Integrative Measurement through Nutritional Status: A Case Study of Purvanchal, Uttar Pradesh

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Abstract: *A nation's food security and Nutritional status is defined as the responsibility of the government to devise ways and means and it depends on income level, income distribution, employment pattern, and the prices of food. It therefore emerges that there are a number of indicators that influence food insecurity in one-way or the other. To find out the actual scenario the author has combined the indicator into a set of broad food security indices of Food Availability.*

Keywords: Food Security, Insecurity, Availability, Female Literacy

1. Introduction

Physiographically Purvanchal lies in the fertile Gangetic Plain its latitudinal extent is $23°52'46''$ N to $28°17'25''$ N, and Longitudinal extent is $81°18'3''$ E to $84°34'4''$ E. Food security indicators draw attention to the factors that actually distinguishes the food secure districts from the food insecure districts.
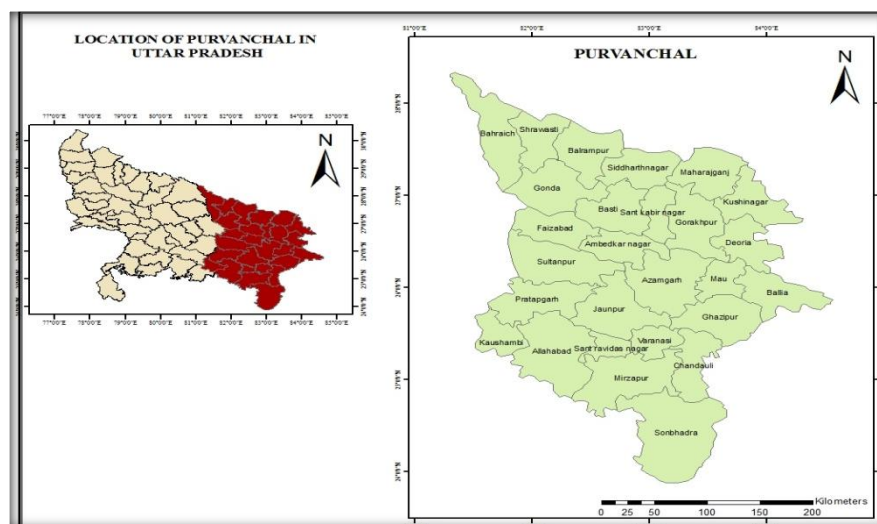

Figure 1: Study Area

Of course, such association between indicators in an index cannot tell the causal relation between these variables and food security. For instance, we find that female literacy is consistently higher in food secure districts and lower in food insecure districts that only show a co-relation between female literacy and food security. Whether it is empowerment of women agency contributing to a better utilization of household income, or through literate women having a better knowledge of improved nutritional practices, or some other relation, it is for analysis to bring out these relations.

But the indicators can draw attention to the issues for which significant differences exist. It therefore emerges that there are a number of indicators that influence food insecurity in one-way or the other. To find out the actual scenario the author has tried to find out the Food availability index.

2. Food Availability

The concern for food availability stems from production and related aspects that sustain a desired level of food production. Food grains are considered to be of paramount significance for household food and nutritional security, the reason being that cereals and pulses are staple foods and there is no perfect substitute for it (Chand, 2005). Food grains are also the cheapest source of energy and proteins as compared to other foods and are indispensible for the food security of the low-income classes (Chand and Kumar, 2004). Broadly the dimensions of availability are production and productivity, extent of irrigation and road connectivity. This relation shows the condition of each district with respect to the selected indicators, the composite index and the scenario of food availability. To analyze this, following

indicators have been chosen to determine a broad picture of food availability:

2.1 Food Grain Production

Agricultural output is an indicator reflecting the availability of food. It is a known fact that Purvanchal economy is dominated by agriculture, which employs about 77.25 per cent (1991) and 66.14 per cent (2001) population of the total work force, Purvanchal is less developed in terms of facilities, no doubt it is a major food grain producing region as and its specialization is in rice, wheat, jowar, bajra, maize and pulses.

2.2 Productivity

With respect to crop productivity, it is apparent that there is almost stagnation in average yield of food-grains during 1991 and 2001. Purvanchal is a major producer of diverse agricultural products in the country and it is the second largest producer of rice.

2.3 The Extent of Irrigation

Irrigation plays a key role in both stabilizing agricultural production and, through an increase in cropping intensity and an associated increase in productivity, improving a districts food security position. The average net irrigated area in 1991 was 49.45 per cent and reached to 61.50 per cent in 2001. There is observed wide inter district variation in irrigation coverage. In 1991 it varies from a minimum 16.55 per cent in Bahraich to a maximum of 77.22 per cent in Sultanpur, while in 2001 it reached to 22.77 per cent in Bahraich to 94.41 per cent in Ambedkarnagar. Tube-wells are the major source of irrigation followed by canals.

Table 1: Indicators of Food Availability Index

Districts	Food-Grains Production(Quintal)		Yield(Per Hectare)		Area-Irrigated(in per cent)		Connectivity(km.per/lakh population)	
	1991	2001	1991	2001	1991	2001	1991	2001
Bahraich	374540	242859	14.87	16.07	16.55	22.77	532	1216
Shrawasti	414331	326638	14.97	16.5	19.45	28.83	361	469
Balrampur	370672	244237	15.37	16.31	18.93	29.99	397	983.8
Gonda	208455	257776	17.22	18.99	30.64	43.61	658	1384
Siddharthnagar	139962	302918	18.21	20.6	29.23	41.95	442	1053
Basti	266617	254138	18.35	21.93	47.64	58.12	360	1068
Santkabirnagar	189587	262662	18.33	21.48	40.22	50.09	379	743
Maharajganj	372556	364218	21.22	25.68	37.22	46.86	520	1168
Gorakhpur	173453	186539	17.22	20.72	44.98	57.72	1080	2613
Deoria	231358	255206	20.21	24.97	39.98	55.55	1029	2241
Kushinagar	205173	224545	22.24	28.47	56.22	69.21	825	2784
Ballia	181092	210956	17.2	19.18	54.22	67.6	534	1875
Mau	234677	207722	18.31	20.41	60.22	73.42	419	1083
Azamgarh	215668	226286	16.22	19.89	67.99	73.47	747	2474
Faizabad	238615	215462	17.32	20.86	69.22	83.37	650	1638
Ambedkarnagar	250926	289856	18.21	24.5	72.33	94.41	582	1123
Sultanpur	226659	243415	18.21	21.05	77.22	69.22	1199	2576
Pratapgarh	189591	200085	14.57	17.97	66.22	78.52	1287	2764
Jaunpur	216655	217766	18.22	21.78	50.99	77.15	2161	4017
Allahabad	150541	191712	16.19	18.24	65.22	73.8	1382	3295
Kaushambi	178417	202356	13.99	17.99	43.21	54.53	613	827
Mirzapur	195608	227602	15.22	17.47	50.44	63.98	737	1898
Ghazipur	208933	222386	18.22	19.7	68.22	80.42	1162	2935
Varanasi	89751	99203	17.99	22.11	55.54	77.81	1108	2285
Chandauli	315989	248513	16.31	19.68	72.66	86.94	725	1691
Sant Ravidas Nagar	147940	140907	16.22	20.45	63.29	74.54	388	1061
Sonbhadra	159668	165501	9.21	11.2	17.22	26.71	506	1276

Source: Economic and Statistics Department, Lucknow

Data Base and Methodology

For the calculation of Food Availability Index (FAI) Max-Min (range estimation method) approach has been adopted. An index for each variable has been constructed. This is calculated by applying the following general Range Equalization Method (REM) adopted by the UNDP (HDR, 2005).
The formula is as under;
Variable Index = (Xi –Min X) / (Max X-Min X)
Where Xi = value of the variable
Min X= Minimum value of X in the scaling

Max X = Maximum value of X in the scaling

Analysis of Availability Index:

Table 2 shows the spatial distribution of index of food availability in Purvanchal in 1991, 2001 and change during this period. It is evident that about 25.96 per cent districts with an index ranging between 0.55 and 0.66 are highly secure in terms of food availability in 1991. All such districts except Maharajganj and Kushinagar form a contiguous region in the central part of the study area (Table 2). The factors which are responsible for high food availability are favorable climatic conditions suitable for

agriculture, coupled with infrastructural development and environment friendly farming practices.

Table 2: Purvanchal: Availability Index and Per cent Change, 1991-2001

	1991		2001		Change 1991-2001	
Districts	Index	Rank	Index	Rank	Index	Rank
Bahraich	0.35	22	0.26	26	-26.48	-4
Shrawasti	0.37	20	0.31	24	-16.15	-4
Balrampur	0.35	23	0.27	25	-22.10	-2
Gonda	0.34	24	0.40	21	15.97	3
Siddharthnagar	0.27	26	0.44	19	58.67	7
Basti	0.44	14	0.47	16	6.22	-2
Santkabirnagar	0.35	21	0.42	20	18.64	1
Maharajganj	0.56	7	0.59	5	6.71	2
Gorakhpur	0.44	15	0.49	13	13.32	2
Deoria	0.51	11	0.59	7	14.96	4
Kushinagar	0.57	5	0.69	2	22.31	3
Ballia	0.40	17	0.48	15	18.22	2
Mau	0.47	13	0.46	18	-3.93	-5
Azamgarh	0.50	12	0.56	10	13.42	2
Faizabad	0.53	8	0.54	12	3.00	-4
Ambedkarnagar	0.56	6	0.67	3	19.91	3
Sultanpur	0.64	2	0.59	6	-8.59	-4
Pratapgarh	0.51	10	0.55	11	7.08	-1
Jaunpur	0.66	1	0.70	1	6.38	0
Allahabad	0.52	9	0.57	9	8.26	0
Kaushambi	0.30	25	0.33	23	8.75	2
Mirzapur	0.39	18	0.46	17	17.38	1
Ghazipur	0.59	4	0.61	4	4.29	0
Varanasi	0.43	16	0.48	14	10.40	2
Chandauli	0.59	3	0.57	8	-3.16	-5
Sant Ravidas Nagar	0.38	19	0.40	22	5.27	-3
Sonbhadra	0.08	27	0.13	27	73.20	0

Source: Calculated by the author

High Food Availability Index of 0.55 to 0.45 has been recorded in six districts located in central and south western part of the study area. The remaining 52 per cent districts have either moderate or low level of availability index ranging between 0.07 and 0.45. All such districts except Balrampur, Gonda and Siddharthnagar are sporadic and scattered. It is interesting to note that the districts which recorded very high surplus of food grains in 1991 recorded moderate availability index. Similarly districts with low level of food surplus recorded moderate level of food availability index.

The responsible factors for insecure and severely insecure food regions are many. The availability of food depends not only on its production, but also on the factors which help in the growth of food market through transport of food from surplus producing areas to deficit areas and linking the habitations to the market.

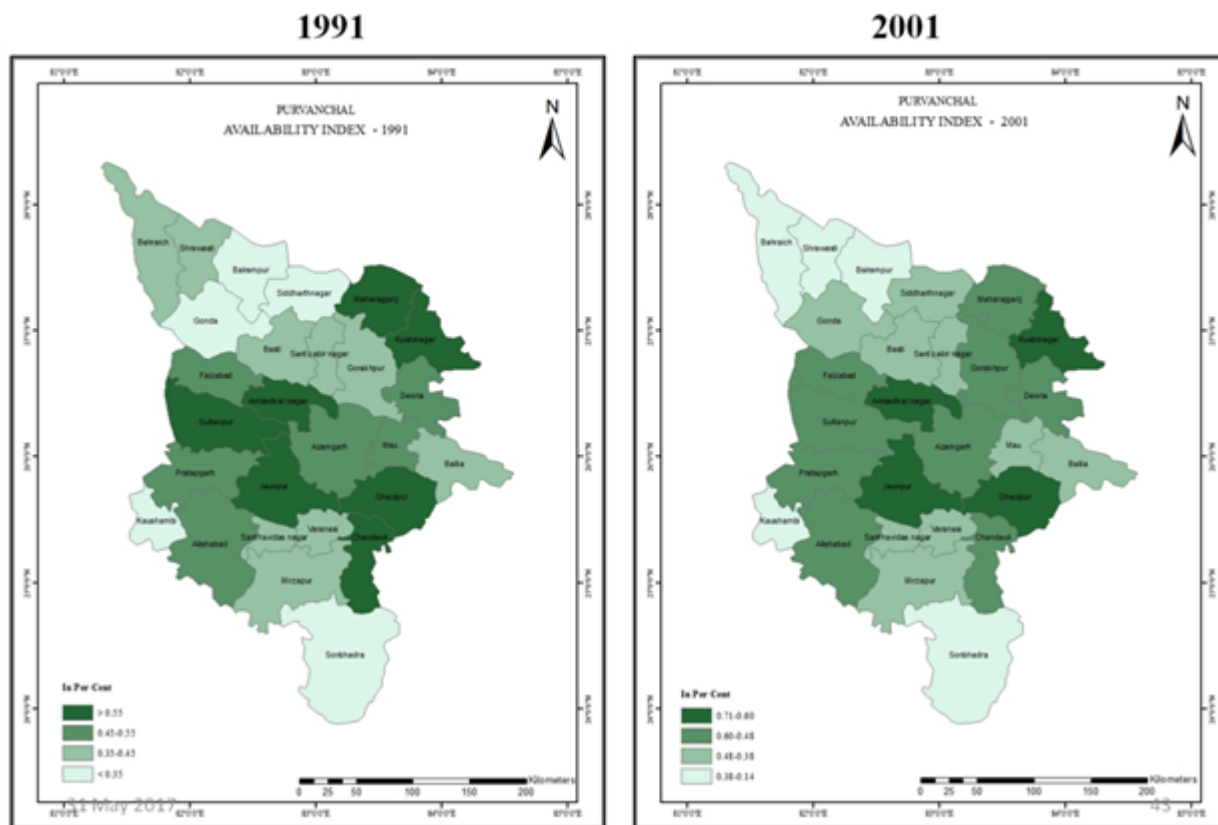## Availability Index- 1991 and 2001
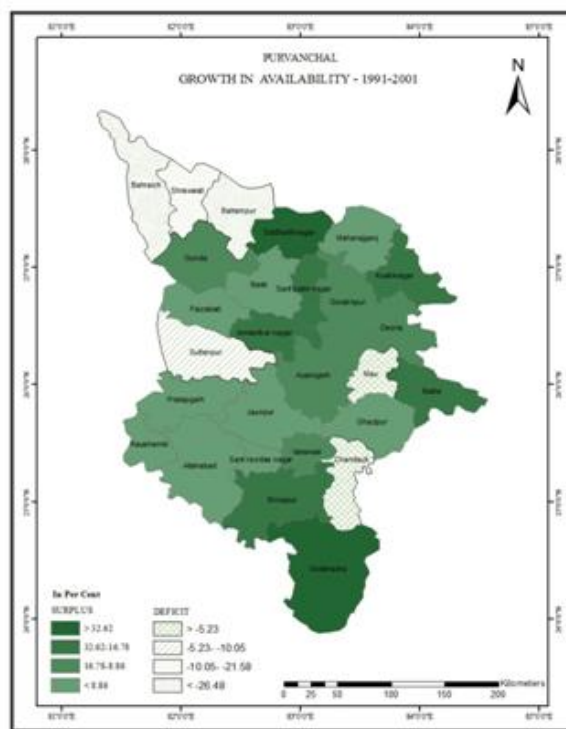

Figure 2and 3

Figure 4: Growth and per cent Change in Availability Index of Purvanchal

It is evident from (Table: 2 and figures: 3) that the situation of food availability index in 2001 is a mix. The number of highly secure districts decreased to four but at the same time the range increased significantly. It ranges between 0.6 - 0.71. It is found that about 33 per cent districts recorded high index value in 2001. This way about 48 per cent districts have recorded high to very high Index of Food Availability. The moderate and low index districts are generally located in the north western and south eastern part of Purvanchal.

Change analysis of food availability (Table 2, Figure 4) index reveals that a good number of districts reported improvement not only in terms of number but also in rank during 1991-2001. The point of concern is that some of the districts lost their position. Though only six districts recorded a negative growth yet it ranges between -3.16 to -26.48. it is found that the districts with very high food availability per head per day recorded highest negative growth in terms of Availability Index. Furthermore, besides negative growth in six districts, there are four other districts which lost their ranking, it is a point of concern and need thorough investigation. Among the districts with positive growth Sonbhadra and Siddharthnagar need special mention because in spite of discernable growth in index, Sonbhadra remained at last ladder and Siddharthnagar jumped from 26th rank to 19th position. Jaunpur, Ghazipur and Allahabad districts reported a high growth and at the same time retained their first, fourth and ninth rank.

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