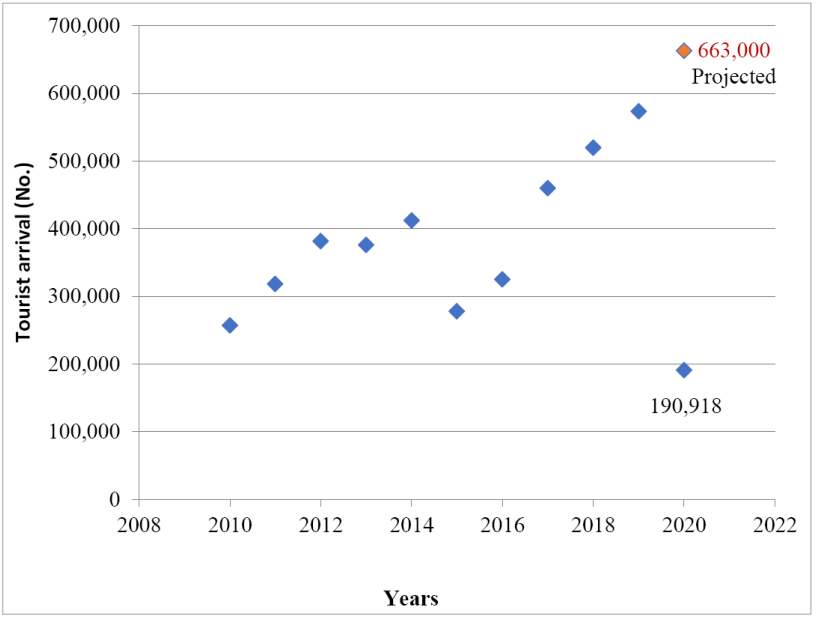

Figure 5 Tourist arrival during January to June from 2010-2020
(the data highlighted red is the projected figure for 2020)
(Data source: DoI, 2020; MoCTCA, 2019)

3.2 Tourism associated sub-sectors

Travel and tourism in Nepal contributes 6.9% of the total employment (WTTC, 2020). More than 1.05 million jobs directly and indirectly related to tourism industry are reported to be affected due to the pandemic (Prashain, 2019). The operation of different tourism associated sub-sectors like hotels, lodges, trekking agencies, transportation services have been completely halted due to the travel restriction (Table 1).

Table 1: The tourism industries associated sectors in Nepal

Tourism industry	Total No. (2019 A.D.)
Tourist standard hotels	1,289
Travel agencies	3,680
Trekking agencies	2,764
Rafting agency	81
Tourist transportation services	82
Tour guides	4,200
Trekking guides	17,625
River guides	266

Source: *MoCTCA (2019)*

3.3 Hotels and hospitality sector

Nepal has 1,289 tourist standard hotels with 43,999 beds capacity (MoCTCA, 2019). This sector employs 2,00,000 workers. Hotels which derive a higher share of revenue from the foreign guests, and food and beverages segment are the worst affected. In this sector, employee costs are one of the largest costs and cutting down of these costs will lead to job loss of large number of employees. The Hotel Association of Nepal (HAN) has decided to close their operation until mid-November, 2020. Among the tourist source countries for Nepal, China and India are the major countries. With the start of the pandemic, the Chinese Government restricted travelling affecting 20% hotel occupancy. As the lockdown started in the peak tourist season (February to April), the hoteliers suffered from a double hit as they had stockpiled the necessary stuff in advance. During the three months period (Jan-March) of 2020, the total number of tourist arrivals has already witnessed a drop of ~31%, accounting for 0.21 million travelers as compared to 0.31 million during the same period in 2019 (Sanghai et al., 2020). According to ADB (2020), there will be a loss of 0.03%, i.e. USD 8 million to 0.08%, i.e. USD 24.07 million in Nepal's hotel and restaurant sector as a result of the Covid-19.

3.4 Transportation sector

Nepal has a total of 49 airports (one international, four domestic hubs and 44 domestic), of which 32 are in operation, seven are under construction and 17 are non-functional. In 2019, 30 International Airlines carried 41,38,764 passengers for Nepal. There are 20 airlines for domestic movement (MoCTCA, 2019). In addition, there are 28 tourist transportation service providing agencies facing huge loss due to the present lockdown. This indicates that the present pandemic has resulted in loss of livelihood of large number of workforces like tourist bus operators, drivers and helpers.

3.5 Trekking and expedition

In Nepal, the majority of tourists come from China, Germany, India, Japan, UK and USA, and most of them prefer to trek in the mountainous regions like Mount Everest, Annapurna and Manaslu areas. In 2019, out of the 11, 97,161 tourists, 1,95,621 trekked at different parts of Nepal and 4,29,764 visited different wildlife conservation areas (MoCTCA, 2019). Nepal collected a royalty of USD 50,77,590 from different expedition members. Quoting Mr. Suman Prasad Parajuli, President of the Union of Trekking, Travel, Rafting, Airlines, Culture, Archaeologies, Courier and Cargo Workers (UNITRAV), Menge and Paudel (2020) have mentioned that altogether around one hundred thousand people working in the trekking sector including around 70,000 trekking porters, 17,625 licensed trekking guides and 4,000 mountain trekking guides as well as many cooks and cleaners have become unemployed. Likewise, four thousand tour guides and three thousand five hundred local guides have lost their livelihood option due to the pandemics (Menge & Paudel, 2020).

3.6 Conservation sector

In Nepal, tourism has substantial contribution in the nature and natural resources conservation. Among the visitors, almost half of them visit Protected Areas (PAs) that provide significant opportunities for economic advancement to the rural communities and works as a powerful economic justification for conserving biological resources and natural heritages. Tourism in the PAs of Nepal is one of the fastest growing sectors with a total of 7,06,184 tourists, including 4,29,764 international visitors in 2019 (Fig. 6). In 2019 March to July, 1,63,075 tourists visited Pas. The imposed lockdown has led to closure of the PAs and other visit worthy ecological sites for tourism affecting the conservation sector. Nepalese PAs charge an entry fee to the national and international visitors. In 2019, from the entry fee of the PAs, Nepal collected revenue worth NRs 7,65,365 thousand (Fig. 7). This entry fee helps generate financial resources needed to carry out park management and community development activities in the buffer zones. Nepal's National Park and Wildlife Conservation Act (1973) has provisioned to channel 30% to 50% of the total park income to the buffer zone communities to support the local community development, implementation of conservation programs, promoting conservation and environmental awareness, skill development and capacity building. As the revenues generated through these areas are mostly used for operation and conservation of parks, the conservation sector is likely to face a huge financial crisis due to the nationwide lockdown which can result in the suspension of the protected area management and restoration programs. The closure of the local business that relies on the protected areas resulted into

a serious unemployment problem around the protected areas (Mandal, 2020). The prevailing unemployment and financial crisis around the PAs can lead the local community to be involved in the illegal activities like poaching and illegal hunting.

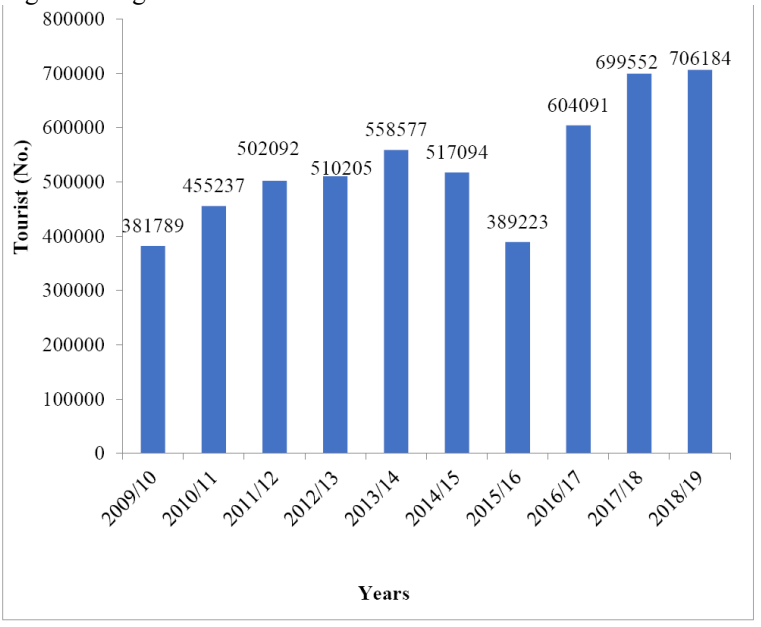

Figure 6 Tourist arrival in the protected areas (2009/10-2018/19) (Data source: DNPWC, 2019; MoCTCA, 2020)

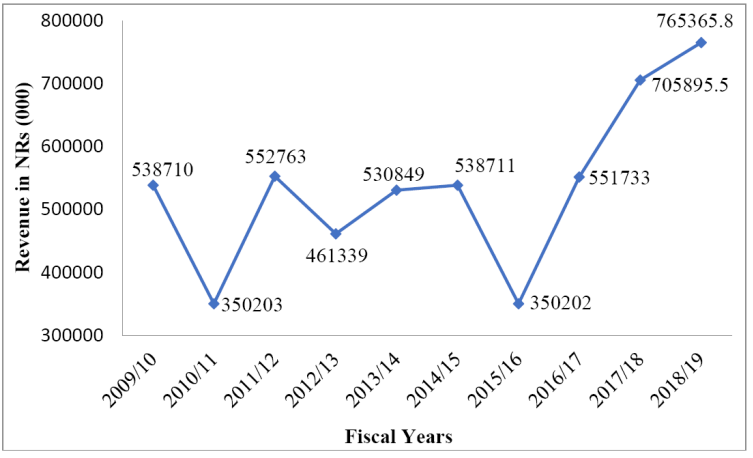

Figure 7 Revenue generated by protected areas from tourist arrival from 2009/10 to 2018/2019 (Data source: DNPWC, 2019; MoCTCA, 2020)

4. Strategies for Revival of the Sector

Nepal Government has recently presented an annual budget of NRs 1,474 billion 640 million (12 billion USD) for the fiscal year 2020/2021 with a focus on strengthening health facility, employment situation and revival of the business affected by the coronavirus pandemic. In order to revitalize the sector from the devastating failure of "Visit Nepal 2020", the Government of Nepal has put forward action plans for the industry to pick up in the forthcoming fiscal years. Some of these are as follows:

- Nepal Government has announced a budget of NRs 1.26 billion (16.8 million USD) for the tourism promotion with a separate fund of NRs. 50 billion (418.34 million USD) for the concessional loan to the tourism business, small, medium and cottage industries at 5% interest (MoF, 2020).
- The government plans to upgrade Kathmandu Airport, bring Bhairahawa Airport into operation for the international flights from the next year, and finish construction of Pokhara International Airport. The government has planned to expand night flights to the nine domestic airports, and built a new airfield in Kavre (Nepal Times, 2020).
- The Ministry of Culture, Tourism and Civil Aviation has postponed the "Visit Nepal 2020"for 2022 and is also planning to announce 2020-2030 as the Tourism Decade.
- The budget speech for fiscal year 2020-2021 has shown commitment to introduce 'Desh Darshan' programme for the promotion of the domestic tourism by encouraging the government and private employees, after the Covid-19 pandemic comes into control (MoF, 2020).
- Nepal Tourism Board has launched "Covid-19 Safety and Hygiene protocol for the tourism industry" covering a wide range of guidelines for service providers and receiver to a new global standard of hygiene and sanitation.

5. Recommendations

In order to continue tourism services in future, all the stakeholders including Nepal Government should think of bringing adequate schemes. The following measures need to be considered for the survival and revival of the sector.

- Government should rebate the income tax for the forthcoming fiscal year for the tourism related entrepreneurs like travel agencies, hotels, airlines and transport companies.

- The confidence of travelers needs to be restored with new safe and clean labels and tourism promotion campaigns.
- Need to conduct intensive hygiene, respiratory etiquette and overall WASH promotion of tourist's destinations and safety assessment at the community level and door to door level for containment and protection in the priority locations.
- All airlines, hotels, lodges and tourist destination must follow the safety and hygiene protocol made by the government.
- Government should join hands with the academia and professional societies to help attract tourists through international conferences, local events and support recovery.
- The domestic tourists should be provided with attractive package for airlines fare, hotel accommodation and other recreation with adequate level of health and sanitation facilities, and travel insurance. Attractive staycation package should be offered for the promotion of local tourism.
- For Domestic tourists who travel through road, safety assurance should be provided by equipping the vehicles by sanitizing products and maintaining distances between the passengers, safe food stations or take-outs should be allocated in every stop. Public toilets in the route must be sanitized and equipped with adequate soap and water.
- Comprehensive tourism recovery plans need to be prepared for rebuilding tourism destinations, innovation and investment in the tourism sector.

6. Conclusion

Tourism has made an important contribution to the Nepalese economy. But the sector has been severely affected by the present Covid-19 pandemic. In the first six months (Jan-Jun 2020), the country has bore a financial loss of USD 220 million to be generated from the tourism sector. In addition to direct economic loss, the present travel restriction has also affected the conservation activities and community development, especially in the buffer zone areas around the protected areas across the country, as the buffer zone communities receive 30-50% of the total revenue generated by the protected areas. The present crisis may lead the local communities to over exploitation of natural resources and involve in illegal activities. In order to survive and revive the sector, Nepal Government has put forward schemes of promoting domestic tourism with

financial incentives. In the post-Covid-19 scenario, in order to build confidence of the travelers, adequate level of health and sanitation program should be ensured of. All the stakeholders including government agencies, tourism entrepreneurs, civil organizations and the local communities should join their hands to work together to revive the tourism sector.

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11

No wealth, poor health: Socio-economic impact of COVID-19 on marginal communities of Nepal

Romy Das Karna

1. Background

The COVID-19 pandemic is creating an unprecedented impact throughout the world. The pandemic which is believed to have originated from Wuhan, China in late 2019, has infected over 34.3 million people and taken the lives of more than 1 million people as of October 1, 2020 . Currently, the US, India, and Brazil have been the hardest hit in terms of infections and fatalities. The virus has spiked in South America, Africa, and South Asia since April and is spreading at a faster rate with diverse levels of fatalities. The South Asian countries, home to one-quarter of the world's population, are expected to emerge as new coronavirus hotspots. The South Asian giant, India, currently ranks the 2nd in terms of the number of COVID-19 infections as the economic lock-down which was imposed for almost 3 months to contain the spread was lifted and there is increasing movement of people around the country.

There is a widespread agreement among economists that COVID-19 has already inflicted huge damage in economies around the globe. The world is experiencing the greatest economic crisis since the great depression and, largely because of this pandemic, more than half a billion people are expected to be pushed into destitution by the end of the year. According to the World Bank estimates, global poverty rates are forecasted to rise for the first time since 1998 and that the pandemic could push about 71 million people into extreme poverty in 2020 [1]. The worst impact is likely to be felt in Sub-Sahara Africa and South Asia where almost half of the projected new poor will be located. The pandemic poses a real challenge to the UN Sustainable Development Goal of ending poverty by 2030, and it could cause a reversal of a decade in the world's progress in reducing poverty (Sumner et. al., 2020). This is also true of many

South Asian countries including Nepal, which had made impressive progress in poverty reduction in the last decade. Without a strong economic recovery plan, COVID-19 could turn back their poverty clock.

Though the virus infects people regardless of wealth, low-income communities are more likely to be exposed to the virus, have higher mortality rates, and suffer more economically. Research has shown that low income status is associated with higher rates of chronic health conditions such as diabetes and heart disease, which are the dominant factors that increase vulnerability to COVID-19 (Bor et al., 2017; CDC, 2020). In times of economic and public health crisis like this, the vulnerabilities are more pronounced for the marginal groups due to their low socio-economic status and lack of economic mobility. This paper provides a deeper analysis of the socio-economic impact of COVID-19 on the marginal and vulnerable communities of Nepal. To better understand those impacts, the paper further analyzes how each section of these communities is being affected individually, in the hope that action plans can be tailored to their specific needs.

2. Current Status of COVID-19 cases in Nepal

As of October 1, 2020, Nepal has 79,728 confirmed cumulative positive cases and 509 fatalities attributed to COVID-19 as per data released by the Ministry of Health and Population of Nepal (MOPH, 2020). The first recorded case goes back to January 2020 when a Nepali student studying in China returned home for a holiday. The positive cases started rising from the third week of March and continues to accelerate since then. Unlike elsewhere in the world, Nepal's COVID-19 infestation has been mainly seen in the younger generation between ages 21-30 (Figure 2). All 7 provinces and 77 administrative districts have now been affected by the pandemic, Province 2 being the most impacted one (Figure 1).

Furthermore, the pandemic did highlight the long-standing problems of the public health care system which has remained under-resourced in the country. The structural weaknesses of the healthcare have manifested in the government's chaotic rollout of COVID-19 quarantine and isolation centers throughout the country. Most cases have emerged from these quarantine posts where migrant workers have been placed upon arrival at home. Due to lack of primary care facilities, thousands of infected migrant returnees were put in ad hoc isolation centers often set up in schools and public buildings that lacked adequate hygienic and other basic facilities such as sanitation and water

supply. In many cases, one or two toilets had to be shared with few hundred individuals, and many were asked to sleep on the floor or benches. Many facilities lacked access to trained medical personnel or ambulances to take patients to a hospital if needed, and reports of death soon started to surface (Poudel, 2020). Meanwhile, several patients escaped from the quarantine facilities all over the country protesting the lack of testing and inadequate food and cleaning services, contributing to the spread.

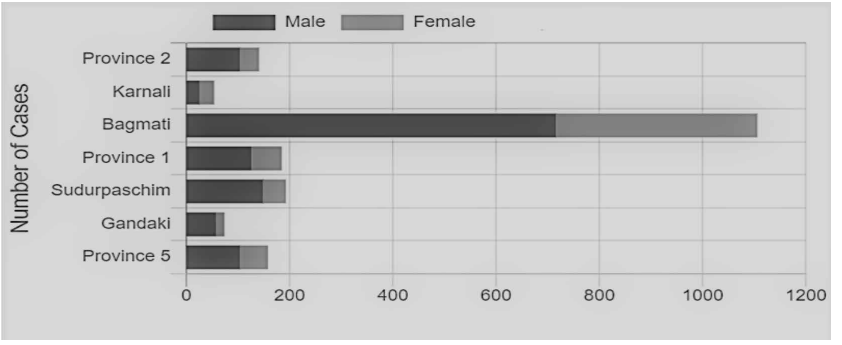

Figure 1: COVID-19 cases by province, as of October 1, 2020
(Source: MOPH, 2020)

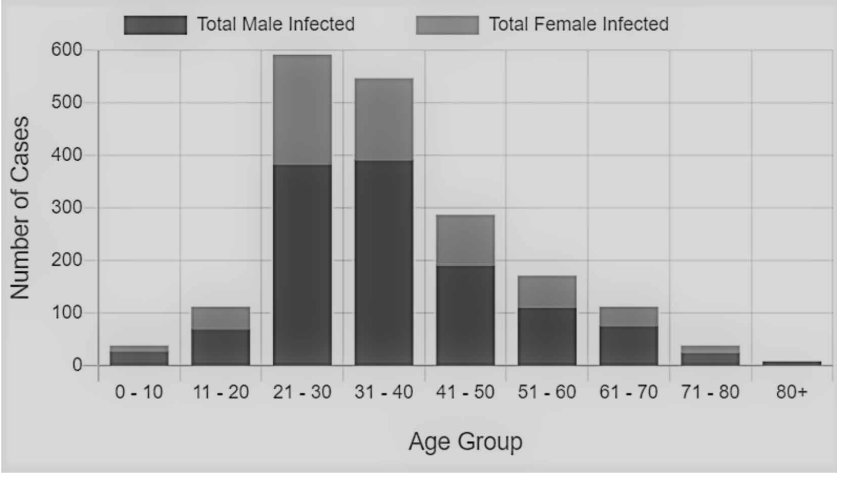

Figure 2: COVID-19 cases by age group as of October 1, 2020
(Source: MOPH, 2020)

3. Impact of COVID -19 on poor communities

While the effects of the COVID-19 have yet to be fully documented, it is evident that the pandemic is disproportionately impacting marginalized populations throughout the world, and Nepal is no exception. The impact is felt by marginalized communities due to two major factors: direct exposure to the virus, and economic lock-down imposed by the government as a measure to contain the spread. The disadvantaged communities are already at risk of being severely exposed to diseases and are expected to have a high mortality rate due to inadequate resources, limited hygienic amenities, and vulnerable situations in the workplace. The lock-down is further adding unintended consequences, such as stoppage of work for daily wage for the laborers. Many people have overnight found themselves without the means to feed their family when the government announced a national lockdown and it shut down human movement on March 24, 2020, to limit transmission after the 2nd case of COVID-19 was confirmed. Mostly, daily-wage workers, street vendors, construction workers, and small retailers were left without daily income and thus were unable to sustain themselves or their families. Nepal, where the informal sector is the largest source of employment, experienced an enormous setback in its economic activities. Medium and Small Enterprises (SMEs) which generate over two million jobs in the country, mostly for marginal communities, and contribute 22% of the country's GDP (Shrestha, 2020), were also severely impacted.

While it's too early to derive any final conclusions regarding the death rate in the country due to COVID-19, numerous cases of death exacerbated by its secondary impacts such as poverty, hunger, and domestic violence are already evident. Since the onset of this crisis, a large number of migrant workers have made their way back home in Nepal particularly from the Gulf countries and India where they found themselves out of work after the respective governments enforced economic lockdowns and restricted people movement. Thousands of Nepali workers were stranded at the southern and western border areas with India when they were denied entry to Nepal. Since then, the daily report of people dying, including elders and children, due to hunger at the border or on the way to Nepal became new normal and the list of problems continues to increase (BC, 2020). In the far-western province, as many as 175 people, 93 males, and 82 females, committed suicide during the nationwide lockdown (The Himalayan Times, 2020 July 7). Mainly farmers, the poor homemakers, and daily wage earners have been found to resort to suicide as the pandemic made

their life more difficult. Economic lock-down also limited farmers' access to markets, causing supply chain disruptions that resulted in food loss and waste, creating a lot of anger and frustration amongst the smallholder farmers.

The majority of Nepal's population works in the informal sector, without paid leave and the social safety net, making them financially too insecure when the lock-down was enforced for over three months. This is especially the case for the rural poor and daily wage earners and laborers, for whom the lockdown brought deprivation of an income source and exposed them to hunger. It is estimated that more than a million informal sector workers in Nepal have lost their jobs temporarily or permanently (Awasthi, 2020). Almost half of the population in Nepal is still food insecure, of which 22% are moderately insecure and 10% are severely insecure (MOPH, 2016). Though the government brought relief packages for those impacted from the lock-down, the momentum and scale of distribution remained ineffective at the local level (BBC Nepali, 2020 March 30). Besides, the food items distributed by the local government and discounts offered on food prices as announced by the government appeared largely inadequate considering the prolonged period of lock-down that people had to endure.

4. Impact on Women and Children

The data released by the Ministry of Health and Population of Nepal indicates that the COVID-19 infestation rate is lower in females (23%) than men (77%) (Figure 3). The lower infestation in females can be explained by their lower economic mobility. Besides, overall COVID-19 cases are mostly linked to migrant worker returnees from India and Gulf countries, and women constitute a very small proportion of the same.

Nevertheless, women bore the brunt of nationwide economic lock-down. As in many other countries, Nepalese women are forced to do heavy unpaid care duties and domestic work. Of those who work outside of these traditional duties, more than 90% of them are in the informal sector according to National Labor Force Survey 2017/18 (UNICEF, 2020).

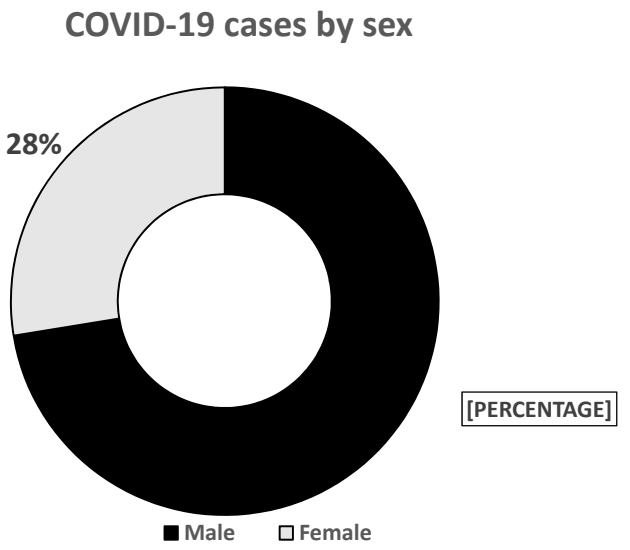

Figure 3: COVID-19 cases by gender, Nepal as of October 1, 2020

These women had to suffer a widespread loss of livelihoods when the economic lockdown was imposed across the country. Now with the school closure, millions of children are staying at home, resulting in the increase of work load for the women. Women and girls who are already living in poverty such as those from disadvantaged caste groups, or in rural, isolated locations are even more vulnerable and likely to face even more extreme consequences. As the economic lock-down prolonged, the cases of domestic violence also surged across the country. The Women's Rehabilitation Center (WOREC, 2020) reported 231 cases of gender-related violence between March 24 and May 9. The organization believes that the cases of domestic violence have been rising as men and women have been residing under the same roof for a longer period due to the loss of daily work creating more opportunities for tension.

The reported case of sexual abuse of a woman migrant returnee in a quarantine facility has further added to public anger over unsafe conditions for thousands of migrant workers forced into confinement (Sharma, 2020). Above all, the most striking concern has been the lack of effective maternity and infant child care services in the country during the lockdown period. According to a recent report, the country witnessed the unfortunate death of 56 new mothers in two months (March 29 - May 27) whereas 60,000 women were deprived of access to prenatal services (Onlinekhabar, 2020 May 31).

5. Impact on marginalized children

Though children are not the face of this pandemic, their risk of being among its biggest victims is profound, particularly in the marginalized communities. So far, the proportion of children (below 18 years) suffering from the COVID-19 in Nepal accounts for only 12% (MOPH, 2020) but those suffering from its secondary impact is considerable. The biggest threat to these children is hunger and malnutrition. Economic hardship experienced by vulnerable families is directly impacts the health and well-being of children. Besides, the countrywide school closure has exacerbated the learning crisis, depriving them of educational and instructional opportunities. While the schools in urban areas have set-up remote learning with moderate to low rates of success, it has remained a challenge in the rural areas of Nepal which do not usually have access to internet services. Now that the possibility of learning is switching to remote platforms, this crisis is likely to deepen along the digital divides between the advantaged group who can access them and those disadvantaged marginal communities who cannot.

Many public schools around the country are being converted to local quarantine and isolation centers. This makes children's safe return to school more challenging. In reopening schools, there is the risk of breaking the safe bounds of physical distancing and increasing the transmission of the virus. While the disease has been known to mostly target the older individuals, the evidence of children's immunity to COVID-19 is unclear. Children of the marginal community may be more susceptible to this illness owing to their potentially lower levels of immunity that comes with a higher prevalence of malnutrition. And, even if children were safe from contracting the disease themselves, there is still the risk of them transmitting it to their teachers, other school staff, and members of their own family, some of whom might be elderly, as multi-generational households are fairly common in Nepal.

6 What next for the returning migrant workers?

When Nepal underwent a nationwide lockdown on March 24, the government closed its borders to all, including its own citizens, from countries with high infection rate. The government was ill-prepared to accommodate huge numbers of returnees due to under-resourced quarantine facilities and poor medical infrastructure which could have easily gotten overwhelmed, if large numbers of cases were found. In the wake of a huge outcry from within and outside of the country regarding entry into the border, the Nepalese Supreme Court

passed an order in April mandating that the government bring back Nepali citizens living abroad (Nepalisansar, 2020 April 17). Since then, huge numbers of migrant workers are making their way home from several countries.

Nepal's economy is largely reliant on remittances. Remittance, accounting for 26% of GDP, is also one of the major sources of foreign currency for the country. With a decline in remittance received from the countries impacted by COVID-19, it is expected to severely undermine Nepal's economy and internal stability. The economic lockdown has had even larger effects on migrant families because there has been a significant (61%) decrease in the remittance receipts since then (Mobarak, 2020). A large part of this is because migrants who would normally be away, earning income elsewhere, are either forced to return home or are stranded in their work country without wages and incomes. In Nepal, 65% of the migrants who were in India or different cities of Nepal from the 1st of January to the 1st of April 2020, returned home during the first two weeks of April.

The challenge remains for the Nepalese government to safely place returning migrants into families and re-integrate them into the communities while taking all measures to prevent further community spread. Besides, the government also faces the challenge of ensuring those who return are properly rehabilitated in the economy by creating sources of domestic employment without which they are most likely to fall back into the poverty trap.

7. Outlook and Policy Options

The onset of COVID-19 in Nepal has brought to the fore systemic weakness that needs to be addressed if better outcomes in preparedness, response, and recovery efforts are to be achieved. The effort to contain the spread of the disease has also highlighted the fragility of the informal job sector as they lack social protection plans. The pandemic has unveiled the crisis of public health in multiple tiers which highlight the need to build a strong public health infrastructure. Consequently, lessons learned should be well documented and used to create structures and response mechanisms for any future outbreak of a pandemic of such proportions. For the outcomes dealing with the impact and aftermath of such a crisis to be sustainable and inclusive, I propose the following long-term and short-term actions to be implemented.

8. Short-term actions

- Expand COVID-19 testing to all those who are at risk of exposure to the diseases and provide follow-up treatments. The focus needs to on expand-

ing the laboratory testing capacity, isolation centers, and equip the health facilities around the country with personal protective equipment.
- Consistent and customized communication with vulnerable communities, including rural and urban poor to increase their awareness of the diseases, with due consideration of their cultural settings and access to information.
- Ensure that cash or good transfer and other relief packages distributed by the government and non-government sectors reaches to the most vulnerable poor farmers, women, people from lower-caste and indigenous communities.
- Provide informal sector laborers with compensatory wages, rent subsidies, and loan waivers to address their immediate needs.
- Collect gender-segregated data on the impact of COVID-19 to better understand its impact and to narrow gender inequalities in our response and recovery measures.

9. Medium to long-term actions

As the proper treatment and effective implementation of vaccine against this pandemic are still at least several months away, economic and social activities must continue while following the safety guidelines of the WHO. Maintaining physical distancing, wearing face cover, and adopting proper hygiene are the only few ways to control the spread at this time. Therefore, the government should encourage dialogue with all stakeholders for the smooth and safe running of the economy while adopting the safety protocol for people to resume their livelihood. The following measures should be implemented in the medium to long-term.

- In the long-term, it is important to strengthen the legislation for informal sector workers to ensure their workplace safety, include them in social protection plans, and provide enough safety nets including risk insurance, interest-free credit as needed to rebuild their resiliency in times of crisis like this.
- Now that it is evident a remittance-based economy cannot absorb the economic shock caused by COVID-19, rebuilding a sustainable domestic economy becomes a pressing need. The country needs to re-integrate returning migrants into the local economy by providing sources of employment, entrepreneurship in agriculture, tourism, and energy. For that to happen, the government and private sector should collaborate with each other and provide the migrant returnees with technical and financial support to start agribusiness, small and medium enterprises in eco-tourism and the green energy sector.

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12

Economic Impacts of Covid-19: Global and South Asian Perspectives

Kanchan Joshi and **Kalpana Khanal**

1. Globalization Phenomena and COVID-19

The globalization process started after the World War II, and accelerated after the economic liberalization in the 1970s which helped improve the interconnectivity of the global economy (Olivie and Garcia, 2020). The economic globalization that started three decades ago has fragmented and helped the specialization of the manufacturing processes in global production chains, making production and investment activities interconnected globally (Oldekop, 2020). However, the COVID-19 pandemic has resulted in health, economic, social and political crises across the world, and severely disrupted the global supply and production chain (Oldekop et al., 2020; World Bank, 2020).

Covid-19 has affected the global economy on a much greater scale than the financial crisis of 2007-09 (Kentikelenis et al., 2020; Olivie and Garcia, 2020). It is the first calamity faced by interconnected global citizens that is causing dire consequences in public health, political and economic spectrum (Scott, 2020 March 24). There has been a disruption in the economic and financial activities as governments across the world try to address the health catastrophe.

The global economy was slowing down since 2019, even before COVID-19, due to trade tensions between major economic powers (World Economic Forum (WEF), 2020). Further, COVID-19 has created "the worst human and economic crisis of our lifetimes" (ECOSOC, 2020: p. 2). The COVID-19 induced humanitarian and economic crises on emerging markets and developing economies with the large informal sector, including South Asia, have been even worse (World Bank, 2020). International Labour Organization (ILO) estimates that hundreds of millions of people have lost their job and livelihoods due to the pandemic (ILO, 2020).

In the first three quarters of 2019, the global trade volume declined by 2.9 per cent as per the World Trade Organization (WEF, 2020) due to stricter trading restrictions. As the COVID-19 pandemic spread infecting millions across the world, the economic activity has slowed down the globalization process significantly (World Bank, 2020). The travel and tourism industries have been harshly affected with more than 50 million jobs at risk across the world (WTTC, 2020). The overall Gross Domestic Product across the world could contract by 6.5 per cent in 2020 than in pre-COVID-19 projections (WEF, 2020).

The reduction in GDP could adversely impact particularly the households with lower income level or households affected by COVID-19 economic shock. The loss in income or jobs could affect the people from developing countries more, thereby, significantly halting the progress made in poverty alleviation since the 1990s (WEF, 2020). Sumner et al. (2020) predicted that more than 80 million people may fall below poverty line with potential earnings of US$1.9 per day even with 5 per cent contraction in per capita incomes, ceteris paribus. With a 10 per cent contraction, there would be 180 million people under poverty line at US$1.90 (Sumner et al., 2020), which would be a hindrance to the UN Sustainable Development Goal of Ending Poverty by 2030. About 80-85 per cent of the poor would remain concentrated in Sub Saharan Africa and South Asia (Sumner et al., 2020).

COVID-19 pandemic has exposed the fragility of public health as a global public good. The pandemic has posed a development challenge across the world. Countries, such as the United States of America, Italy, Spain, England, and Sweden that were supposed to have a sound healthcare system have encountered a severe shock. The pandemic has proven wrong the assumption that global North is capable of leading the fight on global challenges (Oldekop et al., 2020). Many countries in East Asia are managing the COVID-19 related health crisis better, including Taiwan, Japan, Vietnam, South Korea, than in Europe and the Americas. The pandemic has shown the importance of 'multi-directional learning and transformation' among the countries irrespective of power dynamics for creating just and sustainable world (Oldekop et al. 2020).

The COVID-19 pandemic emphasizes the case for understanding contemporary development challenges through a global, rather than a narrower international development paradigm (Oldekop et al., 2020). Whereas international development focuses on inter-state relations, often via aid, and on problems of and in the global South, a broader global development approach should

consider processes and problems that cover all countries, including those in the global North. Global development should focus on collective and shared challenges, with attention to their uneven nature. It should recognize that a more sustainable and equitable world requires the cooperation with all countries, rather than just pushing the 'developing' world to become more like the so-called 'developed' world (Horner and Hulme 2019; Horner 2020).

COVID-19 also provides an opportunity to revaluate certain developmental assumptions such as the idea that the global South should always follow the lead of the global North in terms of expertise and solutions. Rather, development should be based on multi-directional learning (Oldekop et al. 2020). Many countries in the global North could have benefitted from the experiences of dealing with infectious diseases in the global South. For example, Ebola in West Africa (Mogoatlhe 2020), and COVID -19 in recent months as in East Asia (Pardo et al., 2020) and the Indian State of Kerala (Tharoor 2020).

The COVID-19 calamity has hit the economies of the world with varied degrees of adverse effects. The pandemic has debilitating effects in advanced as well as developing and emerging economies. Contrary to the "greater equalizer thesis," COVID-19 is augmented by the pre-existing challenges of inequality and deprivation. COVID-19 health outcomes have been shaped by the social determinants of health, including poverty, physical environment, race and ethnicity (Abrams and Szelfer, 2020). This follows the historical pattern where the poor and vulnerable groups are disproportionately affected by pandemics (Ahmed et al., 2020).

In the advent of COVID-19 crisis, worst impacts have been mitigated in the global North, which used to rely on fiscal austerity driving from neoliberal economic policies, by the emergency social protection measures taken by the governments (Saad-Filho, 2020). For instance, European Union decided to allocate €750 billion (€390 billion as grant and €360 billion as loans) to Next Generation European Union Recovery Fund, with high-debt countries affected by the pandemic receiving the larger sum [International Monetary Fund (IMF), 2020a]. Many developed countries dealt with pandemic by increasing government spending and redirecting economic policies away from the dogmatically frugal policies. They recourse to Keynesian stimulus put forth by the economist John Maynard Keynes that emphasizes government spending as an essential tool to resolve the economic crisis (Goodman, 2020 March 26).

However, the lack of institutional support from the governments could have more significant negative impacts on the economy of the global South (Pilling, 2020). Due to COVID-19, hundreds of millions of people are losing their livelihoods and facing challenges in accessing basic human needs of secure housing, sanitation, food, (Human Rights Watch, 2020), and sound health care system. About 83-132 million people could face varying levels of food insecurity due to disruptions in food access and increased poverty levels (FAO et al., 2020; Klassen and Murphy, 2020).

The pandemic has revealed the vulnerability and shortcomings of the complex network of global value (supply) chains that grew after the 1990s (Razin et al., 2020). These global value chains are characterized by super specialization and fragmentation of production across the world (Razin et al., 2020). The COVID-19 crisis has impacted supply chain of necessary goods, such as food and medicinal products seriously due to restrictions in movement. The governments around the world restricted personal movements, especially air travel and economic activity to control the pandemic (Kerr, 2020). On the one hand, these restrictions during COVID-19 pandemic could promote localized production, revive concern for industrial sovereignty, and identify the need for regional and domestic value chains. Likewise, the countries could recourse the migration and redistribution policies to protectionism and nationalism (Bieber, 2020; Kerr, 2020; Razin et al., 2020). These impacts have revived the discussion of deglobalization, and the result could be an emergence of more multi-polar globalization, mainly led by Asia (Oldekop et al. 2020). On the other hand, the zealous nationalism could pave the way for the rise of authoritarian governments that could reduce the liberties of citizens, and trigger deglobalization and securitization (Bieber, 2020). Likewise, the manufacturing businesses could become more mechanized that might displace the jobs of relatively lower-skilled labor forces.

2. Coping with COVID-19 Effects on High-income and Low-income Economies

COVID-19 has affected individuals from all levels, transcending the levels of wealth, fame, prestige, or age (Mein, 2020) as well as economies across the world. As the virus is a novel one, humans around the world do not have immunity to the virus, which makes everyone vulnerable. Hence, many

consider the disease as "the great equalizer" (Mein, 2020). The statement is a fallacy, considering that the disease has disproportionately affected groups that are socially disadvantaged, including racial and ethnic minorities and low-income populations. Moreover, the disease has exposed health inequalities within and between the countries (Ghosh, 2020a; Mein, 2020). High-income economies and low-income economies deal with pandemic induced economic crisis differently.

Lockdowns and mobility restrictions have caused an unprecedented number of job losses in every sector, causing loss of livelihoods. Workers in unorganized and informal sectors from developing economies have been worst affected as they are deprived of legal, economic and social support (Ghosh, 2020b), whereas in high-income economies, workers are supported by governments up to some extent.

The relief packages by governments in the global North, such as job keeper and jobseeker allowance in Australia (Henrique-Gomes, 2020 August 26), the Coronavirus Aid, Relief and Economic Security (CARES) Act of more than $2 trillion value (Snyder, 2020 April 03) have helped in easing the economic woes of aid workers, small businesses and states.

In European countries, such as Denmark, France, and Germany, respective governments are working with labor unions and employers to deal with the economic fallout with governments contributing to pay a larger proportion of wages (75 per cent by government and 25 per cent by employers), or by giving paid leave funded by the government as in France, or by continuing to pay for the workers who are unable to work (Snyder, 2020 April 03). Germany, which is known to follow prudent economic policies focusing on a balanced budget and savings, has gone against their prudent nature with a $145 billion fiscal stimulus package equivalent to 4 per cent of its GDP over two years to deal with economic fallout caused by the pandemic (de Weck, 2020 June 22). The anticipated increased spending in Germany could have a positive spillover effect to other countries from which it imports (de Weck, 2020 June 22). Germany has tapped into the debt market by giving the nod to a policy that would make possible for the European Central Bank to continue financing the indebted economies from the Eurozone (de Weck, 2020 June 22). Hence, Germany is finally tackling a structural problem of underinvestment and economic imbalances within the European Union by encouraging imports and boosting investments in health and education infrastructure, climate-friendly technologies, and even in fields of data science and artificial intelligence. In many of the well-off economies, such

as Australia, Germany, and other European countries, the governments have supported loan, mortgage and rent payment deferrals through various directives (Australian Bureau of Statistics, 2020; D'Ascenzo et al., 2020 March 25; details of country-wise government support in KPMG, 2020). Likewise, the high-income countries have been able to expand their capacities to support broader testing and contact tracing as compared to the developing countries.

Lockdown and closures have negative implications for aggregate demand in the developing economies that do not have a provision of protection from financial and health issues. The developed countries already have some amount of safety nets and are also able to provide counter-cyclical fiscal policies. As developing countries are less likely and capable to provide adequate counter-cyclical fiscal policies, the economies of these countries are more likely to shrink more for a longer period (Ghosh, 2020b). The pandemic has shown that fiscal spending on public health and social protection schemes are important for coping with pandemics (Ghosh, 2020a). The decline in government funding on public health services over the years has severely compromised the capabilities of societies to fight the pandemic, and have increased global inequality both within the countries and between the countries (Ghosh, 2020a), but more so in developing economies.

In the emerging and developing countries, 70 per cent of all employees are estimated to be in the informal sector (Ghosh, 2020b). The pervasiveness of informal employment in the developing world resulted in a macroeconomic consequence, which is the proportionate absence of automatic stabilizers, such as unemployment insurance/support or health insurance (Ghosh, 2020b). Automatic stabilizers are accessible to the workers in the formal employment sector, and prevalent in the economies that rely on formal workers, especially in developed countries (Ghosh, 2020b). Access to economic stabilizers during the economic contraction in the pandemic provides significant financial support to the affected.

In developing countries, the governments' containment policies for COVID-19 within countries have often shown extreme apathy to the working-class workers. The appalling instance is from India, where informal migrant workers suffered physically, financially and mentally due to brutal but ineffective lockdown, termed as 'Janata curfew'. The disastrous lockdown failed to control the spread of the virus, but devastated tens of millions of workers, especially from the informal sector due to loss of livelihoods and decline in earnings (Ghosh, 2020b, p.23; Stranded Workers Action Network, 2020). A cash stimulus would have been appropriate to support these workers, but being

in the informal sector, it hindered the chances for the informal workers of receiving support from the state.

3. COVID-19 and Economic Measures in South Asia

Studies have shown that the COVID-19 shock has resulted in a sudden stop in capital flows to emerging markets. Weaker inflows mean that they would not be able to run large current account deficits, and would have to draw down reserves. Commodity exporters would be severely affected by the decline in oil prices. Commodity importers would benefit from lower commodity prices only marginally due to shutdowns of economic activity. Many countries might require multilateral support in the COVID crisis due to the stress of external financing and a lack of appropriate policy to support their economies (Brooks et al., 2020).

This section focuses on the economic measures initiated by the governments in South Asia to tackle economic and health issues. In South Asia, economic support has been varied across the countries. India provided fiscal support by allocating 1.9 per cent of GDP through direct spending (in-kind and cash transfer to lower-income households, insurance support for health care workers) and deferred revenue. Also, India allocated 4.9 per cent of GDP to aid businesses and reinforce support to various sectors (IMF, 2020a). Though the fiscal stimulus provided by the Indian Government is the largest in South Asia, the support could not cover many low wage workers from the informal sectors and small businesses. The loss of livelihood and wages have inflicted damage to migrant and informal sector workers in the world's fifth-largest economy (Sakpal, 2020).

Likewise, Bangladesh provided a USD 588 million stimulus package for the export industries to support the salaries of the workers. Bangladesh allocated 21.3 billion Taka for housing scheme of the homeless, 7.6 million Taka for supporting individuals losing jobs to the pandemic, and 8.5 million Taka to support health care and frontline workers (IMF, 2020a). However, the wage earners, who lost their jobs to the pandemic were not supported by the stimulus. Even the governments in Pakistan and Afghanistan have apportioned funds and announced economic packages to address the urgent health and food needs, provided tax reliefs and subsidize mortgages (IMF, 2020a).

Government of Nepal announced that the health spending would be increased and additional insurance coverage for frontline medical personnel would be provided. Nepal provided social assistance by providing daily food rations

to the low-income wage workers, set up quarantine centres and temporary hospitals (IMF, 2020a). The Nepal Rastra Bank planned to reduce cash reserve ratio from 4 to 3 per cent for providing liquidity.

The pandemic has created the worst humanitarian and economic crises in South Asia. The region has emerging markets and developing economies with the large informal sector (Ratha et al., 2020). The government's support through cash and loan stimulus have been inadequate or absent. The low-wage workers and small businesses in the informal sector either did not receive anything or received insufficient financial support. Compared to the other South Asian countries, Nepal provided non-concrete and inadequate fiscal, monetary and macro-financial support to the workers and businesses.

Empirical evidence suggests that the COVID-19 related confinement policies are unaffordable to low-income people as compared to the higher and middle-income people. The enforced lockdowns have disrupted the supply chain. The disruption in the supply chain could raise food prices and aggravate food insecurity situation, even for the non-poor (Ghosh, 2020a). As the pandemic cycle has prolonged, poor and vulnerable groups had to make a difficult choice between either risking to catch and spread COVID-19 or falling into extreme poverty (Bargain and Aminjonov, 2020). Stringent lockdowns in low-income countries should have been accompanied by appropriate support policies in the form of combined healthcare efforts and consumption support, either through transfers in-cash if food markets are working, or in-kind if they are not (Ravallion, 2020). However, weak governance and failure of government institutions to judiciously support the most vulnerable citizens and small entrepreneurs have caused serious economic disruption especially to the poor and vulnerable.

In a crisis like this, targeted cash transfers either through the delivery system of pre-existing transfer schemes could be effective (Beegle et al., 2018; Gentilini, 2020). If there is no effective pre-existing system to inject cash for targeted households, schemes like geographical targeting based on poverty maps and epidemiological/containment maps could be effective in transferring cash to deal with poverty (McBride and Nichols, 2018). For instance, the jobkeeper and jobseeker payment of Australian $750 per week from April 2020 by Federal Government in Australia has helped vulnerable households, including 1.1 million children to afford food and housing (Henriques-Gomes, August 26 2020).

COVID-19 pandemic also forced several sectors, particularly in the cities, into the digital space (EPW Engage, 2020). The rapid virtualization or

digitization process is happening in many sectors, including the educational sector (Leonardi, 2020). Schools and universities are radically transforming education by switching to online, e-learning forms and launching Learning Management Systems solutions (Tian, Zheng, and Chao, 2020). However, digitization in the time of pandemic has financial costs attached (investment in the data, technology and devices), which majority of the low-income households cannot afford. The creation or expansion of digital space could help, if done more inclusively (EPW Engage, 2020).

South Asian economies face the danger of aggravating inequalities by excluding a large group of the population from receiving financial aid during COVID crisis. For instance, India's prolonged complete lockdown hurt the economy and a large number of people. On the contrary, the phased reopening of lockdown and restrictions in Pakistan have been effective in managing disease spread and managing economic wellbeing of the country (Dagia, 2020 August 24; Siddiqui, 2020 August 25). The case of Pakistan in managing COVID is an anomaly. Generally, the governments should strategize to manage health crisis and the financial stress of the individuals and small entrepreneurs.

3.1 *COVID-19 induced problems, migrant and informal sectors workers*

Most countries, including South Asian governments, relied on lockdown, travel restrictions and social distancing to control the highly infectious nature of the virus, as public health systems failed (Ratha et al., 2020). All these factors have led to an economic crisis. The countries in South Asia, including Nepal and India, shut down the whole economy for about three months. As the countries could not bear the economic losses, the governments lifted extreme lockdowns.

The more impoverished people from rural areas migrate to urban areas and abroad to seek employment. These migrants support their families by sending remittances by working beyond their place of origin. However, due to COVID-19 induced job losses and disruption of public transport services, many migrant workers (both external and internal) suffered, and faced difficulty with returning home safely (Ratha et al., 2020). Many migrant workers have lost their jobs in the host countries and cities in manufacturing, construction and hospitality businesses as they shut down (Bieber 2020; Ratha et al., 2020). In the typical scenario, the people who lost their jobs would return. But, due to travel restrictions and prohibitions, the workers are unable to return except for the Nepal-India corridor in South Asia (Ratha et al., 2020).

Matallah (2018) observed that South Asian immigrants were found to invest in their country of origin, utilizing their skills gained in the host countries. The remittance sent by migrants provides good financial support to the families back home. Hence, the job loss in the host country would have long term impacts on the migrants and their origin country.

3.2 *Internal Migrant crisis in India and Nepal in COVID-19*

The internal migrants are about two and a half times that of international migrants (WB, 2020), and their plights should not be ignored. In South Asia, volume and flow of remittances from internal migration or inter-regional migration (such as between India and Nepal) is significant than international migrants (Deshingkar and Grimm, 2005). The COVID-19 crisis has also created an internal migrant crisis in South Asia, more severely in India with 450 million internal migrants (Dandekar and Ghai, 2020). The Indian migrant crisis has been the worst with 40 million affected in the modern Indian history since partition in 1947 (Infante, 2020). During partition, more than 14 million people got displaced (Mukhra et al., 2020). The strict and ad hoc shutdown announced by the Indian Prime Minister Narendra Modi, giving citizens less than four 'hours' notice (Gettleman and Schultz, 2020 March 24) triggered the humanitarian crisis. The crisis unfolded with many losing lives due to incompetence of Government to provide protection and support to marginalized groups and lower castes, and lack of coordination among different Indian states to ensure the safe transportation of migrant workers (Rajagopal and de Schutter, 2020). Indian COVID-19 lockdown also forced low skilled Nepali migrant workers to return to their homeland, unfurling humanitarian, economic and health crises (Hashim, 2020 June 10). Tens of thousands of the migrant workers took an arduous journey for days and weeks without sufficient food and water to reach Nepal. Nepal went to lockdown at the end of March 2020 with just a handful of COVID-19 cases. The cases of COVID-19 and community transfer increased after the migrant crisis (Hashim, 2020).

3.3 *International migrant crisis due to COVID-19*

The six countries from the Gulf Cooperation Council (GCC) host tens of millions of South Asian migrants from India, Pakistan, Bangladesh, Nepal and Sri Lanka (Bhatta, 2020 May 26). Of these countries, Nepal recorded significant growth in migration during the past two decades or so. Majority of South Asian migrants, including the Nepalis work in Gulf states as semi-skilled or low skilled workers in large scale developmental and construction projects, fishing sector, and as drivers (Rajan, 2020). Since the pandemic,

millions of the migrant workers have been laid off. Half a million Nepali in Bahrain, the United Arab Emirates, Saudi Arabia, Qatar and Oman have expressed their interest to return to Nepal (Bhattarai, 2020 May 20). Many Nepali citizens in the Gulf States and Malaysia, who were laid off from their jobs did not receive any financial support (Bhatta, 2020 May 25), and did not have access to food, shelter and money (Bhattarai, 2020). The migrant host countries, such as Bahrain, Kuwait, Maldives, Saudi Arabia, Qatar and other Gulf states have pressurized the origin countries to repatriate their citizens back (Aneja and Islam, 2020; Bhatta, 2020 May 26). South Asian countries already started repatriation flights. However, the countries in South Asia, especially Nepal faces challenges in arranging the logistics for safe repatriation and in rehabilitating the returnees to the domestic workforce (Bhattarai, 2020)

3.4 *Economic impacts of COVID-19 in remittances*

In Nepal, remittances had helped in addressing the unemployment problem since the early 2000s, during decade long civil war and political instability afterwards. The share of remittance in GDP of Nepal increased sharply during 2000-2014 (Imai et al., 2017). However, the remittances are projected to fall by 14 per cent due to the COVID-19 pandemic (Ratha et al., 2020). Due to the pandemic, remittances to South Asia, including, Nepal is projected to decline sharply from estimated 140 billion dollars to projected 109 billion dollars of remittances (World Bank-KNOMAD, cited from Ratha et al., 2020). The decline in remittances would hit Nepal seriously, as the remittances from the Nepali workers abroad is 27.3 per cent of GDP (Ratha et al., 2020). The GDP contribution from remittances is far more substantial in Nepal (5th most remittance dependent economy), whereas the contribution of remittance in other South Asian countries ranges from 7.9 per cent in Pakistan to 0.1 per cent in Maldives (Ratha et al., 2020; Shivakoti, 2020). Nepal aimed to have an economic growth rate of 8.5 per cent, but it has been revised to 1.5-2.8 per cent due to COVID-19 (Shivakoti, 2019). Hence, the COVID-19 induced migration crisis could force Nepal and other countries to rethink their labor policies, individual health security policies and create sustainable job opportunities within the country.

4. COVID-19 and Debt: Policies to Support the Developing Economies

Due to COVID-19 economic and health crises, many countries have suffered sharp declines in revenues from every sector, more specifically in tourism and hospitality sectors, export sectors and capital outflows (Ghosh, 2020a).

Developing countries are unable to institute large fiscal stimulus, unlike developed countries, making it difficult for them to provide adequate social protection (Ghosh, 2020a).

Moreover, since 2010, the debt of the emerging markets and developing economies have increased by 60 percentage points of GDP to the high of 170 per cent of GDP in 2019, with China taking the debt lead (Kose et al., 2020). Debt has increased by 20 percentage points of GDP in 2019, even when China is excluded (Kose et al., 2020). As pandemic hit the developing countries, they would require more debt to sustain their economies and to tackle the health crisis (Kose et al., 2020).

The trade and current account deficits in global South are financed by credit from capital holders in global North and international organizations like International Monetary Fund (IMF) and the World Bank, through foreign aid, grant and investment (Wade, 2020). In the past decade, the global South economies have continuously fallen into a debt trap as their dependency on commodity exports, tourism and remittance increased, and there has been easy entry and exit of capital from the North (Wade, 2020).

COVID-19 would negatively impact the public finances of these countries in three crucial manners (Oldekop et al., 2020). First, new lending to middle and low-income countries would be difficult due to high levels of capital flight out of these countries while local currency devaluates making it difficult for them to pay for imports and dollar-denominated debts (Brooks et al., 2020). As the pandemic has increased the demand for expenditure on social protection to help the communities from food insecurity, health and financial crises, government expenditures around the world increase persistently, increasing their budget deficits. COVID-19 has resulted in a sharp decline in public revenue through taxation, which would further increase debt levels (Oldekop et al., 2020).

The developing economies require cash to tackle the pandemic. The estimated financing requirements of developing countries are in the range of US$ 2.5 trillion. Countries across the world and international institutions should cooperate to financially support the developing economies to come out of COVID-19 induced crises (Ghosh, 2020a). Since the developing economies have less foreign exchange flexibility, the likes of the World Bank Group, IMF and global North leaders should step up for enabling swift access to the compensatory financial resources without any conditionalities (Ghosh, 2020a), while maintaining sound debt management and debt transparency

(Kose et al., 2020). IMF could introduce a policy measure of immediate issuance Special Drawing Rights (SDR) within an existing financial framework (Ghosh, 2020a). IMF created SDR as international reserve assets to supplement the official foreign exchange reserves of member countries for creating additional liquidity without extra cost, and are not loans (IMF, 2020b).

Moreover, as countries cope with viral spread and economic recession due to lockdowns, the international and domestic financing institutions, including the World Bank should freeze debt repayments (both principal and interest) at least for a year, or until debt restructuring is done (Bond and Brown, 2020; Ghosh, 2020a). There has been an increased call of debt cancellation of the developing economies for the World Bank. Hence, international solidarity and globally coordinated responses are the need of the hour. However, a trade war between United States of America and China, American Government's intention of defunding World Health Organization in these crucial times, and rise of nationalism will have negative impacts on global political and economic wellbeing.

In the global level, Japan (238 per cent debt to GDP ratio), followed by Greece (177 per cent debt to GDP ratio), have significant debt to GDP ratio, whereas Brunei (2.4 per cent) and Afghanistan (7.1 per cent) have the lowest debt to GDP ratio (Kandel, 2020 June 24; Trading economics, 2020). In South Asia, Bhutan leads the debt to GDP ratio (110 per cent). India has increased its GDP to debt ratio from 67.4 per cent in fiscal year (FY) 2012 to 72.2 per cent in mid-2020 and is projected to increase to 87.6 per cent by the end of the 2020 (Nayak, 2020 July 20). Nepal, which had 31.90 per cent debt to GDP ratio in the past quarter has increased its debt to 34.54 per cent in the third quarter end of FY 2076/77, with international debt increased by 9.18 per cent and domestic debt raised by 6.75 per cent (Kandel, 2020 June 24).

5. COVID-19--A Gendered Perspective

The crisis is also highly gendered in its impacts (de Paz et al., 2020). Women are more affected by COVID-19 in places with more female health workers (Wenham, Smith and Morgan, 2020). Agarwal (2020) anticipates the disproportionate effect of COVID-19 pandemic in women: on the burden of domestic tasks, care of vulnerable elders, food sharing under scarcity, exposure risks while shopping for essentials, household asset depletion, and domestic violence. In an analysis of 104 countries, Boniol et al. (2019) reported that

women form 67 per cent of the health care workforce on average across 104 countries.

As caregivers, women are highly vulnerable to the 'virus overload' with excessive and repeated exposure. Generally, women have a low risk of mortality than men from Coronavirus, but virus overload could weaken the biological advantage. For instance, 83 per cent of nurses and midwives in India are women. They are more prone to virus exposure, but are less likely to receive good protective gear than doctors (Agarwal, 2020). In India, 84 per cent of doctors are men and are in a higher position in their organizations (Agarwal, 2020). Women nurses are more likely to be harassed by men in isolation wards (Agarwal 2020; Anand and Fan 2016). The closure of schools to contain COVID-19 spread have a differential and grinding effect on women as they provide most of the informal care within families, resulting into limited work and economic opportunities (Davies and Bennett, 2016). Women compromise their calories and protein intakes, and may even go hungry while feeding the men and boys in food insecure households (Agarwal, 2020).

Furthermore, 90% of employed women workers in India and 90.5% in Nepal work in the informal sector as domestic help, street vendors, construction workers, artisans etc., where jobs have collapsed (Agarwal, 2020). The loss of livelihoods would affect migrant workers, most of whom are men. But, after their return to home, joblessness and intra-household gender dynamics could become more complex (Agarwal and Panda, 2007). Evidence supports that domestic violence is significantly higher in households where the husband is unemployed (Agarwal and Panda, 2007). The incidences of domestic violence against women increased during the pandemic all over the world (UN Women, 2020).

Furthermore, to cope with joblessness and income loss in the past due to seasonality and calamity in rural India, families often had to sell assets. The first to be sold are women's assets – typically jewelry or small animals – while men retain their land and large animals (Agarwal, 1990). Understanding and acknowledging the gendered impact of the pandemic on health and finances is vital for formulating equitable and effective policy mechanisms (Wenham et al., 2020). Moreover, considering the role of women as frontline care workers and family caregiver, the inclusion of their voices and knowledge could be empowering and help in improving preparedness and response to pandemic related problems equitably (Wenham et al., 2020).

6. Policy Recommendations, Summary and Conclusion

COVID-19 is a global crisis, which has affected countries all over the world. It has induced economic recession and resulted in health crises across the world with varied levels of negative implications. The lockdowns and movement restrictions have impacted supply chain of necessary goods, including food and medicines; halted travel-related activities for an indefinite period; and disproportionately affected small entrepreneurs and informal workers, resulting in the loss of livelihoods and contraction of incomes. The loss of jobs in informal sectors, restrictions in free movement of goods, including agricultural goods might halt and even reverse the poverty alleviation gains made within the past two decades or so.

Global North has reacted to the pandemic by injecting cash to their economies in the form of relief packages, automatic stabilizers, -mortgage, rent and loan-payment deferrals, encouraging access to digital technologies, and broadening testing and contact tracing mechanisms. However, low-income countries have not been able to support workers in informal sectors as well as small entrepreneurs. Hence, these countries require immediate policy interventions to support and protect all households, including informal sector workers in need of financial and health-related support, through direct cash transfers, debt, rent and mortgage payment deferral support, home deliveries of everyday items to isolated households (Dube, 2020). In the long term, developing countries like India and Nepal should focus on strengthening public health capabilities and financial support mechanism to increase resiliency against future health, financial and natural disaster-related shocks (ICIMOD, 2020). The social and gender inequities and inequalities prevalent in these countries should be addressed for tackling the crises efficiently and inclusively. In order to successfully achieve programs such as cash transfers, it is important to emphasize financial inclusion. Digital campaign and initiatives like online banking have to go in tandem. Initiatives must be taken to reduce the digital gap.

Furthermore, multilateral cooperation of global South, global North and international financial institutions are needed more now than ever to tackle the debt crises and pandemic induced financial and health crises, which is important for maintaining social and political order within and between the countries (Oldekop et al., 2020).

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