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RESEARCH ARTICLE

IMPACT OF HOUSEHOLD AMENITIES ON CHILD HEALTH IN RAJASTHAN: AN ANALYSIS.

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Manuscript Info

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Key words:-
Child Health, Household Amenities, Geographical Analysis

Abstract

An attempt has been made in present study to analyze the impact of safe drinking water, improved sanitation and drainage facility and clean cooking fuel use by households on the infant mortality, under five age group mortality, neo-natal mortality, post-natal mortality, morbidity of diarrhoeas, fever and acute respiratory infection among children. State Rajasthan of India was the area under this study because it lies in the list of BIMARU States. The child health in BIMARU states is most affected than other Indian states. The data used in present study is taken from annual health surveys (AHS) conducted between years 2012-13 and censes of India 2011. The results occurred from this calculation is represented by maps which are prepared by Arc-GIS 9.3 and correlations between all these 11 variables were calculated with the help of SPSS software.Our study suggests that lack of safe drinking water, sanitation and drainage facility increases the risk of infant mortality, under five age group mortality, neo-natal mortality and post natal mortality, morbidity of diarrhoeas, fever and acute respiratory infection among children.

Introduction:-

Unsafe drinking water, poor sanitation, drainage and unhygienic condition claim around 0.5 million children death before the age of 5 from diarrhoea in India annually (Ashwani Kumari, 2014). Most of the research on the health impact of water, sanitation and drainage facility projects has focused on the causes of diarrhoeal disease and mortality of younger children. Although it is generally believed that the rate of disease will decrease following by improvements in drinking water and sanitation (S.A.Esrey et al, 1991). Acute respiratory infections are the leading cause of childhood illness and death worldwide accounting for an estimated 6.5% of the entire global percentage of disease (Mekuriaw. A, 2014). Among children under five age group 3 to 5 millions deaths have been attributed annually to ARI of which 75 % are from pneumonia (Stansfield, S & Shepaed, 1993). Diarrhoea followed by ARI are the most common cause of death under five age group worldwide. Deaths from ARI are often caused by dehydration due to less of water and electrolytes (IIPS AND Macro International, 2007). The unclean cooking fuel leads to increased ARI among childern (Mekuriaw. A, 2014). A numbers of studies suggested that exposure of domestic smoke from biomass fuel (charcoal, wood, cow dung etc.) increase the risk of ARI (Ezzati and Kammen, 2001, Mishra, 2003). Exposure to population from wood burning stoves for indoor heating is associated with severe respiratory symptoms and mortality (Johnson and Aderele, 1992). Since the households fuel use and the ARI cases vary from place to place and space to space within the country.

Hypothesis:-

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The geographical areas which are under safe drinking water availability, improved sanitation, drainage facility and clean cooking fuel facility may be the low infant mortality, low under five age group mortality, low neo-natal mortality, , low morbidity of diarrhoeas, low fever, acute respiratory infection and low post natal mortality among children.

Objectives:-

The objectives of present study are to analyse impact of household's safe drinking water, improved sanitation, clean cooking fuel and drainage on child health in Rajasthan in 2012-13.

Data and Methodology:-

Data:-

The study area of present study is Rajasthan because it lies in the list of BIMARU States. The child health in BIMARU states is lower than other Indian states**.** The district is chosen as the unit of study. The data used in present study is taken from (AHS) 2012-13 annual health surveys and censes of India 2011. The survey provides district-level estimates on a set of infant mortality, under 5 mortality, neo-natal mortality, post natal mortality, acute respiratory infection, diarrhoea and fever among children. From the census data information on drinking water from a treated source, sanitation facility, drainage facility and usage of clean cooking fuel facilities on district level.

Methodology:-

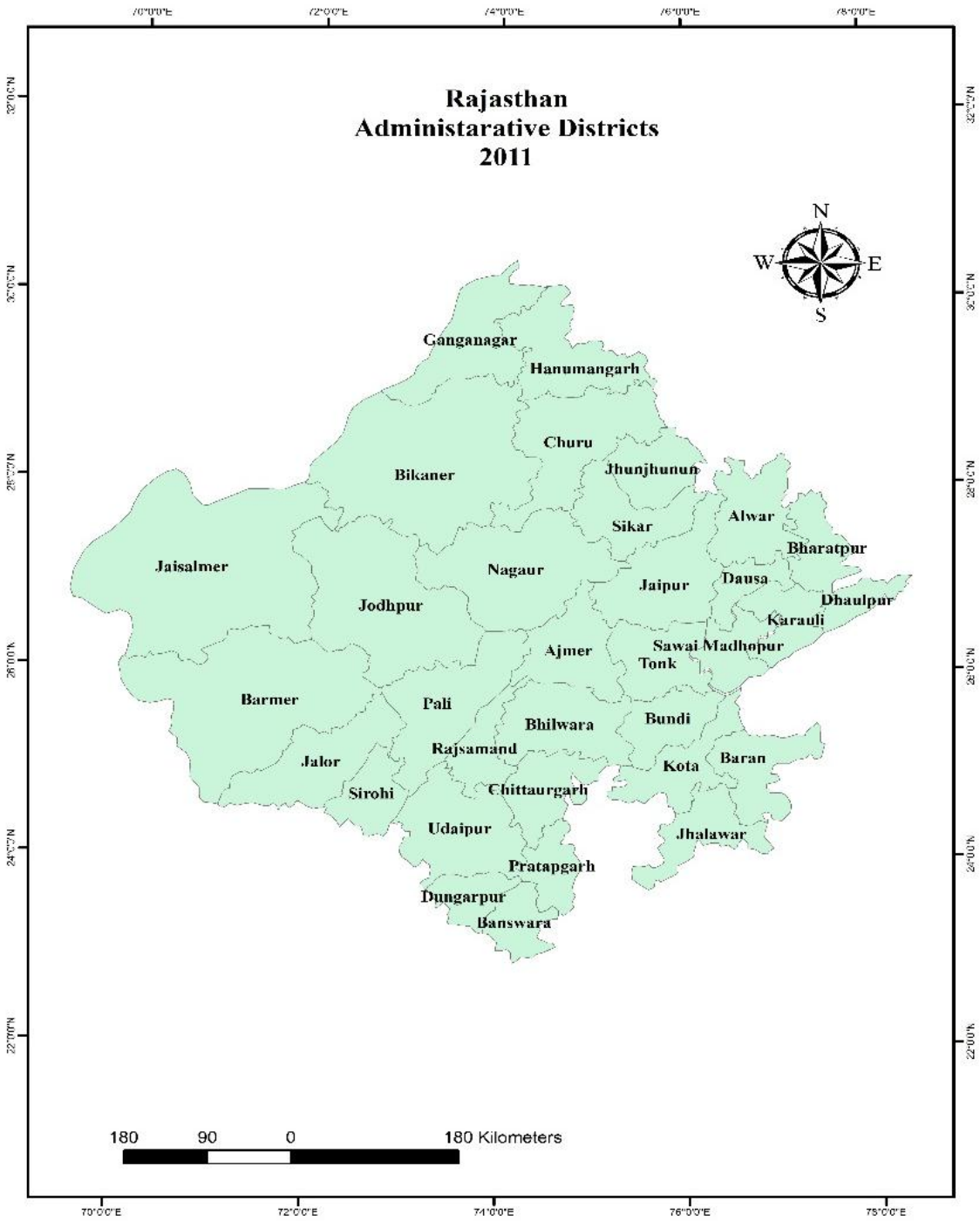
Description of variables	Source
IMR-Total infant death (0-1 year)/ 1000 live births	AHS 2012-13
U5MR- Total child death (under 5 year)/ 1000 live births	AHS 2012-13
NNMR- Total infant deaths (0-29 days)/1000 live births	AHS 2012-13
PNMR- Total infant deaths (29 days- 1 year)/1000 live births	AHS 2012-13

Drinking water from treated source -	Tap water from treated source
Improved sanitation-	Availability of toilet facility
Improved drainage facility-	Both open and close drainage facility
Clean cooking fuel-	LPG/PNG

After collecting the data it is arranged, tabulated, calculated and analysed. Sex ratio is computed for every individual district; The results occurred from this calculation is further represented by maps which are prepared by Arc-GIS 9.3.andrange method is used to form four categories of the data (high, moderate high, moderate low and low).Correlations between all these 11 variables have calculated with the help of SPSS16 software.

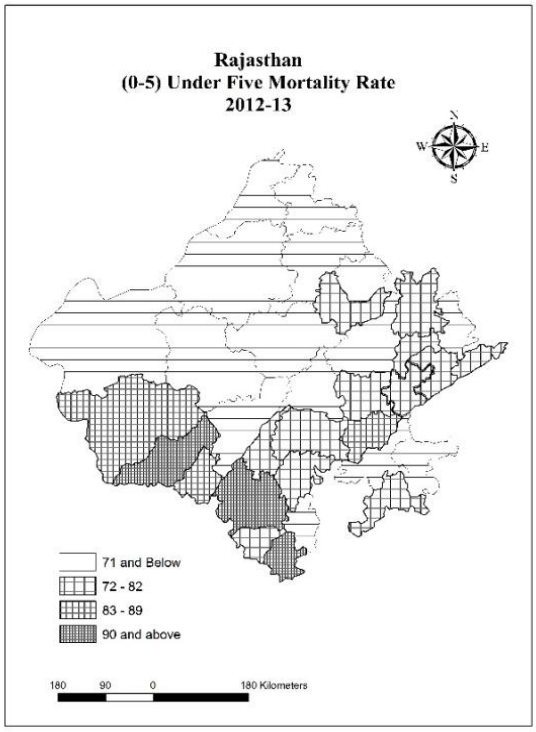
Study Area:-

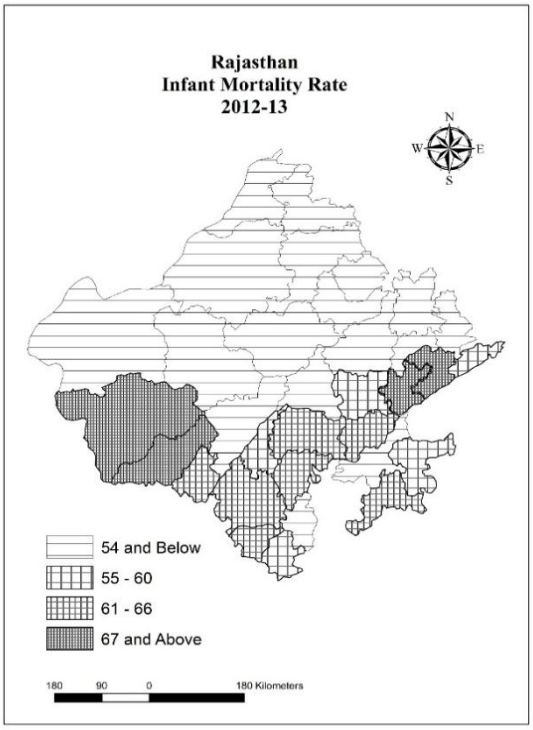
Rajasthan is India's largest state by area (342,239 square kilometres or 10.4% of India's total area). It is located on the western side of the country. The state was formed on 30 March 1949. Its capital and largest city is Jaipur also known as Pink City. Other most important cities are Jodhpur, Udaipur, Bikaner, Kota and Ajmer. The geographic features of Rajasthan are the Thar Desert and the Aravalli Range, which runs through the state from southwest to northeast, almost from one end to the other, for more than 850 kilometres (530 mi). Rajasthan's population is made up mainly of Hindus, who account for 88.45% of the population. Muslims make up 9.08%, Sikhs 1.27% and Jains 1% of the population. Hindi is the official and the most widely spoken language in the state (91% of the population as per the 2001 census), followed by Bhili(5%), Punjabi (2%), and Urdu (1%).The Census 2011, Rajasthan had a literacy rate of 67.06% (80.51% male and 52.66% female). Although Rajasthan's literacy rate is below the national average of 74.04% and although it's female literacy rate is the lowest in the country (followed by Bihar at 53.33%), the state has been praised for its efforts and achievements in raising male and female literacy rates. In Rajasthan Jodhpur and Kota are two major educational hubs, Where Kota known for best medical and Engineering coaching and Jodhpur is home of many higher educational institutions like IIT, AIIMS, National Law University.



***Source: Census of India, Administrative Atlas of Rajasthan**

Result and Discussions:-





Source: Census of India and Households Table

IMR:-

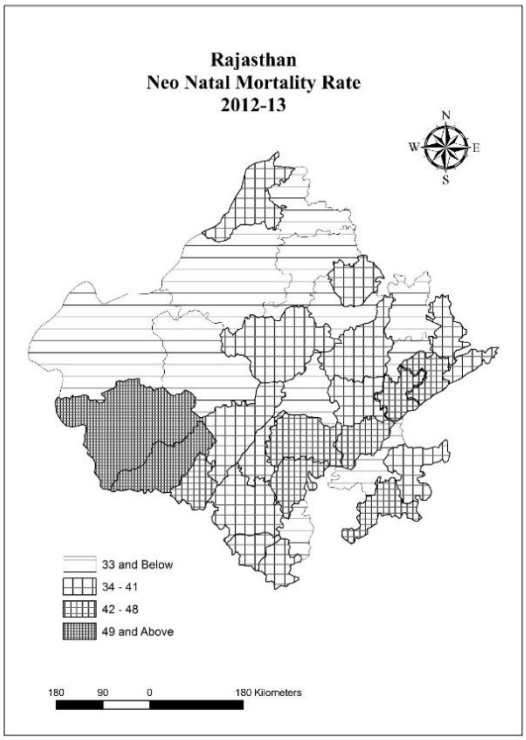
Average IMR of Rajasthan is 55. Jalor (72) at the top followed by Barmer, Karauli, Sawai Madhopur, Sirohi, Bundi, Bhilwara, Chittaurgarh, Jhalawar, Udaipur and Dungarpur, on other side Churu, Jhunjhunun, Bikaner, Jodhpur, Hanumangarh and Kota (36) at the bottom.

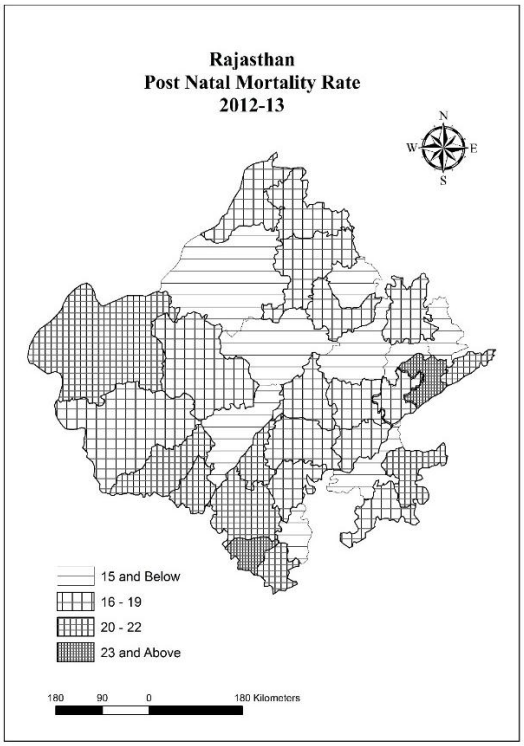
U5MR:-

Average U5MR of Rajasthan is 74. Banswara (95) is at the top followed by Jalor, Udaipur, Sirohi, Bundi, Barmer, Dausa, Karauli, Dungarpur, Bhilwara, Sawai Madhopur, and Rajsamand, on other hand Jhunjhunun (69) followed by Nagaur, Bikaner, Jaipur, Hanumangarh, Churu and Kota (47) at bottom.

NNMR;-

Average NNMR of Rajasthan is 37. Barmer (53) at the top followed by Jalor, Sawai Madhopur, Bundi, Chittaurgarh, Bhilwara, Jhalawar, Karauli, Sirohi, Udaipur, and Dungarpur (41), on other side Dausa, Sikkar, Ajmer (31) followed by Churu, Jodhpur, Hanumangarh, Jaisalmer and Kota (25) at the bottom.





Source: Census of India and Households Table

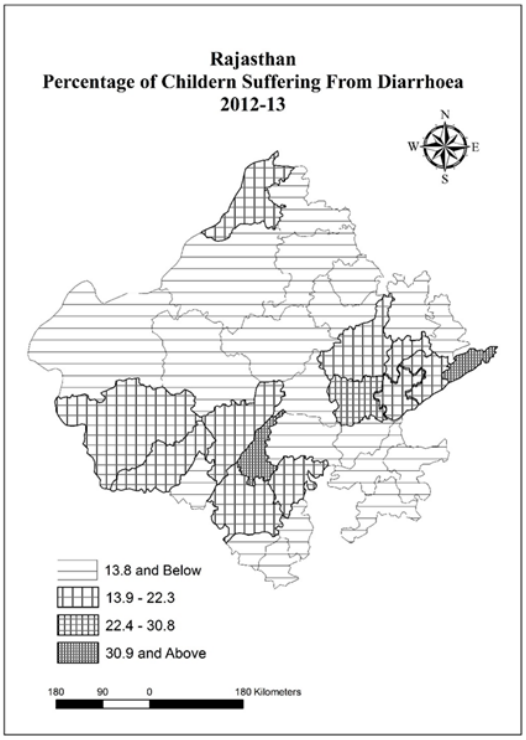
PNMR:-
Average PNMR of Rajasthan is 18. Karauli (25) at the top followed by Dungarpur, Dausa, Jaisalmer, Sirohi, Udaipur,Rajsamand, Dhaulpur and on other side Pali, Jaipur, Bikaner (15) followed by Nagaur, Bharatpur, Jhunjhunun and Kota (12) at the bottom.

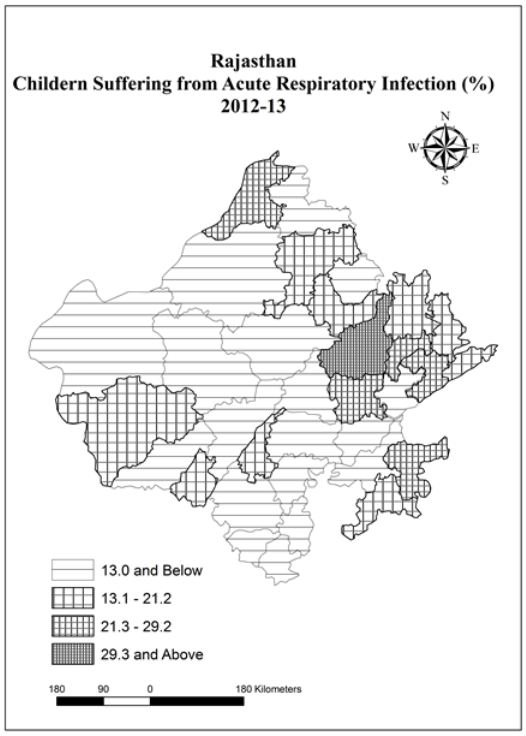
% of Children suffering from Diarrhoea:-
Average % of Children suffering from Diarrhoea of Rajasthan is 13.4 %. Rajsamand (39.3 %) at the top followed by Dhaulpur, Tonk, Chittaurgarh, Barmer, Sawai Madhopur, Jalor, Jaipur (17.9 %) and on other side Sirohi & Banswara (9.4) followed by Bikaner, Hanumangarh, Jaisalmer, Bharatpur, Churu, Sikkar, Jhunjhunun and Nagaur (5.2 %) at the bottom.

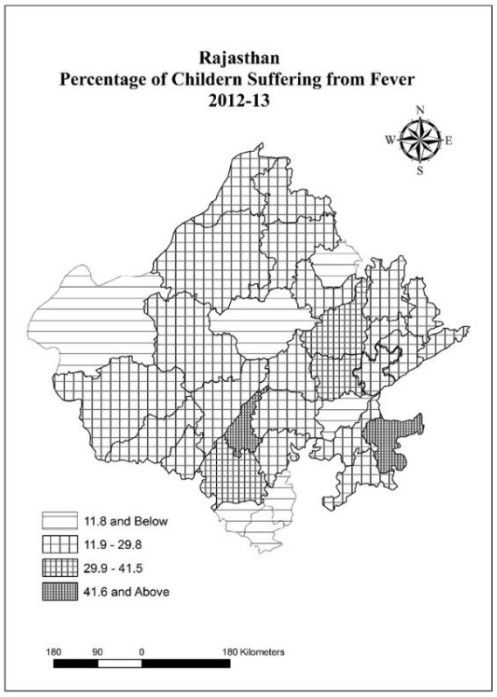
% of Children suffering from ARI:-
Average % of Children suffering from ARI of Rajasthan is 15.9 %. Jaipur (37.2 %) at the top followed by Karauli, Tonk, Ganganagar, Baran, Dausa, Sirohi and Sikkar (21 %) and on other side Hanumangarh (10) followed by Bundi, Ajmer, Pali, Jhunjhunun, Jalor, Bikaner, Jaisalmer, Nagaur and Bhilwara (3.5 %) at the bottom.

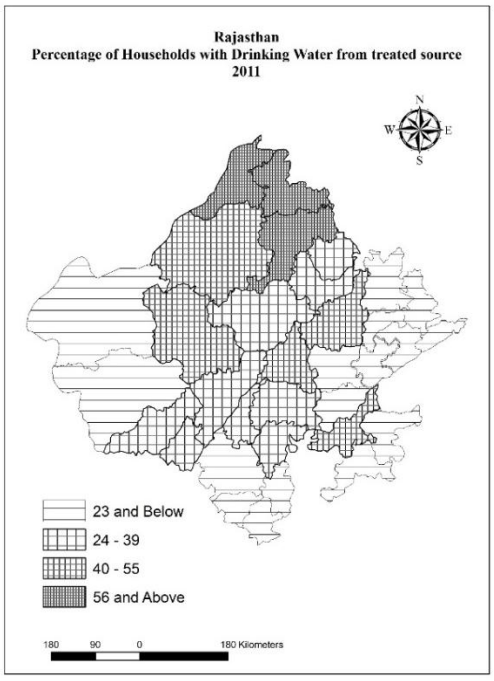
% of Children suffering from Fever:-
Average % of Children suffering from fever of Rajasthan is 20.3 %. Rajsamand (52.2 %) at the top followed by Udaipur, Jaipur, Tonk, Dhaulpur, Bhilwara, and Kota (23.1%) and on other side Bundi (11.3) followed by Dungarpur, Jhunjhunun, Jaisalmer, Banswara and Nagaur (6.4 %) at the bottom.

Tap water from treated source:-
Rajasthan has 32 % of households have tap drinking water from treated source same as national average 32 %. Hanumangarh (71) at the top followed by Ganganagar (68), Churu, Kota, Jaipur, Bikaner, Ajmer and Jodhpur, on other side Tonk (19), followed by Bharatpur, Sawai Madhopur, Baran, Dhaulpur, Barmer, Jaisalmer, Dausa, Karauli, Dungarpur, Partapgarh and Banswara (9) at the bottom level.









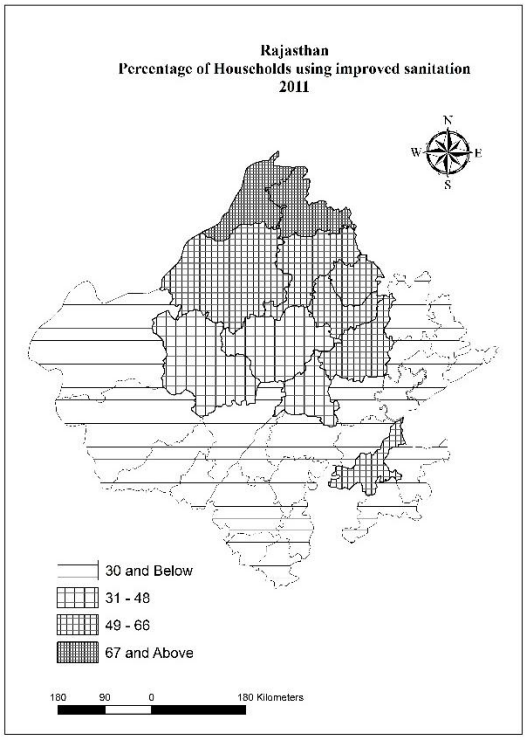
Source: Census of India and Households Table

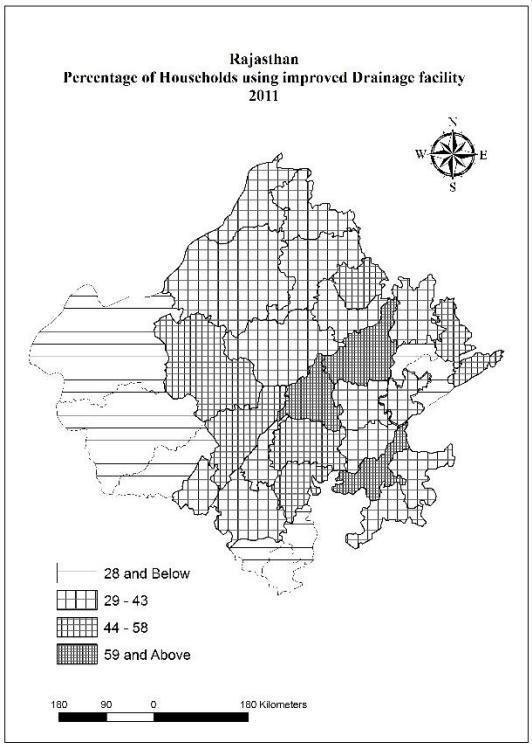
Improved Sanitation:-

Rajasthan has 35 % of households have improved sanitation whereas national average is 47 %. Ganganagar and Hanumangarh (85) at the top followed by Jaipur, Churu, Jhunjhunun, Bikaner, Kota, Sikkar, Ajmer, Jodhpur, and Nagar, and on the other side Baran (18)followed by Dausa, Jalwar, Dhaulpur, Karauli, Jalor, Barmer, Dungarpur, Banswara and Partapgarh (11) at the bottom.

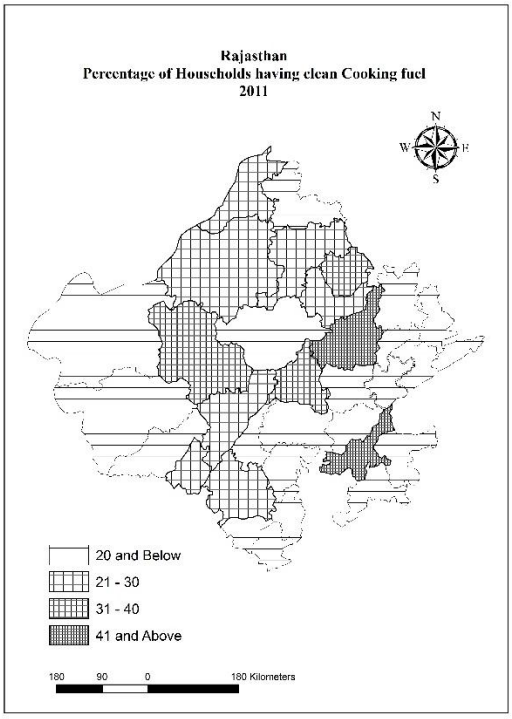
Drainage Facility:-
Rajasthan has 42 % of households have drainage facility whereas national average is 51 %. Kota (73 %) at the top followed by Jaipur (63), Ajmer (59), Bharatpur, Pali, Bhilwara, Chittaurgarh, Jodhpur,Jhunjhunun, Jhalawar and Sikkar on other side Dausa (25) followed by Jaisalmer, Partapgarh, Karauli, Jalor, Dungarpur, Banswara and Barmer (15) at the bottom.

Clean Cooking fuel:-
Rajasthan has 23 % of households have drainage facility whereas national average is 29 %.Jaipur (50) at the top following by Kota, Ajmer, Jhunjhunun, Jodhpur, Sikkar, Bikaner, Ganganagar and Sirohi, and another side Bharatpur, Jalwar, Baran (14) followed by Dausa, Dhaulpur, Tonk, Jalor, Jaisalmer, Karauli, Partapgarh, Dungarpur, Barmer and Banswara (9) at the bottom.



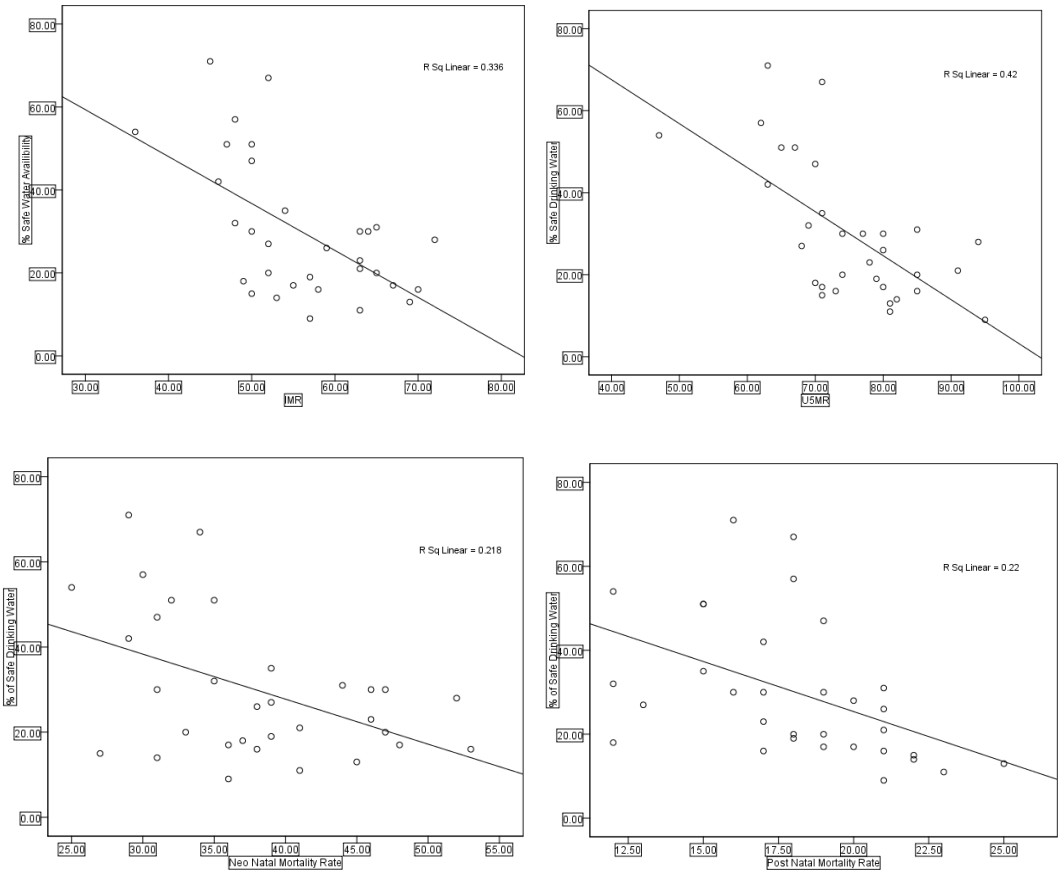


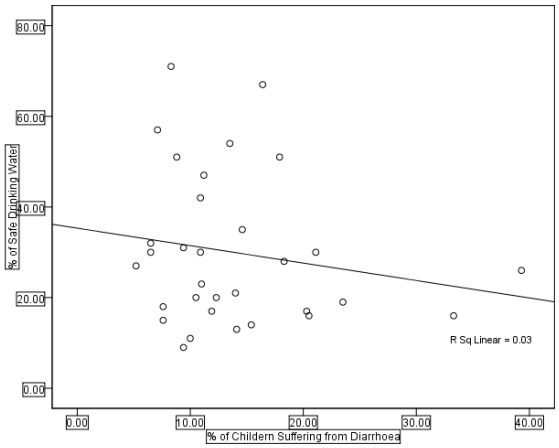
Source: Census of India and Households Table

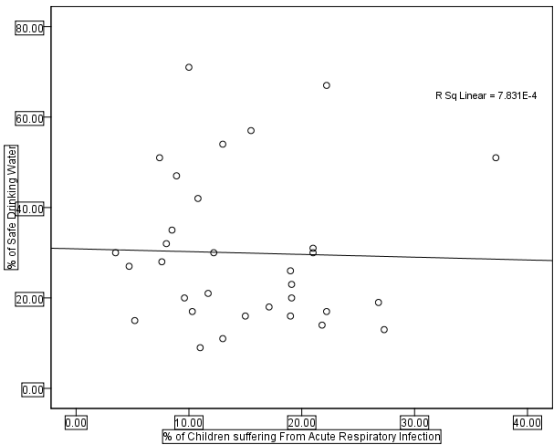


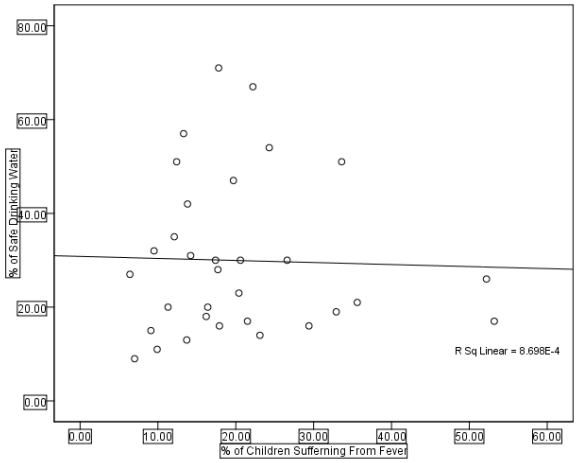
Source: Census of India and Households Table

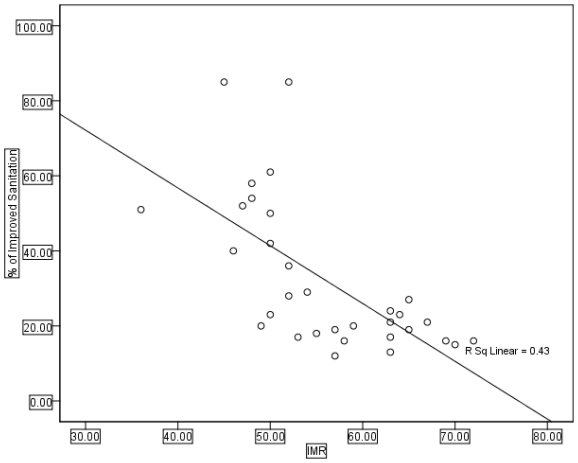
Scatter Diagram Between All Indicators Of Amenities And Child Health

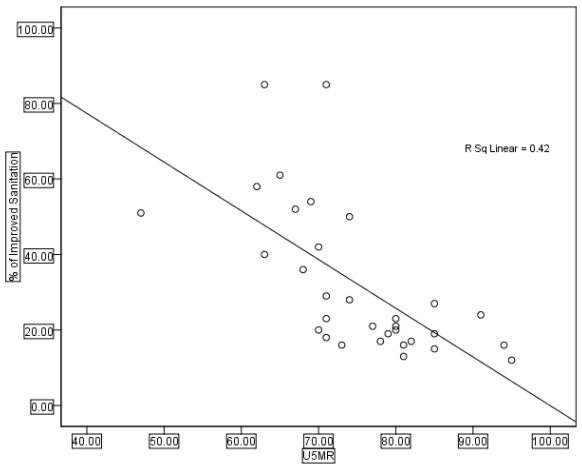


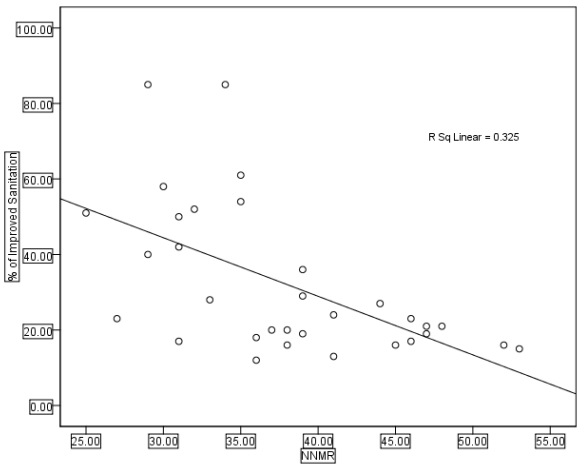

% of Safe Drinking Water
% of Childern Suffering from Diarrhoea
R Sq Linear = 0.03

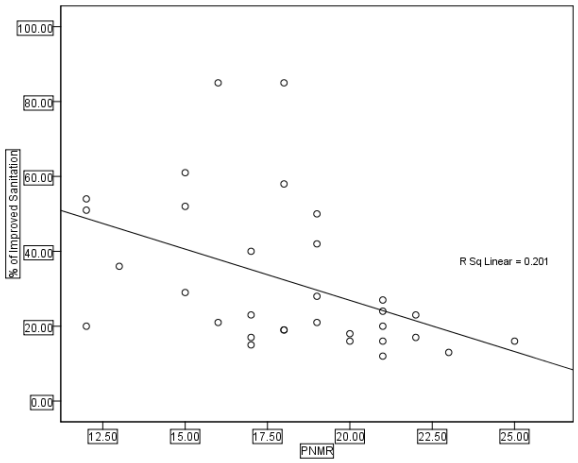

% of Safe Drinking Water
% of Children suffering From Acute Respiratory Infection
R Sq Linear = 7.831E-4

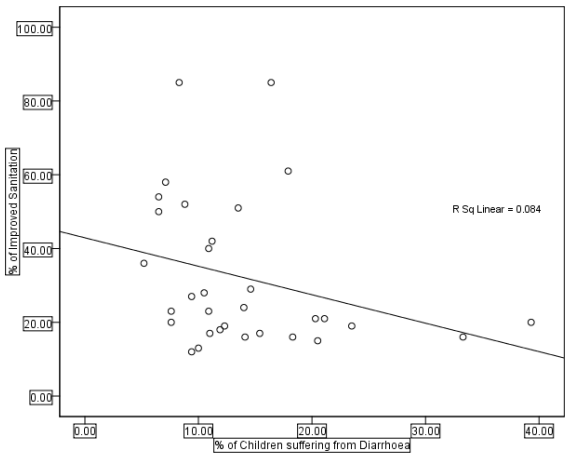

% of Safe Drinking Water
% of Children Suffering From Fever
R Sq Linear = 8.698E-4

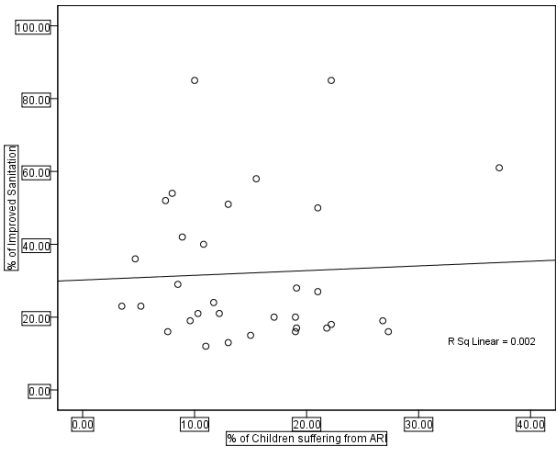

% of Improved Sanitation
IMR
R Sq Linear = 0.43

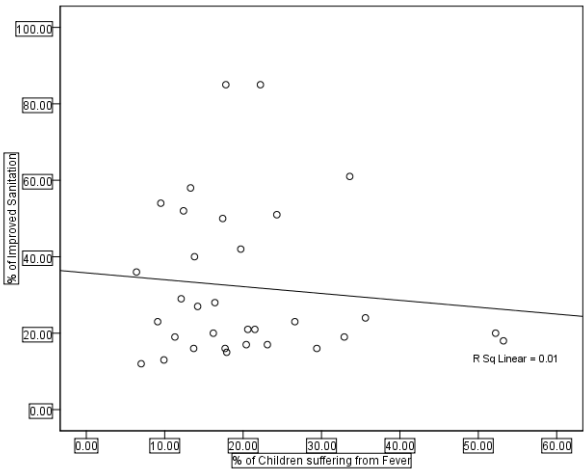

% of Improved Sanitation
U5MR
R Sq Linear = 0.42

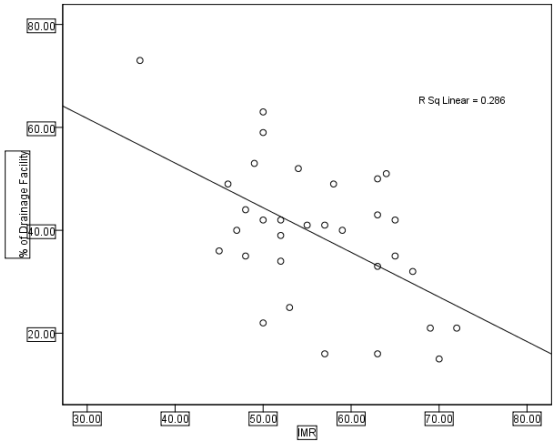

% of Improved Sanitation
NNMR
R Sq Linear = 0.325

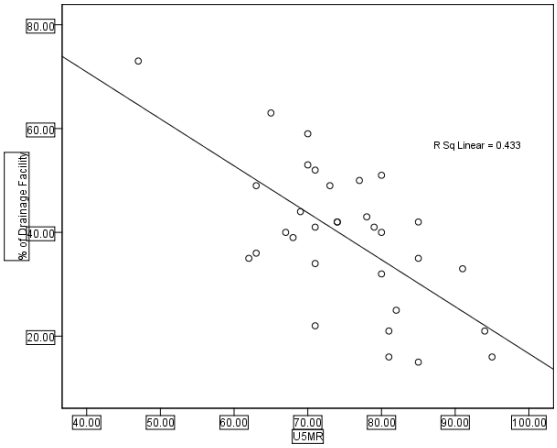

% of Improved Sanitation
R Sq Linear = 0.201
PNMR

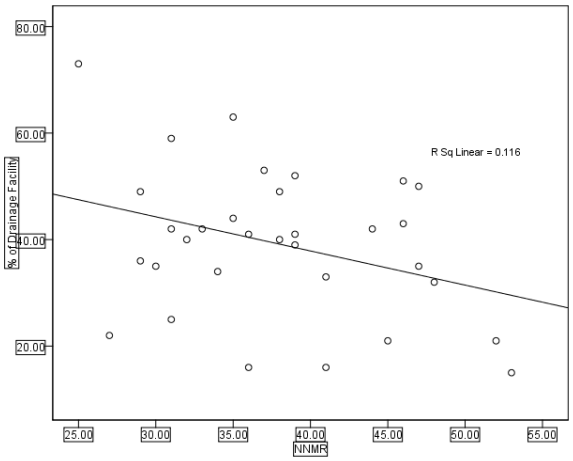

% of Improved Sanitation
R Sq Linear = 0.084
% of Children suffering from Diarrhoea

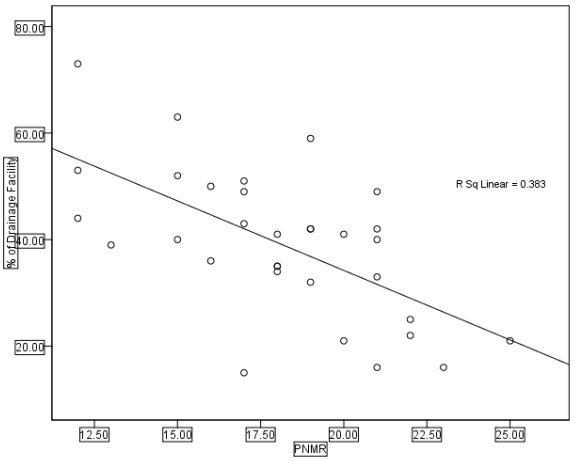

% of Improved Sanitation
R Sq Linear = 0.002
% of Children suffering from ARI

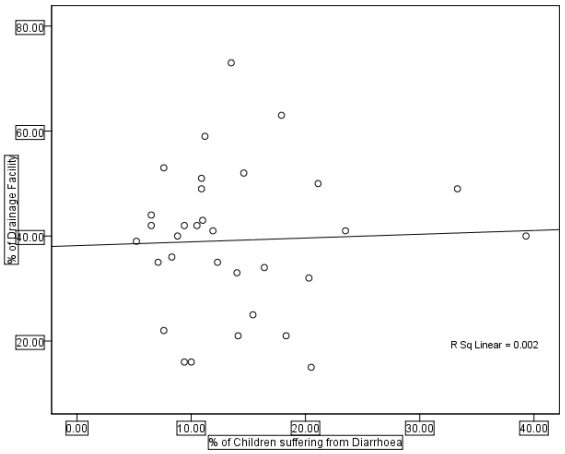

% of Improved Sanitation
R Sq Linear = 0.01
% of Children suffering from Fever

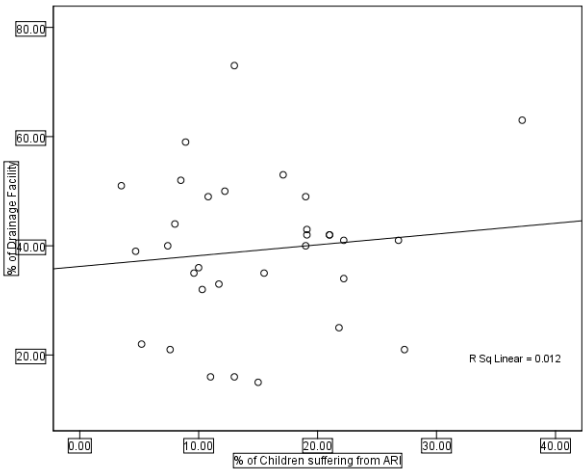

% of Drainage Facility
R Sq Linear = 0.286
IMR

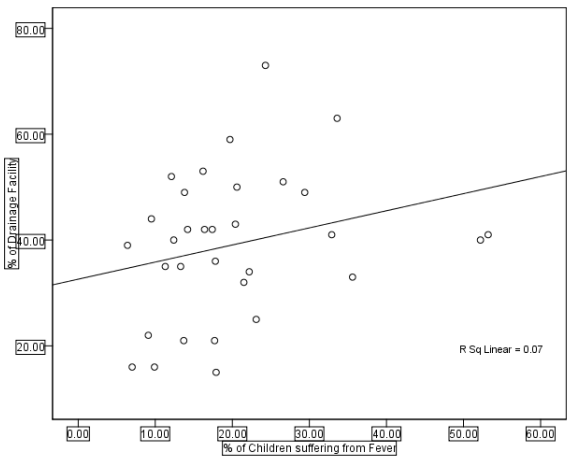

% of Drainage Facility
R Sq Linear = 0.433
U5MR

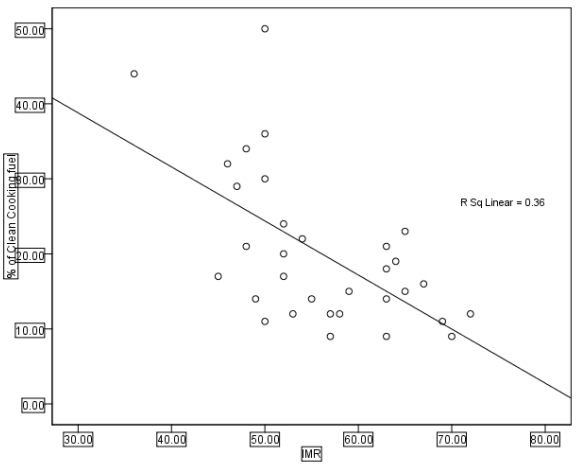

% of Drainage Facility
R Sq Linear = 0.116
NNMR

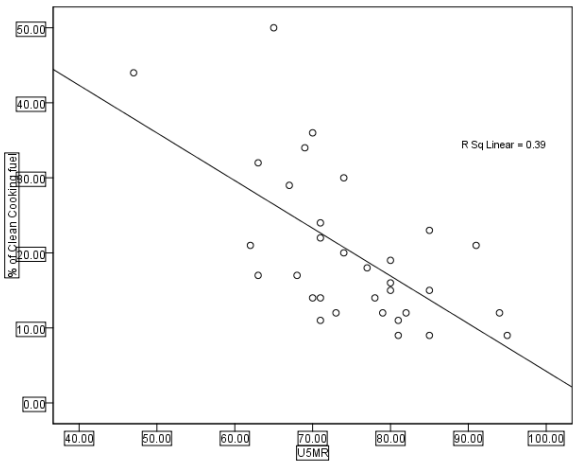

% of Drainage Facility
R Sq Linear = 0.383
PNMR

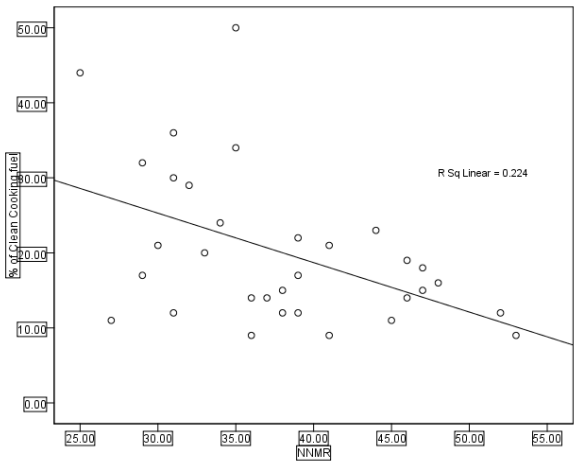

% of Drainage Facility
R Sq Linear = 0.002
% of Children suffering from Diarrhoea

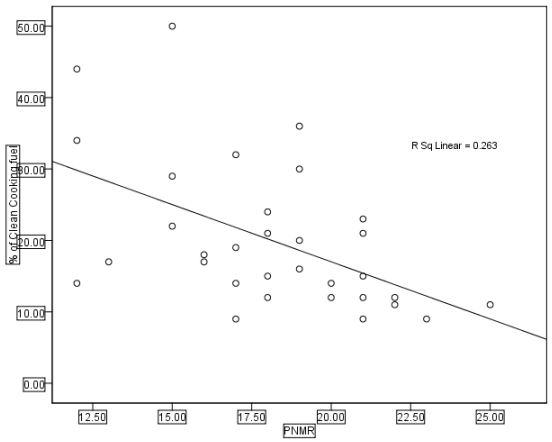

% of Drainage Facility
R Sq Linear = 0.012
% of Children suffering from ARI

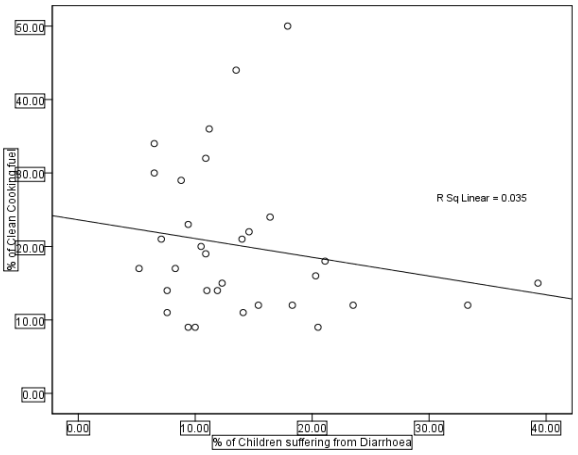

% of Drainage Facility
R Sq Linear = 0.07
% of Children suffering from Fever

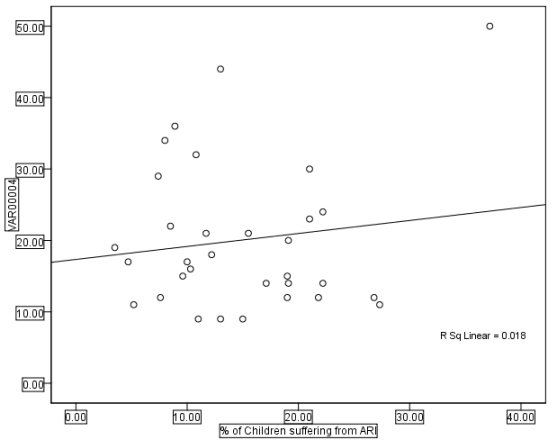

% of Clean Cooking fuel
R Sq Linear = 0.36
IMR

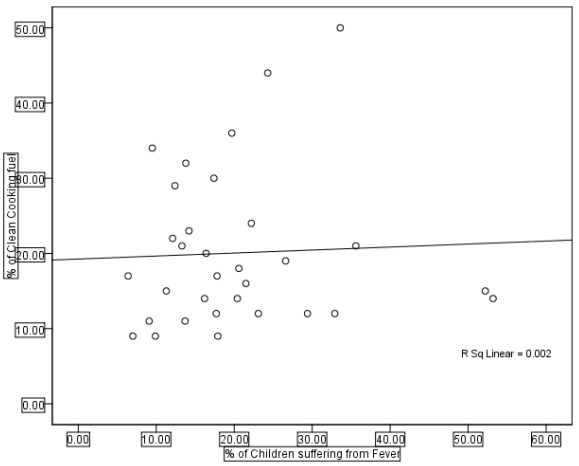












Correlation Matrix of all Amenities and Child Health indicators												
Variables		X1	X2	X3	X4	X5	X6	X7	X8	X9	X10	X11
X1	DrinWater	1										
X2	Imp.Sanitation	0.921**	1									
X3	Imp.Drainage	0.486*	0.368*	1								
X4	Cooking Fuel	0.661**	0.647**	0.647**	1							

X5	IMR	-0.209	-0.287	-0.178	-0.257	1						
X6	U5MR	-0.215	-0.242	-0.217	-0.234	0.842**	1					
X7	NNMR	-0.195	-0.296	-0.101	-0.229	0.928**	0.698**	1				
X8	PNMR	-0.179	-0.188	-0.282	-0.245	0.518	0.591**	0.169	1			
X9	Diarrhoea	-0.1	0.216	0.102	-0.127	0.345	0.221	0.304*	0.254	1		
X10	ARI	0.041	0.101	0.171	0.18	0.026	-0.017	-0.043	0.231	0.317*	1	
X11	Fever	-0.03	-0.102	0.264	0.034	0.072	0.014	0.025	0.158	0.624	0.451*	1

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).
Source: Census of India and Households Table

Conclusion:-

Tap drinking water from treated source is highest in Northern, moderate in Central and lowest in Eastern, Southern and Western Rajasthan. Improved sanitation facility is highest in Northern, moderate in Central and lowest in Southern, Eastern and Western Rajasthan. Improved drainage facility is highest in Central and Eastern, moderate in Northern and lowest in Western Rajasthan. Clean cooking fuel is highest in Jaipur and Kota, moderate in Northern and Central part and lowest in Eastern, Southern and Western Rajasthan.

The rate of IMR, U5MR and NNMR shows that Eastern, South-western Rajasthan shows high rate. Southern Rajasthan shows moderate and Northern, Central and Western Rajasthan shows lowest rate of IMR, U5MR and NNMR. PNMR the Southern and Eastern part shows highest rate, Northern and Western shows moderate rate and Central Rajasthan shows lowest PNMR rate. Children suffering from diarrhoea are highest in Eastern and South-Western, lowest in Northern, Central, Western and Southern Rajasthan. The percentage of children suffering from ARI is highest in Eastern Rajasthan. The percentage of children suffering from fever is highest in Eastern Rajasthan, moderate in Northern and lowest in Central, Southern and Western Rajasthan.

The percentage of safe drinking water facility availability shows strong negative correlation with IMR and U5MR, and moderate negative correlation with NNMR and PNMR, but no correlation with % of Children suffering from Diarrhoea, % of Children suffering from ARI and % of Children suffering from Fever. Improved sanitation facility availability shows strong negative correlation with IMR and U5MR, and moderate negative correlation with NNMR and PNMR, but no correlation with % of Children suffering from Diarrhoea, % of Children suffering from ARI and % of Children suffering from Fever. Improved drainage facility availability shows strong negative correlation with IMR and U5MR, and moderate negative correlation with PNMR, but no correlation with NNMR, % of Children suffering from Diarrhoea, % of Children suffering from ARI and % of Children suffering from Fever. Clean cooking fuel facility availability shows strong negative correlation with IMR and U5MR, and moderate negative correlation with PNMR, but no correlation with NNMR, % of Children suffering from Diarrhoea, % of Children suffering from ARI and % of Children suffering from Fever.

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