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# Trade Potential of Indian Soybean (Seeds, Oil & Meal) in the International Market

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**Abstract :**

The recent trends in the Indian as well as world market reveal that soybean has been rapidly replacing cotton as the crop of choice. Soybean is been considered as a very important source of protein and income, especially in developing economies such as India, Argentina, Brazil and China.

In this paper, an attempt has been made to evaluate the trade potential of Indian soybean in the international market. (The trade analysis done in this paper is based on the net exports (trade gaps) between 2012-17 and throws light on the changing trend in India's BoP with respect to soybean trade.) The Differences in the yield and the harvest periods between potential trade partners of India such as China, USA, Argentina and Brazil has been considered. A SWOT analysis is done on the basis of cost of cultivation of soybean, domestic and international price as well as yield per hectare.

The empirical analysis is done on the basis of RCA (Revealed Comparative Advantage) and BRCA (Bilateral Revealed Comparative Advantage) of India with respect to China, USA, Argentina and Brazil.

The overall reading is that Indian soybean needs to improve its yield per acre to cater to the needs of the domestic market and India's Soy oil import is alarmingly high. This needs to be addressed by adopting a right policy mix. Also, Indian government needs to focus on better and efficient irrigation facilities and technologies for the farmers.

Keywords: Soybean yield, MSP, Cost of Cultivation, International and Domestic price

## 1.1 Introduction

In India agriculture is mostly dependant on the monsoons for irrigation. This dependence on natural irrigation has not been favoring the crops since the rainfall is inconsistent in many significant cultivated areas of India. Though this is a problem for mostly all the crops in general, for kharif crops which are sown and grown mostly during the monsoon season, this setback comes with the burden of assured crop failure. To know what is the scenario the kharif farming and farmers have to face in our country, studies have to be made from the ground to the policy making levels.

Sawant (2016) states that during 2015-18 in the districts of Amravati, Nanded and Yawatmal in Maharashtra stands proof that cotton farmers have mass shifted to cultivating soybean in Maharashtra which is a major cotton growing state of India in the recent years. One of the major reasons for this is the relatively lesser costs as well as lower risks in growing soybean compared to cotton.

Soybean owes its significance from other factors as well. Since soybean is adaptable to mostly all the soil types and climates, the risks associated with cultivation are relatively lesser. The demand for soybean is expected to increase further with rise in incomes since it is a highly nutrient rich crop. Moreover it is the 50% constitution of proteins in the bean which makes it a 'miracle crop'. The increased popularity of soybean among farmers in the past 10

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years is not an isolated trend in Maharashtra; it could be seen as a global scenario change.

Considering the world production of 10 oilseeds over a period of 10 years from 1997/98 to 2017/18, the share of soybean production has increased by 5% (from 55.4% to 60.4%). This increase in share of soybean production in the global oilseed scenario is predominantly marked by a 4% reduction in the production of cottonseed (from 12.1% to 7.8%). As per the Oil World Annual Report 2018, the dominance of soybeans continued to rise in recent years, due to insufficient supplies of other oilseeds. Significant acreage expansion occurred in the areas of Brazil and North America. The importance of soybeans accelerated during the past 3 seasons, mainly due to the declining trend in the world production of rapeseed and cottonseed

**1.2 Objectives:**

- To understand the recent trend among the Indian cotton farmers
- To find out the lacunae in soybean production
- To check the differences in the soybean MSP, Domestic Price and International Price and its impact on Export and Import
- To check the trade potential of India vis a vis USA, Argentina, Brazil and China (RCA and BRCA)

**1.3 Data and Methodology**

The primary data has been collected through the interview method of around 100 farmers in various districts of Maharashtra viz. Amaravati, Nanded and Yawatmal. The secondary data sources are CACP, WTO, WITS, SOPA and OEC.

For empirical analysis, RCA and BRCA are calculated to check export efficiencies of India vis a vis USA, Brazil, Argentina and China.

**1.4 Literature Review**

Kajale and Shroff, (2013), in their research paper 'Problems and Prospects of Soybean Cultivation in Maharashtra' have talked about the problems that farmers of soybean in Maharashtra face. The paper throws light on the issues of soybean agriculture in Maharashtra such as the declining yield. They have found that the area under cultivation is increasing at a faster rate than the production. It is revealed in the study that only 44% of the area is under irrigation. Responses of the farmers show that more than 50 percent of the farmers do not know if they are using recommended doses of fertilizers and whether the price received by them is greater than or lower than the MSP declared for soybean. It is reported that more than 60 percent of the farmers faced problems relating to marketing as well.

Malukani, (2016) in his article on 'Export Potential of Soyabean From India: A Trend Analysis' has talked about the current scenario of soybean farming and exports in India and has tried to forecast the future trends in soybean exports. He has found out that there is a gap in the documentation of soybean data in India and has suggested to make changes in this direction. Suggestions to improve marketing and advertising for Indian soybean are also made by the author.

D.N. Pathak (Executive Director, Soybean Processors Association of India), in his report on 'Soybean Productivity in India Issues and Solutions', has mentioned about the features of the soybean production in India and major challenges faced by the sector. He has proposed the eight-point program to improve productivity. The challenge of inadequate seed supply and policy related issues regarding this are fetched.

The Times of India (dated June 26, 2018), article on 'China to cut import tariffs on soybean, other products from India, 4 other nations' talks about China eliminating tariffs on import products like chemicals, agricultural products, medical products from India, South Korea, Laos, Bangladesh and Sri Lanka as the US-China trade war is looming. All import products from all the five countries are expected to adapt a tariff

rate of the second amendment of the Asia Pacific Trade Agreement, according to the State Council.

Mint (dated March 13, 2018) in the article, 'India soybean imports at record as domestic supply tightens: Report' talks about the record high imports of soybean to India last year and expectations of the imports going even further due to a fall in the production last year. It is reported that the traders have signed deals to sell up to 100,000 tonnes of soybeans to India since December, shipping mainly from the African countries of Ethiopia and Benin with which the South Asian nation has concessional import duty agreements.

### 1.5 Empirical Analysis (National Level)

It has been observed that many Indian farmers are shifting from cotton cultivation to soybean due to its cheaper costs. To validate this, the costs incurred on both the crops in the major soybean producing states are given in Table 1.

#### 1.5.1 Comparative Analysis between the costs of Soybean and cotton

**Table 1: Costs of soybean cultivation in the major producing states 2017-18**

| States | A2 | A2+FL | C2 | share in production |
|---|---|---|---|---|
| Madhya Pradesh | 1413 | 1727 | 2565 | 58 |
| Maharashtra | 2450 | 2753 | 3495 | 32 |
| Rajasthan | 1811 | 2353 | 3119 | 10 |
| All India | 1787 | 2121 | 2921 | |
| **Costs of cotton cultivation in the major producing states 2017-18** | | | | |
| States | A2 | A2+FL | C2 | share in production |
| Madhya Pradesh | 1891 | 2625 | 3801 | 5 |
| Maharashtra | 3369 | 3982 | 5015 | 23 |
| Rajasthan | 1316 | 2457 | 3440 | 4 |
| All India average | 2622 | 3276 | 4376 | |

Source:CACP

From Table 1, it is evident that the cost of soybean is much less compared to cotton in all three major soybean producing states in India. Let's look at the $C_2$[1] costs of both the crops in Maharashtra. As juxtaposed with the cost of 5015 Rs/qtl for cultivating cotton, the cost for soybean is lesser by more than 1500 Rs/qtl, which is 3495. This stark difference in the costs fetched an opportunity to the farmers in Maharashtra to do farming at a lower cost, and therefore the exodus of farmers from cotton to soybean Agriculture in Maharashtra.

Table 2 shows the MSP (Minimum Support Price) given to the farmers of soybean and cotton during the period of 2013-17.

#### 1.5.2 Difference in Cost of Cultivation and MSP

**Table 2: MSPs and Domestic Prices of Soybean and Cotton (2012-17) (In INR)**

| MSP | | | Domestic Price | | |
|---|---|---|---|---|---|
| Year | Soybean | Cotton | Year | Soybean | Cotton |
| 2013 | 2240 | 3600 | 2013 | 3386 | 4765 |
| 2014 | 2560 | 3700 | 2014 | 3551 | 4796 |
| 2015 | 2560 | 3750 | 2015 | 3235 | 4150 |
| 2016 | 2600 | 3800 | 2016 | 3456 | 4788 |
| 2017 | 2775 | 3860-4020 | 2017 | 2888 | 4495 |

Source:CACP

From Table 2, it is clearly seen that soybean production has a better chance of earning since the cost of cultivation ($C_2$) is much lesser than the MSP and the domestic prices. On the contrary, cotton production has higher Costs of Production ($C_2$) in comparison with MSP, domestic and international prices. This is another reason why a bulk of the cotton producers are considering soybean to be the next best option. At this juncture, the government of India should understand the scope of soybean as a high return yielding produce for the farmers as well as a rich source of proteins for the growing population.

#### 1.5.3 State wise Yield Gap Analysis (Maharashtra, Madhya Pradesh, Rajasthan)

As farming tendencies are inclining towards soybean crop and the merits attributed to soybean favor this movement, more attention needs to be given to the area where the new trends are pointing. As the farmers shift, expecting to incur lower costs and gain larger returns, a deep probe is required to understand if the farmers actually are shifting to a safer haven. This paper tries to explore the major issues faced by the soybean farming sector in India and also to discover

[1]includes all actual expenses in cash and kind incurred in production by actual owner + rent paid for leased land + imputed value of family labour + interest on the value of owned capital assets (excluding land) + rental value of owned land (net of land revenues)

opportunities that could be tapped by our country for expanding its trade potential.

India's biggest advantage concerning soybean production is its position in global production. India bags the fifth position in the global ranking of production of soybean. Albeit being a top producing country, India has a share in the global soybean production of around 3.3%. This represents a relief for India in the international soybean market concerned with the number of competitors, but the real problem is severe.

The greatest setback that the soybean agriculture in India faces is the increasing yield gap. A huge gap between the potential and state average yield is a matter of grave concern for soybean production in the country. While the potential yield for a hectare is 17 quintals, the state average yield is only 9.5 quintals per hectare. The average yield gap for whole of the country is 44.1%. This vast gap is primarily because of biological, socio-economic and environmental reasons like degradation of soil through excess use of chemicals. Though India owns humongous figures on production and large amounts of area are utilized, the yields obtained are not commensurable. India stands fifth in the global production but is only at the 82nd with the evaluation of the yields gained.

The Commission for Agricultural Costs and Prices has measured three types of yields to calculate the two yield gaps - A and B. The three types of yields are: (I) Potential yields - yields achieved under Front Line Demonstration (FLD), where best scientific and management practices are followed, (ii) realized farm yield of improved technology under farmer's practices and (iii) state average yields.

From this statistic, the two yield gaps are calculated; Yield Gap A and Yield Gap B. Yield Gap A is the difference between the realized yields and the state average yields. While Yield Gap B requires the difference between FLD i.e., potential yields and the state average yields.

In 2016-17, there was a vast gap between the potential and state average yields (Yield gap B)in the states of Karnataka (64.6) and Maharashtra (60.8). There were large interstate variations in Yield gap A. while the gaps in Karnataka and Maharashtra were as high as 58.1 and 54.1 respectively. MP and Rajasthan had narrower gaps as 6.5% and 5.4% respectively.

Table 3 shows the yield gaps for the soybean producing states - MP, Maharashtra, Rajasthan and

**Table 3: Estimated Yield gaps of the major soybean producing states in India 2016-17**

| | Mah | Raj | MP | India wtd avg |
|---|---|---|---|---|
| Potential yield | 20.6 | 15.1 | 14.9 | 17 |
| Realized yield | 17.6 | 10.2 | 11.4 | 13.5 |
| State average yield | 8.1 | 9.7 | 10.6 | 9.5 |

Source:CACP

The Table 3 draws attention to the enormous gap between the potential and state average yields for Karnataka and Maharashtra and this has pushed up the national weighted average of yield gap to around 44%.

### 1.5.4 Estimate of Potential Production of Soybean

Table 4 shows the estimated quantities of additional production of soybean, groundnut and sunflower when 25%, 50%, 75% and 100% of Yield Gaps (A and B) are bridged.

**Table 4: Likely Impact of Reduction in Yield Gaps on Total Production**

| | Yield gap A | | | | Yield Gap B | | | |
|---|---|---|---|---|---|---|---|---|
| | 25% | 50% | 75% | 100% | 25% | 50% | 75% | 100% |
| Soybean | 1127 | 2253 | 3380 | 4506 | 2112 | 4224 | 6336 | 8448 |
| Groundnut | 274 | 548 | 822 | 1097 | 649 | 1298 | 1948 | 2597 |
| Sunflower | 133 | 266 | 399 | 532 | 171 | 342 | 513 | 648 |
| Total | 1534 | 3067 | 4601 | 6135 | 2932 | 5864 | 8797 | 11729 |

Source:CACP

Drawing attention to the Table 4, it is understood that soybean, among the other oilseeds, possesses maximum potential to grow and expand its production if the yield gaps reduced. It is vital to observe that if at least 25% of the yield gap B is bridged, an increase of about 2112 metric tonnes can be added to the total production, which is 23% of the current production, a nearly proportional increase.

Another comparison can be drawn on an international

plane. It is assumed that India, Brazil and Argentina being the countries with similar income levels as India would be at a proximate parity in the use of technology and the productivity of these countries is attainable for India in the long term. The productivity of India, Argentina and Brazil are 0.81, 2.82 and 3.02 on an average during 2012-17, respectively. If India could raise its productivity to 2.8 or further 3.02 on the area of 11,320 (average harvested area during 2012-17) kept constant, the yields could potentially rise from the current 9180 metric tonnes to the estimated figures of 31922.4 and 34186.4 respectively.

Here are the productivities (yield per hectare) of the top soybean producing countries

| Table 5: Yield(T/ha) of the Top Global Producers | | | | |
|---|---|---|---|---|
| USA | 3.3 | 3.49 | 3.23 | 3.12 |
| Brazil | 3.34 | 3.36 | 2.87 | 3.02 |
| Argentina | 2.23 | 3.05 | 2.89 | 2.82 |
| China, PR | 2.05 | 1.72 | 1.98 | 1.83 |
| India | 0.78 | 0.91 | 0.61 | 0.81 |

Source: Oil World Annual, 2018

### 1.5.5 CAGR in various states

The Compound Annual Growth Rate (CAGR) of soybean has drastically fallen from 3.32 to -3.2 over a period from 200 to 2018. In the duration of 2001-02 to 2010-11, MP, Chhattisgarh and Rajasthan had CAGR 5.3, 5.1, 3.0 respectively. In 2011-18, while only MP fell above the national average (2.5), major producing states such as Chhattisgarh (-5.3), Rajasthan (-5.8), Gujarat (-8.0) and Maharashtra (-8.0) were all below the average. Lack of seeds replacement rates and shortage of protective irrigation are two major reasons for the stunted productivity in this sector.

| Table 6: Compound Annual Growth Rate of soybean over the past two decades | | | | | | |
|---|---|---|---|---|---|---|
| | 2001-02 to 2010-11 | | | 2011-12 to 2017-18 | | |
| | CAGR | >National avg | <National avg | CAGR | >National avg | <National avg |
| Soybean | 3.32 | MP 5.3<br>CG 5.0<br>RAJ 4.1 | GUJ -0.3<br>MH -1.9 | -3.2 | MP 2.5 | CG -5.3<br>RAJ -5.8<br>GUJ -8.0<br>MH -8.0 |

Source: CACP

## 1.6 Empirical Analysis (International Level)

### 1.6.1 Soybean seeds Production, & Consumption Export and Import of Top Global Players

Here is an analysis of the production, crushing, exports and imports of soyabean seeds among the top global producers.

| Table 7: Production of Soybean seeds in the Top 5 Producing Countries | | | | | | |
|---|---|---|---|---|---|---|
| Countries | Harvest | 17/18p | 16/17 | 15/16 | 2012-17 | Share in production |
| USA | sep-nov(1) | 119519 | 116920 | 106857 | 100967 | 0.331006 |
| Brazil | jan-may(2) | 118000 | 114075 | 95435 | 94917 | 0.311172 |
| Argentina | apr-may(2) | 36500 | 54600 | 54400 | 53300 | 0.174736 |
| China | aug-nov(1) | 16660 | 11712 | 106866 | 11861 | 0.038885 |
| India | oct-jan | 7100 | 10500 | 8300 | 9180 | 0.030095 |
| World | | 338843 | 348267 | 310888 | 305031 | 1 |

Source: Oil World Annual 2018, Vol.1-up to 2017/18

From Table 7, it is very clear that India and China are having comparatively lesser share in Soybean production than the other countries. USA and Brazil have more than 30 percent of the soybean production which shows clear dominance of these countries in international trade.

| Table 8: Crushing of Soybean in the Top 5 Producing Countries (Metric Tonnes) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Countries | 17/18p | 16/17 | 15/16 | 14/15 | 13/14 | 2012/13 | total | average | Share in World | Share in Production |
| USA | 54350 | 51920 | 51435.8 | 51950.8 | 47130 | 45645 | 302431.6 | 50405.3 | 0.19 | 0.50 |
| Brazil | 43850 | 40411 | 39748 | 40436 | 36861 | 35233 | 236539 | 39423.2 | 0.15 | 0.42 |
| Argentina | 37850 | 43452 | 43267 | 40235 | 36173 | 33611 | 234588 | 39098 | 0.15 | 0.73 |
| China | 90000 | 85120 | 77620 | 70100 | 65200 | 59930 | 447970 | 74661.7 | 0.28 | 6.29 |
| India | 7330 | 7900 | 5550 | 6200 | 7450 | 9200 | 43630 | 7271.7 | 0.03 | 0.79 |
| World | 294060 | 285724 | 274148 | 261513 | 239138 | 225611 | 1580194 | 263365.7 | 1.00 | 0.86 |

Source: Oil World Annual 2018, Vol.1-up to 2017/18

From Table 8, it is evident that India uses 86 percent of its soybean seeds for crushing and China uses 629 percent of its seeds for crushing, it means that China imports almost 6 times more soybean seeds for the purpose of crushing.

### 1.6.2 Break up of Oil and Meal after crushing of seeds among top global players

| Table 9: Breakup of oil and meal production from crushing | | | | | |
|---|---|---|---|---|---|
| Countries | average | Oil | Meal | Oil share | Meal share |
| USA | 50405 | 9713 | 39692 | 0.19 | 0.79 |
| Brazil | 39423 | 7836 | 29992 | 0.20 | 0.76 |
| Argentina | 39098 | 7505 | 30049 | 0.19 | 0.77 |
| China | 74662 | 13253 | 59741 | 0.18 | 0.80 |
| India | 7272 | 1287 | 5943 | 0.18 | 0.82 |
| World | 263366 | 49144 | 206582 | 0.19 | 0.78 |

Source: Oil World Annual 2018, Vol.1-up to 2017/18

Table 9 shows that in most of the countries, the share of oil and meal from the seeds crushing is almost the same i.e. 20 and 80 percent respectively.

**Table 10: Exports of Soybean seeds in the top 5 producing countries (metric tonnes)**

| Countries | 17/18p | 16/17 | 15/16 | 14/15 | 13/14 | 2012/13 | Total | Avg.exp | Share in production |
|---|---|---|---|---|---|---|---|---|---|
| USA | 56300 | 60187.1 | 54289.8 | 50427.9 | 45266 | 35041.3 | 301512.1 | 50252 | 0.50 |
| Brazil | 73970 | 63136.9 | 54383 | 50611.8 | 46829 | 41904 | 330834.7 | 55139 | 0.58 |
| Argentina | 3320 | 7021.9 | 9915.7 | 10575 | 7842 | 7739.3 | 46413.9 | 7736 | 0.15 |
| China | 140 | 114.4 | 113.5 | 143.3 | 214.7 | 266.2 | 992.1 | 165 | 0.01 |
| India | 230 | 268.9 | 134.1 | 237.5 | 175 | 124.3 | 1169.8 | 195 | 0.02 |
| World | 152022 | 148217.5 | 134690 | 127105 | 114061 | 99161 | 775256.5 | 129209.4 | 0.42 |

Source: Oil World Annual 2018, Vol.1-up to 2017/18

From Table 10, it is evident that India hardly exports (just 2 percent) of soybean seeds in the international market. Brazil is the market leader in the soybean seeds by exporting 58 percent of the production.

**Table 11 : Imports of Soybean in the top 5 producing countries (metric tonnes)**

| Countries | 17/18p | 16/17 | 15/16 | 14/15 | 13/14 | 2012/13 | Total | Avg. imp | Share in production |
|---|---|---|---|---|---|---|---|---|---|
| USA | 640 | 604.1 | 659.5 | 918.4 | 1979.5 | 1161.1 | 5962.6 | 993.7667 | 0.0 |
| Brazil | 300 | 252.8 | 410 | 305.3 | 604.7 | 359 | 2231.8 | 371.9667 | 0.0 |
| Argentina | 4100 | 1690.6 | 675.9 | 1.2 | 1.5 | 2.3 | 6471.5 | 1078.583 | 0.0 |
| China | 94100 | 93497.7 | 83230 | 78350.5 | 7363.7 | 59864.7 | 416406.6 | 69401.1 | 5.9 |
| India | 60 | 77.6 | 101.6 | 14.3 | 2 | 0.7 | 256.2 | 42.7 | 0.0 |
| World | 151540 | 146132 | 133700 | 125569 | 113899 | 98065 | 768905 | 128150.8 | 0.42 |

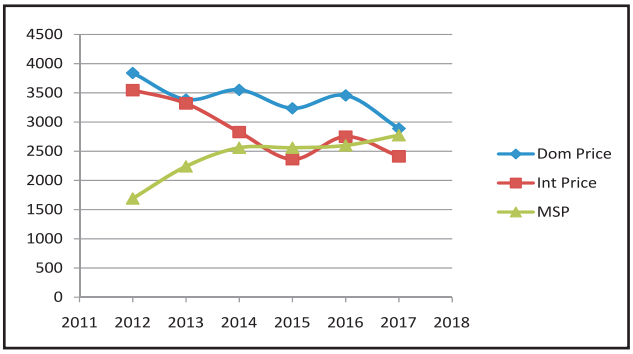
Source: Oil World Annual 2018, Vol.1-up to 2017/18

From Table 11, it is very clear that China is the world's biggest importer of Soybean seeds almost 6 times more than their own production capacity. Hence, India can consider China as the best trade partner from Soybean export point of view.

**Table 12: Difference in the Domestic Price, International Price and MSP (INR)**

| Year | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|---|
| Dom Price | 3841 | 3386 | 3551 | 3235 | 3456 | 2888 |
| Int Price | 3547 | 3318 | 2828 | 2362 | 2750 | 2410 |
| MSP | 1690 | 2240 | 2560 | 2560 | 2600 | 2775 |

Source: Oil World Annual 2018, Vol.1-up to 2017/18




Source : Data from Table 12

From Table 12 and Chart 1, it is clear that Indian domestic price and MSP both are higher than the international price for soybean seeds which reduces any chance of our soybean entering into the international marker.

Considering the soybean market, 79% of the produce is crushed and used to make soy oil and soy meal. While 18% of the crushing is used to make oil, 82% is used to make soy meal. Of all the soybean production, only 2% is exported and less than 1% is imported. This shows that India is more or less self sufficient in the market for soybean seeds.

### 1.6.3 Soy Oil Production, & Consumption export and imports of Top global players

**Table 13: Production of Soybean Oil in the Top 5 Producing Countries**

| Countries | 17/18p | 16/17 | 15/16 | 14/15 | 13/14 | 2012/13 | TOTAL | AVERAGE | Share of World |
|---|---|---|---|---|---|---|---|---|---|
| USA | 10401 | 10032.3 | 9956.5 | 9754.9 | 9143.1 | 8988.4 | 58276.2 | 9713 | 0.20 |
| Brazil | 8797 | 8127 | 7926 | 8041 | 7264 | 6862 | 47017 | 7836 | 0.16 |
| Argentina | 7360.3 | 8396.9 | 8434.1 | 7687.4 | 6785.4 | 6364.1 | 45028.2 | 7505 | 0.15 |
| China | 16020 | 15118 | 13816.4 | 12371.5 | 11572.5 | 10619.7 | 79518.1 | 13253 | 0.27 |
| India | 1304.7 | 1406.2 | 954.6 | 1101.7 | 1323.8 | 1633.8 | 7724.8 | 1287 | 0.03 |
| World | 54917 | 53450 | 51357 | 48471 | 44532 | 42136 | 294863 | 49144 | 1.00 |

Source: Oil World Annual 2018, Vol.1-up to 2017/18

It is evident from the Table 13 that China is the biggest producer of Soybean oil in the world. India produces just 3 percent of the world's share.

**Table 14 : Domestic disappearance of Soybean oil in the top 5 producing countries**

| Countries | 17/18p | 16/17 | 15/16 | 14/15 | 13/14 | 2012/13 | total | average | Share of the World | Share in Production |
|---|---|---|---|---|---|---|---|---|---|---|
| USA | 9430 | 9017 | 9146 | 8669 | 8595 | 8465 | 53322 | 8887 | 0.04 | 0.91 |
| Brazil | 7520 | 8834 | 6552 | 6520 | 5877 | 5618 | 40921 | 6820.167 | 0.03 | 0.87 |
| Argentina | 2710 | 2994 | 2611.3 | 2289.6 | 2634.1 | 2034.4 | 15273.4 | 2545.567 | 0.01 | 0.34 |
| China | 16350 | 15630.6 | 14066.6 | 13238 | 12531.7 | 11825.1 | 83642 | 13940.33 | 0.07 | 1.05 |
| India | 4475 | 4875.5 | 5350.2 | 3731.7 | 3000 | 2810.4 | 24242.8 | 4040.467 | 0.02 | 3.14 |
| World | 223683 | 216913 | 210271 | 203317 | 198787 | 189623 | 1242594 | 207099 | 1.00 | 4.21 |

Source: Oil World Annual 2018, Vol.1-up to 2017/18

From the Table 14, it is evident that India is having the highest domestic disappearance of soy oil compared to any other country in the world. This shows very high level of domestic uses and reduces export surplus for the country.

| Table 15: Exports of Soybean oil in the top 5 producing countries | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Countries | 17/18p | 16/17 | 15/16 | 14/15 | 13/14 | 2012/13 | Total | Avg.exp | Share in prodn. |
| USA | 980 | 1147.9 | 1016.6 | 914.4 | 852.7 | 982 | 5893.6 | 982 | 0.10 |
| Brazil | 1320 | 1240.8 | 1550.2 | 1510.3 | 1378.1 | 1251 | 8250.4 | 1375 | 0.18 |
| Argentina | 4630 | 5437.3 | 5831.8 | 5234.8 | 4261.3 | 4389.7 | 29784.9 | 4964 | 0.66 |
| China | 170 | 118.5 | 95.8 | 106.9 | 94.3 | 83.6 | 669.1 | 112 | 0.01 |
| India | 2.7 | 0.6 | 2.7 | 0.4 | 0.4 | 0.7 | 7.5 | 1 | 0.00 |
| World | 10918 | 11719 | 12415.5 | 11724.5 | 9907 | 9695.2 | 66379.2 | 11063 | 0.23 |

Source: Oil World Annual 2018, Vol.1-up to 2017/18

From Table 15, it is evident that India's share of its production is almost zero while Argentina exports almost 66 percent share of its production and proves to be the most dominant player.

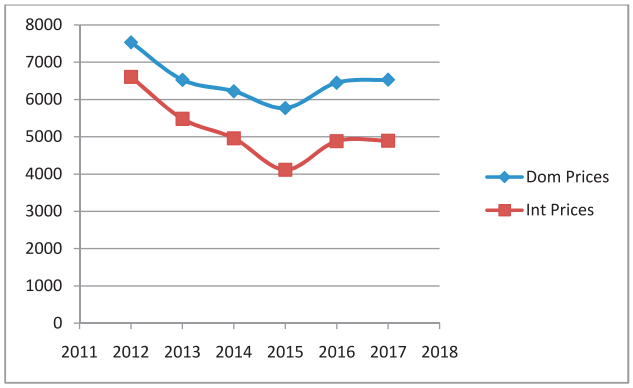
| Table 16: Imports of Soybean Oil in the Top 5 Producing Countries | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Countries | 17/18p | 16/17 | 15/16 | 14/15 | 13/14 | 2012/13 | Total | Avg.exp | share in prodn. |
| USA | 133 | 144.4 | 130.8 | 121.1 | 75 | 88.8 | 693.1 | 115.51 | 0.0 |
| Brazil | 61 | 60.2 | 63.1 | 11.3 | 0 | 6 | 201.6 | 33.6 | 0.0 |
| Argentina | | | | | | | 0 | 0 | 0.0 |
| China | 500 | 711 | 586 | 773.3 | 1353.5 | 1409 | 5332.8 | 888.8 | 0.1 |
| India | 3100 | 3473.9 | 4405.3 | 2839.4 | 1829.7 | 1136.32 | 16784.62 | 2797.437 | 2.2 |
| World | 10762 | 11753 | 12747 | 11087 | 9992 | 9531 | 65872 | 10978.67 | 0.2 |

Source: Oil World Annual 2018, Vol.1-up to 2017/18

| Table 17: Differences in the Domestic and International Soy oil prices (Values in INR) | | | | | | |
|---|---|---|---|---|---|---|
| Year | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 |
| Dom Prices | 7528 | 6524 | 6218 | 5767 | 6446 | 6528 |
| International Prices | 6604 | 5480 | 4959 | 4114 | 4881 | 4892 |

Source: Oil World Annual 2018, Vol.1-up to 2017/18

**Chart 2: Differences in the Domestic and International Soy oil prices (Values in INR)**




Source: data derived from Table 17

Considering the soybean oil market, India's BoP suffers a huge deficit due to its gigantic amount of imports which is around 220%. The domestic consumption of soybean oil (including imports) amounts to about 340% of the oil production. India's colossal consumption combined with insufficient oil production is posed as the problem.

The domestic price of soy oil is much higher than that of International price and showing an increasing trend of the gap widening.

### 1.6.4 Soy meal Production & Consumption, export and import of top global players

| Table 18: Production of Soybean Meal in the Top 5 Producing Countries | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Countries | 17/18p | 16/17 | 15/16 | 14/15 | 13/14 | 2012/13 | Total | Average | Share in World |
| USA | 42775 | 40618.1 | 40525.5 | 41033.3 | 37043.2 | 36154.3 | 238149.4 | 39692 | 0.19 |
| Brazil | 33355 | 30594 | 30316 | 30711 | 28179 | 26798 | 179953 | 29992 | 0.15 |
| Argentina | 28888 | 33285.2 | 33211.2 | 30929.6 | 27893.6 | 26089.3 | 180296.9 | 30049 | 0.15 |
| China | 72000 | 68096 | 62096 | 56062.5 | 52127.1 | 48064.5 | 358446.1 | 59741 | 0.29 |
| India | 5988.6 | 6454.3 | 4545.5 | 5065.4 | 6086.7 | 7516.4 | 35656.9 | 5943 | 0.03 |
| World | 230495 | 223579.4 | 215043.2 | 205067.6 | 187685.9 | 177621 | 1239492 | 206582 | 1.00 |

Source: Oil World Annual 2018, Vol.1-up to 2017/18

From Table 18, it is evident that India possesses only 3 percent of the World's share of Soybean meal and China is the market leader in this case.

| Table 19: Exports of Soybean meal in the top 5 producing countries | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Countries | 17/18p | 16/17 | 15/16 | 14/15 | 13/14 | 2012/13 | total | avg.exp | Share in Production |
| USA | 11600 | 10525 | 10850.8 | 11896.3 | 10507.8 | 10114.9 | 65494.8 | 10916 | 0.28 |
| Brazil | 16000 | 13760.3 | 15407.4 | 14290 | 13948.1 | 13241.6 | 86647.4 | 14441 | 0.48 |
| Argentina | 27000 | 31566.1 | 30940.2 | 29055.8 | 25783.2 | 24918.7 | 169264 | 28211 | 0.94 |
| China | 900 | 1089.8 | 1888.6 | 1576.7 | 1993 | 1323.2 | 8771.3 | 1462 | 0.02 |
| India | 1500 | 1903.3 | 326.6 | 1372.4 | 2634.4 | 4426.3 | 12163 | 2027 | 0.34 |
| World | 63430 | 64810 | 66421.3 | 64336 | 61112.4 | 58655.2 | 378764.9 | 63127 | 0.31 |

Source: Oil World Annual 2018, Vol.1-up to 2017/18

Table 19, it is evident that India has a reasonable share of Soybean meal export which needs to be improved further. The Indian government also offers 10 percent export subsidy to promote export.

| Table 20: Imports of Soybean meal in the top 5 producing countries | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Countries | 17/18p | 16/17 | 15/16 | 14/15 | 13/14 | 2012/13 | Total | Avg.imp | Share in prodn. |
| USA | 421.5 | 317.4 | 365.9 | 344 | 305.2 | 221.9 | 1975.9 | 329.3167 | 0.0 |
| Brazil | 23 | 34.8 | 25 | 19.2 | 26.1 | 31.7 | 159.8 | 26.63333 | 0.0 |
| Argentina | | | | | | | 0 | 0 | 0.0 |
| China | 50 | 58.7 | 30.9 | 83 | 105.5 | 20.3 | 348.4 | 58.06667 | 0.0 |
| India | 4.4 | 4.1 | 37.8 | 2.6 | 1.6 | 4.9 | 55.4 | 9.233333 | 0.0 |
| World | 63353 | 64803 | 66022.8 | 64041.5 | 60781 | 58602.6 | 377603.9 | 62933.98 | 0.3 |

Source: Oil World Annual 2018, Vol.1-up to 2017/18

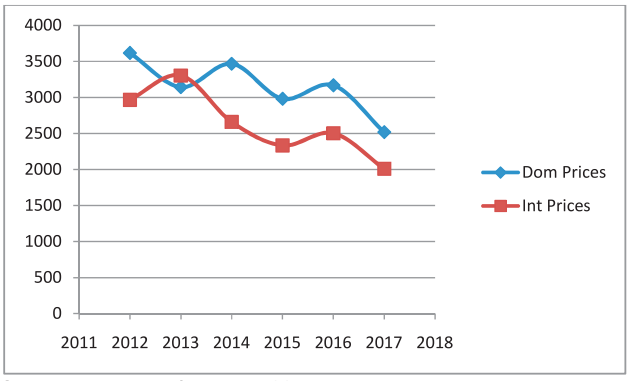
From Table 20, it is evident that none of the major producers import soybean meals. The world's top soybean meals importers are European Union, Vietnam, Thailand, Philippines and Mexico. India should explore close trade partners for soybean meals export.

| Table 21: Differences in the Domestic and International Soybean Meal prices(Values in INR) | | | | | | |
|---|---|---|---|---|---|---|
| Year | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 |
| Dom Prices | 3617 | 3142 | 3467 | 2980 | 3168 | 2517 |
| International Prices | 2966 | 3303 | 2660 | 2333 | 2503 | 2010 |

Source: Oil World Annual 2018, Vol.1-up to 2017/18

From Table 21, it is very clear that India's domestic prices are much higher than that of the International price which reduces the cost efficacy of Indian Soybean meal in the international market.

Chart 3: Differences in the Domestic and International Soybean Meal Prices (Values in INR




Source: data derived from Table 21

Soybean meal production in India amounts to 3% of the world production and 34% of the production is exported and barely any share is imported. But there is a shocking fall in the exports of soybean meal from 4426 metric tonnes to 1500 metric tonnes over a series of six years from 2012 to 2017. The descent in the exports could be attributed to the international prices staying lower than domestic prices persistently over five years from 2013 to 2017. The lack of cost efficiency in the production of the meal lifts up the domestic prices which in turn encourages the manufacturers to prefer the domestic market over the international market to sell their product.

### 1.6.5 RCA & BRCA

The Balassa index of Revealed Comparative Advantage (RCA) gives an indication of those industries in which a given country may have a comparative advantage. The standard calculation of revealed comparative advantage measures how much a country is exporting a given good relative to its total trade, in comparison to the share of that good in world trade. Country i is said to have a "revealed comparative advantage" in a good when the share of that good in its exports is bigger than the share of that good in world exports.

The RCA index ranges between 0 and infinity and where the upper bound for any given calculation is given by xkww/Xww. An RCA greater than 1 implies that the given country has a comparative advantage in that sector in the sense that compared with the world as a whole, this sector has a large share of the country's exports. One difficulty with the RCA measure as detailed above is that the upper bound is stable across countries but varies across sectors and years. This makes the index very suitable for cross country comparisons, but it does have to be used carefully when making cross sectoral comparisons and over time. An alternative version of the index which is often also used therefore is: Normalised RCA = (RCA-1)/(RCA+1). This is an approximation of the log transformation of the RCA index, and now ranges from between -1 to 1. An index of less than 0 suggests a revealed comparative disadvantage in a given product, and an index of greater than suggest revealed comparative advantage in the product. The normalisation means the index is suitable for cross country, cross sector and cross time comparisons.

**Bilateral RCA**

The BRCA1 uses as denominator the exports of a selected comparator country - country j. Hence in this case the RCA is calculated by comparing the share of exports of country i to the world, to the share of exports of country j to the world. The indicator then becomes a bilateral RCA, and shows the products for which country i has revealed comparative advantage, with respect to country j. Like the RCA, the BRCA1 can also be computed in a normalised form.

| Table 22: India's RCA | |
|---|---|
| Soybean seeds | 0.055447655 |
| Soybean oil | 0.009852807 |
| Soybean meal | 0.409430053 |

Source: Authors own calculation

From the Table 22, India doesn't have RCA in seeds, oil or meal. India has to go a long away in improving the cost efficacy in terms of all.

| Table 23: India's BRCA over the main producers | | | | |
|---|---|---|---|---|
| | China | Brazil | Argentina | USA |
| Soybean seeds | 5.141537994 | 0.007061557 | 0.012048499 | 0.013892232 |
| Soybean oil | 0.097633768 | 0.001648986 | 0.000152637 | 0.009266956 |
| Soybean meal | 1.240206404 | 0.031443966 | 0.00692592 | 0.230586227 |

Source: Authors own calculation

From Table 23, there is an important revelation that India has better BRCA against China in case of Soybean seeds (5.14) and meal (1.24). It means that in future, if India wants to explore trade avenue to improve her export then China would be a good trade partner.

To India comes a great opportunity to expand its soybean exports as China, one of the biggest consumers of soybeans in the world, has opened its market to India. China currently imports around 600% of its production of soybean and one of the major caterers to this demand has been the USA. Due to the US-China trade war, China has raised the tariffs imposed on American soybean, while eliminating the tariffs on countries like Singapore and India. India as a big producer, is fetched a chance to wield the extensive market. But the issue faced here is lack of surplus for imports, due to its huge domestic consumption. Again, we come back to depressed yields as the core issue.

Among all the products - Soybean, soy oil and soy meal, Comparative advantage was revealed for India over China for soybeans (oilseeds) and soy meal. This again assures a potential market for Indian soybean in China, if surplus is created.

### 1.6.6 Summary

We summarized this article in the form of SWOT analysis as follows:

| Table 24: SWOT Analysis of Indian Soybean | |
|---|---|
| **Strength**<br>1. Cost of cultivation is lesser than the domestic price compared to other crops.<br>2. India uses organic seeds of Soybean | **Weakness**<br>1. Yield per hectare is significantly low<br>2. Lack of awareness of MSP among the farmers of India |
| **Opportunities**<br>1. USA-China war might create some more market of Indian Soy Meal<br>2. Harvest season of global players don't overlap with Indian harvest | **Threats**<br>1. Indian Domestic price is higher than the International Price<br>2. Indian domestic price is protected by charging tariff (45%) on import<br>3. Increasing imports soybean oil<br>4. Influx of palm oil into the oil market causes adulteration and pulls down soy oil prices |

### 1.9. Limitation of the study

In this article, we have tried to focus on the various aspects of the Indian Soybean trade but for better understanding of the cost efficiency we need data on cost of cultivation, subsidies programs of various governments as well as Tariff imposition on seeds, meals and oil.

### 1.10 Conclusion and Policy Suggestions

It is clearly seen from the whole analysis that India is not having comparative advantage in Soybean Seeds, Oil and Meals production or export except against China. Not just that, our import of soy oil is also huge which could be a sign of concern in future considering the growing needs of Indian population.

In this regard, Indian government should pay attention to increase the yield per hectare which is considerably low compared to other countries in the world. Secondly, with better provision of irrigation technology this can be improved and farmers will be

benefitted to a greater extent.

Indian government cannot overlook the fact that Indian domestic prices have been much higher than the international prices for a long period of time due to over protective policies such as tariff on import and export subsidy of the government. However, in the long run, Indian government needs to focus on cost efficacy of soybean as gradually Indian farmers primarily cotton farmers are considering soybean as the next best alternative.

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