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Exploring the Adaptation Strategies to COVID-19 by Flower and Vegetable Growers and Enterprises in the Lam Dong Province, Central Highlands of Viet Nam[1]

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Abstract

COVID-19 disrupted supply chains for agricultural products from Lam Dong Province, located in the Central Highland of Viet Nam. This study measures and examines the effects of COVID-19 on producers of flowers and vegetables in three major agricultural areas of Lam Dong Province and identifies their adaptation strategies. A survey of flower and vegetable growers (n=215) and of agribusiness enterprises sales (n=65) was conducted. Both flower and vegetable growers and enterprises reported that the sales of their agricultural products declined, and profits were reduced, as a result of the COVID-19 pandemic. Supply chain actors from the different locations reacted in different ways. Government assistance was little used. A SWOT analysis suggests optimism is warranted in Lam Dong's flower and vegetable industries despite the effects of COVID-19.

Keywords: agricultural supply chain, COVID-19 impacts, adaptation strategies, Lam Dong province, Central Highland of Viet Nam

Introduction

The first coronavirus (COVID-19) cases were reported in Viet Nam at the end of January 2020 (United Nation in Viet Nam, 2020). A total 2,253 COVID-19 infected persons were recorded by mid-May 2021. The COVID-19 pandemic has adversely affected Viet Nam's economic growth (Nguyen, 2020), but impacts at regional levels and in specific sectors have not been studied widely. In the region addressed in this study, Da Lat People's Committee reported that many economic targets for 2020 were not met due to COVID-19 (Trong, 2021), and economic growth in 2020 was just 4.29 per cent, much lower than the target 10.5 per cent. More generally, agricultural products depend on seasonal production and effective postharvest and distribution actions. Thus, the quarantine and social distancing measures implemented to prevent the spread of COVID-19 disrupted supply chains.

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Lam Dong Province in Viet Nam's Central Highlands is a leading agricultural production area (Long, 2020). Its main commodities are coffee, tea, flowers, and vegetables. It is considered the primary area of vegetable cultivation in Viet Nam with an average production of vegetables reaching 1.5 million tons annually. In addition, Lam Dong is well-known for producing flowers for domestic and international markets. Cut flowers and potted flowers are the major products with some 1.8 billion flower bunches cut each year. About 80-90 per cent of Lam Dong's agricultural products are consumed in the domestic markets including Ho Chi Minh City, and throughout the country's northern central regions. About 7 per cent of agricultural products are exported and the rest is sold through local retailers (Viet, 2020). A telephone survey of nearly 4,000 households in Viet Nam conducted in September 2021 revealed that online shopping was expanding (World Bank, 2021).

At the time of writing, no persons infected with COVID-19 had been recorded in Lam Dong. However, agricultural products from Lam Dong were not able to be transported to other provinces, nor to other counties. Consequently, some 90 per cent of flower orders were cancelled around mid-April 2020 and flower prices declined by 70-80 per cent (Dong, 2020). Similar effects were seen in vegetable markets (Van, 2020).

In order to support people who were affected by the economic impacts of COVID-19, "rice ATMs" were established to provide free rice and other necessities by government agencies (Vu, 2020). Tran et al. (2020) studied the impacts of the COVID-19 pandemic on smallholder farmers and rural people in 12 provinces in Viet Nam and found 12.8 per cent of households received assistance. The links between the agricultural industry and food and income security have meant that policies supporting more sustainable local food and agricultural production have been widely advocated (Ligairi and Joshi, 2020).

This study measures and examines the effects of COVID-19 on producers of flowers and vegetables in Lam Dong Province and identifies their adaptation strategies. This is done by conducting a survey of farm households and supply chain participants. The study takes account of perceived strengths and weaknesses of the production and marketing system, and of the utilisation of government assistance by supply chain stakeholders. The analysis generates lessons learned by market participants and recommendations for policy makers at local and national level.

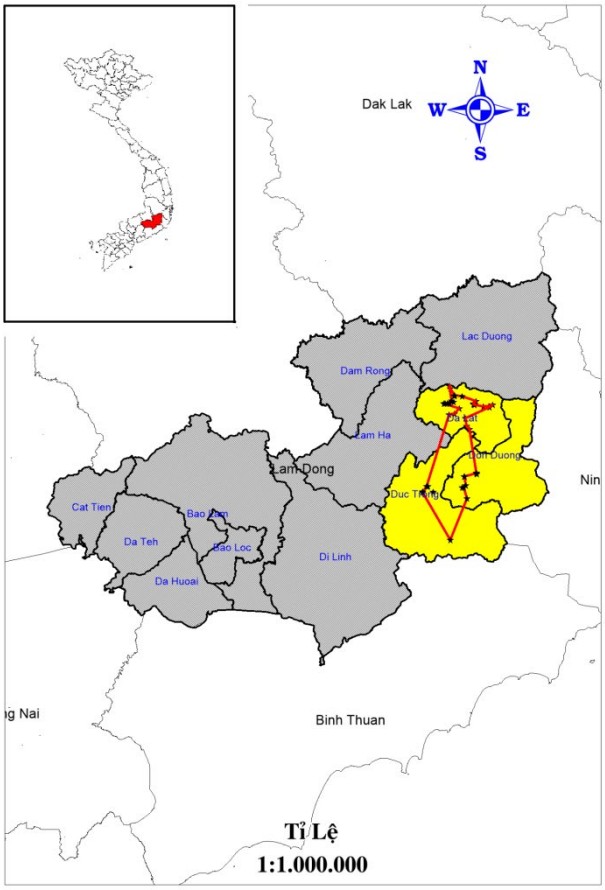
Survey Sites

Lam Dong has an altitude ranging from 800 to 1500 m, with an annual precipitation from 1600 to 2700 mm, and daily average temperature ranging from 16-23 degrees Celsius. The population in 2019 was 1.4 million people comprised of 43 ethnic minorities and each year some 4-7 million tourists visit (Chi, 2020). In Lam Dong, there are two cities and 10 districts. Three major agricultural areas are Da Lat City, Don Duong District and Duc Trong District. According to Lam Dong Agriculture and Rural Development (2020), in 2019, the total land for vegetable cultivation was 67,440 ha including 10,931 ha in Da Lat City (16.21 per cent), 24,350 ha in Don Duong District (36.11 per cent), and 23,617 ha in Duc Trong District (35.02 per cent). The total land for flower cultivation was 8,892 ha including 6,026 ha in Da Lat City (67.77 per cent), 430 ha in Don Duong District (4.83 per cent), and 1,030 ha in Duc Trong District (11.58 per cent). Given these proportions, the study sites were selected in these three areas.

Survey design was informed by key informant discussion and focus groups. Data was obtained from producers' households and from enterprises along the supply chain. Information on potential strengths, weaknesses, opportunities and threats was synthesised from supporting literature. Data collection employed structured questionnaires, where the respondents (households responsible for cultivation and sales) were interviewed. For households (n=215), questions spanned livelihood, food

security, market channel choices and employment before during and after the pandemic (World Food Programme, 2020). The interviews with trading enterprises, associations, and retailers (n=65) covered similar material, relating to consumer market operation and product availability. The interviews were conducted from September 2020 to January 2021. Secondary data was also collected, concerning aggregate measures of production and the likely performance of enterprises. The data were analysed using the SPSS 22.0 software.

Figure 1. Survey sites and the tracking route for interviews (red color)



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Source: website of Lam Dong people committee, (https://lamdong.gov.vn/SitePages/Home.aspx), colours added

Results and Discussion

Sociodemographic characteristics of the respondents

In the survey of flower and vegetable growers, 38.6 per cent of respondents were women, the most-represented age group was 40-60 years old (57.2 per cent), and the most common ethnic group was Kinh (77.6 per cent). In the survey of other supply chain participants, 50.8 per cent of respondents were women, the commonest age was 20-40 years old (57 per cent), again Kinh (92.3 per cent) dominated, and 46.2 per cent of respondents had more than 10 years in business (Table 1).

The highest proportions of respondents only cultivating vegetables were in Don Duong District for both farmers and intermediary (34.0 per cent and 27.7 per cent respectively). The highest proportions of respondents only cultivating flowers were in Da Lat City for both farmers and intermediary (14.0

per cent and 7.7 per cent respectively). The highest proportions of respondents cultivating both vegetables and flowers were in Da Lat City for both farmers and intermediary (10.2 per cent and 6.2 per cent respectively) (Table 2).

Table 1. Respondents' profiles

Variables	Descriptions	per cent of Respondents
1. Flower and Vegetable Growers	**n = 215**	
Gender		
	Females	38.6
	Males	61.4
Ages (years old)		
	20 or less	1.4
	20 – 40	32.0
	40– 60	57.2
	60 or more	9.3
Ethnicity	Kinh	77.6
	Minorities	21.9
	Foreigners	0.5
2. Flower and vegetable enterprises	**n=65**	
Gender		
	Females	50.8
	Males	49.2
Ages (years old)		
	20 or less	0
	20 – 40	57.0
	40– 60	35.3
	60 or more	7.7
Ethnicity		
	Kinh	92.3
	Minorities	6.2
	Foreigners	1.5
Operation period		
	Less than 2 years	12.3
	2-5 years	30.8
	5-10 years	10.8
	More than 10 years	46.2

Respondents' operations

Of the 215 flower and vegetable growers, the proportion of growers choosing to sell in open markets was 28.4 per cent in Da Lat City, 28.8 per cent in Don Duong District and 24.2 per cent in Duc Trong District. The proportion of growers that signed contracts for delivery were 14.0 per cent in Don Duong District, 7.9 per cent in Da Lat City and 7.4 per cent in Duc Trong District. The small proportion of growers that distributed their products to conventional markets ranged between 2.8-5.6 per cent in all three study sites (Table 2).

Regarding choices of market channels, the proportion of producers reporting selling flowers and vegetables direct to retailers ranged from 25.7–30.4 per cent. Almost no growers sold products to

agents and onwards to wholesalers and consumers. Some 12.2-14.3 per cent of intermediary respondents preferred to sell products directly to end consumers online. Some 30.6 per cent of respondents in Da Lat City sold their products to agents and onwards to wholesaler, retailer and to consumers; and 14.3-16.3 per cent of respondents in Don Duong and Duc Trong Districts selected this channel (Table 2).

In the interviews with the flower and vegetable enterprises, respondents reported serving various consuming markets. The proportion of respondents selling their products to the conventional markets in Da Lat City was 28.3 per cent, in Don Duong District 20.0 per cent and in Duc Trong District 13.3 per cent. The proportion of intermediary selling their products online was 26.7 per cent in Da Lat City, 16.7 per cent in Don Duong District and 13.3 per cent in Duc Trong District.

The proportion of intermediaries exporting their crops to Asian countries was 26.7 per cent in Da Lat City, 11.7 per cent in Don Duong District and 13.3 per cent in Duc Trong District (Table 2). The proportion of farmers selling their products directly to the hotels/restaurants/supermarkets was only 1.4 per cent, whereas between 6.7-11.7 per cent of intermediary respondents distributed their products to these markets.

Reported effects of COVID-19

COVID-19's negative effects on vegetable and flower production varied amongst farmer households and locations. In our survey, 14.0 per cent of fruity vegetables and 12.6 per cent of leafy vegetables demonstrated reduced sales and produce income by more than 50 per cent. Some 6.0-8.8 per cent of root vegetables and other vegetables showed reduced sales and incomes of over 50 per cent. Some 4.2 per cent of chrysanthemum producers reported reduced sales and income of more than 50 per cent.

For the flower and vegetable growers, the proportion of respondents reporting failure to sell their products during the pandemic ranged between 22.4-23.8 per cent. Some 22.4 per cent respondents in Da Lat City tried to sell to different buyers, while 20.6 per cent of growers reported that their products could not be sold at any price (Table 2).

For flower and vegetable enterprises, 32.1 per cent of respondents in Da Lat City reported failing to sell their products. Some 22.6 per cent of respondents stated that they did not harvest some agricultural products. They left land fallow, and also fed products to animals (Table 2, Figure 2). Some 9.4 per cent of respondents tried to sell to different buyers while 3.8 per cent of enterprises reported that they tried to preserve or dry their products for later sale.

Results in Da Lat City showed that 7.9 per cent of the flower and vegetable growers reduced their profit by 10-50 per cent whereas 61.5 per cent of enterprises reported their profit reduction was 10-50 per cent. The proportions of respondents with a profit decline of more than 50 per cent in Da Lat City were somewhat similar between the growers and enterprises: 40.0 per cent and 43.1 per cent respectively. Depending on crop types, locations and market channel choices, the proportion of respondents reporting increased profits were just 0.9-2.8 per cent for farmers and 1.5-4.6 per cent for intermediaries.

Reported strategies of flower and vegetable producers

Flower and vegetable producers in Lam Dong Province reported adaptations to emergency measures mitigating the pandemic impact. Of the solutions (generated from pre-survey focus group discussions), some selected multiple solutions. The most popular choices were labour-related: for example in Da

Lat City 19.7 per cent of farmers reported employing only family members, and 10.3 per cent reduced labour use. Some 16.4 per cent of respondents in Da Lat City reported ceasing cultivation (Table 2).

Table 2. The proportion of the vegetable and flower growers and enterprises in Lam Dong respond to the COVID-19 pandemic (%)

Items	Da Lat city		Don Duong district		Duc Trong district	
	Growers	Enterprises	Growers	Enterprises	Growers	Enterprises
Crops cultivation						
Growing only vegetables	9.3	24.6	34.0	27.7	22.3	18.5
Growing only flowers	14.0	7.7	0	4.6	1.4	7.7
Growing both vegetables and flowers	10.2	6.2	3.3	0	5.6	3.1
Consuming markets						
Free trading	28.4	13.3	28.8	3.3	24.2	8.3
Contract	5.1	5.0	10.7	5.0	4.7	1.7
Conventional market	5.6	28.3	2.8	20.0	3.7	13.3
Supermarket/restaurant	0	10.0	1.4	11.7	1.4	6.7
Online	0	26.7	0.9	16.7	0	13.3
Others	4.7	11.7	0	1.7	0.9	3.0
Exports	0	26.7	0.5	11.7	0	13.3
Market channels						
Direct to end customers	7.5	14.3	4.7	12.2	3.3	12.2
To retailers to customers	30.4	18.4	33.6	10.2	25.7	2.0
To wholesaler to customers	0.9	2.0	3.7	10.2	1.9	0
To agent to wholesaler to retailers to customers	0	30.6	0	16.3	6.5	14.3
Difficulties encountered						
Inability to sell at any price (no buyers)	20.6	1.9	10.7	0	16.4	1.9
Not harvest, leave in the field (could not get any inputs)	19.2	22.6	14.0	17.0	18.7	17.0
Harvest then throw away/feeding animals	2.8	24.5	4.7	17.0	3.3	15.1
Try to dry/preserve	7.0	3.8	0.5	9.4	1.4	3.8
Try to sell to different buyers	22.4	9.4	22.9	13.2	18.7	11.3
Fail to sell (buyer at too low prices)	22.4	32.1	23.8	26.4	23.4	18.9
Others	4.2	34.0	10.7	24.5	5.1	22.6
Covid -19 impact on profit levels						
No change	6.5	16.9	22.3	18.5	14.9	10.8
Reduced <10%	3.7	21.5	10.2	24.6	6.5	16.9

Reduced 10-50%	7.9	61.5	14.0	27.7	7.4	33.8
Reduced >50%	40.0	43.1	26.5	27.7	27.0	27.7
Increased >10%	1.4	4.6	2.8	1.5	0.9	3.1
Strategies in the time of Covid-19						
Stop cultivation, leave free land	16.4	12.3	9.9	7.7	16.0	6.2
Change crops	12.7	13.8	10.3	12.3	14.6	9.2
Find alternative markets	14.6	18.5	10.3	16.9	9.9	9.2
Reduce numbers of labour	10.3	24.6	6.6	13.8	8.0	18.5
Only family members working	19.7	15.4	13.6	18.5	11.3	9.2
Selling products to friends/family	6.6	1.5	1.9	0	4.2	3.1
Joining government program	0.9	12.3	1.4	9.2	1.4	3.1
No change/keep doing as normal	5.2	13.8	14.6	6.2	5.6	7.7
Assistant resources						
Government assistance	4.7	1.8	3.3	0	1.9	3.6
Company/organization assistance	8.8	9.1	6.0	3.6	3.7	1.8
Family assistance	7.0	12.7	5.1	16.4	5.6	5.5
Self-support	33.5	30.9	37.2	21.8	29.3	18.2
Administration support	-	5.5	-	12.7	-	12.7
Credit extension	-	30.9	-	23.6	-	29.1

Figure 2. Chinese cabbage in Tutra community, which was not harvested during the Covid-19 pandemic

Source: first author

For Don Duong District, 13.6 per cent of the flower and vegetable growers switched to family labour only, 10.3 per cent changed their crop rotations and only 14.6 per cent of respondents reported that

they kept to business as normal (Table 2). The proportion of respondents in Da Lat and Duc Trong who tried to keep agriculture activities to normal ranged from 5.2-5.6 per cent.

When enterprises were asked about strategies employed during the pandemic, 24.6 per cent of respondents in Da Lat City reduced labour input, followed by 18.5 per cent that sought alternative markets (Table 2). The proportion of managers changing crop rotations ranged from 9.2–13.8 per cent. Changes included ploughing gladiolus field for cultivating corn, tearing up flowers to replace them with sweet potato, or removing vegetable crops to plant lisianthus.

The proportion of farmer respondents who engaged with government programs ranged from 0.9-1.4 per cent while 6.2-13.8 per cent of intermediaries reported doing so. The proportion of respondents reporting receiving assistance from government was small, just 1.9-4.7 per cent for farmers and less than 3.6 per cent for intermediaries (Table 2).

SWOT analysis of agricultural products in Lam Dong province

The surveys identified that 35.3 per cent of vegetable growers and 55.4 per cent of intermediaries believed that soil quality is a strength of agriculture in Lam Dong province. Some 38.1 per cent of vegetable growers and 61.5 per cent of intermediaries also agreed that they had a strong skill base. Some 26.0 per cent of vegetable growers and 13.8 per cent of business respondents considered that threats to agriculture related to markets. Across the SWOT analysis (Table 3, based on available literature), recurrent themes include weak supply chain linkages and inadequate information flows. Government roles are less referred to, but centre on skills.

Table 3. **Strengths, weaknesses, opportunities and threats for producing agricultural products in Lam Dong**

Factors	Characteristics	Sources
Strengths	Weather and land fertile are suitable to produce agriculture products	Viet Nam Trade Promotion Agency (2012)
	Available human resources	Kim et al. (2020)
	Training activities from two universities, six vocational schools and government programs	Kim et al. (2020)
Weaknesses	Pest and disease frequency	Houbraken et al. (2016)
	Overuse of chemical and fertilizer	Nguyen (2017)
	Lack of pricing information in marketing system so the growers depend on middleman	Le (2015)
	Small scale and weak contract obligation	Le (2015)
	Getting to the international standard	Vinh (2020)
Opportunities	High branding names of agriculture from Da Lat City	Hoai (2018)
	Potential to sell in the domestic and international markets	Long (2019)
Threats	High competition with exported products	An (2021)
	Counterfeit Chinese products impersonating Da Lat products and brands	

Conclusions and Recommendations

Many flower and vegetable growers and enterprises reported that they failed to sell their agricultural products during COVID-19 and that their profits were reduced. Sales of both flowers and vegetables were found to be substantially affected. The extent of reduction in sales (and incomes) was found to be more dependent on farmer characteristics than on crop type. Impacts also reflected locations and market channel choices. Leafy vegetables and other perishable crops such as spring onion, bell pepper and Chinese cabbage destined for local markets saw the largest declines in sales.

Our study concludes that flower and vegetable growers and enterprises from different locations reacted differently to the COVID-19 pandemic. They report having developed separate adaptations, but not in ways that show any coordination along the supply chain or amongst producers. A variety of actions were reported to have been taken to handle unsold product; few of these generated income or other benefits. We find that available government relief assistance was little used, and little commercial support was provided to producers. However, there is evidence of family support and assistance from commercial companies.

Stakeholders' perceptions of strengths, weaknesses, opportunities and threats tend toward the development of resilient supply chains, with climate change particularly perceived as a threat. Despite the COVID-19 context of the survey, optimism is apparent, particularly for export markets development. Recommendations to industry and extension include an integrated approach for both public and private sector contributions to infrastructure and a list of other contributions to resilient supply chains. Greater co-operation between public and private parties in the vegetable value chains in Viet Nam has been recommended in the past (Huong et al., 2013; Pham et al., 2019).

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