

Dual Impacts of the COVID-19 Pandemic and *Amphan* Super-cyclone on the Smallholding Betel Leaf Cultivation and Trade in West Bengal

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Article History:

Received 22 April 2021
Received in revised form 22
July 2021
Accepted 05 October 2021

Keywords:

coronavirus lockdown;
horticultural issues;
marketing problems;
smallholder farmers; crop
insurance

ABSTRACT

The COVID-19 pandemic induced lockdown has severely affected farm sustainability and brought hardships to farmers, agricultural labourers and market intermediaries. Here we examine its impact on betel leaf cultivation and trade in West Bengal. Data for this study was perforce gathered via telephonic interviews and from secondary sources due to travel restrictions. With this perishable crop being entirely dependent on its supply chain linkages to cater to its various markets, the lockdown has stymied the entire process. Moreover, the occurrence of the *Amphan* super-cyclone in the region has physically damaged many farms. Therefore, even with markets partially reopening, meeting demands from impaired/destroyed plantations and poor storage facilities is difficult. Bereft of crop insurance, farmers have suffered substantial losses. While some have resorted to selling one-third of their crop locally, the price obtained seldom covers the overheads. Meanwhile traders have been hampered in marketing the leaves due to continuing transportation restrictions.

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Introduction:

The COVID-19 pandemic has markedly affected the global economy and India has been no exception. With transport being restricted and markets closed for a sustained duration during the various lockdown phases, the agricultural sector (the largest informal sector and biggest employer in the country) has witnessed substantial disruptions in supply chains and in the overall production system (APEDA 2020). This may engender slower economic growth, thereby impacting upon agricultural demand, altering produce movement channels and relocate available labour (Padhee and Carberry 2020). Moreover such lockdowns can alter forthcoming harvest and post-harvest periods and engender significant deviations in agricultural commodity prices, farm income and employment (ICAR 2020). Such impacts are also likely to be more severe for those engaged in commercial

and perishable crop cultivation, which are almost wholly dependent on strong market demand and robust supply chains (Ananth 2020; Pandav et al. 2020). Farmers have thus often sold their produce at a minimum price (Lal 2020). Labour relocation due to many migrant farmhands moving back home and being unable to return has further compounded farm management, crop harvest, supply-chain and logistic issues (Anderson et al. 2020; Ivanov 2020). The pandemic has also exposed the dire need for structural reforms in the Indian agricultural sector, particularly for digital solutions that can connect the farmers directly with markets, making them less dependent on intermediaries (Kumar et al. 2020).

Betel leaf (or paan) is one of the most important horticultural cash crops in the country and is widely used in religious rituals, for medicinal benefits and as an addictive substance. It is mostly cultivated by

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smallholder farmers (Jana 2016) and is exported to a large number of locations (Agricultural and Processed Food Development Authority, 2018), offering employment to about 20 million people in different aspects of the trade (Palaniappan et al. 2012). The present study thus focuses on the challenges faced by the smallholding betel leaf farmers and the other stakeholders engaged in its cultivation and trade as a result of the COVID-19 pandemic induced lockdown. The area in focus is the eastern Indian state of West Bengal, which is famous for the quality and quantity of its betel leaf crop and from where the produce is transported to different parts of India and exported to many countries (in 2019-20 this region exported 10386.52 metric tons of betel leaves and earned Rupees 37.6 crores (~USD 51.5 million) in revenue). More than 1.5 million betel leaf farmers of West Bengal currently face a terrible situation since they are unable to sell their harvests, even though the government had exempted this crop from lockdown measures on and from 7th April, 2020. However, most betel leaf markets continued to remain closed due to the threat of the virus and with transportation facilities being minimal, the movement of this fast perishable produce from farms to selling points has been heavily impaired (Agro & Food Processing 2020; Singh 2020). For example, from the Tamluk Subdivision in southern West Bengal (the main nodal point of this crop's cultivation and trade in the state), around 500 tons of betel leaves are usually transported each month to different regional and national markets, almost the entirety of which got halted.

An added impediment to the above was the devastation wreaked by the Amphan super-cyclone that passed over southern West Bengal on 20 May 2020, just when farmers were trying to resume the betel leaf cultivation and production process after the initial lockdown phases (Chakraborty and Phadikar 2020). Generating wind speeds between 100-150 km/hour, this event made large swathes of the region almost inaccessible for weeks afterwards due to fallen trees, flooded areas and uprooted power lines. About 17 lakh hectares (17,000 sq.km) of croplands in various districts of West Bengal that are usually utilized for paddy, vegetables and betel vine cultivation were affected by Amphan. Furthermore, 250556.17 hectares (2,505.56 sq.km) of orchards that grow betel vine, lychee and mangoes were also adversely affected (JRNA Amphan, State IAG West Bengal, June 2020).

The dual effect of first, the COVID-19 lockdown, and then the Amphan super-cyclone, thus almost destroyed

the standing betel leaf crop in West Bengal. It is therefore important to take stock of the extent of damage (i.e. areas most affected and farmers in distress) caused by these two events. Since commercial crops like betel leaf are heavily dependent on robust supply chains that transfer the crop from the plot to the consumer, it is also important to consider the impacts of these two events on the existent transportation linkages and marketing channels (Haque et al. 2010). Both these above findings can possibly elicit existing loopholes in the agricultural and market setup in respect of this crop, for which ameliorative plans may be framed subsequently. While the economic effects of the COVID-19 lockdown have been widely felt, the super-cyclone Amphan almost wholly affected the southern part of West Bengal. We have thus focused this study on the Tamluk Subdivision in Purba Medinipur district, which is the largest centre of betel leaf cultivation and trading in this region, as the prime example of the compound impact of these two events.

2. General effects of the COVID-19 lockdown on the agricultural sector

Agriculture employs almost 50% of India's workforce (Madhusudhan 2015) and small and marginal farmers [small farmers own 1-2 ha of land (1 ha = 0.01 sq.km) while marginal farmers own <0.5 to 1.0 ha] till 86.08% of all holdings (Agriculture Census of 2015-16 Phase-I - MoAFW 2019). Such smallholding farms generally specialise in a particular type of crop (e.g. betel leaf) and are thus vulnerable to price and demand fluctuations (Haque et al. 2010), while their productivity may also get significantly impaired by various abiotic/biotic constraints (Makuvaro et al. 2017; Jambor et al. 2020). The economic shock due to the lockdown has been heightened, firstly, since the Indian economy was already showing signs of slowing down, and secondly, as about 91% of all workers in the country (as of 2017-18) are engaged in the informal sector, comprising mostly of migrant workers in the agricultural and industrial sectors (Bhavani 2020; Dev 2020). The imposed restrictions, while necessary, disrupted farm production, harvest processing, packaging, transporting, marketing and consumption (Schmidhuber et al. 2020), bringing issues of food security and human development into sharp focus (Poudel et al. 2020), primarily among the rural poor (Schmidhuber et al. 2020). The continued viability of high-income commercial crops especially depends on market demand, market functionaries and the robustness of the supply chain. The lockdowns and

the resulting mobility restrictions have engendered supply-demand shortages, affecting both the long and short term economic prospects of this sector (Guerrieri et al. 2020). The arising labour supply challenges have further impacted on farm production, harvest processing and its transportation to traders/retailers (Anderson et al. 2020). The effects have been even more pronounced on perishable cash crops like betel leaf, since the crop cannot be stored for a sustained duration after harvesting and must be carefully packed and conveyed to the market at the earliest. Moreover, since betel leaf cultivation and trade are both dependent on the demand from other states of India and other countries, any restrictions in transportation adversely affects this crop markedly.

3. Materials and methods

Due to the ongoing travel restrictions as a result of the imposed lockdown phases, this study is almost wholly based on data gathered during telephone interviews with betel leaf farmers and traders of the Tamluk Subdivision in Purba Medinipur district of West Bengal (Figure 1 and Figure 2), which is the nodal centre of this crop's cultivation and trade in the region and contains the largest markets (ICAR 1997), foremost among which is at Mecheda, due to its road and rail linkages throughout the country. These individual farmer contact details had been obtained during prior surveys conducted in this area. The farmers and traders were asked a number of questions

pertaining to the ground situation during the lockdown period and how they had managed their betel leaf cultivation and the selling of the harvest (the interview schedules used in this study are provided in the Supplementary Information section). All these information were then collated together and tabulated in MS-Excel after which the required inferences were drawn based on the data compiled. The farms/residences of the interviewed farmers and traders were spread across the six Blocks that comprise Tamluk Subdivision and their business transactions were conducted in the markets situated within the study area. A total of 30 betel leaf cultivators and 20 traders were surveyed using a simple random sampling method, with the study primarily relying on the qualitative and quantitative information collated from these questionnaires. Descriptive and analytical statistics, such as mean, standard deviation, frequency and percentages were derived for the relevant parameters to aid with the analysis. Since the information gathered from them were quite similar in almost all respects, further telephonic interviews were deemed unnecessary. The secondary information obtained was from various Government Offices, prior to the lockdown and some in the period after the lockdown when these offices were partially open. The information on the pre-existing conditions in the area was collated during earlier farm and market surveys conducted in person.

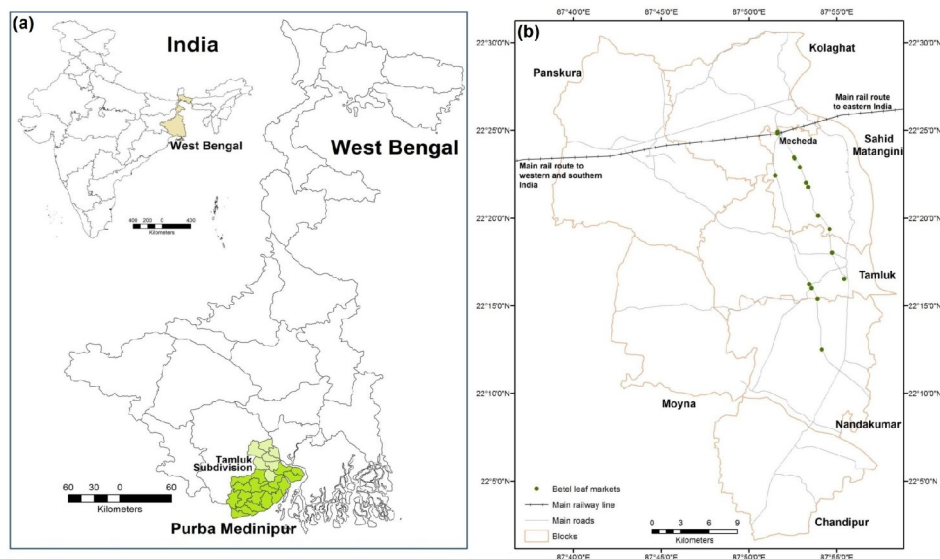


Fig. 1: Location Map, with (a) Tamluk Subdivision (in light green) within Purba Medinipur district (in darker green) of West Bengal in eastern India, and (b) The six Blocks of Tamluk Subdivision with the main betel leaf market at Mecheda and the principal road and rail routes in the area



Note: All photographs were taken by the first author before the pandemic situation arose.

4. Results and discussion

4.1. Betel leaf production and the situation of the farmers during the lockdown period in Tamluk Subdivision

The unique aspect of the betel leaf cultivation in Tamluk Subdivision is that this region is the largest producer of betel leaves in West Bengal. Also, these leaves produced here are of the highest quality. Thus this betel leaf cultivation forms the economic backbone of this region and numerous families are directly and indirectly dependant on this crop for their livelihood, whether being engaged in its cultivation or in its packaging, transportation and sale. This makes analysis of the crop production and its sale a very important aspect for the regional economics of this area. Due to the very delicate nature of the crop and its high perishability, it also needs to be carefully cultivated in shaded sheds (Borojs) and then packaged very carefully and transported to the market soon after the harvest. This makes it quite different from the other horticultural and food crops grown in this region and adds to the burden of the farmers when any disaster strikes as they suffer substantial losses in re-establishing the sheds and the crop. The crop also stands out by means of the very high revenue that it earns, both due to trade within the country and particularly from exports to a number of nations. Thus, the issues that arisen due to the COVID-19 lockdown and the super-cyclone that have caused distress to

the farmers are quite important, as only by mitigating these or helping them recover from these setbacks can this important economic pursuit become fruitful again.

Since betel leaf is a very perishable crop, the plucked produce cannot be stored for more than a few days. Furthermore, despite the huge production in the area, there is no storage facility specifically for betel leaves either in Medinipur district or even in the entirety of West Bengal. While the leaves can remain attached onto the betel vines for up to two months, the matured leaves often turn yellow and are shed by the plant and so must be harvested. Thus, although, the production (the growth) of betel vine had remained quite the same during the lockdown period, the farmers did not pluck the betel leaves from their respective Borojs due to the obvious less demand during this time and thus the actual marketable production of betel leaf (i.e. the amount of leaves that were transferred by the farmers or the Aratdars from the farms/Borojs to the market for selling) had decreased drastically (Table 1).

Usually farmers sell their produce in different betel leaf specific markets at regular time intervals, following a set plucking routine, or depending on the seasonal price of the leaves, which can vary widely. All such markets were closed down immediately after the nationwide lockdown began in March 2020, halting the movement of the produce to the destination states and countries. As a result, the demand from traders

Table 1: Difference in betel leaf production (in terms of amount of leaves sent by farmers to the market) during normal times and during the COVID-19 lockdown period

	Production in thousands/10 decimal/month			
	Bangla Variety		Mitha Variety	
	Normal Time	COVID-19 lockdown	Normal Time	COVID-19 lockdown
Mean	7954.55	3227.27	7214.29	2542.86
SD	1572.49	847.46	951.19	496.18

dropped drastically and farmers were precluded from selling their harvests. Even though a few Paikars (local traders) from the Mecheda, Kaktia and Ramtarak markets made queries about leaf availability, this was to merely sell the same within the district itself or in its immediate neighbourhood. The quantity demanded by them was also very low (about one-tenth of the usual requirement) with an insistence on paying much lower prices than was usual. The Mitha variety of betel leaf, which usually sells around this time of the year at Rupees 5000-6000 per thousand leaves (USD 68.5-80.20), now fetched only Rupees 400-500 rupees (USD 5.5-6.85) for the same quantity. Similarly, the Bangla variety, which would otherwise be sold for Rupees 2000 per thousand leaves (USD 26.67) during normal times, was being traded for only Rupees 100-200 per thousand leaves (USD 1.37-2.74). According to the farmers interviewed, during the lockdown they were asked by the Paikars to pluck a very specific amount of leaves and reach the market at dawn, conduct the transactions and return back home by early morning, before the lockdown would commence more stringently for the day, from 7:00 a.m. onwards. Since the quantity of leaves demanded by the Paikars and the rate at which they were willing to pay for them would have merely met only the harvesting and packing costs to be incurred by the farmers, many cultivators declined to sell their leaves under these terms. However, there were two disparate groups of betel leaf growers in this regard- some felt that it was prudent to sell even the few leaves demanded without letting the harvest rot unplucked, while others felt that there was no point in expending themselves and putting in further labour if the profit margins remained so slim or were non-existent and were therefore unlikely to cover even their overheads.

After the conclusion of the second phase of the lockdown on 4th May 2020, some betel leaf markets had reopened with the permission of the District Horticulture Department, police and local administration. However, due to the unavailability of transportation to the other states of India and the halt

in export activity, the demand for betel leaves was much reduced. This led to the local Market Organising Committee framing some temporary rules for the farmers and the Aratdars (middlemen who source the leaves from farmers and deliver these to larger traders). Keeping in mind the ongoing social distancing norms, the Market Organising Committee decided to divide all Aratdars into three groups, who would each visit the market only one day per week to conduct their business. However, under these norms the farmers were precluded from visiting the market at all and thus they are unable to sell their produce directly to the Aratdar and negotiate prices. Instead, each Aratdar appointed an agent who would visit the individual farms and accrue the leaves from the respective farmers (a minimum of two times in a month). He would then transport the leaves to the Aratdar, who arranged for its further sale. In this new system, the farmer remains unaware of the actual market price and can therefore suffer unknown losses or be exploited.

As per the new norms, farmers cannot choose to sell their leaves to these agents on a day of their choice but are informed beforehand of the date and the quantity of leaves that shall be procured from them. This has hampered and altered the leaf harvesting schedules and practices that were followed by the farmers. Whereas earlier they would pluck the leaves from the betel vines as and when they matured and transport them to the market subsequently in bundles of varying sizes, now they have to perforce wait for the agent's notification to start harvesting the leaves so that these do not spoil beforehand. They are also not able to sell the total amount of leaves they can potentially harvest from their Boroj (the thatched shed inside which the vines are grown and nurtured- Hudait and Patel 2018), since the amount to be purchased by the agent is pre-specified. This ongoing situation has increased the farmers' strife and has led to several protests being made by them. For example, on 6th May 2020, betel leaf farmers of Moyna Block opted to scatter the leaves harvested by them across the roads

in the area in anger at the prevalent norms rather than sell them following the above practices, in an act similar to what they had done on 11th December 2017 when frictions had arisen between farmers and traders over leaf prices (Ghara 2017).

Most of the interviewed farmers reported a loss in capital since they were unable to sell their produce due to the transportation restrictions and the ongoing prohibition on exports. They were thus concerned that they would be unable to recover even the initial capital invested and that the betel vines would perish without being harvested. Even though the government had exempted betel leaf from the latter part of the various lockdown phases (from the third phase onwards that was in place from May 2020), the continuous closure of most markets and unavailability of proper transportation services continued to hamper the farmers. Another problem faced by the farmers is the high perishability of the betel leaf, which is prone to attack from fungi and pests. While some farmers were able to preserve part of their harvested crop within their own small sheds for up to two months using fungicides, most were unable to do so due to the non-availability of any formal storage spaces for this crop. Furthermore, the leaves lose some of their vigour after being stored in this manner and thus their price drops even further. They also need to be sold almost immediately after being taken out of storage and the continuing restrictions on transportation and export hampers this hugely. Moreover, the advent of the monsoon (which commenced during the latter lockdown phases) traditionally leads to faster leaf growth, which then needs to be harvested promptly and stored properly to avoid spoilage in the damp conditions that make them more prone to attacks by pests and pestilence. While such enhanced monsoon harvests during previous years would fetch substantial monetary rewards for the farmers due to the greater volume of leaves germinating and being subsequently harvested and sold, in the present situation this has become yet another challenge for them. Many farmers also felt that if they did not receive adequate financial support from the government during or in the immediate aftermath of the lockdown phases, then perforce they might have to abstain from undertaking betel leaf cultivation in the near future or even give it up altogether. This was even more applicable for many smallholder farmers who cultivate the crop on tiny plots and are thus unable to meet any loan payment requirements during such a sustained cessation of economic activity.

According to the farmers, the current situation faced by them is much worse than what they had been encumbered by during the demonetisation process in India in November 2016. During that period, the farmers were still able to access the market and sell their leaves regularly but payments were either delayed or received only partially during the sale, with the remaining amount being handed over to them after a few days. However, in the pandemic situation they were unable to even access the market, as pointed out above, which significantly affected their transactions and earnings. They also faced the choice between either letting the leaves rot on the betel vines unplucked or having to sell them at such low quantities and prices that the obtained amount did not even cover the input costs and the labour expenses accrued while rearing the crop. Thus betel leaf stocks have kept on augmenting while the reduced demand has led to a continual fall in prices (Singh 2020).

4.2. Betel leaf marketing and state of the marketing stakeholders

As mentioned before, all betel leaf markets were closed immediately after the announcement of the nationwide lockdown. However, this announcement was very sudden and without any prior indication. As a result, the Paikars associated with the different betel leaf markets were not able to deliver the leaves already procured on that day or on the immediately previous days to their ear-marked destinations. Some leaf bundles remained stuck on way to their destinations and were spoiled as a result. As per the business norms of betel leaf trading, the local Paikars receive payment only after delivery of the procured betel leaves to their counterparts in the intended destinations. If a large amount of leaves are to be procured, then the local Paikars obtain a part of the payment amount in advance. In the current situation, as they were unable to deliver the leaves procured to the intended markets, the rest of the payment had to be forfeited. While some Paikars managed to deliver a certain amount of leaves to different places, this was done via by-passing the usual norms by loading the produce on to vegetable trucks returning from West Bengal to their original destinations, after contact and suitable arrangements between the respective Paikars of these two places. Some managed to deliver bundles of leaves to the nearby states of Assam, Bihar and Uttar Pradesh by loading them onto the goods trains passing through Tamluk Subdivision.

While the betel leaf markets had started to open up from the first week of May 2020, many Paikars reported

that they had been able to conduct only ten percent of their usual business in a week due to the non-availability of trucks and trains and other restrictions on movement. Since their business depended on delivering the products to different parts of India and abroad, being unable to do so had hit this perishable cash crop trade extremely hard. In 2019, India had exported betel leaves worth Rupees 37.6 crores (USD 5.22 million) across the world. However, the amount done in 2020 was but a fraction of this. One Paikar stated that the demand for betel leaves outside the country was still quite high but that they were unable to deliver and meet the requirements due to the ongoing restrictions. For them, even to try and undertake such a venture during the present times would lead to incurring further risks and possible losses if the delivery channels did not function properly. By the end of the lockdown phases in early June 2020, the local Paikars were able to deliver small amounts of leaves to states like Assam, Bihar, and Maharashtra and to other places where some semblance of train connectivity had been restored. However, they were not able to deliver the produce across the entire country or even to the above-mentioned states in the quantities done previously, and had thus kept on accruing losses. The halt in air traffic within the country had also prohibited them from sending betel leaves to the north-eastern states of Tripura and Manipur. Betel leaf export to Sri Lanka, Bangladesh, Pakistan, Afghanistan, Australia, Canada, France, Germany, Hong Kong, Kenya, Nepal, United Kingdom, UAE, Saudi Arabia, Oman, Qatar, USA, Yemen and the EU countries were disrupted during the lockdown and this situation has persisted.

In 2019-20, India earned Rs. 37.60 crores (USD 5.22 million) by exporting 10386.52 metric tons of betel leaf worldwide (APEDA 2020). According to the Paikars, the months of February to May usually fetch the highest dividends in the betel leaf market and both farmers and traders earn the maximum amount during this time of the year. However, due to the enforced lockdown across Tamluk Subdivision, the total losses accrued in 2020 had been to the tune of about Rupees 5 crores (~USD 685,000). Some Paikars who do their business locally (i.e. buying the leaves from different markets of Tamluk Subdivision to sell in nearby places like Kolkata, Howrah, Arambagh and Bankura in southern West Bengal), were also unable to conduct any business in this period. About 200-250 such Paikars who operate on a smaller and local scale and usually sell two betel leaf motes per week (1 mote = 10000 leaves) reported facing losses of a minimum of

Rupees 8 lakhs (~USD 11,000) during the two months of the lockdown.

As in the case of the farmers, the demonetisation process in November 2016, had also affected the Paikars and Aratdars, with similar delays over payments and the non-availability of ready money. However, the present situation is even graver as most of their business was halted during the lockdown phases and has resumed only partially post the most stringent period of stoppages. Further, the intermittent access to markets for traders, as per the norms put in place by the local administration and police, continues to hamper this economic activity. As the markets in Tamluk Subdivision are the largest in the region, they draw in farmers and traders from other parts of Paschim Medinipur district and from the neighbouring districts of South 24 Parganas and Howrah. These stakeholders were unable to access the markets during the lockdown and are able to do so only in much diminished numbers in its aftermath. Apart from the farmers themselves, a substantial number of people are employed in this crop's cultivation and trade as labourers in the different markets and at railway stations, for hauling the leaf bundles and enabling their transportation. They have also been much affected by the halting/partial resumption of this trade.

4.3. Additional effect of the *Amphan* Super-cyclone during the COVID 19 Lock-down

On 20 May 2020, the Super-cyclone *Amphan* caused massive destruction across large swathes of southern West Bengal. The State Agriculture Department estimated a total loss of Rupees 5000 crores (~USD 685 million) across 16 districts in respect of all crops. Paddy, vegetables and betel vine farms were the most affected. The State Government's report on the disaster recommended that special attention should be given to the betel vine crop, since most of the existing Boroj in Purba Medinipur, South 24 Parganas and Howrah districts had been razed to the ground, severely affecting about two hundred thousand betel leaf farmers in these districts. Such disasters usually cause additional financial stress and disruptions in supply, exacerbating the existing pandemic situation, and lead to further restrictions or closure of markets and forced changes in the marketing strategies of such specialised commercial/cash crops (Anderson et al. 2020). The projected losses that betel leaf farmers have suffered in West Bengal just due to *Amphan* has been estimated to be about Rupees 2775 crores (~USD 380 million) and this amount was around Rupees 1000 crores (~USD 137 million) in Purba Medinipur district alone (SabrangIndia 2020).

According to the District Agriculture Department, betel leaf plantations were fully or partially damaged in about 5000 ha (50 sq.km) of land just in Tamluk Subdivision. The blocks most affected herein were Sahid Matangini, Nandakumar and Tamluk. Since cultivating and selling this crop is also the primary economic activity in these areas, the losses suffered were even more damaging. The standing vines in these Blocks in the various Boroj were totally destroyed. Whatever little did remain in the meagre storage facilities, could not be sold by the farmers due to the stringent lockdown in place. Furthermore, most of those affected were smallholder famers and they faced an extremely difficult situation bereft of cash-in-hand and the difficulty in selling any leaves saved in the storm's aftermath due to the pandemic situation. Their prospects for renewed betel leaf production in the foreseeable future also remain dim due to the need to accrue capital and set up the various Boroj again, which cannot occur till the remnant crop can be sold or substantial aid packages are received from the government. At the onset of the lockdown in March 2020, many farmers had hoped to harvest and sell their produce once the initial phases were over and repay any loans borrowed for maintenance of their farms, but the Amphan cyclone has put paid to those plans (Singh 2020).

Moreover, the ongoing lack of labour supply and the inability to pay for it creates further problems for farmers needing to again setup or repair/restructure their Boroj, although the local government has allotted Rs. 5000 (USD 68.5) and 40 man days of labour for this purpose (Bhattacharya and Mitra 2020). However, most of the surveyed farmers claimed that this amount was too meagre. Some of them had requested for workers to be allotted to them under the government funded MNREGS (Mahatma Gandhi Rural Employment Guarantee Scheme- a 100 days rural wage guarantee scheme implemented across India) in order to get their plantations back on track, but this plea has gone unheard. Another immediate effect of Amphan was a sudden surplus of plucked betel leaves in storage with the farmers themselves (for those who could salvage the crop from their Boroj) and thereby a temporarily increased leaf availability in the respective markets (as and where transportation had been possible from the respective farms), resulting in a further fall in the leaf price. The heightened supply/storage occurred because famers tried to salvage whatever they could from the remaining standing vines after the storm had passed since the crop was no longer sustainable in the damaged Boroj while the

price fell as the marketing intermediaries only paid a minimal amount to the farmers on the pretext that the then demand was very low and the pandemic situation would restrict leaf sales.

4.4. Supply chain disruptions due to the lockdown and the super-cyclone

Being a commercial crop, the earnings from betel leaf cultivation are almost wholly dependent on transferring/exporting the produce to different markets, within India and abroad, and on the demand in these places. Thus robust supply chains are crucial, more so as the crop is readily perishable. As a result, the factors engendering the various disruptions suffered by the usual supply chain paths (Table 2) should be given the most attention. The enforced lockdowns badly hampered these supply chains, restricting or even fully halting some pathways through which the leaves would otherwise move from the farmer to the eventual consumer. The regular supply chain (Figure 3) thus became quite disrupted in the early phases of the lockdown in the months of March and April 2020, leading to the formulation of alternate channels (Figure 4), that were limited in their geographical ambit (i.e. only catering to markets within West Bengal and its neighbouring states). Furthermore, this reorganisation arose as the farmers were not allowed to go to the market directly, but an agent of the trader would visit them at intervals and obtain the desired quantities of leaves. As mentioned before, the prices obtained during such transactions were minimal and this further affected the farmers adversely, hardly covering their overhead costs.

By the month of May 2020, when some transport restrictions had been eased, a newer form of the supply chain had evolved (Figure 5), which was similar to the pathways that existed in the pre-lockdown era. However, continuing restrictions on export of betel leaf meant that this particular aspect of the farmer-trader-consumer channel was still non-functional. In mid-May 2020 however, the Amphan effect (in its immediate aftermath), combined with that of the still-in-place lockdown measures, put an almost total halt on the trading of the leaf, be it within the state or outside it, partially or entirely disrupting the usual channels and networks in place by then (Figure 6). While the traders associated with this leaf could cope up relatively faster, once roads were cleared of storm debris and communications restored, the farmers have taken much longer to recover, as mentioned in the preceding section.

Issues	Inferences drawn from in-depth interviews with the various stakeholders
Farm input and maintenance issue	<ul style="list-style-type: none"> • The unavailability of different inputs from the local market that are required to sustain the crop and farm productivity, i.e. fertilizers, pesticides and <i>Boroj</i> (hut shaped structured made of bamboo, thatch, rope and other materials) maintenance materials, due to the lockdown has affected farm sustainability. • During the lockdown farmers were unable to sell their produce and therefore lost out on income for a sustained period of time. After the lockdown, due to still restrictive movement norms and the financial crisis beset as a result of the pandemic, they are only able to sell their produce at very low prices. Both situations together have caused much financial loss and this has led to the poor maintenance of farms and affected their sustenance.
Labour management issue	<ul style="list-style-type: none"> • The fear of the COVID-19 virus (for oneself along with concern for family members) and the need to maintain social distancing, has resulted in many farm labourers not venturing out for work, even after the most stringent lockdown measures were lifted. During the lockdown and post it thus, farm labour supply shortages have abounded and this has affected the supply chain of the crop. • While farmers were able to undertake most of the work on their respective farms and could also partly assist others if required, the <i>Amphan</i> super-cyclone that hit the area in mid-May 2020 disrupted this even more as individual/respective farms had to be tended to by each farmer in the aftermath of the destruction caused.
Transportation issue	<ul style="list-style-type: none"> • Unavailability of trucks, buses or any type of road transportation, and the halting of trains and air travel during the lockdown period disrupted to a very large extent the movement of betel leaves from individual farms to the markets and then onto the end consumers, thereby affecting the whole supply chain. The almost total halt in export and inter-state transfer of the leaves also engendered substantial financial losses. • Although trains started to ply again from 11th April 2020 onwards, many avoided them due to the risk of contacting the coronavirus, especially since the numbers of COVID-19 cases have continued to rise. • An acute shortage of both vehicles and drivers occurred in different modes of road transportation. Many vehicles did not ply as it was economically unfeasible to operate them due to reduced passenger numbers. Furthermore, many drivers and their assistants who had gone back to their respective native places during the lockdown had been unable to return to their place of work, due to restricted train and road transport facilities.
Local market (<i>Mandi</i>) issue	<ul style="list-style-type: none"> • To avoid the spread of the COVID-19 virus, all the local betel leaf markets were closed since the announcement of the lockdown measures by the Central and State Government in late-March 2020, which has obviously hampered the trading and sale of the betel leaves and thereby caused huge losses to all stakeholders. • During the latter phases of the lockdown, even though markets were opened, many opted to remain closed to avoid viral transmission. Local market committees framed norms at only one-third of the traders could visit the market just once a week for business while farmers were prohibited from doing so. Instead the leaves were collected, as per requirements, from individual farms. This led to losses for farmers as they could not negotiate prices or sell as desired while restricted market access hampered trading activities for the related stakeholders.

Issues	Inferences drawn from in-depth interviews with the various stakeholders
Export issue	The unavailability of road, rail and air transportation facilities, firstly due to the initial complete lockdown and subsequently due to the still ensuing restricted travel measures (few trains are available while air traffic is totally grounded), has hit betel leaf exports hard with the resultant loss of income.
Payment issue	<ul style="list-style-type: none"> At times customers do not pay local traders or commission agents claiming that the leaves delivered were in a damaged condition or did not reach them in time. In other cases, payments are received after much delay. The financial crisis brought on by the pandemic has also led to the deferment of payments in some cases.

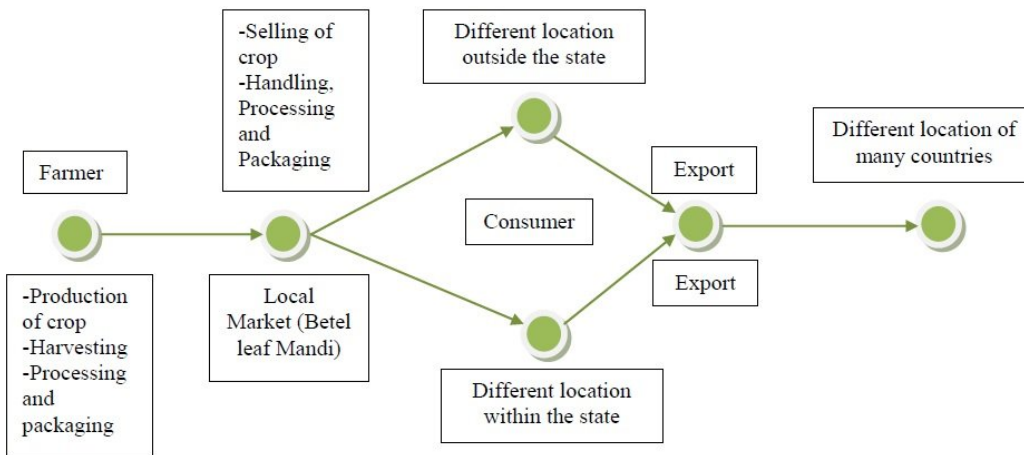


Fig. 3: The usual channels of betel leaf supply from farmers to consumers

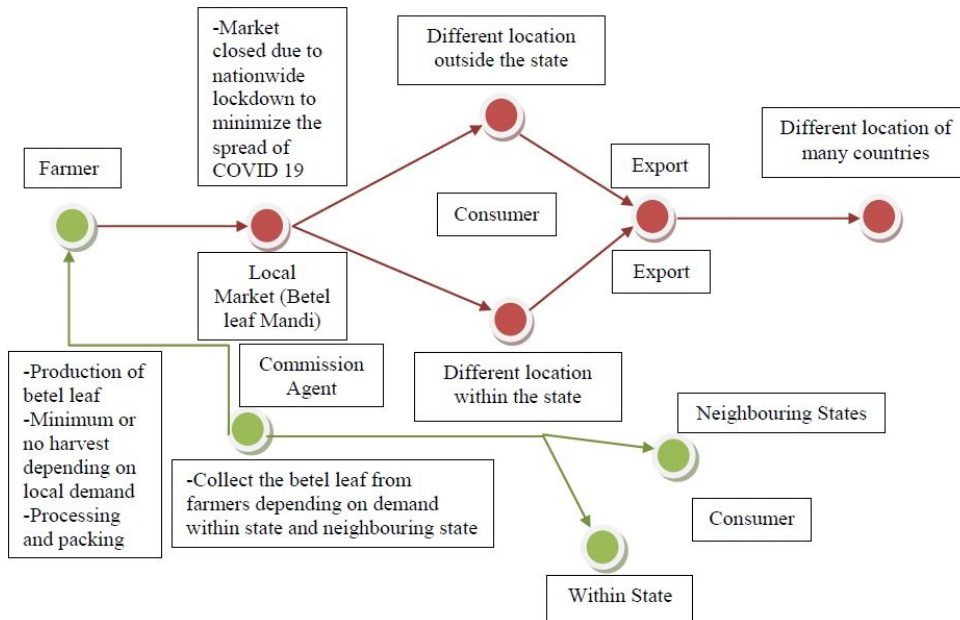


Fig. 4: The modified channels of betel leaf supply during the lockdown

Note: The red circles and arrows indicate channels that did not function due to the lockdown

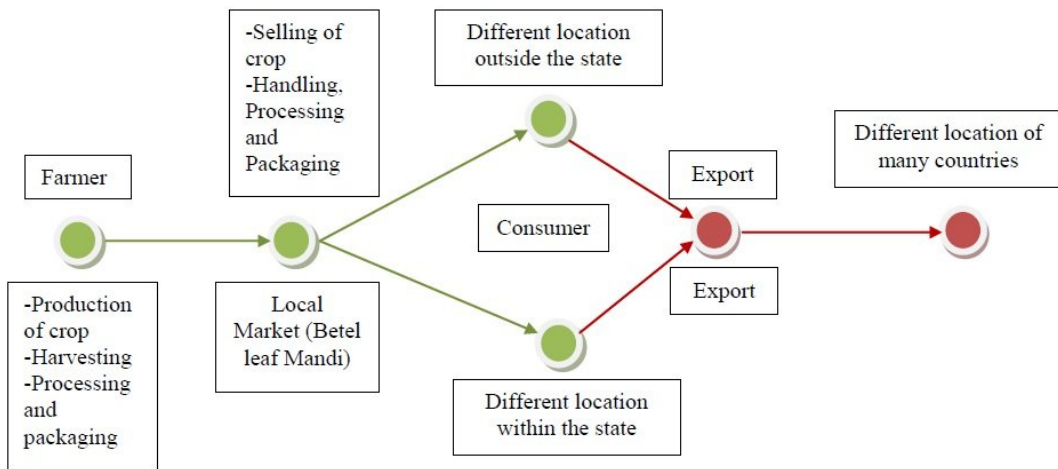


Fig. 5: The emergent betel leaf supply channels after the markets reopened

Note: The red circles and arrows indicate channels not functioning due to existing restrictions after lockdown phases

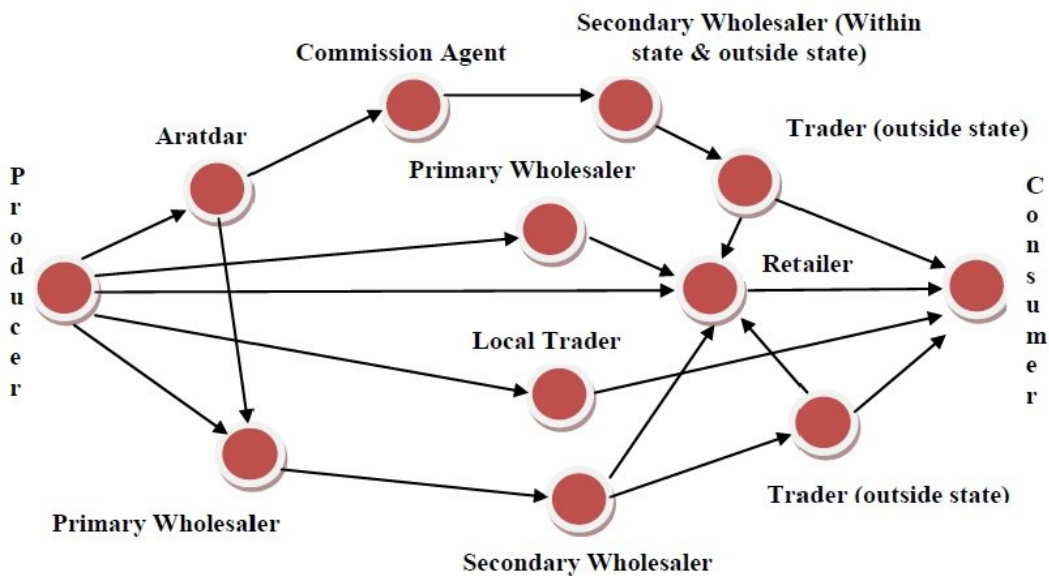


Fig. 6: The short halt in the supply channels due to the *Amphan* Super-cyclone occurrence in mid-May, 2020

Note: Red circles and arrows indicate channels not functioning due to the super-cyclone and also serve to show the linked networks that exist during normal times.

4.5. Fluctuations in betel leaf price

Figure 7 shows the sharp fall in the market price of betel leaves in Tamluk Subdivision due to the initial lockdown effect in April 2020, and then its delayed rise back to the former levels due to the *Amphan* effect. This is in sharp contrast to the other years when the leaf prices during these months were much higher. The more valued Mitha variety of the leaf saw

a sharper jump back in its price while the Bangla variety of the leaf saw a more gradual recovery, after the partial resumption of local and regional markets from May 2020 onwards. Even though the betel leaf price did indeed return to near the former levels after a few months, it was in those few months that these farmers suffered a marked distress. Especially since the vast majority are smallholder farmers, such a loss becomes potentially unbearable, since if they are unable to sell

their leaves and make some profit even in one season, it impacts on the savings and ability to persist with this crop's cultivation in the ensuing seasons, especially with loans and interests on loans to be paid for those availing of credit for their farms or requiring procurement of fresh farm implements and inputs to sustain the betel leaf cultivation. The access to formal credit facilities is minimal for these smallholder betel leaf farmers, and thus they are forced to take loans from informal sources at very high interest rates. Thus any kind of impediment that precludes them from repaying the loans affects them quite adversely. Also, since the crop was not plucked regularly by many during the lockdown period, the leaves had often rotted in the Borojs, which could impair the health of the betel vine. The Amphan super-cyclone also destroyed many Borojs and spoiled many standing betel vine crops, due to which these smallholder farmers suffered further distress. Thus, these two events have left a lasting effect and even though the price did come back to near former levels, it will take a lot of time for these smallholder farmers to recover fully, especially as there are no crop-specific insurance policy for them and also as betel leaf exports are still stopped, meaning that the large amounts of foreign exchange earned in this trade are still being in deficit. Moreover, as mentioned before, these gains have mostly benefitted the betel leaf traders and not the farmers directly.

The gross returns analysis shows that the smallholder betel leaf farmers faced substantial loss during the COVID-19 pandemic (Figure 8). According to the leaf price information ascertained from the farmers, the average loss for those producing Bangla and Mitha betel leaf varieties were Rs. 8359.09 and Rs. 13803.57 per 10 decimal/ month, respectively, due to the pandemic. Even though there was a variation in the stated gross returns among the respondents (standard

deviation Rs. 1643.17 and 202.26 for Bangla; and Rs. 1017.70 and Rs. 307.88 for Mitha variety) mainly due to the differences in yields and overheads of these two leaf types (Table 3), the necessity of improving the agro-economic condition of the farmers was apparent. The concomitant impact of the pandemic and the lockdown on leaf exports is also apparent in the sharply declined quantity and revenue earned (Figure 9), with the amount exported having reduced by ~55% (taking betel leaf and nut together) and earnings by ~23% (Table 4).

As the prevalent market norms dictate that the leaf is only sold through the local market (Mandi) auctions conducted by the traders, farmers usually suffer losses in this system. They are also unaware of the day-to-day fluctuation in the leaf price and thus cannot choose to harvest and sell their leaves during a window of higher returns. Thus market regulation (and the provision of a minimum support price (MSP) for the farmers) with real time broadcasting of the selling prices in the different markets of the Subdivision through apt digital platforms needs to be introduced to safeguard the smallholder betel leaf farmers.

4.6. Situational analysis in the post lockdown period

While betel leaves markets did start functioning perfunctorily from the first week of May 2020 during the latter phases of the lockdown, farmers were precluded from visiting them while traders only had restricted access. This resulted in greater price uncertainty for the farmers, who have had to sell the leaves at minimal price. However, the demand from different states had driven up business to an extent. Especially after the railways resumed partial service during the latter lockdown phases, about 40-45 tons of betel leaf has been transported from Mecheda railway station in Tamluk Subdivision to destinations like Mumbai, Yashvantpur and Porbandar in western

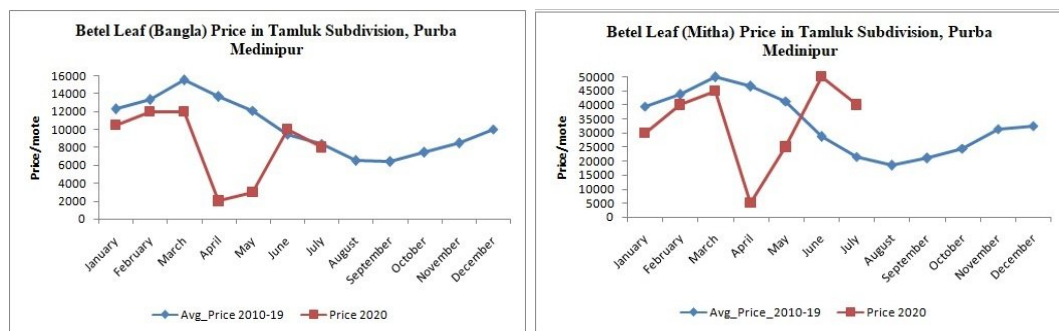


Fig. 7: The sharp drop in the betel leaf price due to the combined lockdown and cyclone effect, for the two main varieties of leaf (Bangla and Mitha)

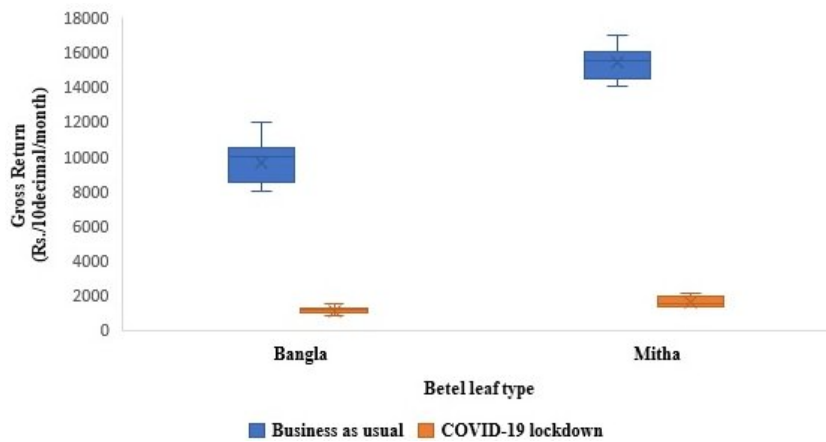


Figure 8: Difference in the gross earnings from the two main betel leaf varieties cultivated in the study area due to the pandemic

Table 3: Difference in obtained gross returns from the two main varieties of betel leaf cultivated

Gross Return from 10 decimal/month (Rs.)				
	Bangla variety		Mitha variety	
	Business as usual	COVID-19 lockdown	Business as usual	COVID-19 lockdown
Mean	9500	1140.91	15428.57	1625
SD	1643.17	202.26	1017.70	307.88

Table 4: Change in betel leaf and nut export from India as a result of the pandemic

Betel leaf and Nut export from India			
	2019-20	2020-21	% change compared to previous year
Quantity	14003.51	6244.59	-55.41
Rs. Crore	137.09	105.67	-22.92

Source : DGCIS

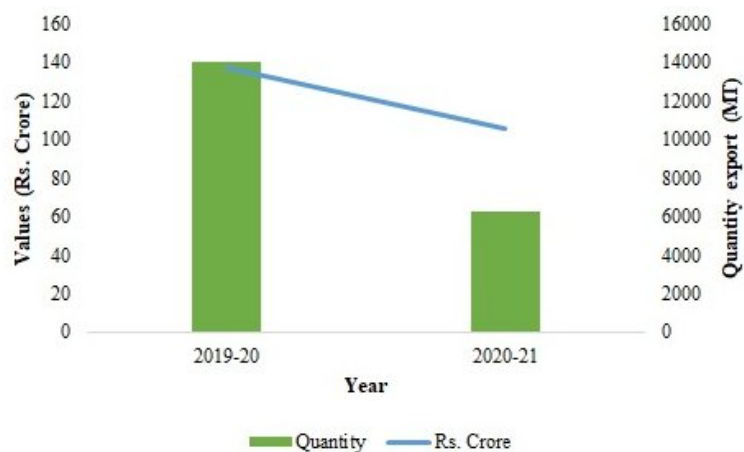


Fig. 9: Decline in betel leaf and nut export from India and change in revenue earned from 2019-20 to 2020-21

and southern India. Thus, the effects beyond the lockdown phases have been partly contrasting for the farmers versus the traders. While most farmers have continued to either suffer losses or earn little profit, traders have been able to earn more after the partial resumption of rail services by being able to deliver the leaf elsewhere. Thus, current market structure norms need re-examining so that cultivators and traders can similarly benefit instead of it being skewed. Furthermore, the most serious issue encumbering the farmers in the post-lockdown phase has been the repayment of the loans taken the year before (often from the informal credit sector at high interest rates), which needs to be completed before the new agricultural season commences. The recent price fall of betel leaves has greatly hindered this and interventions are sorely required to reschedule, restructure or waive any loan payments and ensure a more certain future for the cultivators (Ananth 2020).

4.7 SWOT analysis

In light of the aforementioned issues, a SWOT analysis was undertaken (Figure 10) to gauge ways in which the various stakeholders associated with betel leaf cultivation and trade may cope with the prevalent situation, while maximizing possible benefits and minimizing risk. We have therefore identified the various external and internal factors that can influence

the above, with self-explanatory points provided within the relevant diagram itself. The strengths of the study area with respect to this crop are evident in its long tradition of betel leaf cultivation and the many varieties that are produced, along with it being well-connected to the rest of the country through road and rail networks while being located just a few hours from Kolkata International Airport that handles leaf exports. These should ideally allow farmers and traders to capitalise on the opportunities provided by the lead being in high demand for medicinal purposes and specially for religious ceremonies and as a healthier chewable alternative to tobacco. The constraints to this crop's trading and earning of higher profits arise in the form of poorly regulated markets, archaic trading norms, lack of storage and credit facilities and poor government support for this crop in terms of targeted policies or insurance. These weaknesses are further compounded by the presence of multiple threats like climatic and leaf diseases, competition from nearby growing areas that have come up recently in nearby districts and multiple bottlenecks in trading and exporting the produce. Building on the listed strengths and exploiting the opportunities available, while putting in place measures to reduce the weaknesses and threats outlined, is the viable way forward.

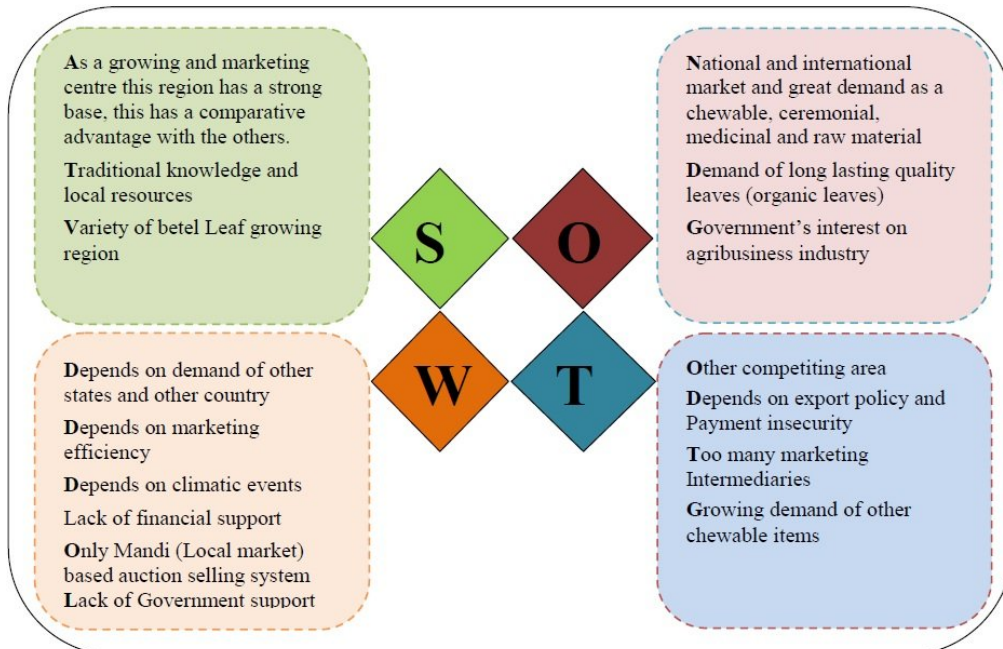


Fig. 10: SWOT analysis on the prospects of betel leaf cultivation and trade in Tamluk Subdivision

4.8. Apparent fallacies in the betel leaf cultivation and trade setup

The pandemic has brought into much sharper focus the issues that generally beset the Indian smallholding agricultural sector and particularly the resultant condition of betel leaf farmers. The key hindrance is in such farmers not obtaining a reasonable price for their produce, despite there being state and central government norms for framing the MSP for other crops (such caveats have however not yet been put in place for trading betel leaves). However, greater production often drives down prices below the MSP. A prime reason behind such supply and price distortions is the inefficiency of the state-level Agricultural Produce Market Committee (APMC) in marketing and selling the agricultural goods, especially via the auction system in local Mandis, which does not ensure the highest returns to the farmers. The implementation of the Electronic National Agricultural System (eNAM), recently introduced by the government may help improve the above issue and more effectively control price distortions (Acuite 2020). Further reforms can be in the form of monitored land leasing, private agricultural markets, contract farming and other measures to invite investments into the agricultural sector (Padhee and Carberry 2020).

Moreover, particularly in respect of betel leaf selling and trade, the prevalent market norms dictate that leaf growers have to go through a large number of intermediaries (Aratdars, Paikars and commission agents). Not only does this result in farmers earning a fraction of the amount that the leaf is eventually sold at to the consumer, a greater number of linkages in such a linearly arranged supply chain entails a higher probability of disruption if any one node fails to function adequately. Furthermore, betel leaf cultivators cannot insure their crop under the Pradhan Mantri Fasal Bima Yojana agricultural insurance guidelines (the crop does not fall within its purview- Roy et al. 2018; Niranjana et al. 2019), which covers only major food crops (Bhogal 2016). This is seemingly a gross oversight and puts a large number of smallholder farmers cultivating such a high-value crop at the risk of substantial loss from pest attacks and natural calamities.

5. Conclusion

The impact of the COVID-19 pandemic on the agricultural sector is complex and spread across different components of the agricultural value chain

(Ananth 2020). The lockdown phases and the Amphan super-cyclone have together heavily impacted on betel vine cultivation and trade in Tamluk Subdivision, engendering much economic loss among the local smallholder farming community and the traders who sell this leaf. We have documented these losses and the farmer conditions in this paper and also examined the concomitant effects on the traders. Our results reveal that there is an urgent need to look into ways to revive this traditionally cultivated crop since it is the primary economic activity of the area. Such smallholder farmers are vital to the regional economy (Abraham and Pingali 2020; Dsouza et al. 2020) but their recovery pathways are also more difficult than that of middlemen and traders (Mhlanga and Ndhlovu 2020). Different government driven measures need to prioritize such groups so that such farmers can continue to earn their livelihood sustainably from a cash crop that fetches so much revenue for the state. The pandemic has also exposed weaknesses in the overall agricultural supply chain (Arumugam et al. 2020; Successful Farming 2020) that have hampered the availability of farm inputs and marketing of the harvest (Hossain 2020). Structural reforms are therefore required in the betel vine crop's market and pricing structure and transportation, so that these become more equitable and robust.

Acknowledgements

The authors express their gratitude to the betel leaf farmers and traders of Tamluk Subdivision for patiently answering all queries during the telephonic interviews, despite telecommunication difficulties due to the Amphan super-cyclone.

Conflicts of interest

None.

Funding

This work was supported by the University Grants Commission Junior Research Fellowship (UGC-JRF) Award given to MH by the University Grants Commission, India for conducting doctoral research.

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