

## Poverty analysis in Maize cultivating farmers under different land-holding categories

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### Abstract

The research probes the relationship between the Minimum Support Price (MSP) price and its income impact on the farmers with different agricultural land-holdings. It examines maize crop cultivation income under three conditions if a farmer is getting crop production value at MSP, above 20% of MSP and above 40% of MSP. It then evaluates the farmers belonging to marginal, small, semi-medium, medium and large categories position in terms of poverty criteria suggested by the World bank. For analysis purposes, it uses an economic-model approach and suggest the concept of survival income for agricultural farmers. Its findings prove that marginal and small farmers require benefits beyond the MSP rate to push them above the poverty line.

**Key Words:** Agriculture Economics, Agriculture land-holdings, Minimum Support Price (MSP), Poverty, Poverty Line, farmers, Maize cultivation

### Introduction:

Maize is known as a miracle crop or queen of cereals because it has the highest yield genetic potential and is grown in 165 countries (Maize, APEDA, 2021) with so much diversity in climate, soil and practices. It contributes 39% of the total grain production, and the USA is the highest producer of maize, followed by China. The top five countries also include Brazil, Argentina and Ukraine.

Maize is grown in the Kharif (85%) season (June-July) and Rabi (15%) season (October-November) (Maize, Directorate of Millets Development, 2021) with a small cultivation period compared to other crops, and it is used widely in combination with other crops for maximizing the gains. Although India maize contribution is only 2% to the world, it has significant importance for Indian farmers in the year 2018, and its contribution was Rs. 3075969 lakhs., as it is the third-largest crop (8.6%) which is cultivated in India behind only to Rice (50.5%) and Wheat (34.9%) (State wise and Item wise value of Output From Agriculture, 2020). Andhra Pradesh is the top cultivating state in India, with a yield (India Maze Scenario, 2021) of 4436 kgs/ha.

Indian agriculture system consists of farmers employing more labour to compensate for lack of technical resources or involve more family members. In both cases, it results in lower opportunity costs and low labour efficiency.

The research probes the relationship between the Minimum Support Price (MSP) price and its income impact on the farmers with different agricultural land-holdings. It examines crop

cultivation income under three conditions if a farmer is getting crop production value at MSP, above 20% of MSP and above 40% of MSP. It then evaluates the farmers belonging to marginal, small, semi-medium, medium and large categories position in terms of poverty criteria suggested by the World bank. For analysis purposes, it uses an economic-model approach and suggest the concept of survival income for agricultural farmers. Its findings prove, marginal and small farmers requires benefits beyond the MSP rate to push them above the poverty line.

### **Literature Review:**

(Chenchen Ren), research findings mentioned that increase in agricultural land-holdings has a positive impact on farmers' income due to economic, technical and labour efficiency. Also, it states that with an increase in farm size, a significant decrease in fertilizer and pesticides is observed. (SAIN DASS, 2012), describe maize as ideal for crop diversification and a solution to depleting water levels and soil erosion.

Even my earlier works (Ahmed, Poverty and Deprivation: Study of a most impoverished population for better management of resources, 2021) points out how the rural population suffers in terms of low living standards and survive with limited assets (Ahmed, Multidimensional Poverty Index and Need to Revise the Methodology for Counting Poor, 2018) where development multidimensional poverty index provide additional information and suggest need to revise methodology to count poor on the basis of it. (Ahmed, Inadequate Land Reforms Reason for Poverty and Social Unrest, 2014) world bank conference paper highlights the plight of poor farmers who are waiting for land reforms, and in the absence of it, social unrest is common in the interior regions.

Crop specific information was accessed from (India Maze Scenario, 2021), (Maize, APEDA, 2021) and (Maize, Directorate of Millets Development, 2021) while authenticating data for analysis purpose was from the government of India, publications. The main statistical reports used are (Cost of Cultivation/Production & Related Data , 2017-18), (Economic Survey 2020-21), (Agriculture Statistics at a Glance 2018, 2019), (India at a Glance, 2021) and (Agriculture Census, 2015-16). For the latest information on Consumer Price Index (CPI) agriculture and Minimum Support Price (MSP), Indian government press notification is consulted.

### **The Masood's Input Cost-Survival model:**

The model provides the relationship between the MSP price and its income impact on the farmers with different sizes of land-holdings. Data from the government sources were used in the preparation of the model, and it provides details in the form of the total cost of cultivation. The cost of cultivation is from the year 2017-18, inflation impact is added, and the current cost of cultivation is derived.

The model uses the concept of survival income, which denotes former earnings which keep him in the occupation. It is his family's contribution that results in income which, if he delegates to an outsider, will make crop cultivation a loss-making proposition.

The model examines crop cultivation income under three conditions if a farmer is getting crop production value at MSP, above 20% of MSP and above 40% of MSP. It then evaluates the

farmers belonging to marginal, small, semi-medium, medium and large categories position in terms of poverty criteria suggested by the World bank (Extreme Poverty, Moderate poverty, Vulnerable, Safe) when their crop yield is in the highest category and when it falls to minimum category.

<b>Table 1. Cost of Production</b>				
			<b>Prices: 2017-18 In Rs./ha</b>	<b>Inflation adjusted Cost of production Prices: 2020-21 Rs./ha.</b>
1.1.1	<b>Human Labour</b>	Family	7433.41	7877.07
1.1.2		Attached	123.75	131.14
1.1.3		Casual	10952.21	11605.89
1.1.4		<b>Total</b>	18509.37	19614.10
1.2.1	<b>Animal Labour</b>	Hired	1207.87	1279.96
1.2.2		Owned	903.40	957.32
1.2.3		<b>Total</b>	2111.27	2237.28
1.3.1	<b>Machine Labour</b>	Hired	7313.59	7750.10
1.3.2		Owned	164.56	174.38
1.3.3		<b>Total</b>	7478.15	7924.48
1.4	<b>Seed</b>		5360.34	5680.27
1.5.1	<b>Fertilizer &amp; Manure</b>	Fertilizer	6707.78	7108.13
1.5.2		Manure	55.03	58.31
1.5.3		<b>Total</b>	6762.81	7166.45
1.6	<b>Insecticides</b>		1690.05	1790.92
1.7	<b>Irrigation Charges</b>		691.77	733.06
1.8	<b>Crop Insurance</b>		0.00	0.00
1.9	<b>Payment to Contractor</b>		3532.66	3743.51
1.10	<b>Miscellaneous</b>		141.82	150.28
1.11	<b>Interest on Working Capital</b>		1213.89	1286.34
<b>1</b>	<b>Operational Cost (Total)</b>		<b>47492.13</b>	<b>50326.69</b>
2.1	Rental Value of Owned Land		24913.51	26400.46
2.2	Rent Paid For Leased-in-Land		1257.04	1332.07
2.3	Land Revenue, Taxes, Cesses		0.00	0.00
2.4	Depreciation on Implements & Farm Building		583.96	618.81
2.5	Interest on Fixed Capital		3037.49	3218.78
<b>2</b>	<b>Fixed Costs (Total)</b>		<b>29792.00</b>	<b>31570.13</b>
<b>3</b>	<b>Total Cost [1+2]</b>		<b>77284.13</b>	<b>81896.81</b>
Adopted from: DIRECTORATE OF ECONOMICS & STATISTICS, INDIA (2017-18)				
Average Per hectare production is between 4436 -2706 kgs in different Indian States				
Adjusting impact of inflation (5.16%) increase in agricultural production prices between 2018 to 2021				
Operational Cost = (1.1.4+1.2.3+1.3.3+1.4+1.5.3+1.6+1.7+1.8+1.9+1.10+1.11)				
Fixed Cost= 2.1+2.2+2.3+2.4+2.5				

Table 2: Calculation of Survival Income at different MSP				
	Income	Income at MSP	20% increase in SP over MSP	40% increase in SP over MSP
a1	Total Cost from table 1	81896.81	81896.81	81896.81
a2	MSP per Quintal	1870	2244	2618
a3	MSP per kg	18.7	22.44	26.18
a4	Yield per Kgs/ha	4436	4436	4436
a5	Income= (a3*a4)	82953.2	99543.84	116134.48
a6	by product value per ha.	2104.73	2104.73	2104.73
a7	Total Income Per Ha (a5+a6)	85057.93	101648.57	118239.21
a8	Farmer Profit/Loss ( a7 - a1)	3161.12	19751.76	36342.40
	Survival Income & Savings			
b1	Human Labour	19614.10	19614.10	19614.10
b2	Payment to Contractor	3743.51	3743.51	3743.51
b3	Rental Value of Owned Land	26400.46	26400.46	26400.46
b4	Depreciation on Implements & Farm Building	618.81	618.81	618.81
b5	Interest on Fixed Capital	3218.78	3218.78	3218.78
b6	Total Survival Savings (b1+b2+b3+b4+b5)	53595.67	53595.67	53595.67
	Possible range of Income			
c1	Survival Income (a7+b6)	138653.60	155244.24	171834.88
d1	Disposable Income (c1 - a1)	56756.78	73347.42	89938.06

Table 3: International Poverty Criteria

Poverty (World Bank)		Less than(\$)	\$1=Rs 73.6	Per month (Rs)
Extreame Poverty	per day	1.9	139.84	4195.2
Moderate Poverty	per day	3.1	228.16	6844.8
Vulnerrable	per day	5.5	404.8	12144

Table 4: Income range (High 4436 per kgs/ha) and Low ( 2706 per kgs/ha)) yield and at different MSP

	Maize Cultivation 60-100 days (3 months)		
	Min. Support Price Net Income	20% increase in SP over MSP Net Income	40% increase in SP over MSP Net Income
Total income from cultivation (Rs.) from Highest Yield 4436 kgs/ha	56756.78	73347.42	89938.06
Per Month Income (Rs.)	18918.93	24449.14	29979.35
Total income from cultivation (Rs.) Min. Yield 2706 Kgs/ha	24405.78	34526.22	44646.66
Per Month Income (Rs.)	8135.26	11508.74	14882.22

Table 5: Categories of Land-Holdings (All India)

	Year 2015-16	%	Area	Avg. Size
Marginal (Less than 1 hectare)	99858000	68.52	37960	0.38
Small (1.0 to 2.0 hectares)	25777000	17.69	36435	1.41
Semi-Medium (2.0 to 4.0 hectares)	13776000	9.45	37168	2.7
Medium (4.0 to 10.0 hectares)	5485000	3.76	31367	5.72
Large (10.0 hectares and above)	831000	0.57	14212	17.1
Total	145727000	100	157142	1.08

Adapted from: Department of Agriculture, Cooperation & Farmers Welfare (Agriculture Census 2015-16, Phase-I)

Area Operated: ('000 Hectares)

Average size: (Hectares)

## Results:

- 1 Maize cultivation is a boon for farmers. It offers options for other crop cultivation but results in decent income from its production in a short period. If marginal farmers are able to get production value at MSP (Table 6) from a higher yield, they will be in a vulnerable category, while in case they get the low yield, they fall into the extreme poverty category.
- 2 At higher yield and MSP price, all other categories are in safe income zone, while if they fell in getting higher yield at low yield small and average land-holders are in a vulnerable position, but semi-medium, medium and large scale farmers enjoy an income that put them in the safe category.
- 3 When farmers are able to get a price above 20% of MSP (Table 7), all category farmers except marginal category are in safe income zone, whether they get high

yield or low yield. Marginal farmers with high yields remain vulnerable, but low yields fall in the moderate poverty category.

- 4 In case farmers are able to get a price above 40% of MSP (Table 8), while for every category income increase by the mentioned percentage, for marginal farmers category remain same, with high yield they remain vulnerable and at low yield they will be in moderate poverty category. It is an extra benefit for all other categories as they already achieve a safe category with 20% above the MSP price.

Table 6: Income-based on MSP at High and Low Yield

	Avg. Size	Monthly Income at higher yield	Poverty Status (Higher Side)	Monthly Income at a Lower yield	Poverty Status (Lower Side)
Marginal (Less than 1 hectare)	0.38	7189.19	V	3091.40	EP
Small (1.0 to 2.0 hectares)	1.41	26675.7	S	11470.72	V
Semi-Medium (2.0 to 4.0 hectares)	2.7	51081.1	S	21965.20	S
Medium (4.0 to 10.0 hectares)	5.72	108216	S	46533.69	S
Large (10.0 hectares and above)	17.1	323514	S	139112.96	S
Average Holdings	1.08	18918.93	S	8786.08	V

Extreme Poverty=EP, less than \$1.9 per day or Rs. 4195.02 per month

Moderate Poverty=MP, less than \$3.1 per day or Rs.6844.8 per month

Vulnerable =V, less than \$5.5 per day or Rs. 12144 per month

Safe=S

Table 7: Income, when the market rate is 20% above MSP

	Avg. Size	Monthly Income at higher yield	Poverty Status (Higher Side)	Monthly Income at a Lower yield	Poverty Status (Lower Side)
Marginal (Less than 1 hectare)	0.38	9290.67	V	4373.32	MP
Small (1.0 to 2.0 hectares)	1.41	34473.29	S	16227.32	S
Semi-Medium (2.0 to 4.0 hectares)	2.7	66012.68	S	31073.60	S
Medium (4.0 to 10.0 hectares)	5.72	139849.09	S	65830.00	S
Large (10.0 hectares and above)	17.1	418080.31	S	196799.47	S
Average Holdings	1.08	26405.07	S	12429.44	S

Extreme Poverty=EP, less than \$1.9 per day or Rs. 4195.02 per month

Moderate Poverty=MP, less than \$3.1 per day or Rs.6844.8 per month

Vulnerable =V, less than \$5.5 per day or Rs. 12144 per month

Safe=S

Table 8: Income, when the market rate is 40% above MSP					
	Avg. Size	Monthly Income at higher yield	Poverty Status (Higher Side)	Monthly Income at a Lower yield	Poverty Status (Lower Side)
Marginal (Less than 1 hectare)	0.38	11392.15	V	5655.24	MP
Small (1.0 to 2.0 hectares)	1.41	42270.89	S	20983.93	S
Semi-Medium (2.0 to 4.0 hectares)	2.7	80944.26	S	40182.00	S
Medium (4.0 to 10.0 hectares)	5.72	171481.91	S	85126.30	S
Large (10.0 hectares and above)	17.1	512646.96	S	254485.98	S
Average Holdings	1.08	32377.70	S	16072.80	S

Extreme Poverty=EP, less than \$1.9 per day or Rs. 4195.02 per month

Moderate Poverty=MP, less than \$3.1 per day or Rs.6844.8 per month

Vulnerable =V, less than \$5.5 per day or Rs. 12144 per month

Safe=S

### Conclusion:

The data provided by the model conclude that marginal, small and average land-holders need market prices above the government announced MSP rate. While a rate above 20% of MSP is sufficient for farmers with small and average land-holdings, marginal farmers need extra benefit more than 40% above the MSP rate to achieve an income under the safe category in both high and low yield scenarios.

At all India level population of marginal farmers is huge, and (Agriculture Statistics at a Glance 2018, 2019) data state that only 42% of marginal and 35% of small farmers has access to irrigation facilities. Besides lack of irrigation facilities, they also lack access to financing options, technological inputs and the ability to input proper fertilizer and pesticides for better crop management.

The research points out an approach to offer different rates of MSP based on the ownership size of the agricultural land-holdings and favours giving more subsidies and direct benefits to marginal and small landholders to increase their survival income and push them into the safe category of income.

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