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Research Paper

Impact of agricultural price policy on farm harvest and wholesale prices of legumes in Maharashtra

AB Thakare, NV Shende* and AA Bhopale

Department of Agricultural Economics & Statistics, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola, Maharashtra

***Corresponding author e-mail:** nishantshende@pdkv.ac.in*

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ABSTRACT

Legumes have been used as an entry point to improve productivity, food security in terms of nutrition and availability aspect and income for smallholder farmers. The findings reveal that the growth in the area of soybean, tur and gram was significantly increased and the production growth in all the selected crops was significantly increased. Productivity growth was significantly increased in gram on the other hand it was stagnant in case of soybean. The high variability in WSPs in almost all the selected crops indicated that all the crops were volatile in terms of prices and also that large variability in MSP were observed. Significantly positive growth rates were observed for FHP and MSP of all the selected crops.

***Key words*:** Minimum Support Price (MSP), Wholesale prices (WSP), Farm Harvest Prices (FHP), Price Policy, Growth rates.

INTRODUCTION

The Commission for Agricultural Costs and Prices (CACP) declared MSP prices fixed by the government of India to protect the producer-farmers-against excessive falls in price during bumper production years. Such minimum support price (MSP) is fixed at an incentive level, to induce the farmers to make a capital investment for the improvement of their farm and to motivate them to adopt improve crop production technologies to step up their production and thereby income. The farm harvest prices (FHP) are those which are prevailing during six to eight weeks immediately after the harvesting period and wholesale prices (WSP) are those that prevail in the wholesale markets. WSP accordingly is the rate at which a relatively large transaction, generally for further sale, is affected price policy for agric-produce is to set remunerative prices with a view to encouraging higher investment and production.

Minimum support price, whereas pro-free agricultural trade thinkers feel that, most of the time, MSP is not in line with the prices as well as demand and supply situation. This leads to distortions and inefficiencies in the production patterns. The agricultural price policy has outlived its utility and is being used more as a political tool than an economic tool. Therefore, it becomes imperative to examine the effectiveness of MSP in different regions of the country as well as its contribution towards growth. Since MSP policy is considered to have approved mostly the surplus states, its role and contribution towards area, production, and productivity was examined for the Maharashtra state. Therefore, this study was planned with the following objectives. To estimate the growth of area, production, productivity, MSP, FHP, and WSP of selected legume crops in Maharashtra, to study the gap between FHP and MSP, WSP and MSP of legume crops in Maharashtra.

MATERIALS AND METHODS

The present study is based on secondary data for the year 1990-91 to 2020-21 and the time series data on MSP, FHP, WSP, area, production and productivity of soybean, tur, and gram were collected from various official sources like Commission for Agricultural Prices and Costs (CACP), www.Indiastat.com, Directorate of Economics and Statistics, Department of Agriculture and Farmers Welfare, Ministry of Agriculture and Farmers Welfare, Government of India, agmarknet.nic.in, etc. The data were compiled and analyzed using standard statistical tools.

Statistical tools

Computation of growth rate

$$Y = ab^t$$

Log Y = Log a + t log b

Where,

Y= area/ production /productivity

α= intercept

b= regression coefficient

t = time period in year

Compound growth rate (%) = {Antilog (log b)-1}*100

Deviation and significance gap between FHP/WSP and MSP of legume crops in Maharashtra

The study is based on the secondary data on FHP, WSP, and MSP of legume crops in Maharashtra. To study the effectiveness of the price policy during the harvest periods and wholesale prices periods, the deviations of farm harvest prices and wholesale prices from the minimum support prices were worked out and divided into positive and negative deviations to examine where market prices ruled higher or lower over the minimum support prices. The negative deviation reflected the ineffectiveness of the MSP policy for producers. The formulae used for the mean absolute negative /positive deviation are as follows:

MAPD or MAND = 1/n [FHP/WSP – MSP]

If FHP/WSP > MSP= Positive deviation (PD) FHP/ WSP< MSP = Negative deviation (ND)

Where, MAPD = Mean absolute positive deviation,

MAND = Mean absolute negative deviation,

FHP = Farm harvest price

WSP = Wholesale price

MSP = Minimum support price and

n = Frequency of positive or negative deviation

These deviations were adjusted with MSP in order to examine the degree of their deviation from MSP. The formulae used to calculate adjusted mean negative/positive deviation are as follows:

AMPD or AMND = 1/n ([FHPi / WSP_i – MSPi] / MSPi)*100

If FHP / WSP > MSP = Positive deviation (PD) FHP/ WSP < MSP = Negative deviation (ND)

Where AMPD = Adjusted mean positive deviation,

AMND = Adjusted mean negative deviation,

The significance gap between FHP/WSP and MSP of legume crops was tasted by two simple *t* test.

$$t = \frac{(\bar{x} - \bar{y}) - (\mu_x - \mu_y)}{s\sqrt{\frac{1}{n_x} - \frac{1}{n_y}}}$$

where, $\bar{x}$ = mean of FHP/WSP of size n_x

$\bar{y}$ = mean of MSP of size n_y

$$s^2 = \frac{(n_x - 1)s_x^2 + (n_y - 1)s_y^2}{(n_x - 1) + (n_y - 1)}$$

RESULTS AND DISCUSSION

Keeping in view the objectives of the study, the data were analyzed using suitable techniques. The results obtained from this study have been presented and discussed.

Growth of area, production, productivity, MSP, FHP and WSP of selected legume crops in Maharashtra during the study period

The minimum, and maximum prices, coefficient of variation, and compound growth rates of selected legume crops in Maharashtra during 1990-2020 are shown in Table 1.

Table 1. Minimum, maximum prices, coefficient of variation and compound growth rates of selected legume crops in Maharashtra.

{Area in (00 ha.), Production (00 tonnes) and Productivity (Kg/ha)}

	Minimum	Maximum	CV (%)	CGR (%)
Soybean				
Area	200.00	4356.50	63.03	9.72**
Production	189.30	6201.08	68.78	9.66**
Productivity	485.00	1582.00	24.72	-0.06
Tur				
Area	1007.60	1435.64	10.65	0.96**
Production	353.30	2089.25	42.19	2.54**
Productivity	292.00	1455.00	33.12	1.57*
Gram				
Area	433.60	2594.30	45.65	4.52**
Production	205.90	2865.80	72.47	6.81**
Productivity	407.00	1104.67	26.02	2.19*

Note: **and* denote significance at 1% and 5% levels of significance.

The maximum and minimum prices per quintal, coefficient of variation (%), and compound growth rate of selected legume crops are presented in Table 1. It is observed that the maximum area of soybean crop over a while of the study was 4356.50 thousand hectares, whereas the minimum area during the study period was 200 thousand hectares.

The coefficient of variation (CV) value for the area of the soybean crop was 63.03% and the area under soybean increased significantly by 9.72% per annum during the study period. In respect of production, maximum production was 6201.08 thousand tonnes and minimum production was 189.30 thousand tonnes. The variability in production was 68.78%. The production of soybean increased by 9.66% per annum during the study period. The variability in productivity in soybean crop was 24.72% and productivity was decreased significantly by -0.06% over the period of study.

The maximum area of gram crop over a period of time of the study was 2594.30 thousand hectors, whereas minimum area during study period was rupees 433.60 thousand hectors. The CV value for area of soybean crop was 45.65% and area under gram was increased by 4.52% per annum during the study period. In respect of production maximum production was 2865.80 thousand tonnes and minimum production was 205.90 thousand tonnes respectively. The variability in production was 72.47%. The production of gram was increased by 6.81% per annum during the study period. The variability in productivity in gram crop was 26.11 per cent and productivity was increased considerably by 6.81% over the period of study. It is also observed that coefficient of variation and compound growths rates of area, production and productivity under tur was comparatively low than soybean and gram crops during 1990-2020.

Table 2. Growth rates of WSP AND MSP for the period 1990-91 to 2020-21

Crops	WSP CV (%)	FHP CV (%)	MSP CV (%)	CGR of WSP	CGR of FHP	CGR of MSP
Soybean	60.91	74.31	68.88	6.62**	8.36**	7.36**
Tur	79.43	54.94	77.17	6.62**	5.45**	7.36**
Gram	63.66	66.64	72.25	6.27**	7.16**	8.44**

Note: ** Denotes significance at 1% level of significance.

The growth rates and variability in WSPs, FHPs, and MSPs of the legume crops were presented in Table-2. It is observed that the variability in WSPs of the legume crops ranged between 79.43% to 60.91%. As the variability in WSPs was high in all most all the selected crops of the study, it denotes all the crops were volatile in terms of prices. The variability in MSP of the selected crops was ranging between 77.12% to 68.88%. Therefore, it is concluded that large variability in MSP was observed for the selected crops during the study period. The compound growth rates of WSP and MSP were significantly increased for all the crops throughout study, but the compound growth rates of MSP were higher than WSP for the selected crops of the study.

The growth rates and variability in FHP and MSP of the selected legume crops were presented in Table 2. the coefficient of variation (CV) value of FHP for the selected crops ranged between 74.31% to 54.94%, on the other hand, CV value of MSP ranged between 77.17% to 68.88%. Significantly positive

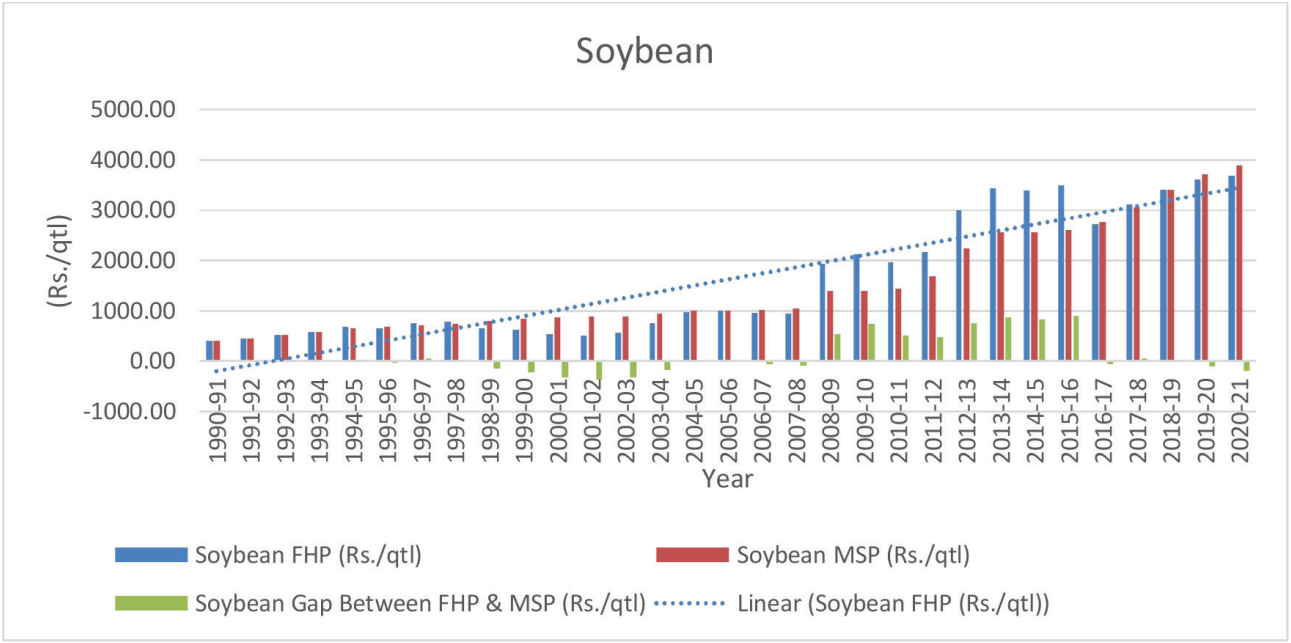

Fig. 1. FHP and MSP of soybean crop

Table 3. Gap between Farm Harvest Prices and Minimum Support price of soybean, tur and gram crops in during 1990-2020.

Yeas	Soybean					Tur					Gram				
	FHP (Rs./ qtl)	WSP (Rs./qtl)	MSP (Rs./ qtl)	Between FHP & MSP (Rs./qtl)	Between WSP & MSP (Rs./qtl)	FHP (Rs./ qtl)	WSP (Rs./ qtl)	MSP (Rs./ qtl)	Between FHP & MSP (Rs./qtl)	Between WSP & MSP (Rs./qtl)	FHP (Rs./ qtl)	WSP (Rs./ qtl)	MSP (Rs./ qtl)	Between FHP & MSP (Rs./qtl)	Between WSP & MSP (Rs./qtl)
1990-91	400.00	706.79	400.00	0.00	306.79	934.20	892.30	480.00	454.20	412.30	560.30	878.44	450.00	110.30	428.44
1991-92	445.00	756.48	445.00	0.00	311.48	1206.95	907.42	545.00	661.95	362.42	635.00	926.87	500.00	135.00	426.87
1992-93	525.00	802.32	525.00	0.00	277.32	1174.00	948.78	640.00	534.00	308.78	672.00	997.45	550.00	122.00	447.45
1993-94	580.00	808.01	580.00	0.00	228.01	1158.00	946.68	700.00	458.00	246.68	721.00	997.53	640.00	81.00	357.53
1994-95	672.85	809.11	650.00	22.85	159.11	1611.00	946.81	760.00	851.00	186.81	873.00	995.64	670.00	203.00	325.64
1995-96	643.54	807.83	680.00	-36.46	127.83	1657.00	952.84	800.00	857.00	152.84	894.00	999.20	670.00	224.00	329.20
1996-97	752.39	808.56	700.00	52.39	108.56	1639.00	946.21	840.00	799.00	106.21	877.00	995.93	700.00	177.00	295.93
1997-98	777.51	802.64	750.00	27.51	52.64	2145.25	946.84	900.00	1245.25	46.84	1251.70	998.77	740.00	511.70	258.77
1998-99	647.73	802.87	r795.00	-147.27	7.87	1993.75	950.38	960.00	1033.75	-9.62	1132.45	999.05	895.00	237.45	104.05
1999-00	622.61	806.33	845.00	-222.39	-38.67	1991.60	953.48	1105.00	886.60	-151.52	1202.87	995.37	1015.00	187.87	-19.63
2000-01	538.88	807.10	865.00	-326.12	-57.90	2024.76	957.74	1200.00	824.76	-242.26	1313.22	1006.40	1100.00	213.22	-93.60
2001-02	513.76	962.45	885.00	-371.24	77.45	2015.00	953.87	1320.00	695.00	-366.13	1314.00	1859.60	1200.00	114.00	659.60
2002-03	564.00	1010.60	885.00	-321.00	125.60	1999.00	1350.00	1320.00	679.00	30.00	1332.00	1509.16	1220.00	112.00	289.16
2003-04	760.77	1397.30	930.00	-169.23	467.30	1983.00	1382.00	1360.00	623.00	22.00	1328.00	1496.71	1400.00	-72.00	96.71
2004-05	974.00	1618.08	1000.00	-26.00	618.08	1971.00	1787.50	1390.00	581.00	397.50	1328.00	1398.76	1425.00	-97.00	-26.24
2005-06	1008.00	1234.08	1010.00	-2.00	224.08	1916.00	1930.10	1400.00	516.00	530.10	1326.00	1699.42	1435.00	-109.00	264.42
2006-07	957.00	1126.21	1020.00	-63.00	106.21	1882.00	2150.00	1410.00	472.00	740.00	1504.00	2204.60	1445.00	59.00	759.60
2007-08	955.00	1437.35	1050.00	-95.00	387.35	1917.00	1900.00	1550.00	367.00	350.00	1506.00	2156.54	1600.00	-94.00	556.54
2008-09	1934.00	2201.32	1390.00	544.00	811.32	2684.00	2325.00	2000.00	684.00	325.00	1996.00	2165.75	1730.00	266.00	435.75
2009-10	2132.00	2204.38	1390.00	742.00	814.38	3878.00	2301.00	2300.00	1578.00	1.00	2024.00	2199.93	1760.00	264.00	439.93
2010-11	1957.00	1984.61	1440.00	517.00	544.61	3569.00	2154.00	3000.00	569.00	-846.00	2023.00	2102.03	2100.00	-77.00	2.03
2011-12	2162.00	2238.31	1690.00	472.00	548.31	3070.00	2750.00	3200.00	-130.00	-450.00	2517.00	2471.34	2800.00	-283.00	-328.66
2012-13	3000.00	2554.68	2240.00	760.00	314.68	3526.00	3837.94	3850.00	-324.00	-12.06	3768.00	4095.01	3000.00	768.00	1095.01
2013-14	3422.00	3359.06	2560.00	862.00	799.06	3994.00	4212.74	4300.00	-306.00	-87.26	2884.00	3088.12	3100.00	-216.00	-11.88
2014-15	3387.00	3826.10	2560.00	827.00	1266.10	4634.00	4244.17	4350.00	284.00	-105.83	2758.00	2380.43	3175.00	-417.00	-794.57
2015-16	3490.00	3151.01	2600.00	890.00	551.01	7741.00	6788.41	4625.00	3116.00	2163.41	4169.00	4162.14	3500.00	669.00	662.14
2016-17	2714.00	3573.01	2775.00	-61.00	798.01	4297.00	8794.36	5050.00	-753.00	3744.36	5667.00	6344.07	4000.00	1667.00	2344.07
2017-18	3115.00	2655.83	3050.00	65.00	-394.17	3846.00	3877.82	5450.00	-1604.00	-1572.18	3646.00	4937.68	4400.00	-754.00	537.68
2018-19	3401.00	3573.09	3399.00	2.00	174.09	4873.00	3544.90	5675.00	-802.00	-2130.10	4009.00	3086.47	4620.00	-611.00	-1533.53
2019-20	3610.00	3540.04	3710.00	-100.00	-169.96	4987.00	5240.86	5800.00	-813.00	-559.14	4266.00	4056.83	4875.00	-609.00	-818.17
2020-21	3686.00	3558.41	3880.00	-194.00	-321.59	5087.00	5261.31	6000.00	-913.00	-738.69	4367.00	4007.71	5100.00	-733.00	-1092.29

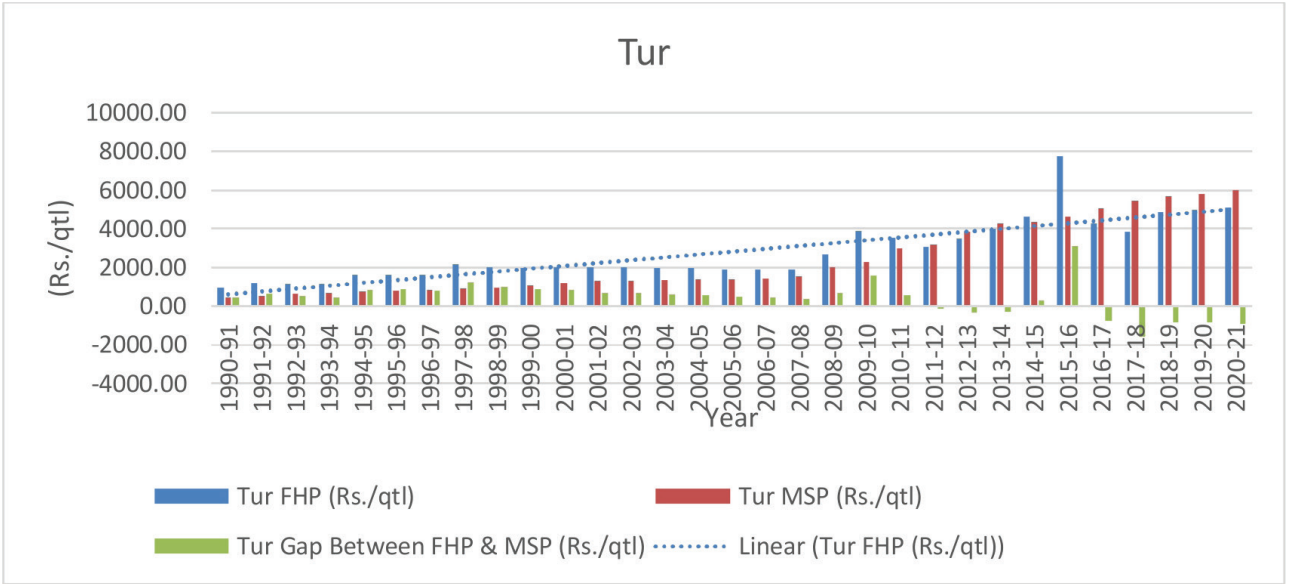

Fig. 2. FHP and MSP of tur crop

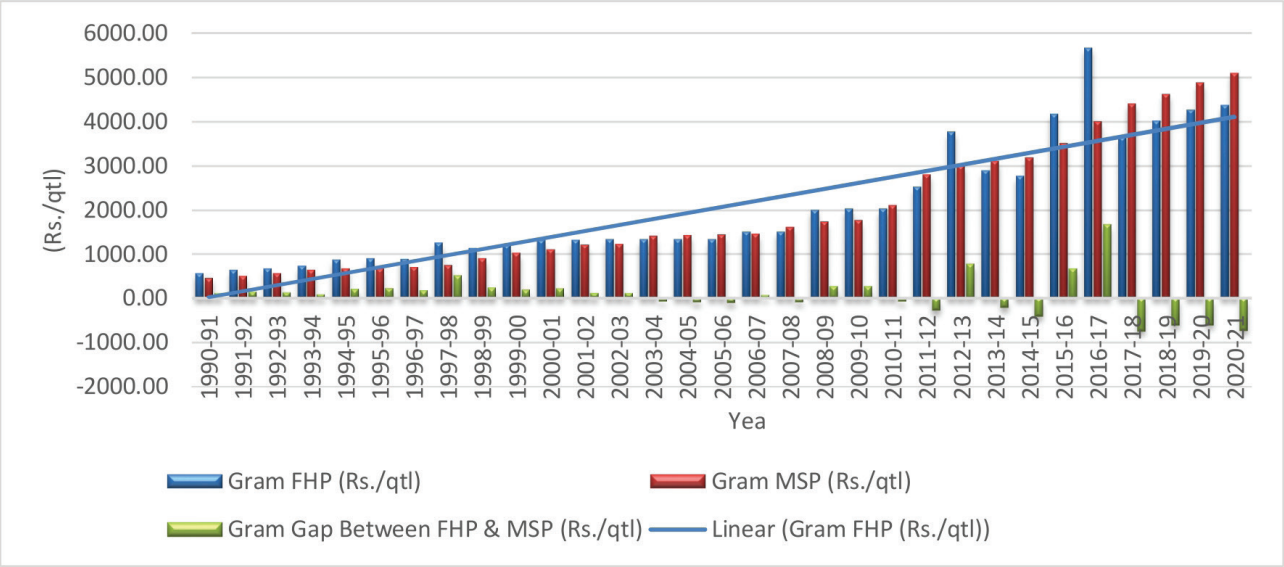

Fig. 3. FHP and MSP of gram crop

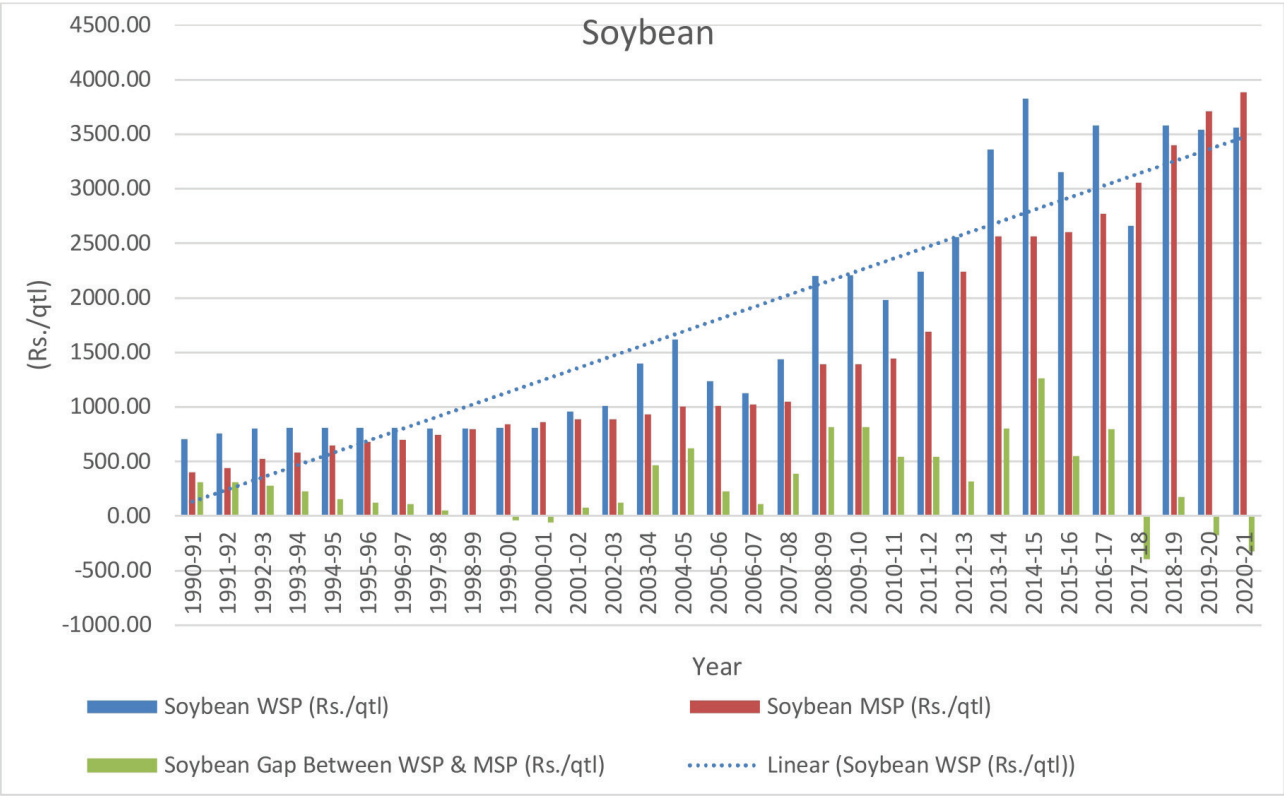

Fig. 4. WSP and MSP of soybean crop

growth rates were observed for FHP and MSP of all the selected crops. Except soybean the growth rates of MSP for the other selected crops were higher than the growth rates of FHP.

The Table 4 presents the significance of gap between Farm harvest price (FHP)/wholesale prices (WSP) and minimum support price (MSP) for various crops, along with the calculated *t*-values. As per comparing the *t*-values with the tabulated values at a 5 per cent level of significance, it is observed that the calculated *t*-values are below the tabulated values for all crops. Consequently, It was

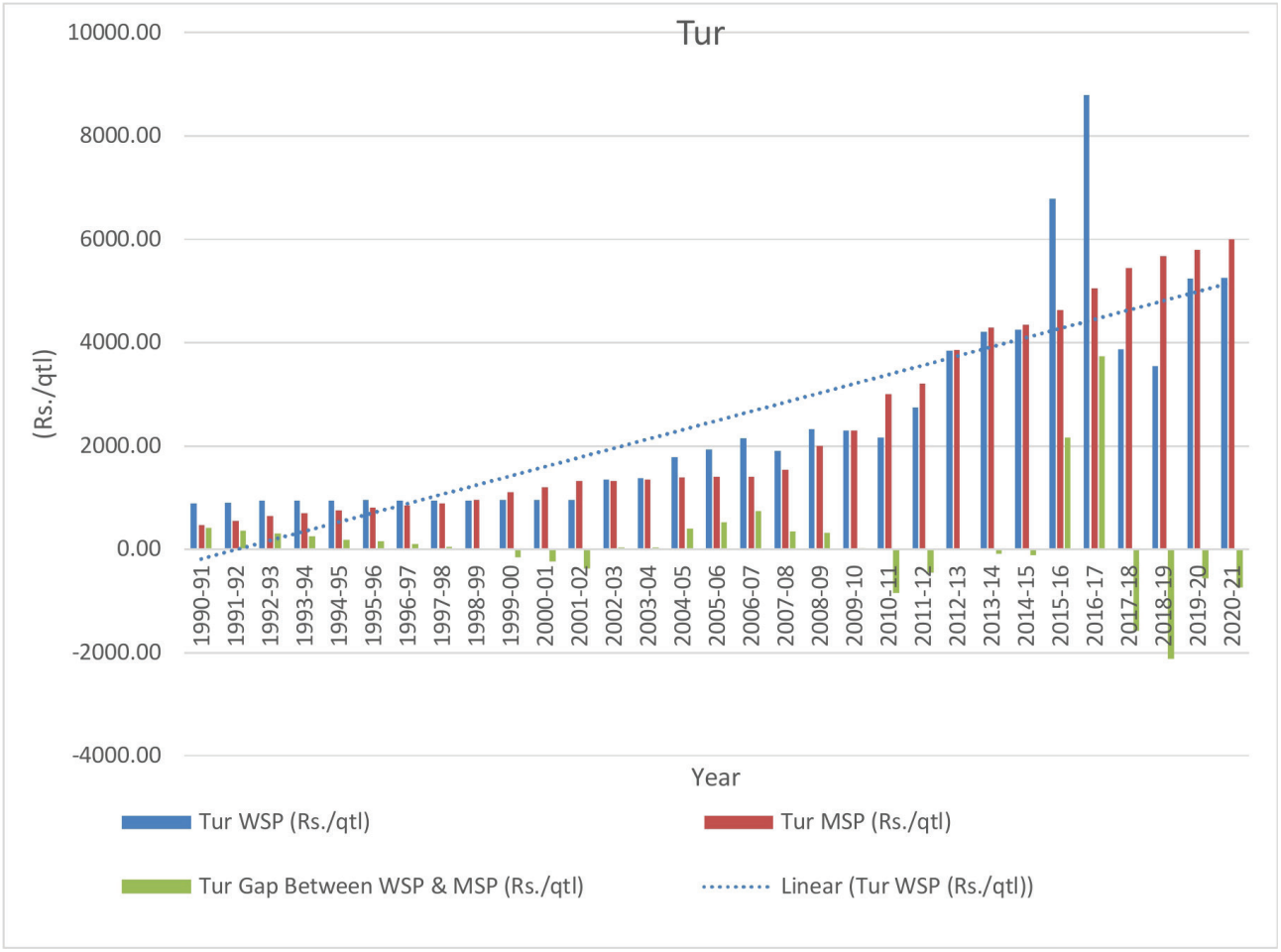

Fig. 5. WSP and MSP of tur crop

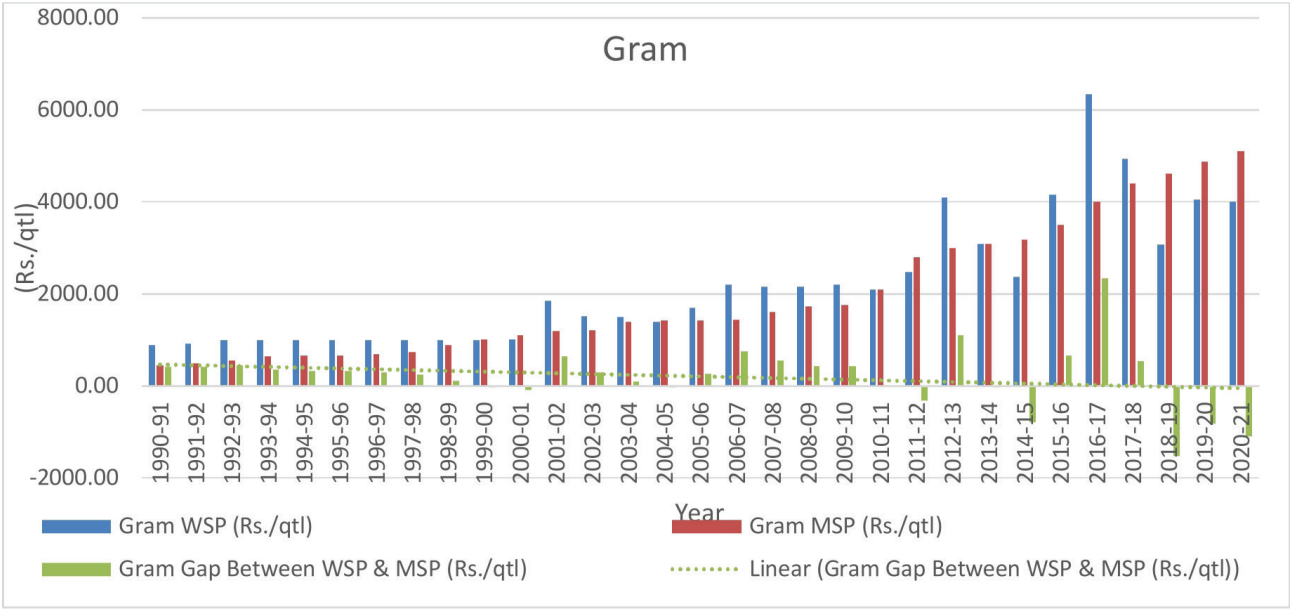

Fig. 6. WSP and MSP of gram crop

Table 4. Significance between FHP and MSP of legume crops during 1990-2020

(*t*-table value-2.00 & D.F.-60)

Crops	Mean FHP	Mean WSP	Mean MSP	*t* value (t-cal.) (FHP & MSP)	*t* value (t-cal.) (WSP & MSP)
Soybean	1624.13	1804.00	1506.42	0.41	1.10
Tur	2819.50	2488.24	2396.13	0.98	0.19
Gram	2060.15	2200.42	1994.03	0.18	0.57

Note : t cal < t tab that means H_0 is accepted at (5%) level of significance and conclude that the gap between FHP & WSP and MSP do not differ significantly.

indicated that there is no significant difference in the gap between FHP/WSP and MSP for selected major crops.

The analysis of the provided data using t-tests suggests that the gap between farm harvest prices and minimum support prices for the mentioned crops during the study period is not statistically significant. This implies that the pricing mechanisms for these crops have generally maintained consistency over the specified time frame. Further research and analysis could explore the underlying factors contributing to this stability in the gap between FHP/WSP and MSP for selected major crops.

Deviation of FHPs from MSPs of legume crops in Maharashtra.

To examine the effectiveness of the MSP policy of legume crops in Maharashtra, the difference between its FHP and MSP was calculated in different years. Tur, gram, and soybean experienced positive deviations i.e. 23, 19, and 17 times, and negative deviations 8, 12, and 14 times during the study period. This means that the average FHP was very near to or ruled higher than MSP in 23, 19, and 17 times out of 31 years. The adjusted difference (positive) between MSP and FHP in the tur crop was as above i.e. 74 % of MSP and the negative difference in the tur crop that was low i.e. 28.81 %. All selected legume crops experienced negative deviation many times in 31 years during 1990-2020.

Deviation of WSPs from MSPs of legume crops in Maharashtra.

To examine the effectiveness of the MSP policy of legume crops in Maharashtra, the difference between its WSP and MSP was calculated in different years. Soybean, gram, and tur experienced positive deviation at 26, 22 and 18 times in 31 years during 1990-2020. This means that the average WSP was very near to or ruled higher than MSP in 26, 22 and 18 times and lower than MSP in 5, 9 and 13 times out of 31 years. The adjusted difference (positive) between MSP and WSP was low as above 83 % of the MSP in soybean crops and the negative difference was very low. All selected legume crops experienced negative deviation many times in 31 years during 1990-2020.

Table 5. Deviation of FHPs vis-à-vis MSPs of legume crops in Maharashtra

Crops	Negative deviation					Positive deviation				
	Frequency	MAND (Rs./qtl)	Range (Rs./qtl)	AMND (Rs./qtl)	%	Frequency	MAPD (Rs./qtl)	Range (Rs./qtl)	AMPD (Rs./qtl)	%
Soybean	14	-147.84	(-2)-(-371.24)	-15.01	45.16	17	340.22	2-890	18.08	54.84
Tur	8	-705.63	(-130) - (-1604)	-13.41	25.81	23	816.07	284-3116	67.63	74.19
Gram	12	-339.33	(-72) (-754)	-9.71	38.71	19	322.19	59-1667	23.6	61.29

Note : Zero deviation (FHP=MSP) was considered positive deviation indicating the success of the MSP policy Average = Average of the different of FHP from MSP (+ve or -ve) and % = Percentage of average positive or negative deviation over MSP.

Table 6. Deviation of WSPs vis-à-vis MSPs of legume crops in Maharashtra during 1990-2020

Crops	Negative deviation					Positive deviation				
	Frequency	MAND (Rs./qtl)	Range (Rs./qtl)	AMND (Rs./qtl)	%	Frequency	MAPD (Rs./qtl)	Range (Rs./qtl)	AMPD (Rs./qtl)	%
Soybean	5	-196.46	(-38.67)-(-394.17)	-7.4	16.13	26	392.59	7.87-1266.10	32.58	83.87
Tur	13	-559.29	(-9.62)-(-2130.10)	-15.23	41.94	18	562.57	1-3744.36	32.22	58.06
Gram	9	-524.29	(-11.88)-(-1533.53)	-13.43	29.03	22	505.30	2.03-2344.07	39.65	70.97

CONCLUSION

The growth in the area of soybean, tur, and gram was significantly increased. The production growth in all the selected crops was significantly increased during the study period. Productivity growth was significantly increased in gram on the other hand it was stagnant in the case of soybean. As the variability in WSPs was high in almost all the selected crops of the study, it denotes that all the crops were volatile in terms of prices and also large variability in MSP was observed for the selected crops during the study period. The compound growth rates of MSP were higher than WSP for the selected crops of the study. Significantly positive growth rates was observed for FHP and MSP of all the selected crops except soybean. The growth rates of MSP for the other selected crops were higher than the growth rates of FHP. It was observed that the significance gap between FHP, WSP, and MSP. The adjusted difference (positive) between MSP and FHP was about 54 to 74 % of the MSP and the negative difference was very low. All selected legume crops experienced negative deviation many times in 31 years during the study period.

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