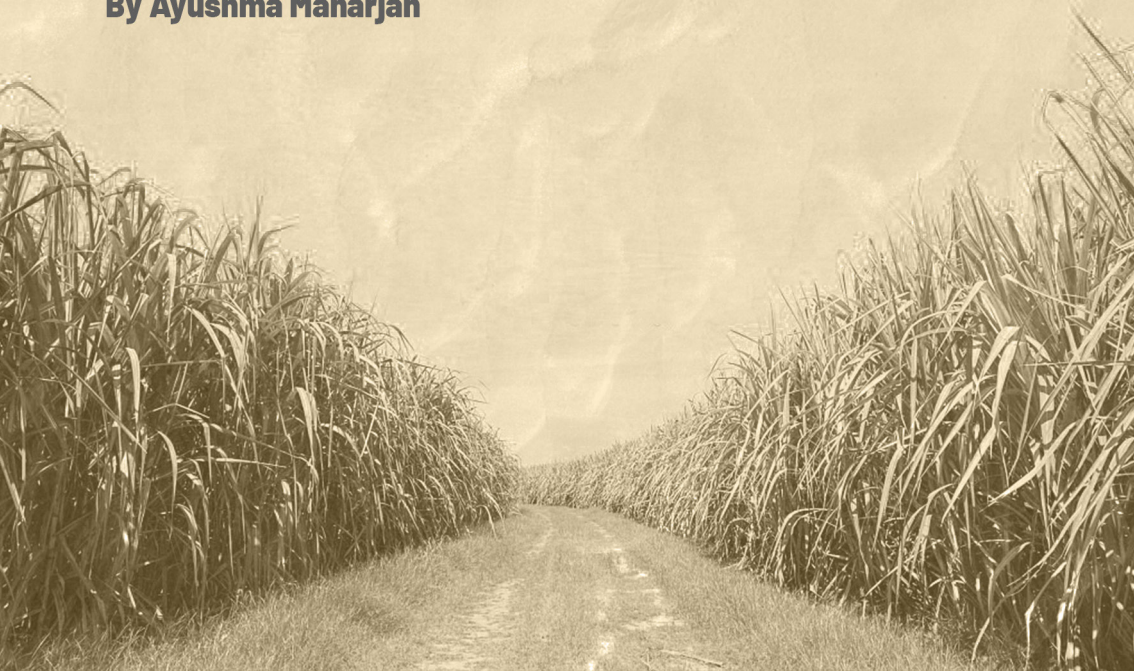


The Sugar Economy of Nepal

By Ayushma Maharjan



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Ayushma Maharjan is a thinker and an ardent libertarian. She is currently working as a Research and Communications Officer, where she is regularly involved in drafting research papers, discussing her findings with relevant stakeholders and advocating for policy changes. She also writes blogs and articles on contemporary economic issues of Nepal. Through these efforts, she aspires to craft conducive policy reforms and redefine policy discourse in Nepal.

Executive Summary

Sugarcane fourth largest grown commercial cash crop of Nepal and contributes to 1.81 percent to the overall Agriculture Gross Domestic Product (AGDP) of the country. However, the sugar economy in Nepal has been in decline since 2015. The sugarcane production has decreased by 26.75 percent in FY 2020/21, when compared to FY 2015/16. Likewise, the production of sugar has decreased from 280,000 tonnes in FY 2013/14 to merely 131,000 tonnes in FY 2020/21. Out of 31 sugar factories, only 8 factories are currently operational. The decline in productive capacity of both sugarcane and sugar in Nepal stands despite government interventions like subsidies and protectionist trade policies.

Given the same, this study attempts to identify key challenges faced by the sugarcane farmers and sugar industries and generate favorable policy recommendations to improve the state of sugar economy in Nepal.

The findings suggest that challenges faced by sugarcane farmers include lack of timely access to agricultural inputs, overutilization of human labor and machineries for tillage, underutilization of modern agricultural machineries, suboptimal utilization of seeds, high cost of production, low profitability, low demand from industries that produce sugarcane by-products, unscientific fixation of Minimum Procurement Price (MPP), and delayed payment to sugarcane farmers by both sugar mills and the government. Likewise, the problems faced by sugar industries are shortage of sugarcane, low quality of sugarcane, unscientific fixation of MPP, and inability to compete with the price of imported sugar.

To improve the state of sugar economy in Nepal, this study recommends exploring alternative methods, such as removing

restrictions on Foreign Direct Investment (FDI) in agriculture, promoting contract farming, and incentivizing industries to produce sugarcane by-products like molasses and ethanol, bagasse, energy, electricity, and press mud. Likewise, to resolve problems related to price fixation this study discusses alternative ideas related to agriculture commodity markets, and price fixation through market mechanism. Lastly, this study highlights that, given low yield and profit from sugarcane, farmers should consider switching to more productive crops in their respective localities. The government can facilitate this by organizing educational and awareness programs to ensure a smooth transition.

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List of Abbreviations

AGDP	Agriculture Gross Domestic Product
B:C Ratio	Benefit to Cost Ratio
CBS	Central Bureau of Statistics
DAO	District Administrative Office
FAO	Food and Agriculture Organization
FDI	Foreign Direct Investment
FITTA	Foreign Investment and Technology Transfer Act
FY	Fiscal Year
MoALD	Ministry of Agriculture and Livestock Development
MoICS	Ministry of Industry, Commerce and Supply
MoF	Ministry of Finance
MPP	Minimum Procurement Price
MW	Mega Watt
NEA	Nepal Electricity Authority
NNSC	Nepalese National Seed Centre
NPR	Nepalese Rupee
USD	United States Dollar
VAT	Value Added Tax

Purpose

The primary purpose of this study is to (i) understand the state of sugar economy in Nepal and policies targeted to improve the same; (ii) understand the key challenges faced by the stakeholders and whether the policies have been able to mitigate the same; and (iii) generate favorable policy recommendations to improve the state of sugar economy.

Background

Sugarcane farming is considered as one of the oldest occupations in Nepal, with at least three generations of farmers of the same household being engaged in its production. Sugarcane is produced in 41 districts of Nepal, with 14 districts engaged in its commercial production (MOALD, 2020). It contributes to 1.81 percent to the overall Agriculture Gross Domestic Product (AGDP), which makes it the seventh largest contributor to AGDP and fourth largest grown commercial cash crop of Nepal (MOALD, 2021).

It is reported that there are approximately 0.1 million sugarcane farmers in Nepal. The shift of sugarcane plant from traditional to commercial is attributed to the growth in establishment of sugar factories, mills, and refineries in major sugarcane producing districts of Nepal. Given the same, the area of sugarcane plantation increased from 7,000 hectares in 1961 to 80,931 hectares by 2015/16. While Nepal merely produced 20 tonnes per hectare sugarcane in 1961, its yield increased to 53.71 ton per hectare by 2015. While Nepal remained far behind top producers of sugarcane like Brazil and India with an average yield of 83.04 tonnes per hectare and 74.33 tonnes per hectare respectively, the overall progress of the sector seemed steady and promising (Neupane, Maraseni, & Köhl, 2017).

However, post 2015, the sugar economy of Nepal has experienced a severe downfall. While in 2014 Nepal ranked 41st largest sugar producing economy, today Nepal has slid down to 76th. The sugarcane production in Nepal declined by 26.75 percent¹ in FY 2020/21, when compared to FY 2015/16. Likewise, the plantation area also declined by 20.48 percent – from 80,931 hectares in FY 2015/16 to 64,354 hectares in FY 2020/21 (MOALD, 2021). According to a study

¹ Based on Statistical Information on Nepalese Agriculture of FY 2015/16 and FY 2020/21, MOALD.

conducted by Pandey & Devkota (2020), given the challenges and risks in the sugarcane farming, 52 percent of sugarcane farmers in Nawalparasi and Kapilvastu district of Nepal were planning to replace sugarcane by other crops.

On the other hand, out of 31 sugar factories in the country, 21 are shut down and only 8 factories have been operating since FY 2021/22. Five of the factories were shut down post FY 2015 citing shortage of sugarcane. Up until FY 2013/14, Nepal produced 280,000 tonnes of sugar annually. However, in FY 2020/21, Nepal Sugar Producers Association reported that only 131,000 tonnes of sugar was produced². All sugar factories in the country have been operating below their capacity.

The general population of Nepal have been facing the brunt of the challenges faced by the sugar economy in the form of frequent shortages and price hike of sugar – an essential product in Nepalese household.

In realization of the problems faced by sugar economy, the government of Nepal has introduced different plans and programs like subsidies to sugarcane farmers based on production and protectionist trade policies to support sugar factories in the form of both tariff and non-tariff barriers in sugar import. However, the decline in productive capacity of sugarcane and sugar in Nepal stands despite these efforts³ from the government.

Thus, this study attempts to analyze the sugar economy, its trend, and challenges with the aim to provide policy recommendation to mitigate the same.

2 Nepal's Market has a Stock of 30,000 Tons of Sugar, June, 20 2022, New Business Age, <https://www.newbusinessage.com/Articles/view/15471s>

3 Extracted from the budget speech presented by the Ministry of Finance from FY 2017/18 to FY 2022/23

Sugar Economy at a Glance

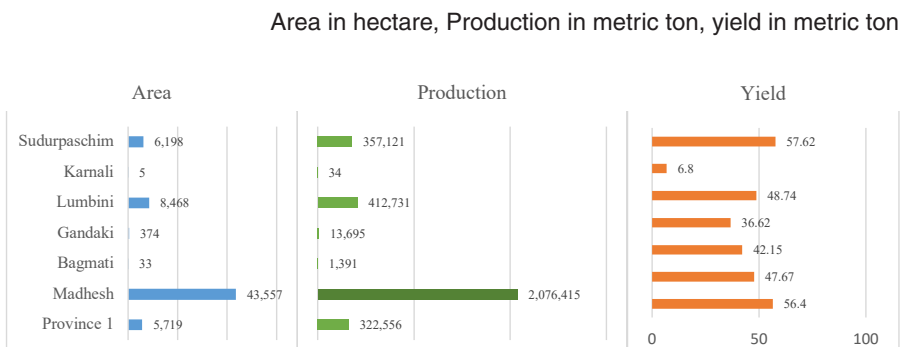
The sugar economy of Nepal constitutes of sugarcane farmers, sugar industries, mills and refineries, sugar traders and middlemen, the government, and consumers as the major stakeholders. These stakeholders are directly or indirectly associated with the production, distribution, and pricing of sugar in the economy.

Sugarcane

Sugarcane is one of the major commercially grown cash crops in Nepal with total contribution to AGDP of 1.81 percent. It employs about 0.1 million farmers.

Sugarcane is mostly grown in the Terai belt of Nepal. Madhesh Province is the largest producer of sugarcane in Nepal. It produced 2.08 million tonnes of sugarcane in FY 2020/21. It is also the largest province based on area of land used for sugarcane cultivation.

Figure 1: Province-Wise Area, Production, and Yield of Sugarcane



Source: MOALD, Statistical information on Nepalese agriculture, 2020/21

The major districts with sugarcane production of more than 100,000 tonnes in FY 2020/21 are Sarlahi, Mahottari, Rautahat, Kanchanpur, Sunsari, Nawalparasi (West), Kapilvastu, Dhanusha, Siraha, Bara, and Morang. However, the annual progress of sugarcane production in these districts shows that both production and area of cultivation of sugarcane has been declining over the years. The declining area of cultivation and total production of sugarcane in these districts are presented in Table 1.

Table 1: Plantation Area and Production of Sugarcane in Largest Sugarcane Producing Districts

Area in hectare, Production in metric tonnes

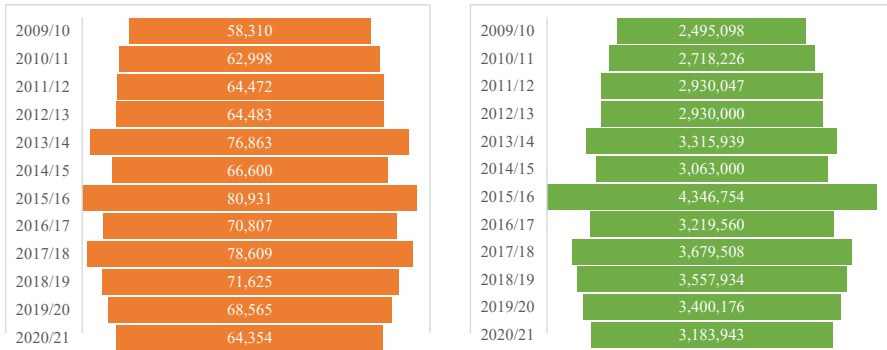
Year	Mahottari		Sarlahi		Rautahat		Nawalparasi		Kapilvastu	
	Area	Production	Area	Production	Area	Production	Area	Production	Area	Production
2014/15	7500	288750	22500	1129500	10075	322400	7015	210600	5235	277717
2015/16	7500	388750	27000	1350000	10015	550555	7438	462825	5230	315000
2016/17	N/A	N/A	26000	1326000	9985	349475	7388	354624	4930	271180
2017/18	7654	393191	25814	1297419	9913	341942	7335	346980	4894	265335
2018/19	7642	392493	22153	1101915	9112	438925	4521	212987	1534	70564

2019/20	6642	341133	18906	995214	7112	342585	4321	203547	1434	65964
2020/21	7148	367162	17360	902722	8513	342264	4313	203298	3540	185880

Source: MOALD, Statistical information on Nepalese agriculture, 2020/21

With the decline in production and cultivation areas of major sugarcane farming districts, the overall sugarcane production of Nepal has also experienced a downfall post FY 2015/16.

Figure 2: Total Sugarcane Production in Nepal from FY 2009/10 to FY 2020/21



Source: MOALD, Statistical information on Nepalese agriculture, 2020/21

Studies conducted by Neupane, Maraseni, and Köhl (2017), Pandey and Devkota (2020) and MoALD (2020), have highlighted that the cost of sugarcane production is high in Nepal. While the minimum support price of Nepal for sugarcane is highest when compared to other sugarcane producing countries, the benefit to cost ratio is merely

1.17. Neupane, Maraseni, and Köhl (2017), suggests that sugarcane farmers in Nawalparasi earn a net profit of mere NPR 27,237 annually.

Table 2: Minimum Procurement Price of Sugarcane in Selected Countries (2022)

Country	MPP (in NPR)
India	464
Nepal	590
Pakistan	391.41
Thailand	384.03

Apart from high cost and low productivity, the sugarcane farmers are engraved with other risks and challenges like uncertainty of payment, that has made the sector less lucrative for continuation of sugarcane plantation. Considering the same, the sugarcane farmers have formed a sugarcane farmers' struggle committee, who have been engaged in different protests in both local and federal level.

Sugar

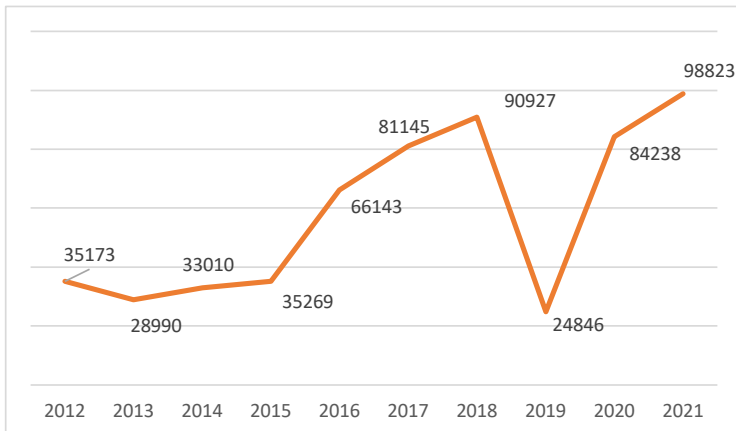
Sugar is one of the one of the most frequently used products in the Nepalese household. According to the Annual Household Survey published by Central Bureau of Statistics (2016/17), the per capita consumption of sugar is 8 kg per annum. Annual demand of sugar in Nepal stands at 250,000 metric tonnes, out of which, 65 percent is attributed to household consumption and the remaining 35 percent is attributed to industrial use. However, the annual sugar production of Nepal barely meets 50 percent of the total demand. As reported by Nepal Sugar Producers Association⁴, in FY 2021/22 Nepal produced merely 131,000 metric tonnes of sugar – a drastic decline from 280,000 metric tonnes produced in FY 2013/14.

4 Nepal Sugar Producers Association reported the figure to New Business Age. It is available at <https://www.newbusinessage.com/Articles/view/15471>

The total number of sugar factories registered in Nepal till date is 31. However, majority of factories have either shut down or are currently not operating. In FY 2021/22, only 8 industries were operating – however, at reduced capacity. The average recovery rate of sugar in the country for early variety of sugarcane is 12.607 percent and for mid/late variety is 12.068 percent. This implies that 100 kg of sugarcane can produce approximately 12 kg of sugar in Nepal, given the use of right variety of seed. As per a report published by MOALD (2020), given all existing sugar industries operate at full capacity, Nepal has the capacity to produce 477,450 metric tonnes of sugar annually. However, Nepal produces much less sugar than its capacity for which sugar industries often cite shortage of sugarcane as a major barrier.

Given, the deteriorating condition of sugar production in the country, the dependency on import has drastically increased in the recent years.

*Figure 3: Import of Sugar and Sugar Confectioneries
In USD*

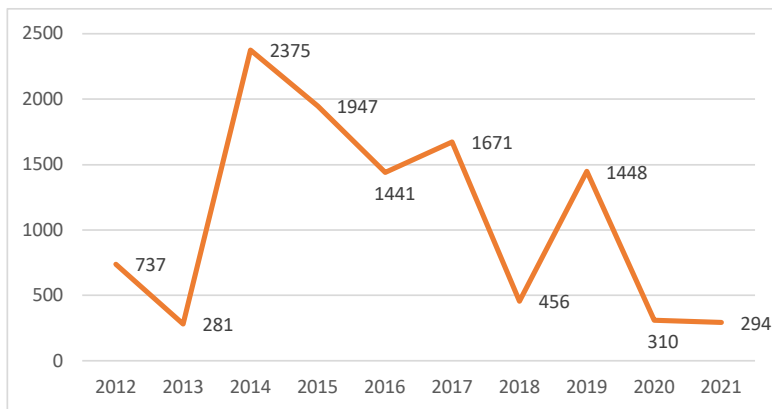


Source: Trade Map, International Trade Center⁵

⁵ The fall of import in 2019 can be explained by the imposition of quota on sugar and increment in custom duty on sugar to 30 percent

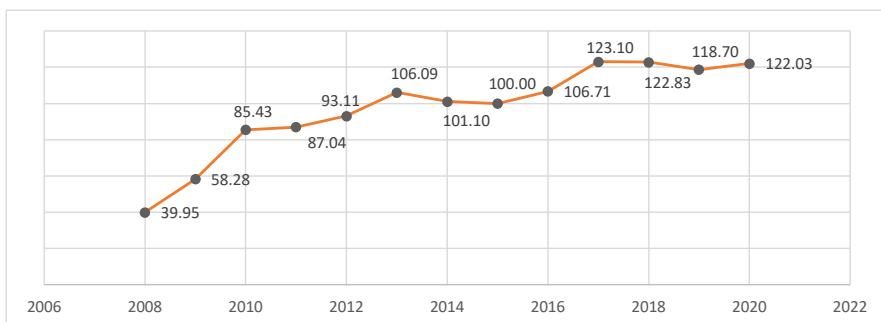
In the ten years from 2012 to 2021, the amount spent on import of sugar has increased by 180.9 percent. Except in FY 2019 (period of quota and increment of tariff on sugar import), the import of sugar has increased steadily over the years to meet the unmet demand of sugar. Consequently, the sugar export of the country has experienced a decline since 2015.

Figure 4: Export of Sugar and Sugar Confectioneries In USD



Source: Trade Map, International Trade Center

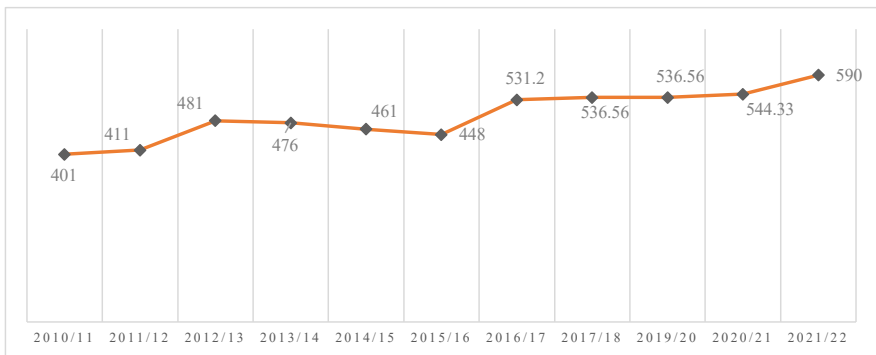
Figure 5: Consumer Price Index of Sugar



Source: Consumer Price Index of Sugar and Sugar Products, Nepal in Data Government

The government of Nepal has been heavily engaged in facilitating the productive capacity of both sugar and sugarcane in Nepal. For the same, the government fixes the minimum procurement price (MPP) of sugarcane annually, implements different programs, and provides subsidy to farmers and tax benefits to the industries. Some of the programs include insurance, seed distribution, 50 percent subsidy on procurement of modern machinery, award to best sugarcane farmers, among others.

*Figure 6: Minimum Procurement Price of Sugar in Nepal
(2010/11 - 2021/22)*



Source: MOALD, 2020⁶

Since 2014/15, the government has also introduced subsidy program for the sugarcane farmers. In FY 2014/15, the government initiated a production-based subsidy scheme for sugarcane farmers, whereby it was ensured that the government would provide NPR 25 per quintal of sugarcane. In FY 2017/18, the government adopted another scheme whereby it introduced policies to provide 90 percent Value Added Tax (VAT) refund to sugar industries on sales of sugar. Amongst the VAT refund amount, the sugar industries further required to provide NPR 65.28 per quintal to sugarcane farmers in addition to the initial

⁶ The data for FY 2021/22 was updated in the data.

cost. However, in FY 2018/19 this program was terminated, and, in its stead, the government announced subsidy worth NPR 65.28 per quintal to the farmers. In FY 2022/23, the government allocated a total of NPR 810 million as subsidy to sugarcane farmers (Ministry of Finance, 2022).

The government of Nepal has also been assisting the sugar industries by imposing different form of tariff and non-tariff barriers to limit competition from import. From September 2018 to July 2019, quota on sugar at 100,000 tons per year was introduced by the government. During the same period, customs on sugar import was also increased to 30 percent from 15 percent (Ministry of Finance, 2018). The customs further increased in FY 2019/20 to 40 percent (Ministry of Finance, 2019).

Challenges in Sugar Economy

Sugarcane Farming

i. Resource-use Efficiency

Nepalese sugarcane farming is engraved with challenges pertaining to sub-optimal use of resources. According to Pandey et al. (2020) human labor and machineries for tillage are over utilized in the sector, whereas other imperative inputs like setts, irrigation and nutrition from fertilizer are underutilized.

One of the major factors leading towards underutilization of resources is the scarcity or unavailability of agricultural inputs. The problems related to timely access to quality fertilizer, improved seeds, year-round irrigation facilities, electricity, availability of modern agricultural machineries, and infrastructures and machines for plant protection are prominent in the agricultural sector of Nepal. Moreover, use of modern tools and equipment, designed specifically for sugarcane cultivation which assists in sett transplantation, harvesting, weed management, and earthing up, are minimal in Nepal. This implies that Nepalese sugarcane farming is highly dependent on manual labor. According to ICAR-Sugarcane Breeding Institute (2019) in India, while fertilizers and irrigation facilities helps increase the number of sugarcane, the inputs along with sett, and intercultural operations like timely earthing up and weed management helps to increase the weight, length, and juice sucrose of sugarcane. The underutilization of modern machines has resulted in lower sugarcane yield when compared to actual potential in Nepal.

Nepalese National Seed Centre (NNSC) pointed out that suboptimal utilization of seeds is one of the major reasons concerning low

yield of Nepalese sugarcane, which stands at approximately 53.72 tonnes per hectare. According to Neupane, Marasani, and Kohl (2017), NNSC proposed four varieties of sugarcane seeds – Jeetpur 1, 2, 3, and 4 – for different parts of the country. The seeds have the potential yield of 71 t/ha, 92 t/ha, 79.2 t/ha and 86 t/ha, respectively. However, the farmers rely largely on available seed rather than the most suitable one which contributes to below par productivity.

ii. Cost of Production and Profitability

The excessive use of human labor along with inefficient use of resources and lack of agricultural machineries has resulted in inflated cost of production in the sugarcane industry. The study conducted by Neupane, Marasani, and Kohl (2017) estimated that the per hectare cost of sugarcane production is approximately NRs. 0.326 million, and benefit is NRs. 0.380 million⁷. This implies that the per hectare profit of sugar cane crop was merely NRs. 27, 237.1 annually. The study also revealed that the benefit to cost ratio of sugarcane production was merely 1:17. Likewise, a study conducted by Pokharel et al. (2019) in Eastern Nepal confirmed that sugarcane production was more profitable in eastern region with a benefit to cost ratio 1.38 for main crop and 1.34 for ratoon crop⁸. Another study conducted by Pandey, et al. (2020) highlighted that the average benefit to cost ratio stood at 1:35 with B:C ratio of main sugarcane crop being 1.02 and ratoon crop being 2.08. The study identified that the farmers continued to plant sugarcane despite low returns on main crop due to higher margin in ratoon crop.

⁷ The study was based in Nawalparasi district of Nepal.

⁸ Sugarcane plantation in Nepal is done in two phases and the entire cycle of completion requires two years. The first phase is the harvesting of main crop which is both capital and labor intensive. The second phase is the harvesting of ratoon crop, which is the second sugarcane grown after harvesting of the main crop. It requires lesser effort and minimum capital

The cost of production of sugarcane is mainly dominated by factors like human resource, seed, fertilizer, credit from formal and informal sources, and transportation. The human resources are utilized for almost all activities from land preparation to weeding, earthing up, and harvesting. While approximately 40 percent and 58 percent of cost of main and ratoon crop respectively are paid to labor, the remaining 60 percent and 42 percent cost are incurred by other factor inputs, interest, and transportation. Pandey, et al. (2020) has identified that the cost incurred by labor and tillage are excess by 81.8 percent and 26.6 percent respectively. Likewise, investment in sett, irrigation and fertilizers were inadequate by 40.8 percent, 94 percent, and 89.7 percent respectively. Given the inadequate investment, the sugarcane fields do not have timely access to fertilizers, and irrigation facilities which hinders the productivity and increases the cost of production.

The higher cost of sugarcane production in the country translates to reduced profit margin for the farmers, and thus farmers struggle to live a decent livelihood by engaging solely in the sector. According to Pokharel et al. (2019) the higher dependency on labor rather than mechanical means has increased the cost of production of farmers and lowering the same is imperative for better productivity and profitability. One of the factors that bars farmers from realizing greater benefits from the sector is the limited demand from industries that produce by-products from sugarcane like ethanol production, fertilizer production, energy production, among others. Currently, the farmers earn from sugarcane farming solely by selling the cane to sugar industries for sugar production.

iii. Pricing of Sugarcane and Minimum Procurement Price

Studies conducted by Pandey and Devkota (2020) and Neupane, Maraseni, and Köhl (2017), have highlighted that the fixation of Minimum Procurement Price (MPP) in sugarcane industry is

unscientific, and has been a major reason behind the recurrent disputes between the sugarcane farmers and sugar producers. The MPP is usually fixed based on cost of production, transportation cost, profit margin, and direct cash subsidy by government, which is identified with the help of selected sugarcane farmers as samples. The MPP of NPR 590 in FY 2021/22 was fixed with the help of sample cost collected from 30 farmers. However, the farmers depicted dissatisfaction with the MPP as their demand amounted to NPR 650. Likewise, in the FY 2020/21 the farmers demanded a price hike of NPR 106 in MPP from previous MPP of NPR 536.56. However, the price was increased only by NPR 8 to NPR 544.33 per quintal. For FY 2022/23, the demand of farmers stands at NPR 705 per quintal⁹.

Given the same, the sugarcane farmers organize frequent protest at both local and federal level and visit administrative buildings to ask for fair price. The effort of farmers has remained unsuccessful till date. While the MPP is below the demanded price of sugarcane farmers, the problems associated with delay in fixing MPP has exacerbated the risk of post-harvest loss of farmers, due to which farmers reluctantly sell the produce at lower price. The government of Nepal introduced MPP in the late 1970s, which required the government to announce MPP prior to crop harvest. However, the sugarcane farmers of Nepal have, for a prolonged period, experienced a delay in fixing of MPP.

Moreover, the benefit associated with MPP, and direct cost subsidies are only enjoyed by farmers who sell their produce to sugarcane mills. As per the current regulation, local crushers and small-scale sugar industries do not need to comply to MPP. Additionally, there is no mechanism to guarantee that all farmers who sell their produce to sugar mills get fair compensation as per

9 Prasain, K., Sugarcane farmers demand Rs705 per quintal minimum for this season's harvest, December, 17 2022, The Kathmandu Post, <https://kathmandupost.com/money/2022/12/17/sugarcane-farmers-demand-rs705-per-quintal-minimum>

stipulated MPP. A study conducted by Pandey and Devkota (2020) identified that in Nawalparasi district, only 33 percent farmers received MPP while selling the produce while other farmers settled for negotiated price below MPP. This implies that despite the fixation of MPP, the sugarcane prices are subject to fluctuation and MPP has only disrupted competition and provided unfair price advantage to few farmers. The study has also revealed that the MPP has an insignificant and negative relation to sugarcane yield. This poses serious question on the effectiveness of fixation of MPP.

iv. Payment

The problem of delay in payment to sugarcane farmers by both the sugar mills and the government has been a major reason behind the plight of sugarcane farmers in Nepal. On December 2019, it was reported that the farmers were yet to receive their payment for the past six to ten months and the accumulated debt amount was more than NPR 1.3 billion. After multiple protests at federal and local level, and a prolonged fight, the farmers were repaid certain portion of the due amount. However, as per January 2022, NPR 80.70 million due amount was yet to be paid.

Table 3: Sugarcane Farmer Protest Timeline

December 2019	Sugarcane farmers from Sarlahi organized a protest in Kathmanu Valley demanding the government to help them retrieve their payment from sugar mills. It was reported that about 5-6 thousand farmers in Sarlahi had not received their payment from the mills for the past six to ten years. The total due amount was NRs. 1.320 billion (Annapurna Sugar Mill: 500million; Shree Ram Sugar Mill: 420million; Mahalaxmi Sugar Mill: 200million; Other Mills: 200million)
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January 2020	<p>The farmers were yet to receive NRs. 800 million from sugar mills.</p> <p>Government signed an agreement with the Sugarcane Farmers Struggle Committee ensuring that their payment will be made from Jan 21, 2020.</p>
December 2020	<p>Farmers were yet to receive NPR 520 million, the Sugarcane Farmers Struggle Committee organized second protest in Kathmandu Valley</p>
	<p>Government Issued order to District Administrative Office to arrest mill owners who hadn't paid the farmers</p>
March 2021	<p>Government started listing sugarcane farmers to end delay in their payments</p>
July 2021	<p>Sugarcane Farmers Struggle Committee organized third round of protest, as they were yet to receive NPR 250 million.</p>
	<p>The Ministry of Industry, Commerce and Supply (MoCSI) mentioned that the total amount of NPR 155 million had been paid to the farmers. Given that some farmers did not have bank accounts, the funds could not be transferred.</p>
	<p>Farmers were agitated and gave ultimatum to the government to correct the amount of NPR 155 million (as it did not include the amount of government subsidy) by August 2021</p>
December 2021	<p>The farmers were yet to receive NPR 130 million and thus they planned for another protest.</p>
January 2022	<p>NPR 80.70 million due amount was unpaid to the farmers.</p>
	<p>Government froze assets of defaulting mills.</p>
April 2022	<p>Farmers in Sarlahi halted supply of sugar by stopping 3 trucks of sugar</p>

According to Pandey and Devkota (2020), the delay in payment to the sugarcane farmers has a negative impact on productivity as well as profitability. Given the delay in payment, the farmers cannot procure imperative inputs like fertilizers, seeds and other resources for weeding and earthing up on time, leading to lower productivity. Moreover, the farmers manage the financial resources by taking debt from different formal and informal institutions. The payback period of loans are mostly annual, and farmers need to pay monthly installments. The interest rate from credit cooperatives are more than 16 percent per annum and informal sources are expected to be higher. Given the delay in payment by the mills, the farmers have no means to repay the debt. The farmers are under constant threat that the creditors will seize their land.

In addition to the same, the government has also not been able to effectively implement its direct cash subsidy program. While 92 percent sugarcane farmers in Nawalparasi district did not receive payment from mills on time, they were also agitated that the District Administrative Office (DAO) had not distributed the cash subsidy (Neupane, Marasani & Kohl, 2017).

Sugar Production

i. Shortage of Sugarcane

With decline in sugarcane productivity and production, the sugar industries are facing acute shortage of sugar. Given the same, the currently sugar mills are operating at 10 percent of production capacity¹⁰.

¹⁰ Sugar mills facing raw material shortage as farmers decide not to grow sugarcane for not receiving payment, February, 1 2021, My Republica, <https://myrepublica.nagariknetwork.com/news/sugar-mills-facing-raw-material-shortage-as-farmers-decide-not-to-grow-sugarcane-for-not-receiving-payment/>

While importing low prices sugarcane from neighboring countries like India, Pakistan, China, among others could provide some respite to the sugar mills, given the agitation of sugarcane farmers, the mills refrain from doing so. In 2014, Reliance Sugar Mill of Manaharwa imported sugarcane to operate its factory. However, the farmers in the area protested the import for which the mill had to pay Rs 8 million to farmers as compensation for not purchasing their sugarcane¹¹. This is even though such regulation is not mentioned in any legislation in Nepal. This suggests that the sugar industries have minimum methods to ensure their sustainability.

ii. Quality of Sugarcane and Minimum Procurement Price

The sugar industries are largely unsatisfied with the MPP fixed by the government of Nepal and deem it to be unscientific. The quality of sugarcane is low in Nepal. While the global average of sugarcane recovery stands at 12-14 percent, the recovery rate of Nepalese sugarcane is merely 9 percent. However, the MPP of sugarcane is one of the highest in the world¹². The Sugar Industries Association of Nepal has for a prolonged period attempted to fix the sugarcane prices at fair market prices. The association has asked the government to fix the price based on the quality of sugarcane. According to their proposal, they were ready to pay higher prices for good quality sugarcane, but the government should fix the MPP as per the quality by dividing sugarcane into high, medium, and low quality. Sugar mills have also argued that complying to MPP would push the enterprise towards loss.

In June, 2014 Mahalaxmi Sugar Mill refused to pay MPP to the farmers which was NPR 476¹³. The mill had made an agreement

11 Sah, L., Sugarcane farmers protest against lopsided contract, September, 3 2014, The Kathmandu Post, <https://kathmandupost.com/money/2014/09/03/sugarcane-farmers-protest-against-lopsided-contract>

12 See Table 2

13 Mahalaxmi Sugar Mill denies to pay minimum price of sugarcane, June, 11 2014, Share Sansar, <https://www.sharesansar.com/newsdetail/mahalaxmi-sugar-mill-denies-to-pay-minimum-price-of-sugarcane>

with the farmers and made an advance payment of NPR 400, a month prior to fixation of MPP. The farmers also signed another agreement with the mill which stated that the mill will not be liable to make the remaining payment. However, the farmers resorted to protest and obstructed the supply of sugar from the warehouse of the mill.

While sugarcane farmers in areas with no presence of sugar mills are devoid of MPP and direct cash subsidies from government and receive less price for sugarcane than the stipulated MPP, the farmers realize timely payment from sugar refineries and middlemen.

iii. International Competition

The price of sugarcane is highest in Nepal when compared to neighboring countries. Given the same, the sugar produced by industries are also subject to inflated price. Given the same, the industries cannot compete with the imported sugar in Nepal. The benefit from sugar trade is higher than production as the prices of sugar are lower when it arrives at the Nepal-India border. Given the same, it is impossible for sugar industries in Nepal to compete with rising imports of sugar from nations where sugar prices are far cheaper.

This suggests that the sugar industries have minimum methods to ensure their sustainability. Some of the known methods are importing low-priced sugarcane from neighboring countries and selling it at a high price in the Nepali market, creating artificial shortages to hike the price of sugar, hoarding sugar, lobbying for protectionism in the form of increasing tariff rates and quota on sugar import, among others. This might also be one of the reasons behind recurrent issues of sugar smuggling and creation of artificial shortage in the country (Bagat, 2010).

Recommendations

The facts and figures pertaining to the sugar economy suggest that both sugarcane farming and sugar production is neither profitable nor productive venture in Nepal. Much of the associated problems are attributable to the methods practiced by the farmers, as well as the industries. To mitigate the same and to improve the status of sugar economy, the government of Nepal has introduced different plans and programs like subsidy, MPP, protection of domestic sugar industries, fertilizer distribution, among others. However, the findings highlight the inefficacies of such programs to attain the desired results. While there is no easy solution to the existing challenges of the sugar economy, it is important for Nepal to explore alternative methods.

To Increase Productivity and Profitability

Much of the problems attributed to low productivity and higher cost of production are related to over utilization of labor and underutilization of irrigation, quality inputs, and modern machineries. It has been identified that use of modern tools and equipment at different stages of sugarcane plantation can enhance both quantity and juice sucrose of sugarcane. However, the findings suggest that the investment in labor is excess by 81.8 percent, while the same is inadequate in inputs and modern machineries.

To increase the productivity of sugarcane, higher capital investment is required. However, given the problems pertaining to access to finance, especially by farmers, making such agricultural investment is challenging. In light of the existing higher interest loans and financial difficulties faced by sugarcane farmers, the government's policy of providing 50 percent capital subsidy in modern agricultural machineries provides little incentive for farmers to switch from traditional to modern agriculture. Moreover, the farmers lack technical knowledge to adopt

to modern practices. Given the problems in sugarcane farming, the sugar industries face problems like lack of sugarcane or high price for low quality sugarcane, which bars them from operating at full capacity or increases their cost of production, making it difficult for them to compete with imported sugar.

Some of the ways through which Nepal can facilitate the farmers in increasing productivity and profitability are as follows:

i. Foreign Direct Investment (FDI) in Agriculture

The most recent amendment to Foreign Investment and Technology Transfer Act (FITTA), 2019 of Nepal removed the agriculture sector from the negative list. However, it was met with backlash and protest from the agriculture entrepreneurs¹⁴, and dairy industry.

As per FITTA, foreign investment in agricultural sector except in large industries relating to poultry, fisheries, beekeeping, fruits, vegetables, oil seeds, pulse seeds, milk industry and other sectors of primary agro-production that produce and export at least 75 percent of their production, was barred in Nepal. Given the fact that Nepalese sugarcane production is unable to meet the domestic demand, sugarcane farmers do not qualify for attaining foreign investment.

Numerous studies around the globe have highlighted the benefits of FDI in agricultural sector. A study amongst 51 developing countries conducted by Djokoto, Agyei-Henaku, and Badu-Prah (2022) identified that FDI in agriculture has a positive effect on welfare as it enhances infrastructure, human capital, and openness to trade. The study also disproved the myth that FDI and the competition it brings enables foreign nationals to acquire land, eventually depriving the farmers of land for cultivation. It further established

¹⁴ Foreign investment in agriculture: Entrepreneurs launch protest, January, 24 2021, Online Khabar <https://english.onlinekhabar.com/foreign-investment-in-agriculture-entrepreneurs-launch-protest.html>

that FDI was more effective in attaining agricultural development than government expenditure on the sector.

Another study conducted by Nyiwul and Koirala (2022) studied 16 developing economies and found a medium to long term positive effect of FDI on value added in agriculture, forestry and fishing. The study highlighted that countries that have high FDI transaction cost or less conducive environment for foreign investors can improve their agricultural sector by making it easier for FDI to enter the country. It also highlighted that host countries benefit through improvement in technology, technical knowledge, and other agricultural practices.

The studies reveal that the Nepalese sugarcane farmers can benefit immensely by enabling agriculture sector to access FDI. From 2015 to 2019, China and India with an investment of USD 2.77 billion and USD 2.72 billion, were the largest providers of FDI in agriculture (Food and Agriculture Organization, 2019). Nepal's proximity with the two biggest investors in the agriculture sector presents a unique opportunity in terms of harnessing the potential to attract more investment.

According to Food and Agriculture Organization (2019), agriculture sector accounted for less than one percent of the total FDI inflows and outflows from 2010 to 2019, and the global flow of FDI in the sector has been declining. Despite the declining trend, the FDI inflows to agriculture in Indonesia (USD 3.1 billion annually) experienced a positive rise since 2015. The rise in FDI in agriculture was attributed to relaxed FDI regulations by Indonesia. For instance, in its palm oil production industry, Indonesia allowed foreign investors to own 95 percent of local company's stake.

ii. Contract Farming

International studies have confirmed that innovative models that links farmers with markets have helped transform agriculture to the benefits of farmers. One such widely accepted model is contract farming which has not only resulted in higher productivity and better-quality produce but also reduced risk and transaction cost of farmers.

Research conducted in Nepal by Kumar et al. (2016) studied the impact of contract farming on yield, cost of production, return, and quality of small holder farmers engaged in lentil production. The study identified that farmers who have participated in contract farming earn higher profits by 81 percent resulting in increased household income of smallholder farmers. Likewise, higher yield, lower cost of production, and quality enhancement were also identified. Thus, contract farming can be an alternative in sugarcane industry to not only provide respite to sugarcane farmers but also to meet the unmet domestic demand of the industry.

While the discussions on contract farming act in Nepal were widely popular, Nepal has yet not been able to issue the same. However, Nepal can promote contract farming and regulate the same through Agri Business Promotion Act, 2017.

iii. Sugarcane By-products

Sugarcane by-products can be an alternative source of income for sugarcane farmers and sugar industries, which can help increase the profitability from sugar and sugarcane. However, according to a study conducted by Neupane, Marasani, and Kohl (2017), Nepal is yet to fully explore these alternative products, as currently, the sugar economy highly depends on sugar production.

According to (MOALD, 2020), sugar industries of Nepal have

the potential to generate sugarcane by-products like molasses and ethanol, paper, energy and electricity, and press mud. Nepal has a potential to produce 464,000 metric tons of sugar, 232,000 metric tonnes of molasses, and 46,000 kilo liters of ethanol, if all sugar industries run at full capacity. The ethanol or rectified spirit can be used as carbon neutral fuel or in alcohol industries. Carbon neutral fuel can be mixed with petroleum, which can not only help address climate change but also can reduce Nepal's dependency on imported fuel to some extent. Numerous countries like Germany, China, India, Canada, Spain, France, and others are giving strong incentive for ethanol production with the motive to reduce dependency on fossil fuels. Numerous countries around the globe also use ethanol fuel for cars. On 10 November 2003, His Majesty's government of Nepal also published a notice which made it mandatory to mix 10 percent ethanol on petroleum product, however it was never implemented.

Another by-product of sugarcane is Bagasse which can be used for energy/electricity production. While about 70 percent of the produced bagasse is used in the production process itself, 30 percent can be used as a by-product. According to MOALD (2020) 4 kg of bagasse can produce one unit electricity. Additionally, with the help of high pressure and temperature-based turbogenerator, one unit of electricity can be generated by merely 2.3 kg of bagasse. Thus, the current sugar industries have a potential to connect 40 MW to 70 MW of electricity to the national transmission line. Currently, Reliance Sugar and Chemical Industries Pvt. Ltd, Indu Shankhar Chini Udhyog Limited, and Everest Sugar and Chemical Industries Limited have license to co-generate electricity along with Nepal Electricity Authority (NEA)¹⁵. Amongst the three, Everest Sugar and Chemical Industries Limited have started co-generating and contributes 3 MW electricity to national transmission line. The bagasse can also be used to produce paper, and the sugar industries in Nepal have been involved in paper production.

15 Extracted from the official website of NEA, <https://www.nea.org.np/>

However, the profit from bagasse paper has been declining and the sector has become less attractive for producers.

Another by-product of sugarcane is press-mud. The sugar industries can produce 3 to 3.5 kg press mud while processing one quintal sugarcane. According to James and Pandian (2016) press mud can be used to produce fertilizers, chemical extractions, animal feed, and cement. Likewise, according to Diaz (2016), sugarcane press muds improve soil productivity and improves crop production. It can also be used as bio-fertilizers to help fields with degraded soil quality due to excessive use of fertilizers to recover.

iv. Sugarcane Import

To help sugar industries, run in full capacity, and invest in sugarcane by-products, it is important for them to access adequate amount of sugarcane. Given the current shortage and higher price of sugarcane, it is prudent for these industries to import sugarcane from neighboring countries like India and Pakistan. It will also introduce competition in the sector, making the farmers upgrade quality and resort to mechanisms that would lower cost of production to sustain.

To Resolve Price-related Problems

Price fixation has been a major problem in sugar economy of Nepal. The problems pertaining to delays and unscientific MPP fixation has brought forth many challenges for sugarcane farmers and the industry. Additionally, while majority farmers do not receive the stipulated MPP, the industries are not satisfied with the price against the quality of sugarcane. Moreover, studies based in Nepal has identified that MPP has insignificant and negative impact on sugarcane yield. One of the reason attributable to negative impact on productivity is lack of competition and incentive to improve production quantity as

well as quality. Moreover, the price of sugarcane is highest in Nepal when compared to other countries. This has adversely impacted the domestic sugar prices.

Additionally, delay in payment of sugarcane by industries has further exacerbated the problems of sugarcane farmers as the farmers are unable to repay loans, purchase agricultural inputs, and finance other basic needs.

Some of the alternatives to address price related problems are:

i. Agriculture Commodity Market

A more sophisticated market mechanism like the commodity market could be a right fit for Nepal. A commodity futures market is a platform through which futures contracts—agreement to buy and sell goods at a specific price in a future date—are bought and sold. The contracts go through an exchange clear house which acts as stock brokers for the commodity market. The contracts help farmers to hedge the risk of price fluctuations as well as payment default. If such a thing could be guaranteed, it would subsequently create an enabling environment for contract farming in Nepal. As a result, farmers' access to other benefits like crop insurance, warehousing facilities and higher credit from formal institutions would expand.

The fundamental benefit of this is that farmers or their partners know beforehand about the future demand and price of sugarcane. In case of low demand price, the farmers will have a choice and a chance to switch to the crops which have higher demand and thus higher return. Moreover, since the future contract provides guarantee on the quantity, quality, and price of sugarcane to the sugar factories, the factories can pre-plan their production in such a way that they can maximize their profits and respect the contract.

Currently, Nepal does have a commodity market but it is in a nascent

stage. Despite sugarcane being classified as a certified product that can be traded in the commodity market, lack of infrastructure, technical human resource, awareness among farmers, and favorable policy environment that allow market mechanisms to work have barred the farmers from benefitting from the commodity market.

ii. Determination of Prices through Market Mechanism

Excessive protection for the farmers can reduce the incentive to farm smart and farm right. Given the same, it would be best if the government refrained from fixing MPP and left the prices to be determined through market mechanism.

For Enhanced Livelihood

i. Switching from Sugarcane to other Crops

It is important for both the sugarcane farmers and the government to realize that there is no easy solution to this problem. Farmers should definitely have an opportunity to live a decent livelihood, however, it cannot always come at the expense of other taxpayers in the form of subsidies or other protection. The farmers, given low yield and profit from sugarcane, can switch to more productive crops in their respective localities, and the government can run educational and awareness programs to facilitate and ensure a smooth transition. Likewise, for farmers who do not wish to switch, ensuring the plantation of the right variety of sugarcane is important.

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