

Impact of Subsidies on Ethanol Production in India

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Abstract

In the year 2012, India's government subsidies to promote biofuels seem to be a solution to multiple objectives. Adoption of ethanol production synthesized the following reasons encountered in the global context: The growth experienced in the ethanol production & blending of fuels by the Brazilian sugar industry, stabilization in demand & supply position in the sugar industry, reduction in Forex payment burden. The Indian Sugar Mills Association suggested the production & sale of ethanol is much more profitable than molasses as a primary by-product of sugar. The paper aims to analyze the impact of subsidies on ethanol production by sugar mills in India. Outline the subsidies provided by the government of India to induce the production of ethanol. The result suggests that production is Insignificant and weakly associated with the subsidies granted. Subsidies play a vital role in motivating different stakeholders to adopt in the cultivation, generation, and blending of biofuels. Improve and adapt the policy to meet up the blending targets set by the government. Assisting soft loans, single-window query systems need to be made adopted to a different generation of biofuels.

Keywords: Subsidies, Sugar mills, Biofuels, Ethanol.

I. Introduction

India is experiencing swift growth in the transportation industry. meet the fuel demand, along with an eye on combating the green house gas (GHG) emission levels. The government of India is focusing on taking an edge over carbon management through environmental and sustainability goals. Bio energy is becoming a more relevant alternative source of energy and an ambitious programme has been initiated to switch to a conventional source of energy from fossil fuels (Raju, S. S., et.al.,2012). Asia contributes 65% of the global share of bio energy supply to the American and European regions (Statistics, W. G. B. 2019). In 2001, the country began a five percent ethanol blending pilot program, and in 2003, formulated a National Biodiesel Mission (NBM) with a goal of 20 percent biodiesel blends by 2011–2012. The sustainability of many first-generation biofuels has called attention to the potential of second-generation or advanced biofuels (MoPNG, 2010).

The notable features behind the adoption of ethanol production are: the growth experienced in the ethanol production & blending of fuels by the Brazilian sugar industry, stabilization in demand & supply position in sugar industry and a reduction in the Forex payment burden. The Indian Sugar Mills Association suggested the production & sale of ethanol is much more profitable than molasses as a primary by product of sugar.

To demotivate the dependence on fossil fuels is done by amending subsidy policies in the frontline over decades. In order to ensure accessibility to clean energy in the industry, The assurance is provided through social support and economic development (International Energy Agency, 2020). The National biofuel policy of the Government of India aims at providing financial & other incentives in order to encourage adoption of clean energy fuels.

Subsidies are provided at different points in the supply chain of biofuels. Supply of feedstocks right from the production and up to consumption of biofuels (Koplow, D. 2006). The paper aims to analyse the impact of subsidies on ethanol production by sugar mills in India. Outline the subsidies provided by the government of India to induce the production of ethanol.

II. Literature Review

(Paul B. Thompson, 2012) the study outlines Plant-based transportation fuels were the focus of extended criticism in the press, especially during 2008 when a portion of the blame for a spike in global food prices was associated with growth of the United States' corn ethanol industry. Benefits will materialize in the absence of concerted programs to deliberately select biofuel development strategies that are targeted to strengthen food security for poor and small-holding producers. An adequate agricultural ethics for biofuels will require commitment by both private and public sector biofuel developers to ensure that potentially positive attributes of biofuel development are realized.

(Kimberly Elliott, 2015) the study exhibits the reviews the evolution of biofuel policies in the United States, because it is by far the largest market for biofuels, and the European Union, because the use of oilseed crops for biodiesel, including palm oil, poses particular risks for tropical forests and for climate change. This paper reviews the evolution of biofuel policies in the United States, because it is by far the largest market for biofuels, and the European Union, because the use of oilseed crops for biodiesel, including palm oil, poses particular risks for tropical forests and for climate change.

(Stephen Devadoss and Jude Bayham, 2010) the study outlines The U.S. crop subsidies provide incentives for farmers to expand feedstock production, which benefits the biofuel producers by lowering input costs. This study develops a general equilibrium model to analyze the effects of a reduction in the U.S. crop subsidy on biofuel industries and social welfare. The impacts of feedstock policies on the biofuel market are marginal. In contrast, the biofuel mandate has a larger impact and counteracts the effects of the crop subsidy reduction. The mandate increases the demand for feedstock and causes not only grain ethanol, but

also cellulosic ethanol production to rise. The mandate exacerbates the distortion, and government spending increases significantly, leading to greater welfare loss.

III. Hypothesis of the study

H1: There is direct effect on production of ethanol and the volume of subsidies granted to sugar mills in India.

IV. Methodology

The data is collected through secondary sources. The data collected primarily focus on Subsidy amount disbursed during the period. In respect to ethanol production the ethanol produced by the sugar distillers majorly concentrated on molasses based production. The annual report of the Ministry of food, consumer affairs & public distribution, Indian Sugar Mills Association [1], Department of Biofuels, Ministry of New and Renewable Energy. A period of 8 years, i.e. from the year 2012 to 2019 is considered for analysis. To evaluate the impact of subsidies on production, the dependence between the factors was measured through correlation analysis. For the calculation, we used the Pearson correlation coefficient that determines the direction and rate of statistical dependence force of two numeric variables. The Pearson correlation coefficient is in the range of -1 to 1. one sample t-test to test the hypothesis.

[1] Includes estimated figures by the Indian Sugar Mills Association

V. Analysis and Interpretation

According to the study, subsidies are classified based on feedstock, production & marketing of biofuels (shilong et.al). These subsidies on ethanol production by sugar industries started by the government in the year 2012, despite the biofuel policy initiated by the government of India in the year 2008.

5.1 The following are the vital subsidies available to sugar mills on ethanol production in India:

Scheme for Extending Financial Assistance to Sugar Mills For Enhancement and Augmentation of Ethanol Production Capacity

In the year 2018, the government approved a soft loan scheme to enhance ethanol production through 1st generation grains. A major focus is on ethanol production by sugar mills and stand-alone distillers in India. Increase the existing ethanol production capacity or build up a new ethanol production unit. The assistance provided under the scheme is interest subvention @ 6% per annum or 50% interest charged by eligible financial institutions, whichever is lower, is borne by the central government for 5 years.

New Scheme for Extending Financial Assistance to Sugar Mills For Enhancement and Augmentation of Ethanol Production Capacity

In the month of March 2019, the Cabinet Committee on Economic Affairs of the Government of India provided a soft loan to sugar mills/distillers to motivate ethanol production under the Ethanol Blending Programme (EBP). Rs.2790 crore of funds are allotted to meet the interest subvention through this scheme. In addition to it amount of extending Rs.12900 crore indicative loans by banks.

Export Policy Subsidy

The government approved a subsidy of Rs.3500 crore to improve the consumption of sugar feed stock in ethanol production to supply the fuel. The scheme helps the sugar mills to handle the operating margin in mark with the international sugar prices. The subsidised loans are being given to sugar mills for capacity expansion in order to achieve the ethanol production of over 360 crore litres and meet the ethanol blending with petrol target of 10 per cent by 2022 and 20 per cent by 2030.

5.2 Impact of subsidies on ethanol production by sugar mills in India

As part of testing the hypothesis set, the subsidies granted to sugar mills and Ethanol supplied during the these years the data is drawn in (Table 1).

Table 1.

Data of Subsidies and Ethanol produced by sugar mills in India

Year	Subsidies on ethanol production (Rs in Crore)	Ethanol Production(in crore litres)
2012-13	43.04	30.5
2013-14	78.04	38
2014-15	75	67.4
2015-16	16.86	111
2016-17	0	66.5
2017-18	35.35	120
2018-19	81.87	180
2019-20	60	142.26
2020-21	47.06	130

(Source: Annual reports of DFAD, ISMA)

Year	Ethanol supplied(cr litres)	% of difference in production
2012-13	30.5	
2013-14	38	21.90%
2014-15	67.4	55.60%
2015-16	111	48.90%
2016-17	66.5	-50%
2017-18	120	57.40%
2018-19	180	40%
2019-20	142.26	-23%
2020-21	130	-9%

Table 2: Percentage Change of Ethanol Production

The (Table 2) depicts the percentage change in ethanol production from year 2012 to 2020. The degree of change represents the effect of subsidies on production. In the year the 2013 there was 21% change in production, with increase in the amount of subsidies the production increased to 55% in the year 2014. And in the year 2019 & 2020 there is a negative difference in production of 23% & 9% outlining the reduction in subsidies curtailed the production of ethanol and diversification of production to other by-products.

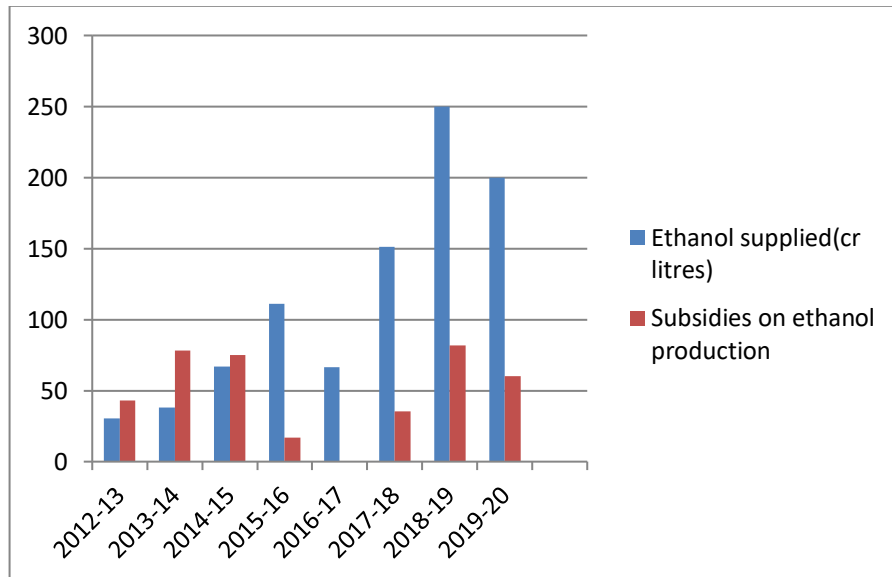


Figure 1. Subsidies and ethanol supplied in each year.

For each of the year from 2012-2021, (Fig 1) depicts the ethanol production increased along with subsidies. In year 2016 no subsidy is been granted on ethanol production which led to decrease in the ethanol production from 111 litres to 66.51 litres. And from the year 2017 subsidies of Rs.35.35 crore was granted which led to increase in the production to 120 litres.

The production of ethanol is mainly dependent on the support provided by the government.

According to (Berenson M.L. and Levine D.M. 1996) Pearson correlation coefficient indicates the direction of a linear relationship as follows:

$R > 1$ there is a direct linear relationship between variables;

$R < 1$ there is a indirect linear relationship between variables;

$R = 0$ variables are not linearly dependent

The effect of subsidies is expressed as a weak correlated with ethanol production. The statistical measure (r) 0.158 is shows weak strength between the two variables. The analysis of the relationship is considered Insignificant according to the analysis. The result suggests that production is non-significant & moderately associated with the subsidies granted. An incentive is a key drive in improving biofuel production. Diversifying the utilization of by-products to ethanol production can be resolved through multi-pronged strategy of allocating subsidies and incentives.

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
Ethanolproduction	9	98.4067	50.55111	16.85037

One-Sample Test

	Test Value = 50					
	t	Df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Ethanolproduction	2.873	8	.021	48.40667	9.5496	87.2637

The null hypothesis is rejected as the p value under the study is 0.021 which less than 5%. Indicating to reject the null hypothesis and accept alternate hypothesis. Other statistically data i.e. confidence interval level depicts the upper value is higher than lower value concluding the statistically non-significant relationship between the variables.

VI. Conclusion

The novelty and contribution of this paper is that it assesses the impact of subsidies provided on ethanol production. The study conducted to measure the impact of the specific subsidy provided to production of ethanol to achieve the aims and objectives that were identified under Ethanol Blending Programme. The results revealed that government subsidies have a more positive impact on Ethanol production in sugar industries.

Sugar mills in India face huge inconsistent supply & demand. Other economic hurdles such as labour, opportunity cost, financial crisis etc. Brings down the prominence of producing ethanol. Subsidies help to fortify the supply by offsetting production cost & losses incurred by the Sugar industries. The outcome depends upon the policy adopted for implementation in the country. A regular, progressive & Updation in the scheme will provide a constructive path reaching the blending targets. Directing the subsidies and incentives in the supply chain helps to improve clean environment and less emission. Further scope of research can be done on the net effect of subsidies on biofuel production with the inclusion of both direct and indirect subsidies provided by the government.

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Abbreviations

DFAD: Department Of Food, Agriculture & Public Distribution

ISMA: Indian Sugar Mills Association

EBP: Ethanol Blending Programme