CORRELATIONS

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Finding correlations between coal production and HDI (Human Development Indices)

First, I tried finding the correlation between the coal production and HDI for the whole country, by considering different years, but realized that was not a good point of comparison, as both the values are going to increase and won't really show how they're related. So, when I did that, I got a ridiculously high value (0.9712740800639509) which was pretty predictable.

So, then I did a year wise analysis with the top 10 coal producing states of India and their HDIs and this is what I got.

Coal production in million tonnes

States	2009-2010	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20
Chhattisgarh	109.953	113.825	113.958	117.83	127.095	134.764	130.605	138.525	142.546	161.893	157.744
Jharkhand	105.917	108.949	109.566	111.274	113.091	124.143	121.067	126.435	123.297	134.666	131.763
Odisha	106.409	102.565	105.476	110.132	112.917	123.627	138.461	139.359	143.328	144.312	143.016
Madhya Pradesh	74.074	71.104	71.123	75.948	75.59	87.609	107.714	105.013	112.127	118.661	125.726
Jammu and Kashmir	0.023	0.023	0.02	0.019	0.019	0.013	0.013	0.01	0.014	0.013	0.014
Maharashtra	41.005	39.336	39.159	39.134	37.223	38.257	38.351	40.559	42.219	49.818	54.746
West Bengal	23.133	21.659	24.23	26.467	28.244	29.97	25.751	27.667	29.24	33.136	33.614
Uttar Pradesh	13.968	15.526	16.178	16.09	14.721	14.957	12.689	16.056	18.309	20.275	18.03
Meghalaya	5.767	6.974	7.206	5.64	5.732	2.524	3.712	2.308	1.529	0	0
Assam	1.113	1.101	0.602	0.605	0.664	0.779	0.487	0.6	0.781	0.784	0.517

Human Development Index of each State (value out of 1)

State	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Chhattisgarh	0.571	0.57	0.567	0.563	0.572	0.582	0.59	0.596	0.606	0.608	0.611
Jharkhand	0.572	0.571	0.568	0.564	0.569	0.576	0.58	0.582	0.592	0.595	0.598
Odisha	0.522	0.533	0.541	0.55	0.56	0.572	0.582	0.589	0.599	0.602	0.605
Madhya Pradesh	0.525	0.535	0.542	0.549	0.559	0.571	0.581	0.588	0.598	0.6	0.603
Jammu and Kashmir	0.627	0.64	0.65	0.66	0.664	0.67	0.672	0.672	0.682	0.685	0.688
Maharashtra	0.633	0.644	0.651	0.659	0.666	0.673	0.678	0.68	0.691	0.694	0.697
West Bengal	0.562	0.571	0.577	0.584	0.595	0.607	0.617	0.625	0.635	0.638	0.641
Uttar Pradesh	0.524	0.532	0.537	0.543	0.553	0.564	0.572	0.579	0.589	0.591	0.594
Meghalaya	0.597	0.619	0.636	0.654	0.652	0.65	0.646	0.64	0.65	0.652	0.656
Assam	0.555	0.564	0.57	0.578	0.584	0.59	0.595	0.598	0.608	0.61	0.613

Results:

Year	Correlation
2009-10	-0.3346873503
2010-11	-0.4094166027
2011-12	-0.4795356248
2012-13	-0.55238061
2013-14	-0.5490560734
2014-15	-0.5533337548
2015-16	-0.5449708401
2016-17	-0.5321417975
2017-18	-0.5321140543
2018-19	-0.5139799276
2019-20	-0.4999105003

These results show that the coal production and HDI are negatively correlated for the major coal producing states of India.

Earlier, I had thought it would be positively correlated because more coal production would mean more jobs and more revenue, resulting in people leading better lives. This shows that this is not the case.

More production does seem like it brings more money for the people, but in reality, it means that other people, not the primary workers benefit from it.

This is probably because workers aren't paid enough in correlation to the amount of work they do, or its thinly spread out, barely raising their income. And since the people don't have any rights to the land, there's not much they can do about the later processes and change how they benefit from it.

This feels like a real-world application of the resource curse theory, which states that states with an abundance of non-renewable natural resources experience stagnant economic growth/ economic contraction. While this isn't completely stagnant, it's enough to affect the human development index of the state which has per capita income as a parameter.

Another parameter it may be affecting the HDI negatively is in the life expectancy part. Coal production and mining involves a lot of toxic materials that aren't good for your respiratory system. While it might not seem like a lot, they can build up over the years in workers that have been working there their whole lives.

Coal production might also affect the education of the people there as some of them might not be encouraged to pursue a degree, but to start working in factories/ mines to earn for their families.

From the results you can see how the correlation was increasing negatively from 2009 to 2015, which wasn't a good thing as it could've meant that the gap between the product and the benefits gained by the people was increasing. However, we now see a negative trend from 2016 to 2020 which is a positive sign as it means that the HDI is also increasing faster than before which is a good thing for the state.

So, to conclude, coal production might be affecting HDI positively in some ways, but the net effect can be considered negative. The negatives might be outweighing the positives right now, but with that positive trend that we see, that could change.