

Fani's Impact on Incidence, Depth and Severity of Poverty in Odisha

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Abstract: This brief provides incidence, depth and severity of poverty pre-Fani and post-Fani across sub-groups of population in Odisha. In this process, it also suggest a methodology for computing poverty indices by adjusting for growth, distributional norms and change in population to an earlier available household data on consumption expenditure.

Introduction

Fani, an extremely severe cyclone struck Odisha on 3rd May 2019 that affected 1.66 crore (16.6 million) people, which is 36.5% of the state's population. Such disasters not only halt the fight against poverty but also reverse the gains made.² A question that arises is what would be the impact of Fani on poverty. It is this, that has led to the current exercise.

Measure

If z is the (income) poverty line and y_i is the i^{th} individual's (income) attainment value then the sum of the shortfall from the poverty line normalized to the poverty line for all the poor will be $\sum_i s_i = \sum_i (z - y_i)/z$. From this, for a given population, n , a class of poverty measure is $P_\alpha = \sum_i s_i^\alpha / n$; $\alpha = 0,1,2$ refer to incidence, depth, and severity, respectively.³

The measure P_α lies between 0-1 and when multiplied with 100 can be expressed in per cent terms such that incidence can imply per cent of people below the poverty line, depth can imply per cent of per capita shortfall from the poverty line, and severity can imply per cent of per capita value of sum of squared normalized shortfall from the poverty line. Severity is particularly important from the perspective of last mile connectivity.

Approach

In India, income poor are computed using household level consumption expenditure data collected by the National Sample Survey in its quinquennial rounds and by methods of arriving at a poverty line that the erstwhile Planning Commission provided. The latest available poverty estimates for India is 2011-12.⁴ The data on consumption expenditure collected in 2017-18 has not yet been released. In the absence of data on consumption expenditure for recent times, we propose an indirect way of estimating poverty for Odisha in the pre-Fani and post-Fani periods.

First, as indicated in a recent paper, poverty change can be decomposed into growth, inequality and population effects.⁵ Hence, if we have information on growth, inequality and

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² Andrew Shephard et al, *The Geography of Poverty, Disasters and Climate Extremes in 2030*, Overseas Development Institute (ODI), UK Met Office and Risk Management Solution (RMS), London, 2013.

³ James Foster, Joel Greer, Erik Thorbecke, "A Class of Decomposable Poverty Measure," *Econometrica*, 1984.

⁴ Planning Commission, *Press Note on Poverty Estimates, 2011-12*, Government of India, 2013.

⁵ Srijit Mishra, "Decomposing Poverty Change: Deciphering Change in Total Population and Beyond," *Review of Income and Wealth*, 2015.



population changes then incorporating that to the earlier household level information on consumption expenditure should give us poverty estimates for recent times. This is easier said than done, as inequality is itself obtained from household level consumption expenditure data and we do not have access to that for the recent time.

Second, to address the inequality-related imbroglia we take recourse to a recent work that estimates different growth for different income groups (1.85% per annum for lower 50%, 1.91% per annum for middle 40%, and 4.91% per annum for top 10%) during 1980-2015.⁶ We impose these on the household level consumption expenditure of Odisha for 2011-12 to arrive at a consumption expenditure for 2018-19. Acknowledging the limitation of clubbing lower five deciles to lower 50% and the next four deciles to middle 40% in estimating inequality, this exercise addresses our growth and distributional concerns together.

Third, the change in population is based on the one used by the Directorate of Economics and Statistics of Odisha to compute per capita income for 2018-19. This will not change the population share of each household. However, depending on the position of the household in the distribution (lower 50% or middle 40%) it will have impact on incidence, depth and severity of poverty estimates in the pre-Fani scenario, 2018-19.

Fourth, to address the post-Fani scenario, a provisional damage and loss of ₹25,000 crore, which is equivalent to 5% of gross state domestic product for 2018-19 and about 10% of gross district domestic product of the 14 affected districts is imposed on the 2018-19 scenario.⁷ Restricting the impact to the affected districts gives us the poverty estimates for the post-Fani scenario, May 2019.

Results

The incidence, depth and severity of poverty across sub-groups for Odisha in the base year (2011-12), pre-Fani year (2018-19), and post-Fani period (May 2019) are indicated in Table 1. The table also provides information on actual change or percentage points change between pre-Fani and base year and between post-Fani and pre-Fani.

At the aggregate level, for the state for incidence, depth and severity, the reductions from the base year to pre-Fani have been reversed on account of Fani. The percentage points increase (actual change) post-Fani was greater than the absolute value of percentage points decrease pre-Fani, particularly for incidence in Odisha because of the relatively greater increase in rural areas.

In the base year, one observes that incidence, depth and severity in non-Fani districts are almost double that of the Fani districts. Given this, the relatively higher percentage points decrease in non-Fani districts in the pre-Fani scenario is commendable. This could reduce the incidence of poverty in non-Fani districts to less than twice that of the Fani districts, but this gap seems to have further increased for depth and severity. Given that bottom 50% were clubbed that does away with relatively lower growth among the lower deciles (say, bottom 20%), this is a matter of concern from the perspective of last mile connectivity. The gaps have reduced post-Fani because the districts with relatively lower poverty values pre-Fani have bore the brunt.

⁶ Lucas Chancel, Thomas Piketty, "Indian Income Inequality, 1922-2015: From British Raj to Billionaire Raj," WID.world Working Paper Series No 2017/11, 2017.

⁷ Srijit Mishra, Sarthak Gaurav, Hippu Salk Kristle Nathan, "Gross and Per Capita District Domestic Product for Odisha, 2018-19," Policy Brief 8, Nabakrushna Choudhury Centre for Development Studies, 2019.

Table 1: Poverty across Sub-groups in Odisha, Pre and Post Fani

Sub-Group	P _α	P _α Poverty Value									Actual Change					
		Base, 2011-12			Pre Fani, 2018-19			Post Fani, May 2019			Pre minus Base			Post minus Pre		
		Rur	Urb	Com	Rur	Urb	Com	Rur	Urb	Com	Rur	Urb	Com	Rur	Urb	Com
Odisha	P ₀	35.7	17.3	32.9	30.3	14.0	27.8	36.0	17.2	33.1	-5.4	-3.3	-5.1	5.7	3.2	5.3
	P ₁	7.0	3.2	6.4	5.5	2.4	5.0	6.9	3.1	6.3	-1.6	-0.7	-1.4	1.4	0.6	1.3
	P ₂	2.0	0.9	1.9	1.5	0.6	1.4	2.0	0.8	1.8	-0.5	-0.2	-0.5	0.5	0.2	0.4
14 Fani Districts	P ₀	26.4	11.2	24.1	22.7	9.6	20.8	31.7	14.8	29.2	-3.6	-1.5	-3.3	9.0	5.2	8.5
	P ₁	4.8	1.9	4.4	3.7	1.5	3.3	5.9	2.4	5.4	-1.2	-0.5	-1.1	2.3	1.0	2.1
	P ₂	1.3	0.5	1.2	1.0	0.4	0.9	1.7	0.7	1.5	-0.4	-0.1	-0.3	0.7	0.3	0.7
16 Non-Fani Districts	P ₀	51.8	27.2	47.9	43.2	21.1	39.8	43.2	21.1	39.8	-8.6	-6.1	-8.2	0.0	0.0	0.0
	P ₁	10.8	5.1	9.9	8.5	4.0	7.8	8.5	4.0	7.8	-2.2	-1.1	-2.1	0.0	0.0	0.0
	P ₂	3.3	1.4	3.0	2.5	1.0	2.2	2.5	1.0	2.2	-0.8	-0.4	-0.7	0.0	0.0	0.0
ST	P ₀	63.5	39.7	62.6	56.3	32.9	55.4	60.0	35.0	59.0	-7.2	-6.8	-7.2	3.7	2.1	3.6
	P ₁	14.4	8.2	14.2	11.7	6.7	11.5	13.6	7.2	13.3	-2.8	-1.6	-2.7	1.9	0.5	1.9
	P ₂	4.6	2.4	4.5	3.6	1.8	3.5	4.4	2.0	4.3	-1.0	-0.6	-1.0	0.8	0.3	0.8
SC	P ₀	41.4	26.3	39.0	36.4	18.7	33.6	43.1	27.7	40.7	-5.0	-7.6	-5.5	6.7	9.0	7.1
	P ₁	8.2	4.8	7.7	6.4	3.9	6.0	8.4	4.7	7.8	-1.9	-1.0	-1.7	2.0	0.9	1.9
	P ₂	2.3	1.4	2.2	1.7	1.1	1.6	2.3	1.3	2.2	-0.6	-0.4	-0.6	0.7	0.3	0.6
OBC	P ₀	24.2	22.1	23.9	18.2	20.0	18.4	24.0	21.4	23.7	-5.9	-2.1	-5.5	5.7	1.4	5.2
	P ₁	3.8	3.9	3.8	2.8	2.9	2.8	3.7	4.0	3.8	-1.0	-1.0	-1.0	1.0	1.1	1.0
	P ₂	0.9	1.0	0.9	0.6	0.7	0.7	0.9	1.0	0.9	-0.3	-0.3	-0.3	0.3	0.3	0.3
Oth-SG	P ₀	14.2	6.7	11.8	11.8	5.4	9.8	19.0	6.9	15.2	-2.4	-1.3	-2.0	7.2	1.5	5.4
	P ₁	2.0	1.2	1.7	1.4	0.9	1.2	2.4	1.1	2.0	-0.7	-0.3	-0.5	1.0	0.2	0.8
	P ₂	0.4	0.3	0.4	0.3	0.2	0.3	0.5	0.3	0.4	-0.2	-0.1	-0.1	0.2	0.1	0.2
CL-A	P ₀	59.6	-	59.6	51.0	-	51.0	59.5	-	59.5	-8.6	-	-8.6	8.4	-	8.4
	P ₁	11.1	-	11.1	8.4	-	8.4	11.0	-	11.0	-2.7	-	-2.7	2.6	-	2.6
	P ₂	3.0	-	3.0	2.2	-	2.2	3.0	-	3.0	-0.8	-	-0.8	0.8	-	0.8
CL-NA	P ₀	45.4	55.3	46.6	42.6	50.0	43.5	47.1	51.0	47.6	-2.9	-5.3	-3.2	4.5	1.0	4.1
	P ₁	9.6	10.6	9.8	7.6	8.1	7.7	9.1	10.6	9.2	-2.0	-2.5	-2.1	1.4	2.5	1.6
	P ₂	2.8	2.8	2.8	2.1	2.1	2.1	2.6	2.8	2.6	-0.7	-0.8	-0.7	0.5	0.7	0.5
SE-A	P ₀	32.1	-	32.1	26.0	-	26.0	32.1	-	32.1	-6.2	-	-6.2	6.2	-	6.2
	P ₁	6.2	-	6.2	4.8	-	4.8	6.0	-	6.0	-1.4	-	-1.4	1.2	-	1.2
	P ₂	1.8	-	1.8	1.4	-	1.4	1.7	-	1.7	-0.5	-	-0.5	0.3	-	0.3
SE-NA	P ₀	25.2	17.3	22.9	20.9	13.8	18.8	25.1	20.7	23.9	-4.3	-3.5	-4.1	4.3	6.9	5.0
	P ₁	5.0	3.3	4.6	4.0	2.6	3.6	5.2	3.4	4.7	-1.1	-0.7	-1.0	1.3	0.7	1.1
	P ₂	1.5	1.0	1.4	1.2	0.7	1.0	1.6	0.9	1.4	-0.4	-0.3	-0.3	0.5	0.2	0.4
RWS	P ₀	12.0	8.7	10.4	9.2	5.6	7.5	11.6	5.8	8.8	-2.8	-3.1	-2.9	2.4	0.2	1.3
	P ₁	2.5	1.2	1.9	2.0	0.9	1.5	2.6	1.0	1.9	-0.5	-0.3	-0.4	0.6	0.1	0.4
	P ₂	0.8	0.3	0.5	0.6	0.2	0.4	0.8	0.3	0.6	-0.2	-0.1	-0.1	0.2	0.0	0.1
Oth-OG	P ₀	20.4	11.9	18.1	18.2	11.6	16.4	23.7	12.5	20.6	-2.1	-0.4	-1.7	5.4	0.9	4.2
	P ₁	5.1	2.3	4.4	4.3	1.7	3.6	4.9	1.9	4.1	-0.8	-0.6	-0.8	0.7	0.2	0.5
	P ₂	1.6	0.5	1.3	1.2	0.3	1.0	1.5	0.4	1.2	-0.4	-0.2	-0.3	0.2	0.1	0.2

Sources and Notes: Authors' calculation based on unit level National Sample Survey (NSS) data for 2011-12 adjusted for growth with distributional concerns for pre Fani scenario of 2018-19 and with damage and loss limited to affected districts for post Fani scenario of May 2019. P_α is a poverty measure where α=0,1,2 refer to incidence, depth and severity, respectively. Rur is Rural, Urb is Urban, Com is Combined. Across social group, ST is Scheduled Tribe, SC is Scheduled Caste, OBC is Other Backward Classes, and Oth-SG is Other Social Group. Across occupational group, CL-A is Casual Labour in Agriculture, CL-NA is Casual Labour in Non-Agriculture, SE-A is Self Employed in Agriculture, SE-NA is Self Employed in Non-Agriculture, RWS is Regular Wage or Salary, and Oth-OG is Other Occupational Group.



Across social groups, the hierarchy from those with high to low poverty values are scheduled tribe, scheduled caste, other backward classes, and other social groups. This hierarchy holds for rural and urban areas, independently as also combined, in all the three periods - base, pre-Fani and post-Fani. Comparing pre-Fani with base, the percentage point decrease was the highest for scheduled tribe and then for other backward classes in rural areas and also for combined areas, and for scheduled caste and then for scheduled tribe in urban areas. Post-Fani when compared with pre-Fani, the percentage points increase was the highest for other social groups and then scheduled caste in rural areas, for scheduled caste and then scheduled tribe in urban areas, and for scheduled caste and other social groups when both the areas are combined.

Across occupational groups, the hierarchy from high to low poverty values for all three periods are casual labour in agriculture (not a category in urban), casual labour in non-agriculture, self-employed in agriculture, self-employed in non-agriculture (not a category in urban), other occupational groups, and real wages or salaries. Comparing pre-Fani with base the decrease was the highest for casual labour in agriculture and then for self-employed in agriculture in rural areas as also for combined areas, and for casual labour in non-agriculture and then for self-employed in non-agriculture for urban areas. A reverse pattern (increase in poverty values) was observed among these occupational groups was observed when Post-Fani was compared with pre-Fani. These increased the poverty values in Post-Fani period to be greater than the base period for casual labour in non-agriculture for rural areas, self-employed in non-agriculture for urban areas, and other occupational groups in both rural and urban areas.

Conclusion

Using an earlier round of household survey, this brief provides poverty estimates in the pre-Fani period by adjusting for growth, distribution and population change, and in the post-Fani period by adjusting for damages and losses in the affected districts. Gains in poverty reduction obtained till the pre-Fani period seems to have been reversed post-Fani. The vulnerable in terms of increase in percentage points for income poor in the post-Fani period when compared with the pre-Fani period are other social groups, scheduled castes, and casual labourers.

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