

Impact of Economic Reforms on Indian Agriculture with Special Reference to WTO Agreements

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Abstract

It was presumed that the new economic reforms adopted in 1991 would benefit tradable agriculture and also by improving the terms of trade in its favour. But it was ironic that trade liberalisation and macroeconomic policy framework had not been able to bring any significant growth in the agriculture sector. Although WTO brings new opportunities and challenges for the member countries through trade liberalisation in the agriculture sector, in the case of India, it had created more challenges for the farmers than opportunities. The present study aims to address 'how WTO agreements have adversely impacted Indian agriculture'. The study endeavours to quantify the variables related to globalization. A composite index of agrarian crisis has been created to check the impact of different implications of WTO agreements on agrarian crisis. Results of regression analysis found, that domestic to international prices ratio and total subsidies have a significant impact on Indian agriculture. No study has constructed an index of agrarian crisis and used it as the dependent variable in regression analysis which has been done in the present study.

Keywords; Composite Index, Principal Component Analysis, Profitability, Productivity, competitiveness, tariff rate, domestic support.

1. Introduction

The economic strategy that has been implemented since 1991 is known as a new economic strategy or economic reforms. Liberalisation, privatisation, and globalisation were the primary concerns of these economic changes, and the key to reforms was increased efficiency, improved productivity, adoption of contemporary technology, flexibility, and better capacity utilisation. The main goal of economic reforms was to give the private sector a bigger role. To reduce needless barriers to obtaining licences, adjusting output to managed prices, and denying MRTP enterprises industrial licencing, the government launched a variety of steps as part of its new economic strategy. However, real performance had been

poor since the middle of the 1990s. The 1991 neo-liberal policies had a negative impact on the cultivators' way of life, the majority of whom were small and marginal farmers and agricultural labourers. The majority of the population was impacted by a slowdown in the growth rate of the agricultural sector (Das, 2012).

The different policies adopted in neo-liberalization phase were the decline in public investment, cutbacks in input subsidies, declining incentive pricing, contraction of institutional credit in rural areas, and shrinking public extension services. But all these had precipitated a widespread agrarian crisis in India, which resulted in a fall in farm incomes and the problem of indebtedness in agriculture. Thus, the

liberalization of agricultural trade and export-oriented agriculture forced farmers to shift to the cultivation of commercial crops but the average returns from the investment undertaken for the cultivation of these crops were very low due to the increasing volatility of crop prices. Other than this, squeezing farm incomes, and increasing dependence on moneylenders for credit requirements resulted in a high-stress situation and the distressing phenomenon of farmer suicides in India (Banergee, 2011).

Vyas (2001) and Bhalla (2004) stated that the competitiveness of Indian agriculture had been adversely affected since the WTO regime. The developed countries continued to protect their agriculture sector by providing heavy export subsidies and domestic support to their agricultural products. The result was a significant decline in global pricing, making Indian agricultural products uncompetitive on the global market. Shiva (2003) also looked at how the corporate world controls Indian agriculture, making it impossible for small and marginal farmers to compete with their inputs. Through Market Access, developing nations are forced to forgo even quantitative restrictions, which are designed to shield local farmers against heavily subsidised food imports, thanks to market access. As a result, farmers in developing countries experience significant losses. In their 2009 study, Bhalla and Singh analysed the expansion of India's agricultural sector throughout the pre-liberalization (1980-83 to 1990-93) and post-liberalization (1990-93 to 2003-06) eras. In the years following liberalisation, India's economy showed a noticeable slowdown in growth of yield and output in different areas.

India is facing several challenges under the WTO regime related to food security, product-specific support, non-tariff measures, export subsidies and erosion of policy space to protect farmers interested in certain agricultural products. The likely adverse impact of WTO on the Indian agriculture sector may be in terms of curtailing the flexibility to impose export restrictions, domestic support under Article 6.2, crop insurance scheme under Green Box and poultry sector etc. (Sharma, 2016).

1.1 Objectives

In light of the above, the main objectives of the present paper are:

1. To study the impact of new economic reforms on Indian agriculture.
2. To analyse the extent of the agrarian crisis in India due to different WTO agreements such as cutbacks in input subsidies, tariff reduction commitments, declining exports and competitiveness in the international market etc.

1.2 Research Gap

The review of the literature shows that most of the studies are related to agrarian crisis i.e. declaration in agricultural growth, farmers' distress, and implications of economic reforms on agricultural sector etc. Only a few studies are about the impact of different factors on Indian farming after economic reforms. The study is an attempt to enlighten the different implications of WTO agreements which gravely affected Indian agriculture.

2. Materials and Methods

2.1 Data Collection

The secondary data have been used to analyse the agrarian crisis in India. The data has been collected mainly from sources such as the Ministry of Agriculture, Planning Commission, CACP Reports of the Directorate of Economics

and Statistics, WTO reports, Handbook of Statistics, Reserve Bank of India, Ministry of Finance, Ministry of Agriculture and Farmers Welfare, CMIE reports, NSSO reports etc. the time frame of the study has been taken from 1996-97 to 2013-14. It was due to the onset of deceleration in the agricultural sector that began in the early 90s but it becomes sharp in the late nineties (Dhas, 2009). All the monetary data has been deflated using the GNP deflator to express at constant prices 2011-12.

2.2 Analytical Approach

a) Principal Component Analysis

The composite index of Agrarian Crisis has been constructed by employing Principal Component Analysis. It is a variable reduction method, which helps in summarizing a large number of interrelated variables into a smaller number of uncorrelated composite variables. Therefore, when there is some redundancy in the variables, then this method is used, where redundancy means correlation among the variables. In the present study, this method is employed to construct one composite variable from three correlated variables.

b) Multiple Linear Regression analysis

The index, constructed with the help of principal component analysis, has been used as the dependent variable. The independent variables have been chosen according to the objective of the study and data availability. The constructed model is shown below:

$$\ln ACI = a + b_{11}\ln INPSUB + b_{12}\ln DIPR + b_{13}\ln EXIM + b_{14}\ln FDI + b_{15}\ln TRF + U_t$$

Here,

$\ln ACI$ = Agrarian Crisis Index

$\ln INPSUB$ = Total Input Subsidies

$\ln DIPR$ = Domestic to International Prices Ratio

$\ln EXIM$ = Exports to Import Ratio

$\ln FDI$ = Share of FDI in Agriculture

$\ln TRF$ = Average Agricultural Tariff Rate

a = Constant

$b_{11}, b_{12}, b_{13}, b_{14}, b_{15}$ = Regression Coefficients

U_t = Error term

3. Results and Discussions

3.1 Economic Reforms and Indian Agriculture

The introduction of economic reforms in 1991 brought several major changes in the economy, which had a direct bearing on the agricultural sector. Although the adjustment policies did not make any direct reference to the agriculture sector, it was argued that the other changes involving stabilisation and structural adjustment programme would have a significant impact on the agricultural sector of the economy. Tradeable agriculture would profit from the many reforms, such as the exchange and trade policies, currency depreciation, elimination of the industrial licencing policy, and decrease in industrial protection, by improving the terms of trade. But it was ironic that trade liberalisation and macroeconomic policy framework had not been able to bring any significant growth in the agriculture sector (Bhalla and Singh, 2009).

But the removal of industrial protection and the ensuing depreciation in the exchange rate had pushed relative pricing in the direction of agriculture and benefitted agricultural exports. The index of agricultural prices in relation to manufactured goods increased by 30 per cent in the 1990s. Additionally, compared to the ten years prior to the reform, agricultural exports climbed from 1.1 per cent in 1990 to 1.9 per cent in 1999 in the world's exports of various commodities. Even while trade policy

reforms had benefited Indian agriculture, it had also suffered in other ways, most notably from a drop in state investment in crucial sectors like irrigation and drainage, soil conservation and water management systems, and rural roads (Ahluwalia, 2002). The reduction in fertilizer subsidies increased the input cost. It was also expected that there would be improved availability of imported materials and products with tariff reduction and import liberalisation.

3.2 *WTO and Indian Agriculture*

The WTO started functioning on January 1, 1995, with the acceptance of the Dunkel proposal. Along with old ones, WTO dealt with several new issues. The various issues were covered by the WTO at the time: tariff and non-tariff barriers, agriculture, textiles and clothing, trade-related aspects of intellectual property rights (TRIPs), trade-related investment measures (TRIMs), the General Agreement on Trade in Services (GATS), anti-dumping measures, pre-shipment inspection, state trading, import licencing, Government procurement procedures, technical trade barriers, customs union and free trade area, subsidies, and countervailing measures, the balance of payment problems and a lot of others.

Thus, under the auspices of WTO, the member countries signed several trade-related agreements. And the first-ever reform and removal of trade barriers in the agriculture sector were accomplished by the Agreement on Agriculture (AoA) (Deodhar, 1999). Establishing a fair and market-based agricultural trade system was the major goal of the AoA. Starting on January 1, 1995, the date the agreement went into effect, the implementation period of the agreement was six years for developed nations and nine years for

developing countries. The built-in feature of AoA that allows for its own evaluation and renewal led to the extension of these dates.

Several studies suggest that Indian agriculture is internationally competitive and possesses strong export potential. It was expected that greater market access in developed countries—through reduced tariffs, removal of non-tariff barriers, elimination of export subsidies, and lower domestic support—would significantly boost India's agricultural exports. During 1987–88 to 1993–94, domestic prices of wheat, rice, and cotton in India were below world prices, indicating the likelihood of higher farm incomes following trade liberalisation (Gulati & Sharma, 1994). Similarly, Debroy (1996) noted that India could gain additional competitiveness under the WTO regime. Studies by Bhalla and Singh (1996) showed that Punjab could profitably export rice and cotton, while Anderson and Valenzuela (2006) argued that agricultural liberalisation after the Doha Round would generate real income gains for developing countries. WTO affected Indian agriculture in both positive and negative ways. It had made agricultural trade possible in the fields of floriculture, horticulture, dairy, etc. However, the WTO system has also brought about issues like biopiracy, loss of biodiversity, ecological imbalance, and food and seed instability. All these aggravated the problems of poverty, unemployment, low prices of produce and low agricultural incomes etc.

Although WTO brings new opportunities and challenges for the member countries through trade liberalisation in agriculture sector, in the case of India, it had created more challenges for the farmers than opportunities. It is a well-known fact

that the gains from trade liberalisation depend upon the competitiveness of the agriculture sector, and the export competitiveness depends upon the export subsidies given to the sector and the trends in international prices. The performance of Indian agriculture exports had not been satisfactory due to internal and external factors since 1995. The developed countries continued to protect their agriculture sector. International prices were lowered as a result of the developed countries' substantial export subsidies and domestic support. Thus, the competitiveness of Indian agriculture had been adversely affected.

3.3 Impact of Economic Reforms on Agrarian Crisis

The Indian economy underwent a significant transformation as a result of this policy and WTO regulations. The Export-Import policy was liberalised, and numerous items had their import and customs duties significantly reduced or completely eliminated so they could be imported without restrictions. Investments made by the government in the industrial and agricultural sectors started to decrease. The restructuring of the PDS really affected the availability of food grains to the poor at subsidised rates. All of these actions had effects on the farming sector. (Mallika, 2012).

Construction of Composite Index of Agrarian Crisis: Principal Component Analysis

Agrarian crisis is a complex situation. Since we want to analyse the impact of various implications of economic reforms on the agrarian crisis, we try to quantify the agrarian crisis and construct a composite index of agrarian crisis. To quantify the agrarian crisis, we have considered three variables i.e. firstly, profitability; as

agriculture has become highly unprofitable, secondly productivity; the productivity of the agricultural sector has also been declining due to rising costs, crop failures etc., thirdly, terms of trade between agriculture and non-agricultural sector; as it has become unfavourable for agricultural sector. Table-1 is an explanation of the indicators taken under analysis.

Table 1 : Indicators Selected for Constructing Index of Agrarian Crisis

Indicators	Variables
Profitability	Profitability=Value of main output – Cost of cultivation(C ₂)
Productivity	Yield of total food grains
Terms of Trade between Agricultural and Non-Agricultural Sector	(Index of prices received/Index of prices paid) *100

(i) Profitability

Indian agriculture is becoming unremunerative and economically unviable because the profitability of agriculture is low or negative. The farm incomes are not sufficient enough for the farmers to meet their various consumption as well as farming expenditures (Dhas, 2009). Tripathi (2013) also examined the trends in farm profitability of wheat and paddy by using the data in CACP reports on C₂ and A₂ and the gross value of output. The study concluded that during the reform period, the average real paid-out cost of cultivation of these crops had increased in absolute terms as compared to the 1980s and the net farm profitability of rice had declined by 10 per cent in real terms during the post reforms period (1994-95 to 2004-05). The Study mentioned the various reasons behind the slowdown in growth rates of the value of production of major crops on the basis of other studies i.e. technology

fatigue, declined public spending in irrigation and water management, biased economic reforms etc.

(ii) Productivity

“India’s membership and commitment to World Trade Organization (WTO) in 1995 was a clear sign of India’s intention to take advantage of globalization and face the challenge of accelerating its economic growth. One measure of economic growth is given by productivity growth as it forms the basis for improvements in real incomes and welfare. The concept of productivity growth gained importance for sustaining output growth over the long run as input growth alone is insufficient to generate output growth because of diminishing returns to input use” (Mahadevan, 2003). Nevertheless, Indian agricultural productivity is quite low due to several factors i.e. heavy burden of population, traditional methods of farming, small holdings, natural calamities, lack of good quality seeds and manure etc.

(iii) Terms of Trade

“The concept of terms of trade between agriculture and non-agriculture, representing the relative prices, was added as one of the factors for consideration while fixing the minimum support prices by the Government of India since 1980”. Mitra (1977) and Dantwala (1987) examined the fall in the relative demand for manufacturing goods and the favourable

terms of trade in the agricultural sector during the period 1965-1976. But after the economic reforms, imports of food grains and lower domestic prices converted it into unfavourable. The terms of trade remained unfavourable to the agricultural sector even after the termination of industrial protection in 1991 (Bhalla, 2005). The disparity in the agricultural and non-agricultural sectors can be seen from the official data. During the period 1999-2005, the agricultural GDP growth rate was only 1.7 per cent annually, whereas the growth rate of GDP of the non-agricultural sector exceeded 7 per cent (Government of India, 2013).

Table-2: Sampling Adequacy for Agrarian Crisis

KMO (Kaiser-Meyer-Olkin) measure of sampling adequacy		0.626
Bartlett’s test of Sphericity	Chi-Square	31.192
	Degree of Freedom	3
	Sig.	.000

Source: Author’s own calculations

The next table- 3 gives information about the total variance explained by the number of components. It is clear from the table that there is only one component which has an eigenvalue greater than one, thus only one component has been extracted. This first component explains 81.615 per cent of the total variance of the three variables of the agrarian crisis.

Table 3 : Principal Components and Total Variance Explained

Component	Initial Eigen values		
	Total	% of Variance	Cumulative %
1	2.448	81.615	81.615
2	0.430	14.337	95.952
3	0.121	4.048	100.000

Extraction Method:- Principal Component Analysis

Source: Author’s own calculations

The next table 4 shows the composite index of agrarian crisis in India. By using the SPSS procedure, only one component was extracted, and these component scores were used as a composite index of agrarian crisis. It is clear from the table that this non-standardized index has both positive and negative values but for the analysis, positive values are required for easy interpretations. Thus, for further analysis, a standardized index has been constructed.

It is apparent from the table that the values of the standardised index are increasing from 0.269 in 1996-97 to 1.00 in 2012-13, and meagrely

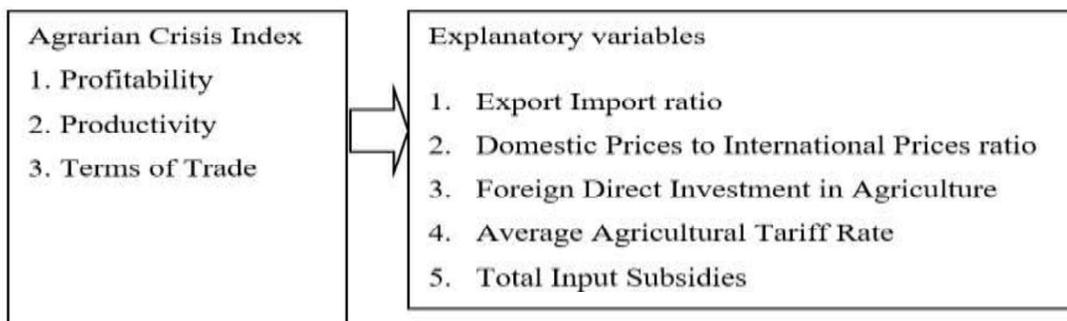
decreased to 0.984 in 2013-14. But the overall trend is increasing under the study period, which clarifies the increasing agrarian crisis in the Indian economy. It is concluded in various studies that the performance of Indian agriculture was very poor and unsatisfactory since 1994 (Dev, 2008). Siddiqui (2014) pointed out that the 250,000 farmer suicides between 1997 and 2012 in the post-reform period are a clear sign of distress in the Indian agriculture sector. Tripathi (2013) also stated that the post-reform period (1995-96 to 2004-05) was a phase of lacklustre performance for most of the crops.

Table 4 : Composite Index of Agrarian Crisis in India (1996-2014)

Years	Agrarian Crisis Index	
	Non-Standardized Index	Standardized Index
1996-97	-0.501	0.269
1997-98	-0.678	0.209
1998-99	-0.366	0.315
1999-00	-0.600	0.236
2000-01	-0.964	0.112
2001-02	-0.757	0.182
2002-03	-1.294	0.000
2003-04	-0.587	0.240
2004-05	-0.788	0.172
2005-06	-0.742	0.188
2006-07	-0.343	0.323
2007-08	0.043	0.454
2008-09	0.238	0.521
2009-10	1.220	0.854
2010-11	1.582	0.977
2011-12	1.285	0.876
2012-13	1.649	1.000
2013-14	1.602	0.984

Extraction Method:- Principal Component Analysis

Source: Author's own calculations by using IBM SPSS Statistics 21



Multiple Regression Analysis

After constructing the index of agrarian crisis, five variables have been selected to regress on this dependent variable. The regression analysis has been carried out using SPSS. The following text box gives detail of dependent and independent variables.

1. Exports to Import Ratio: The collapse in the price of agricultural goods, the elimination of quantitative restrictions and reduction of import duties in accordance with WTO commitments, and the country's open import policies had a negative impact on India's agricultural sector.
2. Domestic to International Prices Ratio: The competitiveness of a commodity depends upon the level of domestic prices relative to international prices. Many studies found that the fall in the international prices of cotton was one of the important reasons behind the farmers' distress and suicides in Vidarbha and Andhra Pradesh during the period 1995-2011 (Sharma, 2016).
3. Share of FDI in Agriculture: The World Bank claims that India will gain from the opening of the agriculture sector to FDI. But the share of FDI in

the agricultural sector always remained low. This is due to lack of a technological base and the primitive structure of the sector.

4. Average Agricultural Tariff Rate: Due to quantitative restrictions, tariffs had a little impact on Indian agriculture, while tariff reductions invariably resulted in increased imports.
5. Total Input Subsidies: Since the Amber Box Subsidies were deemed to be trade-distorting, the WTO allowed for agreements to gradually reduce their use. Nevertheless, the cutback in these subsidies adversely affected the agriculture production and income of farmers.

The model summary is explained in table IX, the value of R is 0.779 i.e. 77.9 per cent which shows the correlation between agrarian crisis and its causes. And the variability accounted in the model is 0.606, which is the value of R square, therefore 60.6 per cent of the variability in dependent variables is explained by independent variables. The table also shows the value of the Durbin-Watson test which is between 1.5 to 2.5 i.e. 2.475, indicating no problem of autocorrelation in the model.

Table - 5 : Summary of Model

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	0.779	0.606	0.442	1.1626	2.475

Source: Author's own calculations

The final regression model has been inferred from Table- 6 by using the unstandardised coefficients. The table shows that only two variables come out

to be statistically significant at a 5 per cent level. These are domestic to international price ratio (lnDIPR) and total input subsidies (lnINPSUB).

Table 6: Results of Multiple Linear Regression Analysis

Model	Regression coefficient	Std. error	t-value	Sign
(Constant)	1.978	18.084	0.109	0.915
lnEXIM	2.576	1.445	1.783	0.100
lnFDI	0.411	0.261	1.576	0.141
lnDIPR	6.575	2.739	2.400*	0.034
lnTRF	-7.594	3.881	-1.957	0.074
lnINPSUB	2.023	0.787	2.571*	0.024

Source: Author's own calculations

* Significant at 5 per cent level

$$\ln ACI = 1.978 + 2.576 (\ln EXIM) + 0.411 (\ln FDI) + 6.575 (\ln DIPR) - 7.594 (\ln TRF) + 2.023 (\ln INPSUB)$$

The regression equation explains that the three variables export/import ratio, FDI and average agricultural tariff rate have no significant impact on the agrarian crisis. Only two variables are statistically significant.

The first variable is the domestic to international prices ratio, which is positively correlated with agrarian crisis. The P value (0.03 which is less than 0.05) reveals that with an increase in domestic to international prices ratio, agrarian crisis will also increase because higher domestic prices and lower international prices cannot compete in the world

market and this leads to more imports in the country.

Sharma (2016) reported that during 1995-2006, the high domestic support by the developed countries decreased international prices which led to farmer's distress in developing countries like India.

The second variable which comes out to be significant in the model is total subsidies in the agricultural sector. It is positive and significant at 5 per cent level, which demonstrates that an increase in these subsidies will increase

agrarian crisis. Although it is increasing in nominal terms, the share of agricultural subsidies as a per cent of agricultural production, is very much low. Therefore, the low share leads to an increasing value of agrarian crisis.

4. Conclusions and Policy Implications

In a nutshell, economic reforms have failed to transform agriculture into a growth engine and have instead increased its vulnerability due to reduced subsidies and public investment, limited FDI, and the adverse effects of MNCs. Addressing the agrarian crisis requires substantial changes in agricultural policies rather than short-term measures. Trade liberalisation has raised domestic foodgrain prices, making it essential for India to continue supporting farmers through adequate subsidies. At the same time, export promotion of high-value, processed, horticultural, and marine products, along with market reforms and investment in infrastructure, is necessary to improve agricultural competitiveness.

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