

Economic & Dynamic Analysis of Sugarcane Production in Eastern Plains of Nepal

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Abstract

The area of sugarcane production in the Eastern Plains of Nepal is diminishing each year because of a few factors, including expanding cost of cultivation, lower yield, lower and postpone installment, insect and diseases issues. An examination was led to dissect the efficiency and profitability of sugarcane production in this area, where, an arbitrarily chosen 80 sugarcane farmers from Morang and Sunsari locale were regulated with the survey to gather information somewhere in the range of 2017 and 2018. Consequences of the examination uncovered that farmers were male prevailing (67.50%) with normal landholdings of 1.30 ha. The predominant age bunch in the cultivating network was 51 to 60 years and 58.75% of farmers had an essential level of training. The sugarcane production in the analysis area was beneficial with benefit cost ratio (B/C) 1.38 and 1.34 for principle and ratoon crops, individually. The net gain was NRs. 91369.70 and NRs. 36065.00 for primary and ratoon crops, individually. The coefficient of various conclusions was 0.79, which implies that varieties in the logical variable clarified 79.80% of the variety in the needy variable. Lower profitability, informal cost obsession, and defer installment of the sugarcane by the sugar plants were these serious issues found in the examination region. Work costs comprise half of the complete expense of cultivation, so automation are expected to bring down the expense and increment the benefit. Co-coordination among various partners, including the administration substance, is required for logical valuing and maintainable production of sugarcane.

Key words: Benefit, Cost Ratio, Financial matters, Farm Profitability, Great Plains, Sugarcane Production

Introduction

The Eastern Indo-Genetic Plains is the places of poor and burdened individuals[1]. The Eastern Plains of Nepal lies in the EIGP with 0.25Mha of land which reaches out somewhere in the range of 26°09' and 28°07' scope, and 86°06' and 88°03' longitude with a huge topographical and atmosphere extend[2]. This Eastern Plains of Nepal is described with low rural profitability which influences provincial farmers' salary and the national total national output of the nation[3]. Rice, maize, wheat, potato, sugarcane, oil seeds, jute are the chief harvests developed in this area[4]. Sugarcane is generally developed in marsh conditions in the Eastern Plains area of Nepal through two harvest pivots: principle crop and the ratoon crop[5]. Sugarcane is one of the significant money yields of Nepal[6]. Nepal positions 34th as far as collected zone, and 39th in yield with 0.16% i.e., 1.95 Mt all-inclusive[7]. It has

developed on an area of 71466.00 ha with production 3234711.00 tons and out of which 8954.68 ha region lies in the analysis region with 10.88 % production of sugarcane[8]. The normal efficiency of sugarcane in this district is lower than the national profitability and the worldwide normal[9].

Nepal's commitment on worldwide sugarcane production as far as zone, production and efficiency were declined as of late[10]. Sugarcane production in the Eastern Plains is fit because of its level geography, sandy topsoil soil, sub-tropical climatic conditions, and water accessibility through Koshi waterway. Legislature of Nepal has suggested four high yielding assortments with at any rate 70.45 t ha⁻¹ efficiency in spite of poor reception of motorization, physical work based cultivating, poor administration of ailment and irritation, shortage of value inputs, poor estimating instrument, and deferred installment. High production cost is the significant constraints to the sugarcane cultivation in Nepal. There are 13 sugar processes in Nepal, with 3.11 Mt of yearly pounding limit. In this locale, there are seven sugar plants which pound 70.37% of the total stick squashed in Nepal. Be that as it may, because of absence of sugarcane, those plants are working under limit. Nepalese sugar plants produce around 0.10 Mt of sugar every year, which is not exactly the local interest (0.16 Mt). Nepal needs more sugarcane, which is about 80000.00 t of production value NRs. 11800000.00 to satisfy our national interest however the region under harvest has been diminishing to a great extent as of late mostly because of deficient inspiration to the farmers. Sugarcane profitability in creating nations has been affected by biotic, abiotic, and financial variables. Additionally, there were a progression of fights and tumult for valuing related issues between sugar plants and cultivators. Consequently, this examination was centered on investigating the dynamics and monetary analysis of sugarcane cultivating in the eastern district of Nepal.

Methodology

1. Study Area:

The examination was directed in Morang and Sunsari locale of eastern Nepal. Sugarcane cultivation comprised 2204 ha and 4000 ha in Morang and Sunsari areas, individually. The normal temperature of this locale shifts from 10 to 20 °C in the winter to greatest 35 to 43 °C in the late spring, and normal yearly precipitation is around 1950 mm. The Eastern Sugar Organization is likewise situated in Sunsari area, which is the main outlet for the sugarcane producers in this locale.

2. Testing and Information Assortment Strategies:

Two regions were purposively chosen for this examination as both contribute 69.31% area under sugarcane cultivation in the eastern area. Two-arrange irregular examining procedures were utilized to choose the respondents. Four country districts with sugarcane as predominant harvest were chosen two in each of the regions. Twenty farmers were chosen in every one of the groups from the rundown of sugarcane producers gave by the Eastern Sugar Plant, Sunsari, and Region Agribusiness Advancement Workplaces of Sunsari and Morang locale

and making 80 sugarcane farmer respondents in the examination through and through. A semi-organized poll was controlled to investigate the yield level, input use, financial variables related with sugarcane production. During the study, we visited Eastern Sugar Plant, Barju, Sunsari for a few casual dialogs on various parts of sugarcane preparing issues.

3. Information Examination:

Expressive measurements, including recurrence dispersion, mean, rate, standard deviation, standard mistake were utilized to dissect the information gathered. Farm spending plan was likewise used to decide the financial aspects of sugarcane production in Eastern Plains of Nepal. The capability of money crop was evaluated utilizing the Center Gathering Talk and poll with farmers. The production work was utilized to decide the dynamics influencing sugarcane production in the area.

4. Farm Spending Model:

Farm spending plan is a detailed financial and physical related arrangement required for the activity of farm ventures after some time. The net farm pay gives an unmistakable sign of the degree of profitability of sugarcane production.

5. Benefit and Cost Ratio:

Benefit and cost ratio (B/C) gives a thought regarding the recuperation of cost brought about during the production by the arrival from items. This examination was done in terms of benefits and expenses at a family unit level by utilizing B/C examination. The present estimation of the expenses and benefits of the sugarcane production district was completed.

6. Production Capacity Examination:

Cobb-Douglas production analysis was utilized to survey the asset use efficiency of sugarcane production. It was expected that there exists a direct connection between the yield of sugarcane and different dynamics influencing the yield of sugarcane, for example, set amount, area under cultivation, excrements, and manures, synthetic concoctions, water system and work utilized in the production. The hypothetical various relapse model understudy.

7. Asset Use Efficiency:

The distribution efficiency record of an asset utilized was dictated by the ratio of Negligible Value Result of variable information and the Minor Factor Cost for the information and tried for its uniformity to one. The efficiency of asset utilize was determined. The standard method to inspect such proficiency is to contrast MVP and the Peripheral Value Result of every factor input which was processed by increasing the production coefficient of a given asset with the ratio of geometric mean estimation of yield and info factors. In this way the result of relapse coefficient with the ratio of geometric mean of gross come back to the degree of

utilization the asset. Once more, the relative rate change in Negligible Value Result of every asset required to get ideal asset portion was assessed.

Results

1. Financial Attributes of the Examination Area:

The normal time of sugarcane farmers as family unit head/respondents was about 53.7 years with least 25 years and greatest 88 years. Greater part of the respondents have a place with the age extend 51-60, not very many adolescents were seen as occupied with sugarcane cultivation, i.e., about 8.75% with age under 30. This information is in understanding that rustic youth's interruption in ventures is found in Nepal. The absence of gainful age bunch in sugarcane cultivating shows hazard avoidance in embracing new cultivating methods that at last outcomes in low efficiency of the yield. Lion's share of the respondents was male (67.51%) while rest 32.49% was female among the examination populace (n=80) and also the work cost comprises the greater part of the production cost which demonstrates that sugarcane production is strenuous and work serious. Most of the respondents are with an essential degree of instruction (58.80%) trailed by unskilled (25.00%), optional level (11.20%) and the respondent with tertiary training was about 5.00%. The normal landholdings of sugarcane producer's farmers in the eastern plain locale were 2.50 ha, which was higher than the national normal landholdings 0.82 ha. The greater part (48.80%) of the respondents occupied with sugarcane production had a normal farm size of 1 to 2 ha, trailed by 2 to 4 ha with (38.70%). Additionally, those with 4 to 6 ha landholdings comprised 10.00% and in excess of 6 ha was just 2.50%. The core family comprises 83.8% of the absolute reviewed populace and 16.25% were in a joint family. The respondents having a place with the joint family hold in excess of 4 ha landholdings. The greater part of the respondents (76.20%) took an interest in various preparing programs on sugarcane production, while rests (23.80%) of the respondents were not accepting any sugarcane preparing program.

2. Cost and Benefits of Sugarcane Production:

The expense and benefits related were evaluated in two editing schedules of two successive seasons. The yearly gauges of the consumptions with various sub-exercises on sugarcane production and the benefits were condensed. Significant costs in principle crop were work cost (50.72%), seed materials/setts (14.81%), excrements and manures (14.03%), land readiness/mechanical (9.84%), synthetic substances (7.45%) and water system charge (3.15%) which is appeared with the absolute expense of about NRs. 238912.32 or \$2133.15 USD though in ratoon crop the harvest foundation cost was about half than that of the primary yield. Results demonstrated that nine farmers out of 80 (11.25%) were not utilizing water system, and 37 farmers out of 80 (46.25%) were not utilizing any herbicides in their farm, 12 out of 80 farmers (15.00%) were not utilizing any smaller scale supplements in their sugarcane farm. Additionally, the utilization of bug sprays and fungicides was not normal.

Nine farmers out of 80 (11.25%) were not performing earthling up in the sugarcane, and eight farmers out of 80 (10.00%) were utilizing propping or tie-up the sticks in the field.

3. Benefits Related with Sugarcane Production:

In spite of the fact that sugarcane has a few benefits like stick, green foliage, feed, material and covering materials, the sugarcane farmers in Eastern Plains were focused on the stick for fiscal returns. The interest for molasses and bagasse is exceptionally low, so just sugar is taken as the principle item. The yield was 62.20 t ha⁻¹ in the fundamental harvest while 26.50 t ha⁻¹ in the ratoon crop. The value got by the farmers was NRs. 5310.00 t⁻¹ crisp stick. The gross pay was NRs. 330282.00 from fundamental season yield and NRs. 140714.00 from ratoon crop with B/C 1.38 and 1.34 individually. The total compensation per hectare was NRs. 91369.71 from principle season harvest and NRs. 36065.00 from the ratoon crop. The recuperation pace of sugarcane was 9.02% for sugar, 4.00% for bagasse, and 4.50% for molasses. The cost of sugar kg⁻¹, bagasse kg⁻¹ and molasses L⁻¹ were NRs. 71.00, 1.00, and 2.00, individually.

4. Cost and Return Examination of Sugarcane Production:

The expense and return examination of sugarcane production in the Eastern Plains of Nepal was condensed. Results show that the absolute variable expense represented 97.15% and FC represents 2.85%. Dominant part of the sugarcane farmers have their properties, the land lease per hectare NRs. 7000.00 was taken as a normal lease of the land in the examination area. Out of the variable cost work charge especially on channel arrangement and set planting, weeding, earthling and hoeing transferring and emptying to move truck accounts about portion of the total expense of cultivation. Greater part of the farmer's in the analysis region are found to get the advance from nearby level, cooperatives, and because of long restitution period, postpone installment by sugar plants raise farmer hell in reimbursing their credit on schedule. Work comprised the significant contributions to sugarcane cultivation, so sugarcane production is both work and capital serious. Planting materials/sett and composts and manures account one-fourth of the absolute expense of cultivation. In spite of the fact that, the B/C announced by MOAD was higher than the watched ratio; eastern locale yields higher B: C when contrasted with the remainder of the nation, for instance, 1.17 for Nepal region and 1.78 for Bara region. Our outcomes indicated that sugarcane production is under productive in the analysis zone.

5. Production Analysis:

The production work was chosen as it concurs with the earlier desire that sets, land arrangement, excrements and manures, synthetic compounds, water system and work costs affect sugarcane production in the locale, which is introduced. The coefficient of different judgments is a rundown measure which educates about the wellness of the date in the relapse line. The outcomes show that the informative factors in the model have clarified 79.70% of the varieties in net return. The estimation of balanced R² was 0.79, showing that in the wake

of considering the level of opportunity 79.80% of the variety in the reliant variable clarified by the illustrative factors remembered for the model. The F esteem for generally speaking centrality was 584.70, and it was exceptionally critical inferring that all the informative factors remembered for the model are significant for clarifying the variety of the reliant factors in Sugarcane production in the locale. We found that excrements and composts, water system and work charge have a negative impact in net pay which implies an expansion in the excrements and composts, water system and work will diminish in net salary by 0.19%, 0.01%, and 0.15% individually. What's more, comparably, an expansion in the expense of setts, land planning, synthetic compounds would impact net pay i.e., 0.08%, 0.19%, and 0.08% individually.

The geometric mean, coefficient, assessed MVP of various data sources utilized in sugarcane production is exhibited. The distribution proficiency list of land readiness and various synthetics were certain, demonstrated theirs under use. The portion proficiency list on sett materials, composts and manures, water system charge, and work cost showed over use of the contributions to sugarcane production. Sett materials were emphatically connected with the sugarcane production though excrements and manures, water system charge and work cost were adversely related with the production subsequently lesser benefit could be acquired by expanding on these information sources. The land arrangement and utilization of synthetics ought to require to increment by 47.09% and 14.74% individually while cost on sett materials, excrements and composts, water system and work ought to be diminished by 72.22%, 173.66%, 410.58% and 324.4% separately to ideal allotment of assets utilized in sugarcane production in the district. The degree of alterations for the utilization of various contributions to sugarcane production gives a reasonable thought on supportable administration of the rare asset in boosting crop production.

6. Difficulties to Sugarcane Producers:

In spite of the fact that, sugarcane crop is a significant money yield of Nepal plague with numerous issues: low efficiency of the developed assortments, higher production cost, yearly variance of the production, poor evaluating component. Key source overview and FGD in five distinct areas in the analysis zone distinguished these issues to the sugarcane producers. Our outcomes show that the region under sugarcane crop has been declined in these years because of lesser benefit as envisioned. The significant imperatives to sugarcane farmers in the analysis region were recognized and positioned arranged by need. Administration of Nepal is endeavoring endeavors on the modernization of agribusiness, yet sugarcane investigate furthermore, advancement is giving lesser consideration because of which the improvement of good and keen agronomic administration rehearses was missing because of which farmers were picking the customary practices. The absence of innovative work support on sugarcane and absence of specialized HR chipping away at sugarcane extend the yield hole between explore station and farmers' field in Nepal.

Conclusion

Administration of Nepal exertion is to expand sugarcane production, yet the stockpile hole has not satisfied at this point. The examination affirms that sugarcane production in the plain district is sensibly a beneficial endeavor with a B/C of 1.38 (main crop) and 1.34 (ratoon crop) for every unit of speculation, in spite of the fact that its efficiency on farmer's field is exceptionally low when contrasted with the tested yield. The reliance on manual works expands the production cost of sugarcane in Nepal. Half of the production costs were utilized in labor costs in various activities so bringing down these costs by mechanical methods is the need of time to make sugarcane production business increasingly manageable. Serious issues incorporate lower efficiency, postponed installment, informal value obsession, which occupies farmers from dispensing more zone for sugarcane crop. Cost obsession dependent on the recuperation rate will be the feasible choice over winning weight-based framework so sugar factory will look for gainful methods to expand the recuperation percent and farmers will likewise look for the great administration practices to build the efficiency of the farm alongside increase in the profitability. Empowering a domain combined with plans and arrangements in the benefit potential regions for advancing automation, lessening work drudgery, giving appropriation on quality and convenient stock of sources of info, legitimate and logical harvest the board information and aptitudes, logical valuing system, inspiration to youthful ages will have vital extension in building up the success win circumstance of the farmers and sugar plants. The attention on R&D in sugarcane production will build the profitability of the harvest and make the sugarcane-based agro-endeavors progressively gainful and maintainable in Eastern Plains of Nepal.

References

1. G. L. R. Vaccaro et al., "Interrelationship among actors in ethanol production chain as a competitive and sustainable factor: The case of associative production and family-farming in southern Brazil," *J. Clean. Prod.*, 2018.
2. C. A. Cardona, J. A. Quintero, and I. C. Paz, "Production of bioethanol from sugarcane bagasse: Status and perspectives," *Bioresour. Technol.*, 2010.
3. A. M. Murugan and A. J. A. Ranjit Singh, "Sugarcane," in *Valorization of Food Processing By-Products*, 2012.
4. M. O. S. Dias et al., "Integrated versus stand-alone second production ethanol production from sugarcane bagasse and trash," *Bioresour. Technol.*, 2012.
5. R. de O. Bordonal, J. L. N. Carvalho, R. Lal, E. B. de Figueiredo, B. G. de Oliveira, and N. La Scala, "Sustainability of sugarcane production in Brazil. A review," *Agronomy for Sustainable Cultivation*. 2018.
6. C. A. Christofolletti, J. P. Escher, J. E. Correia, J. F. U. Marinho, and C. S. Fontanetti, "Sugarcane vinasse: Environmental implications of its use," *Waste Manag.*, 2013.
7. B. S. Moraes, M. Zaiat, and A. Bonomi, "Anaerobic digestion of vinasse from sugarcane ethanol production in Brazil: Challenges and perspectives," *Renewable and Sustainable Energy Reviews*. 2015.
8. R. Sindhu, E. Gnansounou, P. Binod, and A. Pandey, "Bioconversion of sugarcane crop residue for value added products – An overview," *Renew. Energy*, 2016.

9. A. Cheavegatti-Gianotto et al., "Sugarcane (*Saccharum X officinarum*): A Reference Study for the Regulation of Genetically Modified Cultivars in Brazil," *Tropical Plant Biology*. 2011.
10. K. Hofsetz and M. A. Silva, "Brazilian sugarcane bagasse: Energy and non-energy consumption," *Biomass and Bioenergy*, 2012.