

Post-COVID Horticulture: Challenges and Way Forward for Food and Nutrition Security and Income Generation

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Abstract

This paper aims to provide the general overview on the contribution of horticulture sector in food and nutrition security and understand the impact of COVID-19 crisis with post COVID recovery strategy. The paper is based on literature review and working experiences and expertise of authors working in the agriculture sector in Nepal and the information is further supplemented by consultations with experts, farmers and government officials working in agriculture sector. Horticulture is a very important sector of agriculture for improving livelihoods of people through income generation food and nutritional security. Since 2020, the Covid-19 pandemic has caused the socio-economic suffering all over the world including Nepal. Overall study showed that production and marketing of perishable horticultural crops were heavily affected by COVID-19 due to lockdown and transport restriction. However, there was a positive realization that horticulture sector should be prioritized with the post COVID recovery plan for food and nutrition security. For this, there is also a need for integrated policies and their implementation plan to ensure technical and financial support with sufficient budget allocation, subsidies schemes with an easy access and timely availability of inputs, access to soft loan, supply chains and assured markets for horticultural commodities.

Keywords: Horticulture, food security, COVID-19 pandemic, lockdown, socio-economic impact

Introduction

Food is a basic need for survival of human beings. Food Security entails access to sufficient and nutritious food for healthy and productive lives (FAO, 1996). Agriculture sector has a paramount role in this regard. The government of Nepal has regarded horticulture sector as one of the significant components of agricultural sector for food and nutrition security. The

share of horticulture sector in agriculture gross domestic product (AGDP) is about 38.59% (MoALD, 2018) which has high comparative and competitive advantage.

One of the biggest humanitarian problems of 21st century, COVID 19 pandemics has revealed how the global food systems can become vulnerable leading to increased food insecurity, malnutrition and poverty especially among vulnerable categories of population in societies.

(World Bank, 2020a; WFP, 2020; Nguyen, 2020; Stephens et al., 2020; Fore et al., 2020). Unpleasant situations have also been observed in Nepal as adverse impacts of COVID-19 in terms of human casualties along with other losses in economy, country's diverse farming systems ultimately impacting food security. As of 20th March 2021, 275750 total cases of infection with 1001 active cases and 3016 total deaths have been reported (Worldometer, 2021). Government of Nepal imposed a lockdown; complete restriction in movement of people and vehicles, shutdown of market and services exclusive of emergency operations, to control the spread of coronavirus since 24 March 2020 which was partially relaxed since the first week of September 2020.

Similar to other developing countries, Nepal also faced a question as to whether the real chaos from this pandemic would come from infection or from hunger, or to what extent the crisis could impair the achievement of the Sustainable Development Goals (SDGs) by 2030 (UN, 2015). However, some specialties of Nepalese farming systems like vivid geographic settings, smallholder farming communities, diversified cropping system, and diverse income-generating activities also have some resilience that helps to cope with and adapt the crisis. (Epstein et al., 2017). Government of Nepal at all federal, provincial and local level have implemented various ways to deal with the disruption caused by COVID-19 in food production and food security focusing basically on a fast rebounding pillar of the economy i.e., agriculture/horticulture.

Objectives of the study

The broad objective of this study is to assess the contribution of horticulture sector in food and nutrition security and understand the impact of COVID-19 crisis in this sector with post COVID recovery strategy.

The specific objectives are:

- To review critically the national plan policies and programs of horticulture sector development in relation with food and nutrition security.
- To assess the impact of COVID 19 in horticulture sector.
- To develop the post-COVID horticulture development strategy.

Methodology

This study was based on qualitative and quantitative method of information and data collection and their analysis. Basically, extensive literature review was done and information was collected and analyzed. In addition, focus group discussion with government officials and policy makers was done. Finally, perception and information were taken from traders of fruits, vegetables and ornamental plants in Kalimati and Balkhu wholesale market in Kathmandu. .

Results and Discussion

National plan, policies and programs for horticulture development in Nepal:

Nepal has made increasing efforts for horticulture sector development through different plan, policies and programs. Government of Nepal has continuously prioritized horticulture development through different periodic plans. A 20-year horticulture development plan "Master Plan for Horticulture Development (MPHD) was formulated in 1990 (MPHD, 1990). However, it was not effectively followed and tied up with the different periodic and annual plans as well. It is the issue of study whether the slow growth of horticulture sector development is due to poor implementation of prepared plan and policies. Despite the potentiality of development and opportunities available, the development of this sector is not satisfactory as expected. With due consideration of such situation, long term agriculture perspective plan (APP,1995)

was designed and implemented focusing on comparative and competitive advantage of horticulture. APP focused to transform subsistence agriculture into commercialized one with priorities given to horticultural crops such as apple in mountains, citrus, coffee, tea, off season vegetables and vegetable seeds in the mid-hills and mango banana and fresh vegetables in terai region (APP, 1995). Some remarkable achievements of APP were expansion in fruit orchard areas and increment in vegetable production. However, due to weak functional coordination among concerned stakeholders, ownership, of the program and low investment to horticulture program, horticultural sector has not been boosted as targeted (ADS, 2015).

Furthermore, government prepared Nepal Trade Integration Strategy (NTIS) in 2010 and reviewed in 2016. It has identified four horticultural commodities namely cardamom, ginger, tea and large cardamoms products of export potentiality for balancing negative trade balance (World Bank, 2016). NTIS has focused on institutional capacity for trade negotiation, business environment for investment and trade, trade and transport facilitation, standard and technical regulation, sanitary and phytosanitary measures, intellectual property right and issue related to trade in service. (MoC, 2016)

The government has designed foreign aided projects for horticulture development in Nepal. Among them High Value Agriculture Project (HVAP) implemented in 7 remote districts of mid and far western region from 2010-2017 focusing on apple, ginger/turmeric, off season vegetable and vegetable seed through value chain approach. Likewise, the Project for Agriculture Commercialization and Trade (PACT), previously in 25 districts (15 terai and 10 hills) and later on throughout the country. Similarly, Kisan ka Lagi Unnat Biu Bijan Karyakram (KUBK) in 7 hilly districts of western and mid-western regions from 2012-2019 focusing on seed sector development,

Raising Income of Small and Medium Farmers Project (RISMFP) in 10 districts of mid and far-western regions from 2011-2018. Commercial Agriculture Development Project (CADP) in 11 districts of Eastern Development Region from 2007-2014, and High Mountain Agribusiness and Livelihood Implementation (HIMALI) in 8 high hill districts from 2012-2018 also included horticulture components as priority sector. Similarly, agriculture ministry focused on youth focused vegetable production program and orchard management project.

Currently Agriculture Sector Development Program (ASDP) is implemented in all districts of Karnali province except Dolpa and Humla supporting in value chains of off-season vegetables, seed potato, vegetable seeds, ginger, turmeric, apple and citrus. Likewise, small projects like Value chain Development Project (VCDP), Sindhuli Road Corridor Commercial Agriculture Project (SR-CAP), Agriculture component of Rani Jamara Kularia Irrigation Project, food and Nutrition Security Enhancement Project (FANSEP) are in implementation with focus on various horticultural commodities.

Government has implemented Agriculture Development Strategy (ADS) since 2015. It is a long-term strategy for overall agriculture sector development with 20 years vision and ten years action plan and strategy focusing on governance, productivity, profitable commercialization, and competitiveness. Basically, fresh vegetables and tea sub sector has been focused as subsector horticulture in ADS (MoAD, 2015).

In line with ADS, government has designed and implemented Prime Minister Agriculture Modernization Project (PMAMP) from 2016/17. It has provisioned large commercial agricultural production and industrialized center development called 'superzone' followed by zones, blocks and pockets at different levels. Many horticultural crops including apples, citrus,

vegetables and spice crops have been included as focused commodities in superzone, zone, block and pocket program.

The fifteenth five-year plan (2019/20-2023/24) has envisioned to increase profitability from agriculture and make it competitive by production, processing, and marketing of industrial crops, fruits, vegetables and flowers will be promoted focusing on specific regions and locations for the establishment and expansion of agro-industries. Meanwhile priority to horticulture and farming of other appropriate crops are planned to be promoted alongside river basins and highways as per the principle of proper utilization of agro-climatic zones in coordination with the local level (NPC, 2020).

By the end of the fifteenth plan period, the contribution of the agriculture sector to GDP will be decreased to 22.3 per cent from the current 27 per cent as industries will grow up. The seed replacement rate for major crops will have reached 25 per cent by the end of the planning period. The productivity of per hectare will have reached 20 MT for vegetables; 22 MT for potatoes; 12 MT for fruits; by the end of the planning period i.e., by FY 2023/24 from the productivity of 14.1 MT for vegetables; 16.4 MT for potatoes; 9.8 MT for fruits; as of FY 2018/19 (NPC, 2020).

The UN general assembly in Resolution A/RES/74/244 has declared the year 2021 as "The International Year of Fruits and Vegetables 2021 (IYFV)" aiming to raise awareness of, directing policy attention to, and sharing good practices on the nutritional and health benefits of fruit and vegetable consumption, the contribution of fruit and vegetable consumption to the promotion of diversified, balanced and healthy diets and lifestyles, and reducing loss and waste of fruits and vegetables (FAO, 2020).

Thus, overall policy review revealed that horticulture sector is the priority area of government of Nepal.

Horticulture sector in the context of federal structure of government:

The constitution of Nepal has provisioned for three tiers governmental system- federal, provincial and local level with some autonomy to province and local governments. Looking at the annual programs on agricultural development of all three layers of governments, fruits and vegetables are priority commodities. Federal and provincial government has also commodity specific farm centers for leading for resource conservation and technology demonstration for national horticulture sector development. For few years along with the government sector, private sector is also emerging for commercialized production of horticultural commodities like off season vegetable products in protected structures, cut flowers, fruit and vegetables post-harvest value chain-based business and digitally equipped marketing networks of horticultural products, which is a positive sign.

Challenges posed by COVID-19 and post-COVID strategy:

Despite government priority on horticultural sector, this sector has faced different challenges rendering slow growth. Latest horticulture sector has been hit hard by COVID-19 pandemic. Broadly speaking the COVID-19 pandemic is the biggest human crisis causing health and socioeconomic suffering globally. Government of Nepal enforced a lockdown; complete restriction on market operation and public mobility, beginning on 24th March 2020 to restrict the spread of coronavirus. Due to which there was significant impact on production and marketing of horticultural commodities allowing the perishables like vegetables and cut flowers to wither or decay in field (Adhikari, 2020).

Most of the horticultural commodities specially vegetables and cut flowers; highly perishable in nature was severely affected by COVID-19 pandemic. Preliminary study conducted by the Department of Agriculture showed that

lockdown and transport restriction had severe negative consequences on cut flower and fresh vegetable marketing. Farmers, particularly in the peri urban areas were forced to either distribute freely their produce to the needy people in local area or destroy it in the fields itself due to transport restriction and limited demand in urban areas (anecdote shared by Rajendrajung Rayamajhi; Chitwan based commercial farmer and entrepreneur).

A study conducted by Adhikari et al. 2020 has revealed that traditional subsistence farming appeared to be relatively resilient. However, commercial farming limited to the periphery of market centers, cities in accessible areas was more affected due to poor supply network to reach the market from food security point of view. This study also explored those wage-based laborers from marginalized groups and regions already vulnerable in food security and malnutrition suffered due to COVID-19 as they lost both external support and coping mechanism. Crisis form COVID-19 came from health and hunger as well. However, Nepal's diversified farming system also has some resilience that helped to cope with and adapt the crisis caused by COVID-19.

COVID-19 impacts on agriculture with special Reference to Horticulture:

From the overall observation and experience it seems that the COVID-19 pandemic is one of the biggest human crisis causing health and socio-economic suffering all over the world. A rapid assessment conducted by UNDP (2020) has revealed that tourism, trade and agricultural industrial and education sector were mostly affected. The study also assessed that 31.5 percent of the total workers in Nepal have lost their Job, and 74 percent have been unpaid since the lockdown started (UNDP, 2020). Likewise, a study conducted by Adhikari & Hussain (2020) found that communal farming limited to the periphery of market centers, cities

in the accessible area were more impacted due to disturbance in the supply network to reach the market.

A preliminary study conducted by Department of Agriculture (DOA) during lockdown period has revealed that lockdown and transport restriction have severe consequences on marketing of vegetables. Sub-sector analysis showed that dairy, vegetable and poultry were severally affected by lockdown and transport restriction. However, in the initial phase of lockdown period, the farmers were compelled to sell vegetables in low price. Some of the farmers distributed vegetable free of cost and left it decaying in the field as local there was the less demand in the suborn center due to lockdown. In most cases commercial farmer in Chitwan lost about 25-50 percent of their income due to low profit margin farm vegetable production (experience shared by Rajendra Jung Ragamajhi a commercial agriculture entrepreneur from Chitwan district). Vegetable contributes 2.6 percent to GDP and 9.7 percent of the AGDP (CBS, 2018). In this context it is great loss in the national economy when broadly observed.

More specifically, potatoes, cowpea, brinjal, okra were most affected vegetables. A preliminary study done by DOA showed that fruit-subsector was comparatively less affected. However, the availability of fruits in Kalimati and Balkhu market center were reduced to 60 percent. The market survey conducted by DOA team showed that price rise of fruit specialty apple, papaya, grapes, banana, watermelon and pineapple was by 50 percent because of low supply of fruits as most of them are supplied through import from China and India. During the study, the importer and wholesaler in the Kalimati and Balkhu Vegetable and Fruit Market opined that supply and availability of apple has drastically reduced due to complete blockade of custom and transport restriction from China side too. They also opined that during that period commercial Banana producers from Nepal were

mostly affected as their share in the market was about 40 percent. Primarily the agricultural commodities, especially vegetable, mostly were affected during harvesting and marketing phase and disturbing supply chain. Secondly agricultural commodities especially, maize, rice, poultry were affected during production phase. The major exportable commodities like large cardamom, tea, coffee, ginger and cut flower were also negatively affected. However, among horticultural commodities, vegetable and floriculture have become the first victim of the lockdown imposed by the government as they are perishable in nature. Floriculture sector faced a huge loss due to the lockdown as the sale of flowers across the country had decreased significantly due to restrictions on organization of public occasions like marriages, festivals and so on inflicting loss of NRs. 750 million on floriculture sector alone as claimed by Floriculture Association Nepal (FAN) (Ojha, 2020).

Besides, as a part of socio-economic suffering, a deceleration of remittance income and loss of job has decreased the affordable capacity for basic needs like food. It has caused the poor accessibility of food due to which poorer working-class people were more worried about food and livelihood than the COVID-19 infection itself.

Thus, overall study showed that production and marketing of agricultural products was heavily affected by COVID-19 due to lockdown inflicting transport restriction.

Government efforts to address the socioeconomic effects of the COVID-19 pandemic:

Government of Nepal tried to address the effect of the COVID-19 through Monetary Policy 2020/21. Extension of the loan repayment deadline, discount on interest of small loans, refinance facility and targeted lending in productive sectors at cheaper rate were the key

measures addressed through Monetary Policy 2020/21 for relief and revival of productive economic sectors like agriculture (NRB, 2020). Also, the Monetary Policy 2020/21 made commercial banks mandatory to lend at least 15 percent of credit on the agricultural sector along with priorities on agriculture, energy, tourism and cottage industries (NRB, 2020).

Ministry of Agriculture and Livestock Development (MoALD) issued a safety protocol to be followed by agriculture sector during COVID-19 pandemic to facilitate the safe and uninterrupted operation of agricultural activities (MoALD, 2021b). MoALD initiated coordination with Ministry of Home Affairs (MoHA) and provincial ministries to facilitate the transportation of agricultural commodities (MoALD, 2021a). In the later stage of lockdown period farmers felt relatively relaxed restrictions due to continuous effort of ministry and farmers groups.

The Provincial government of Province 1 decided to avail a relief fund to the local governments ranging from NPR 0.5-2.0 million to support the provision of relief packages to the most affected households (WFP-NeKSAP, 2020).

The Provincial Ministry of Land Management, Agriculture and Cooperatives (MoLMAC), Province 2 decided to pay the interest on agriculture credit throughout the province for period of four months (2076 Chaitra-2077 Ashadh) on loan limit of 3 million Nepalese Rupees in Province 2 (MoLMAC, 2020).

The Provincial Ministry of Land Management, Agriculture and Cooperatives (MoLMAC) Bagmati Province established the Agri-Product Marriage Bureau (AMB) in order to facilitate linkages between farmers and traders (WFP-NeKSAP, 2020).

MoLMAC Lumbini Province managed some 44 'Agriculture Ambulances' to support farmers in supplying agriculture products to markets (WFP-NeKSAP, 2020).

Government of Karnali Province facilitated the supply of agricultural products to ensure functioning of markets, as well as tied to make key inputs (seeds, fertilizers and tools) available to farmers for agricultural activities. The MoLMAC also operating an emergency transportation service to help farmers bring their products to the markets (WFP-NeKSAP, 2020).

Government of Sudurpaschim (Province 7) coordinated with farmers and traders to facilitate agribusiness activities, including within markets and related to the supply of food. The MoLMAC took steps to ensure the supply of seeds and fertilizer to farmers in need by mobilizing AKCs (WFP-NeKSAP, 2020).

Post COVID recovery strategy:

Production sector of agriculture was hard hit by the pandemic with relatively higher losses on perishable products like cut flowers, fresh vegetables and fruits respectively. Lockdown with transport restriction disturbed marketing of domestically produced agricultural commodities disturbances in timely availability of agricultural inputs like seeds, fertilizers, pesticides and other accessories posing a problem. Service sector flourishing in urban areas accelerated the unemployment rate due to shut down of activities preceded by nationwide lockdown which ultimately brought down the affordability of people engaged in service sector. Disturbance of availability and accessibility of food caused food and nutrition insecurity among daily wage-based labors.

However, COVID-19 crisis has also brought some opportunities too, for the revival of agricultural sector. There is the positive realization that agriculture sector should be prioritized in the planning process to absorb the migrant returnees, workforce withdrawn from service and industry to create employment for them.

Roof top farming has become popular among urban residents throughout the country during

lockdown to be self-reliant on fresh vegetables.

Still, we are not in the stage of post-COVID, however, situation is normal compared to past months. Post-COVID strategies should be directed to guard against vulnerabilities by strengthening the socio-economic protection and livelihood. Horticulture sector especially vegetables and spices are quick regenerative and important sector for improving livelihood of people. Therefore, Nepal has a great scope for post-COVID livelihood improvement through overall development of horticultural sector. Following strategies can be useful to revive and promote horticulture sector in Nepal.

A) Youth focus program

Three layers of the government i.e., federal, provincial and local level should focus on the youth involvement in the horticulture sector through the support on commercial production, processing and their linkage to the market.

B) Export promotion program

Many Nepalese exportable horticultural commodities such as large cardamom, tea, coffee, ginger and cut flower and vegetables have been facing the non-tariff barriers for export. So, the federal government needs to address this problem through bilateral dialogue with concerned government of importing countries.

C) Establishment of formal institutional linkage among three layers of governments for enterprise development, production plan, postharvest plan and marketing support plan

D) Special provision support for mechanization and irrigation specially in the commercial production areas

E) Support for bringing fallow and abandoned land into cultivation through cash incentives program. For this fruit and plantation crop may be suitable supported by research and development.

- F) Boost horticulture sector through agribusiness: Government spending on horticultural sector is important at this time when people are beginning to explore livelihood opportunities through this sector. This sector has capacity to absorb people displaced from non-formal sector and returnees from foreign employment. For this fiscal and monetary policy should be oriented towards easy access to credit with interest subsidy.
- G) Diversification of horticultural crops: There are emerging fruit crops which need promotion for production and marketing. Similarly, many vegetables are export oriented to the neighboring countries and abroad. Nepal has to diversify horticultural commodities as per the demand of domestic market and export market as well.

Table 1. Challenges/opportunities posed by COVID-19 pandemic in Nepalese horticulture sector and possible recovery strategies.

S.N.	Challenges/opportunities	Recovery strategies
1	Huge loss in horticulture sector (Immediate loss of perishable products like fresh vegetables and cut flowers.)	<p>COVID recovery support scheme</p> <ul style="list-style-type: none"> • Soft loan scheme • Subsidy scheme • Insurance • Technology transfer • vegetable ambulance supply system
2	Strained work force in rural areas (Absorption of the migrant returnees in agricultural sector Losses of jobs from smallholder business and vulnerable areas of service industry.)	<p>Workforce absorption in agriculture</p> <ul style="list-style-type: none"> • Land use planning, • Contract farming, soft loan, insurance, subsidy scheme. • Technology transfer. • Support programs to utilize abandoned fallow land. • Group farming to commercial scale of production <p>Youth focus agriculture program</p> <ul style="list-style-type: none"> • Promotion of diversification in horticulture with technical and financial support. • Policy support and technical guidelines for land pooling. • Mechanization

S.N.	Challenges/opportunities	Recovery strategies
4	Non-tariff barriers in trade of horticulture products (Many Nepalese exportable horticultural commodities such as large cardamom, tea, coffee, ginger, vegetables and cut flower have been facing the non-tariff barriers for export.)	Bilateral Dialogue and Negotiation Strengthen non-tariff related domestic capacity. Include items in exportable lists
5	Poor coordination of horticultural resource centers. (Federal and Provincial farm centers)	Establishment of formal institutional linkage among three layers of governments.
6	Emergencies (Frequent occurrence of disasters (flood, draught, earthquake) and pandemic like COVID-19)	Coping mechanism Development of coping mechanism and emergency response system with a long-term planning.
7	Post-harvest loss in horticulture commodities	Value chain management Storage and processing infrastructure Cool bots and cold storage. Refrigerated van transport.

Conclusion

Horticulture is a very important sector of agriculture for improving nutrition and livelihoods of people through employments generation, income generation, food and nutritional security and environment balance. The lockdown imposed to restrict the spread of corona virus have caused severe consequences on production and marketing of agricultural commodities especially vegetable, cut flower, banana, papaya and watermelon (perishable horticultural commodities). Crops ready to harvest were even damaged in field due inadequate safe transport and absence of assured market. Government at all levels has brought different COVOD recovery support scheme to revive the agriculture sector which needs to further widened for overall resilience building and continuity. Horticulture sector; one of the fastest regenerating backbone of agriculture

economy must be diversified with technical and financial support along with marketing and trade in domestic and international markets.

Declaration of conflict of interest

The authors certify that they have no affiliations with or involvement in any organization or entity with interests of any kind subject to inflict with subject matter or materials discussed in this manuscript.

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