Policy Brief #2 NFHS-4: An analysis of district level malnutrition data for Rajasthan

NFHS – 4 provides, for the first time, a district level data on nutritional status of children below the age of 5 years. This provides an excellent and timely opportunity to plan for eradication of child malnutrition at the district level. A quick preliminary analysis of the district level child malnutrition levels, reveals certain important aspects. This is presented in the tables 1 and 2.

Table 1: Data on wasting, underweight and stunting in a colour coded form

District	Children under 5 years who are stunted	Children under 5 years who are wasted	Children under 5 years who are severely wasted	Children under 5 years who are underweight	District	Children under 5 years who are stunted	Children under 5 years who are wasted	Children under 5 years who are severely wasted	Children under 5 years who are underweight
Rajasthan (NFHS-3)	40.1	22.5	*	36.8	Rajasthan (NFHS-3)	40.1	22.5	*	36.8
Rajasthan (NFHS-4)	39.1	23	8.6	36.7	Rajasthan (NFHS-4)	39.1	23	8.6	36.7
Ajmer	33.5	31.6	12.2	39.6	Jaipur	35.7	12.8	4.2	25.2
Alwar	41.8	18.5	8.7	35.6	Jaisalmer	37.4	21.9	10.2	37.4
Banswara	50	30.8	12	50.7	Jalor	45	27.2	9.1	42.7
Baran	40.2	28.5	10.6	41.1	Jhalawar	38.1	31.8	13.9	47.2
Barmer	36.6	25.9	9.1	39.6	Jhunjhunun	32.5	13.6	5	19.5
Bharatpur	47.6	14.6	6.7	30.9	Jodhpur	40.3	23.8	9	38.6
Bhilwara	35.5	33.8	12.9	42.6	Karauli	45.5	18.9	5.8	35.7
Bikaner	33.7	24.4	9.5	33.2	Kota	32	27.7	7.6	39.7
Bundi	38.4	27.7	8.6	43.4	Nagaur	39.1	18.4	7	31.4
Chittaurgarh	37.4	23.8	8.7	41.9	Pali	44.4	21.7	6.5	41.3
Churu	31.2	21.7	9.4	27.1	Pratapgarh	46.3	38.2	15.1	54.6
Dausa	33.8	15.3	6	28.1	Rajsamand	38.6	28.9	11.8	38.8
Dhaulpur	54.3	15.8	4.8	39.8	Sawai Madhopur	39.4	16.4	5.5	34.4
Dungarpur	46.8	37.5	16.1	53.4	Sikar	28.4	11.5	4.1	20.5
Ganganagar	29.1	20.6	5.8	29.3	Sirohi	42.3	36.6	15.6	50.4
Hanumangarh	35	20.7	7.6	23.4	Tonk	32	23.6	5	37.3
					Udaipur	47.5	29.9	11.4	52

The three parameters, stunting, wasting and underweight are strongly correlated. This relationship is brought out in Figure 2 below. There is a clear linear relationship between underweight on one hand and stunting and wasting on the other. The strength of linear regressions is not very strong, (R Sq of 0.4 for stunting, it is quite robust for wasting R Sq of 0.77), unlike in case of, say, Odisha where both are strong, R. sq. of 0.79 for stunting and 0.76 for wasting). But it still has a bearing on program implementation. Collecting good quality data on underweight can give us a good indication of the levels of wasting and stunting as well to some extent. Hence as suggested in our Odisha blog 1, we need not initiate routine measurement of height through Anganwadi workers or ASHAs. The task of estimating stunting can be left to periodical NFHS surveys which will now be taking place at 3 year intervals. At Anganwadi level recording weight and use of MUAC tapes to identify wasting will be adequate at this stage.

*All parameters are for Children aged under 5 years for Rural areas.

** Data not available for Severely Wasted in NFHS-3.

Figure 2 gives correlation of Severe wasting with Wasting (R. sq. of 0.86). This shows the importance of focusing on wasting so as to bring down incidence of severe wasting children first. This is desirable on three counts; first the relatively low numbers, second a higher odds ratio or chances of death in the case of wasting compared to stunting and underweight, and third a relative ease of reducing wasting given that it is episodal in nature rather than cumulative like stunting. The graph also shows that severe wasting may come to zero when wasting is around 3%. This could perhaps be the first priority in the low wasting districts.

Rearranging Table 1 in increasing order of underweight will help us identify regions of low prevalence of Underweight. As we can see in Table 2 and in Figure 2, it identifies a belt in the north-eastern part of Rajasthan which has least incidence of Underweight. It also brings out places where Severe Wasting is low the other indicators also perform well in other indicators.

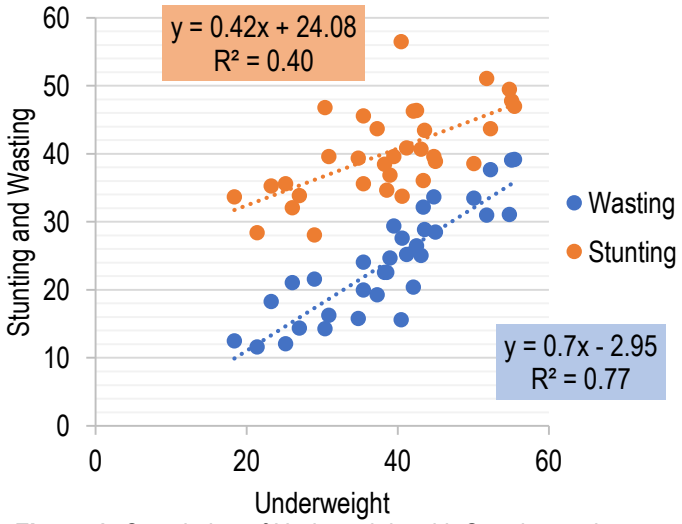

Figure 1: Correlation of Underweight with Stunting and Wasting (Rural)

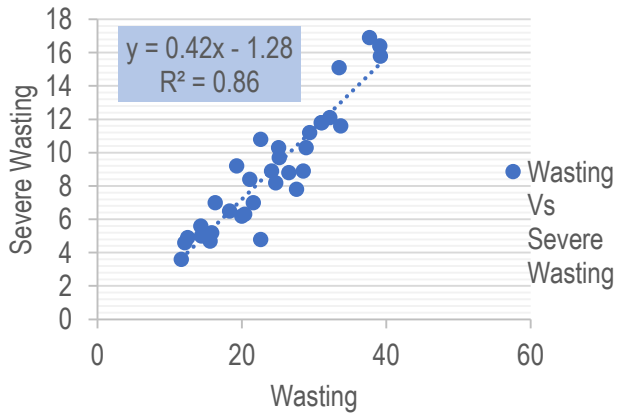

Figure 2: Correlation between wasting and severe wasting (Rural)

Table 2: Levels of malnutrition in districts of Odisha NFHS-4

	Children under 5 years who are underweight (weight-for-age) (%)	Children under 5 years who are severely wasted (weight-for-height) (%)	Children under 5 years who are wasted (weight-for-height)(%)	Children under 5 years who are stunted (height-for-age) (%)
Rajasthan (NFHS-3)	36.8	*	22.5	40.1
Rajasthan (NFHS-4)	36.7	8.6	23	39.1
Jhunjhunu	19.5	5	13.6	32.5
Sikar	20.5	4.1	11.5	28.4
Hanumangarh	23.4	7.6	20.7	35
Jaipur	25.2	4.2	12.8	35.7
Churu	27.1	9.4	21.7	31.2
Dausa	28.1	6	15.3	33.8
Ganganagar	29.3	5.8	20.6	29.1
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Tonk	37.3	5	23.6	32
Jaisalmer	37.4	10.2	21.9	37.4
Jodhpur	38.6	9	23.8	40.3
Rajsamand	38.8	11.8	28.9	38.6
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Dhaulpur	39.8	4.8	15.8	54.3
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Pali	41.3	6.5	21.7	44.4
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Bundi	43.4	8.6	27.7	38.4
Jhalawar	47.2	13.9	31.8	38.1
Sirohi	50.4	15.6	36.6	42.3
Banswara	50.7	12	30.8	50
Udaipur	52	11.4	29.9	47.5
Dungarpur	53.4	16.1	37.5	46.8
Pratapgarh	54.6	15.1	38.2	46.3

Information given in the table above when depicted spatially (Figures 3-7 besides), reveals strong clustering of the incidence of malnutrition for all the four parameters i.e. underweight, wasting, stunting and severe stunting.

One can see a regional continuity with a rough cluster emerging in north-eastern region where incidence of malnutrition is low, a southern cluster near border of Gujrat and Madhya Pradesh with high incidence of malnutrition while the western arid region of Rajasthan shows intermediate performance.

Districts of Jhunjhunu, Sikar and Jaipur have performed well in all indicators. Hanumangarh if improves in wasting and stunting just by few units can also join the earlier districts. Districts in the southern region namely, Pratapgarh, Banswara, Dungarpur, Udaipur, Jhalawar and Sirohi are performing badly in all indicators. Districts of Bikaner, Ganaganagar and Churu needs to improve in wasting if they wish to join the contiguous north-eastern (green) belt. Alwar has to improve in both wasting and stunting. to join Jhunjhunu and Sikar in the green zone.

The case of Bharatpur, Dholpur and Karauli is somewhat curious. They have relatively low underweight and wasting prevalence but very high rates of stunting. This may need a closer scrutiny.

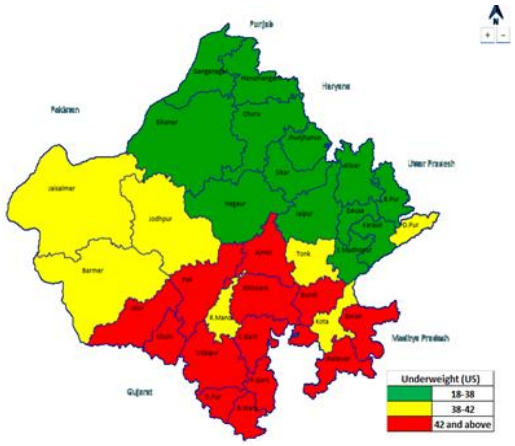

Figure 3a: Underweight (Rural; Under-5 years of age)

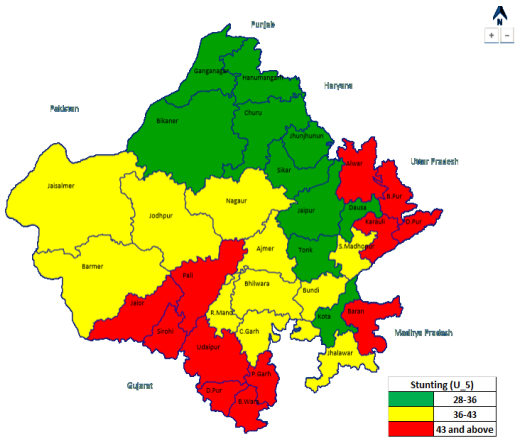

Figure 3b: Stunting (Rural; Under-5 years of age)

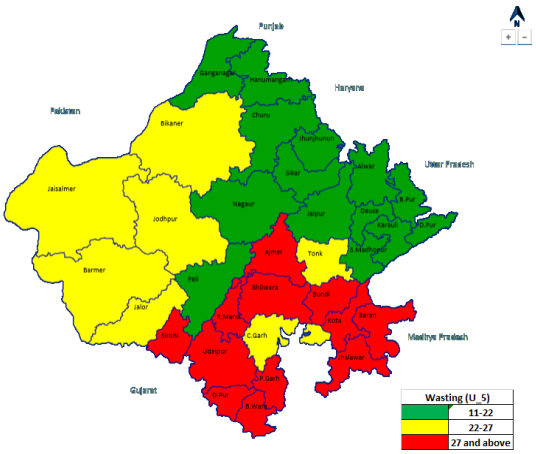

Figure 3c: Wasting (Rural; Under 5 yrs of age)

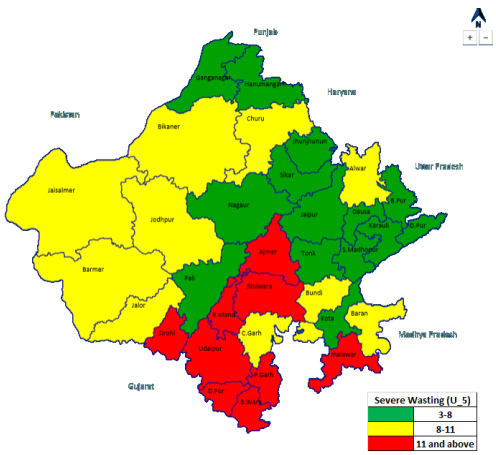

Figure 3d: Severe Wasting (Rural; Under 5 yrs)

Table 3: Rajsthan IMR data form SRS by NSSO regions

State region	Remarks	NSSO Regions	IMR												
			2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Southern		83	89	90	90	88	87	83	75	70	66	63	70	57	53
Western		81	72	72	69	67	67	64	58	54	52	49	47	45	45
South-Eastern		84	86	87	83	84	83	77	67	71	66	64	45	42	41
North-Eastern		82	68	69	70	66	61	57	57	51	48	46	43	41	37
Northern	New Region	85											35	35	36

Not surprisingly, the spatial patterns chime in with the IMR data available from SRS on a yearly basis in terms of the NSSO regions. Rajsthan earlier had 4 NSSO regions Southern, Western, South astern and North Eastern and IMR data were available in a time series till 2013. From 2013 the northern region has been separated; which incidentally is the best performing region in terms of IMR and, from back inference, given that child malnutrition contributes to IMR, well performing in nutritional status of children too.

The stagnation in the southern and the Western region is worrying. The newly carved out northern region has performed well but has reached a plateau and needs a fresh push. This is a region where some districts can aspire to be malnutrition free.

This preliminary analysis is useful in indicating where does the shoe pinch the most. A more detailed analysis needs to be done by looking at other parameters under NFHS-4 i.e. the correlates of child malnutrition. This is presented in the next stage of the analysis where we look at the districts with the best potential to achieve the status of being “malnutrition free”.

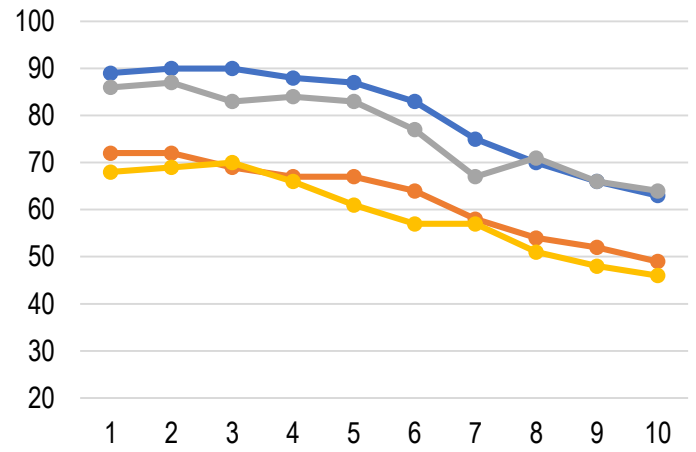

Figure 8: SRS data on IMR by NSSO regions 2004-13

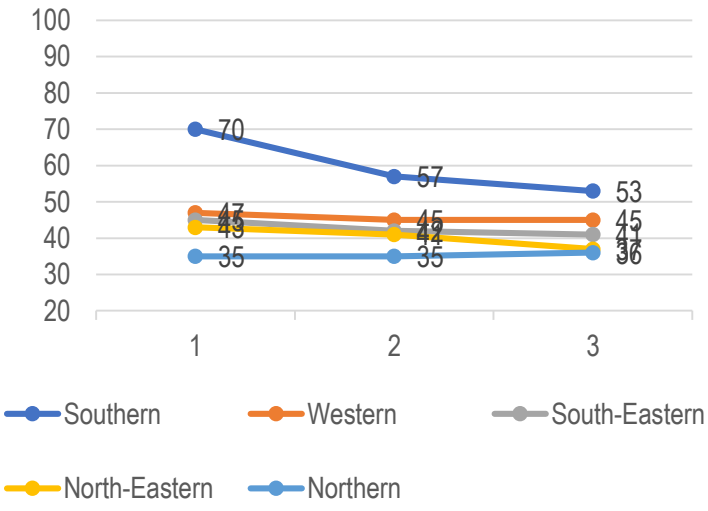

Figure 9: SRS data on IMR by NSSO regions 2014-16

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