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STUDY OF
SOCIO-ECONOMIC
STATUS IN SLUM AREA
USING STATISTICAL
METHODS

INTRODUCTION

Socio-economic status is way of describing people based on their education, income, and type of job. Socio-economic status is usually described as low, medium, and high. People with a lower socio-economic status usually have less access to financial, educational, social, and health resources than those with a higher socio-economic status. As a result, they are more likely to be in poor health and have chronic health conditions and disabilities.

The slum population doubles every 5-10 years. In the past decade, over 22 million people have migrated from rural to urban areas in India. While official estimates indicate that the number of slum dwellers in India increased from 30 million in 1981 to over 61 million in 2014. A UN Habitat report estimates the number of slum dwellers in India to be over 100 million. In 2011, 200 million people in urban Indian households were considered to live in slums, of which over a third were in million-plus cities of India.

As per United Nations , the aim of Sustainable Development Goals (SDGs) is to transform our world. They are a call to action to end poverty and inequality, protect the planet, and ensure that all people enjoy health, justice and prosperity.

As per the recent survey, India is striving to combine the element of ‘sustainability’ to its economic development through well designed initiatives for inclusive development like electrification of rural households, augmenting usage of renewable sources, eliminating malnutrition, eradicating poverty, increasing access to primary education to all girls, providing sanitation and housing for all, equipping young people with skills to compete in the global labour market.

Here we studied the population of 5 different slum areas taking 40 samples from each area and interpreted the data using statistical tools.

In this project we mainly focused on the 5 main goals of sustainable development which are –

- Goal 1: End poverty in all its forms.
- Goal 2: Zero Hunger.
- Goal 3: Health.
- Goal 4: Education.
- Goal 6: Water and Sanitation.

ABSTRACT

A socio-economic survey is regarded as one of the most important sources of statistical data on household expenditure and income as well as other data on the status of housing, individual and household characteristics and living conditions. Economical and Social Survey provides objective analysis of pressing long-term social and economic development issues, and discusses the positive and negative impact of corresponding policies.

Poverty is widespread across countries all over the world. India is one among them. India is estimated to have one third of the world's poor. According to the World Bank estimate, 41.6% of the total Indian population falls below the international poverty line of Rs. 21.6/- a day in urban areas and Rs. 14.3/- in rural areas and residing in the slum areas. This project makes an attempt to present the socio-economic status of slum areas with special reference to Nashik City.

OBJECTIVES

- Analyze the normality of distribution of students in government and private.
 - To investigate the existence of area and source of portable water.
 - A comprehensive analysis of ration card classification costs necessitates a structured approach.
 - To achieve a comprehensive understanding of the financial disparities area.
 - To facilitate a analysis of mean healthcare expenditure across disparate economic sectors.
 - A comparative analysis of the stochastic distribution of residential architectural typologies across different areas.
 - To inquiry about uniformity of garbage management.
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METHODOLOGY

Nashik district of Maharashtra has total population of 1,486,053 as per the Census 2011. Slums are the informal settlements in the city. In Nashik city there are 168 slums. Amongst which 54 are declared and 112 are undeclared. These slums are located in municipal corporation land, private land as well as government land. About 56,235 populations live in 10,447 huts. People in the slums have lack of basic amenities like water availability, light, toilets, ration card, schools, etc.

For project work, Primary data was collected with the help of a well-designed questionnaire using which the data of 200 families across different slum areas of Nashik were taken and conclusions on different aspects like poverty, hunger, education, health, etc. were made. A total of 40 samples were collected from each of the 5 areas chosen at random from Nashik city.

Areas from which the samples are collected are –

- 1] Bajrang Vadi
- 2] Phule Nagar
- 3] Malhar Khani
- 4] Vadarwadi
- 5] Rajiv Nagar

Statistical Tools used

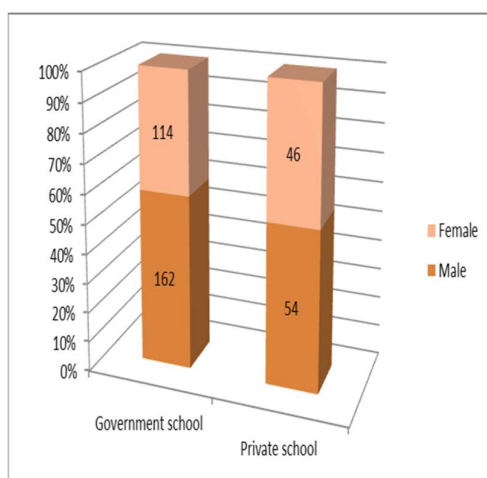
- ❖ **Graphical Tools:** Bar diagram, Multiple Bar diagram, Pie chart
- ❖ **Parametric Test:** Chi-Square Test, Z-Test for Proportion
- ❖ **Non-Parametric Test:** Kruskal Wallis Test, Mann Whitney U test
- ❖ **Other Statistical Methods:** ANOVA

Software used

- MS-Excel
- R-Software
- MS-Word

GRAPHICAL REPRESENTATION

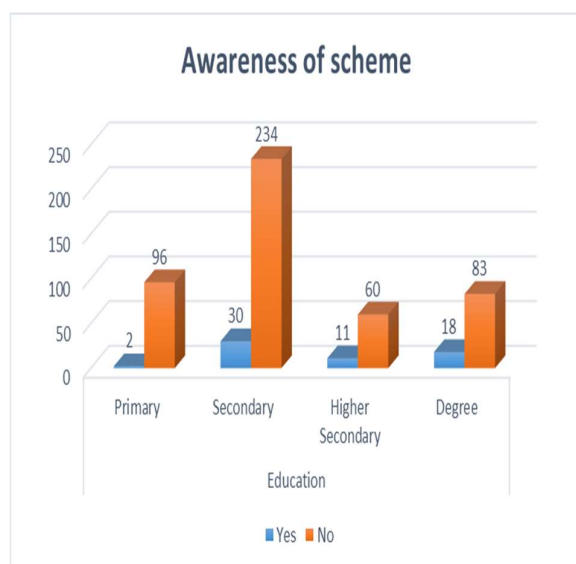
❖ Gender wise distribution of type of school



	Government school	Private School
Male	162	54
Female	114	46

- About 3/4th (73.40%) of the slum children are admitted in Government schools/colleges.
- Proportion of male and female children studying in Private and Government schools are almost equal.

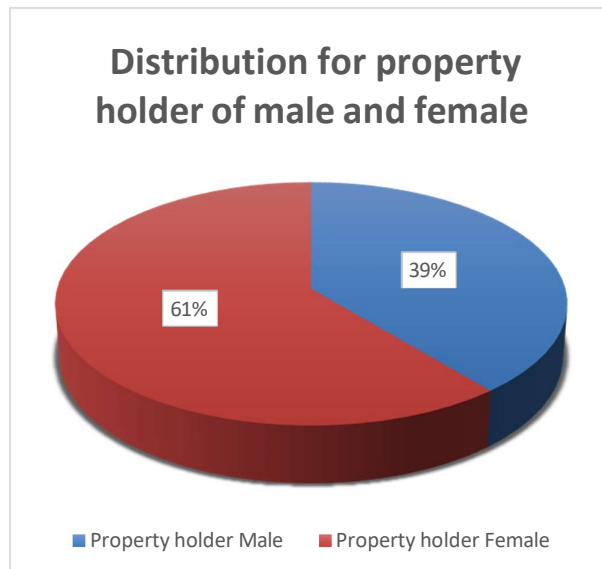
❖ Distribution of awareness of scheme and education



Education	Awareness of Scheme	
	Yes	No
Primary	2	96
Secondary	30	234
Higher Secondary	11	60
Degree	18	83

- There is negligible awareness among people living in slum areas about government schemes especially health schemes.

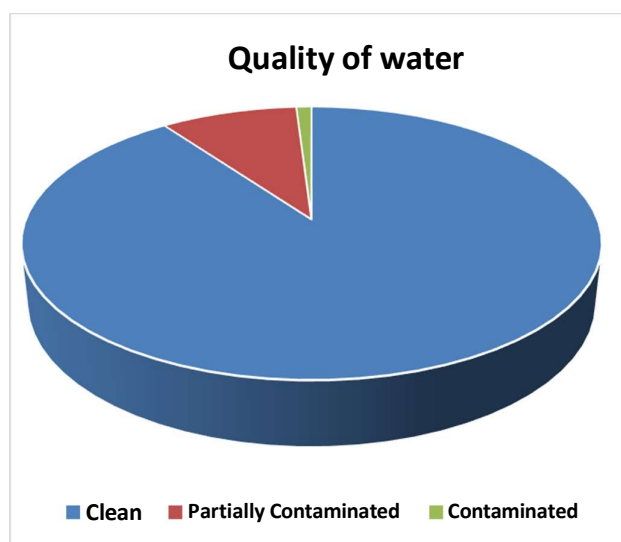
❖ **Gender wise distribution of property holder**



Property holder	
Male	Female
78	122

- a) Majority of the property of families living in slum areas is named after the females.

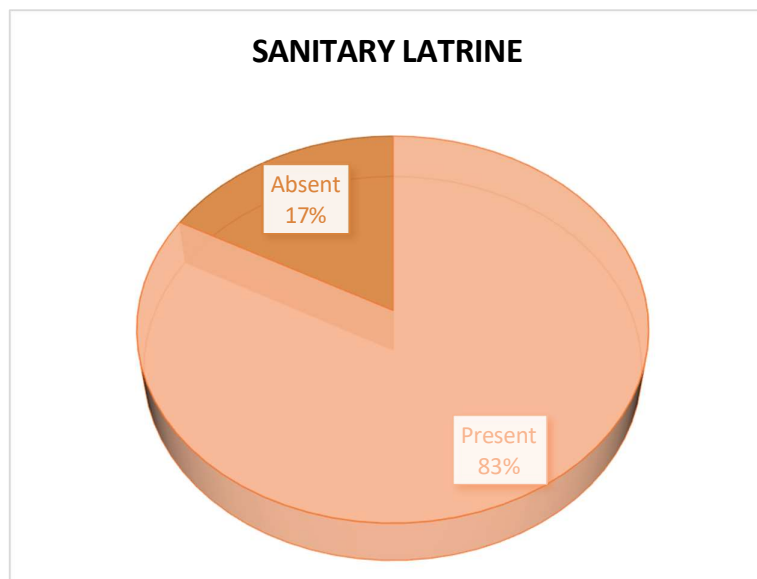
❖ **Quality of water**



Quality of water		
Clean	Partially Contaminated	Contaminated
180	18	2

- a) Clean drinking water is available to majority of the families throughout the year.

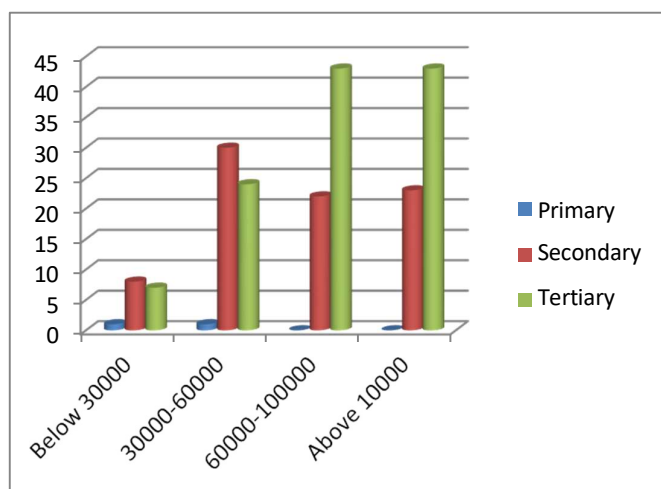
❖ Sanitary Latrine



Sanitary Latrine	
Present	Absent
166	34

- a) Sanitary latrine is available to more than 3/4th households living in slum areas across Nashik.

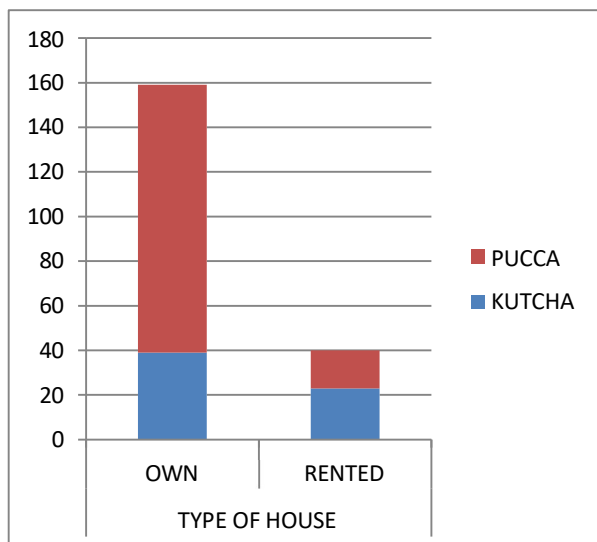
❖ Annual income and sector of economy



Annual income	Sector of economy		
	Primary	Secondary	Tertiary
Below 30000	1	8	7
30000-60000	1	30	24
60000-100000	0	24	43
Above 100000	0	52	43

- a) Limited families are engaged in primary sector while most of the families are engaged in secondary sector and considerable no. of families engaged in tertiary sector.
- b) Secondary sector has the highest average annual income among all the three sectors of economy having highest proportion for income of above 1 lakh.

❖ **Distribution for type of house and accommodation type**



Accommodation type	Type of house	
	Own	Rented
Kutcha	40	23
Pucca	120	17
Total	160	40

- Majority of the families who owns the house lives in pucca house.
- Majority of the families who lives in a rented house prefers kutcha house (low rent might be the reason).

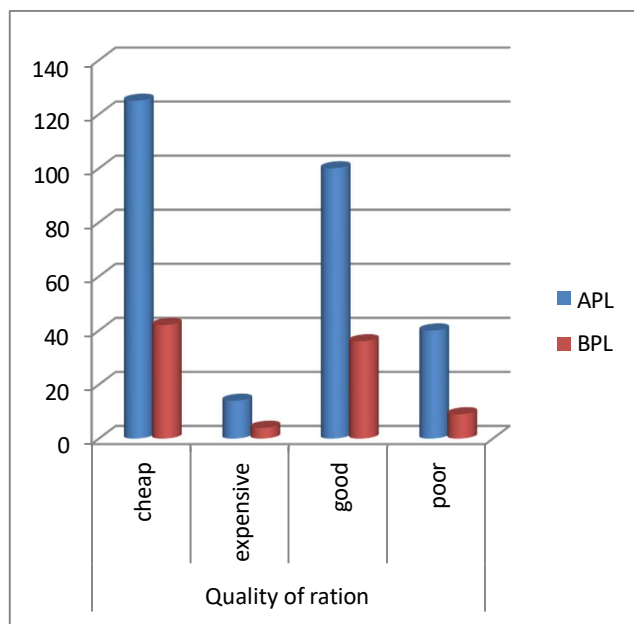
❖ **Distribution for facilities in health center**



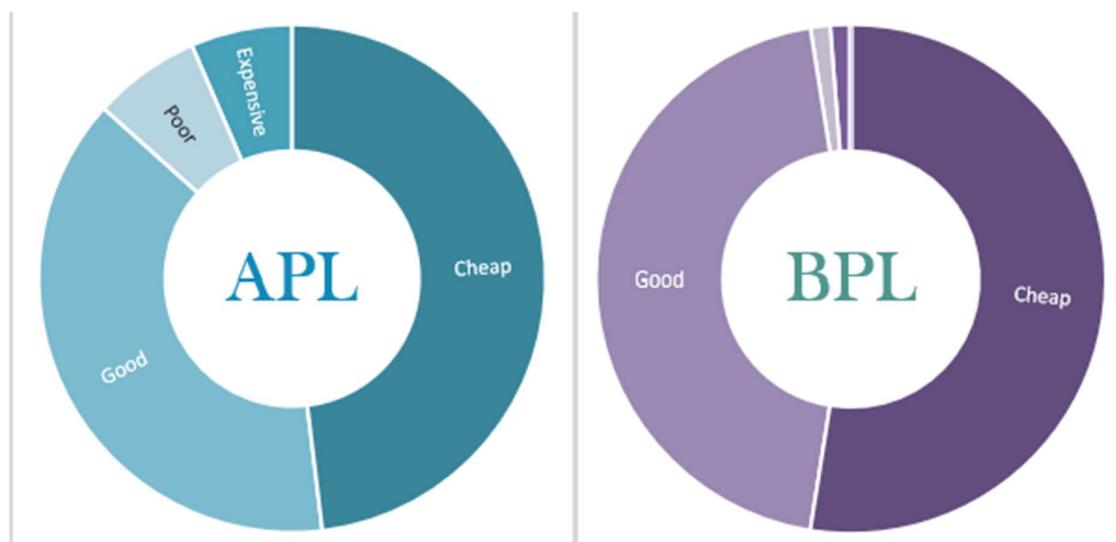
Facilities in Health Center			
Excellent	Good	Average	Worst
43	86	41	10

- Majority of the families agreed to the statement that government health centers provides them with good health facilities.

❖ **Distribution for type of ration card and quality of ration**



Type of Ration Card	Quality of ration			
	cheap	expensive	good	poor
APL	125	14	100	40
BPL	42	4	36	9



- Almost 90% of the families said that government provides cheap ration.
- Majority of the families get cheap and good quality ration from government while few people claimed the ration to be of poor quality.

TESTING OF HYPOTHESIS

Test for Normality

Hypothesis:

H_{01} : Given sample is taken from normal population.

H_{02} : Given sample is taken from non-normal population.

R-codes:

INPUT:-

```
Treatment<-c("G","P"); Treatment
Block<-c("M","F"); Block
treat<-rep(c("G","P"),each=2); treat
block<-rep(c("M","F"),each=2); block
d1<-c(162,54,114,46); d1
shapiro.test(d1)
D1<-sqrt(d1)
expt<-data.frame("Block"=block,"Treatment"=treat,"Yield"=D1)
anova_rbd<-aov(D1~treat+block,data=expt)
summary(anova_rbd)
```

OUTPUT:-

```
> Treatment<-c("G","P"); Treatment
[1] "G" "P"
> Block<-c("M","F"); Block
[1] "M" "F"
> treat<-rep(c("G","P"),each=2); treat
[1] "G" "G" "P" "P"
> block<-rep(c("M","F"),each=2); block
[1] "M" "M" "F" "F"
> d1<-c(162,54,114,46); d1
[1] 162 54 114 46
> shapiro.test(d1)

Shapiro-Wilk normality test
data: d1
W = 0.90128, p-value = 0.4374
```

Result: Since $p\text{-value} > 0.05$ (l.o.s), therefore by Wilk Shapiro test we conclude that the sample has been generated from normal distribution.

Chi square test for independence between type of house and accommodation

Hypothesis:

H₀: Type of house is independent of accommodation type

H₁: Type of house is not independent of accommodation type

Observation Table:

	Own	Rented	Total
Kuttcha	40	23	63
Pucca	120	17	137
Total	160	40	200

Notations:

N= Population size =200

(a)= No. of families owning kuttcha house = 40

(b)= No. of families renting kuttcha house = 23

(c)= No. of families owning pucca house = 120

(d)= No. of families renting pucca house = 17

Test Statistics:

Under H₀ the test statistics,

$$\chi^2 = \frac{N(ad - bc)^2}{(a + b)(c + d)(b + d)(a + d)}$$

$$\chi^2 = \frac{200(680 - 2760)^2}{(40 + 23)(120 + 17)(23 + 17)(40 + 17)}$$

$$\chi^2 = 43.9704$$

Critical value:

$$\chi^2_{table} = \chi^2_{(r-1)(s-1), 5\% \text{ l.o.s}}$$

$$\chi^2_{table} = \chi^2_{1, 0.05}$$

$$\chi^2_{table} = 3.841$$

Conclusion : Since, $\chi^2_{cal} > \chi^2_{table}$

Therefore we reject H₀ at 5% level of significance and conclude that type of house (kuttcha/pucca) is dependent on accommodation type (own/rented).

Chi square (χ^2) test for independence between area and source of drinking water.

Hypothesis:

H₀: Source of drinking water is independent of area.

H₁: Source of drinking water is not independent of area.

Observation Table:

Area	Source of drinking water				
	Municipal pipe	Tube Well	Public tap	RO water	Total
Phule Nagar	26	3	1	10	40
Malhar Khani	22	8	0	10	40
Bajarang Vadi	26	0	0	14	40
Vadarwadi	14	16	0	10	40
Rajiv Nagar	27	11	1	1	40
Total	115	38	2	45	200

Table for expected frequency

	Below 30000	30000-60000	60000-100000	Above 100000
Phule Nagar	$\frac{40 * 115}{200} = 23$	$\frac{40 * 38}{200} = 7.6$	$\frac{40 * 2}{200} = 0.4$	$\frac{40 * 45}{200} = 9$
Malhar Khani	$\frac{40 * 115}{200} = 23$	$\frac{40 * 38}{200} = 7.6$	$\frac{40 * 2}{200} = 0.4$	$\frac{40 * 45}{200} = 9$
Bajarang Vadi	$\frac{40 * 115}{200} = 23$	$\frac{40 * 38}{200} = 7.6$	$\frac{40 * 2}{200} = 0.4$	$\frac{40 * 45}{200} = 9$
Vadarwadi	$\frac{40 * 115}{200} = 23$	$\frac{40 * 38}{200} = 7.6$	$\frac{40 * 2}{200} = 0.4$	$\frac{40 * 45}{200} = 9$
Rajiv Nagar	$\frac{40 * 115}{200} = 23$	$\frac{40 * 38}{200} = 7.6$	$\frac{40 * 2}{200} = 0.4$	$\frac{40 * 45}{200} = 9$

Test Statistics:

Under H₀ the test statistic is,

$$\chi^2 = \sum \frac{(O_i - E_i)^2}{E_i}$$

Observation Table:

O_i	E_i	$(O_i - E_i - 0.5)^2$	$\frac{(O_i - E_i - 0.5)^2}{E_i}$
26	23	6.25	0.2717
22	23	2.25	0.0978
26	23	6.25	0.2717
14	23	90.25	3.9239
27	23	12.25	0.5326
3	7.6	26.01	3.4223
8	7.6	0.01	0.0013
0	7.6	65.61	8.6328
16	7.6	62.41	8.2118
11	7.6	8.41	1.1065
1	0.4	0.01	0.025
0	0.4	0.81	2.025
0	0.4	0.81	2.025
0	0.4	0.81	2.025
1	0.4	0.01	0.025
10	9	0.25	0.0277
10	9	0.25	0.0277
14	9	20.25	2.25
10	9	0.25	0.0277
1	9	72.25	8.0277
Total			42.9582

$$\chi^2_{cal} = 42.9582$$

Critical value:

$$\chi^2_{table} = \chi^2_{(r-1)(s-1), \text{ at 5\% level of significance}}$$

$$\chi^2_{table} = 21.026$$

Therefore, $\chi^2_{cal} > \chi^2_{table}$

Conclusion:

We reject H_0 at 5% level of significance and conclude that source of drinking water and area are dependent.

Chi square test for independence between type of ration card and cost of ration

Hypothesis:

H₀: Type of ration card is independent to cost of ration

H₁: Type of ration card is not independent to cost of ration

Observation Table:

	Cheap	Expensive	Total
APL	126	17	143
BPL	42	1	43
Total	168	18	186

Notations:

N= Population size =186

(a)= No. of APL families getting cheap ration = 126

(b)= No. of APL families getting expensive ration = 17

(c)= No. of BPL families getting cheap ration = 42

(d)= No. of BPL families getting expensive ration = 1

Test Statistic:

$$\chi^2 = \frac{N(ad - bc)^2}{(a + b)(c + d)(b + d)(a + d)}$$
$$\chi^2 = \frac{186(126 - 714)^2}{(126 + 17)(42 + 1)(17 + 1)(126 + 1)}$$
$$\chi^2 = 4.5749$$

Critical value:

$$\chi^2_{table} = \chi^2_{(r-1)(s-1), \text{ at } 5\% \text{ level of significance}}$$
$$\chi^2_{table} = 3.841$$

Conclusion: Since, $\chi^2_{cal} > \chi^2_{table}$

Hence, We reject H₀ at 5% level of significance and conclude that the cost of ration is dependent on type of ration card

Kruskal Wallis test for checking the difference between monthly expenses in different areas.

Hypothesis:

H₀: There is no significant difference in monthly expenses (per household) in different areas.

H₁: There is significant difference in monthly expenses (per household) in different areas.

Given: n=20

Observation table:

Area	Below 3000		3000-6000		6000-10000		Above 10000	
	Observation	Rank	Observation	Rank	Observation	Rank	Observation	Rank
Phule Nagar	2	1	7	7	17	18	14	15.5
Malhar Khani	5	5	6	6	18	20	11	12.5
Bajarang Vadi	3	3	13	14	10	10	14	15.5
Vadarwadi	3	3	10	10	10	10	17	18
Vichare mal	3	3	17	18	9	8	11	12.5
Total	16	15	53	55	64	66	67	74

Calculation table

Monthly expenses	T _i	n _i	T _i ²	T _i ² /n _i
Below 3000	15	5	225	45
3000-6000	55	5	3025	605
6000-10000	66	5	4356	871.2
Above 10000	74	5	5476	1095.2
Total				$\Sigma \frac{T_i^2}{n_i} = 2616.4$

Test statistics: Under H₀,

$$H = \frac{12}{n(n+1)} \sum \frac{T_i^2}{n_i} - 3(n+1)$$

Where,

n₁ = No. of observation having monthly expenses below 3000

n₂ = No. of observation having monthly expenses 3000-6000

n₃ = No. of observation having monthly expenses 6000-10000

n₄ = No. of observation having monthly expenses above 10000.

K= no. of classes.

$$n = n_1 + n_2 + n_3 + n_4$$

Calculation:

$$H = \frac{12}{n(n+1)} \sum \frac{T_i^2}{n_i} - 3(n+1)$$

$$H = \frac{12}{20(20+1)} * 2616.4 - 3(20+1)$$

$$H = 11.7542$$

$$\begin{aligned} \chi_{table}^2 &= \chi_{(k-1), 5\% \text{ l.o.s}}^2 \\ &= \chi_{2, 0.05}^2 \\ \chi_{table}^2 &= 7.8147 \end{aligned}$$

Result: Since, $H > \chi_{table}^2$

Therefore, we reject H_0 at 5% level of significance and conclude that, there is significant difference in monthly expenses in different areas.

Kruskal Wallis test to check the distribution of water supply in different areas

Hypothesis:

H₀: There is no significant difference in water supply in different areas.

H₁: There is significant difference in water supply in different areas.

Given: n=20

Observation table:

Area	Municipal pipe		Tube well		Public tap		RO water	
	Observation	Rank	Observation	Rank	Observation	Rank	Observation	Rank
Phule Nagar	26	18.5	3	8	1	6	10	11
Bhosalewadi	22	17	8	9	0	2.5	10	11
Bajarang Vadi	26	18.5	0	2.5	0	2.5	14	15
Vadarwadi	13	14	17	16	0	2.5	10	11
Rajiv Nagar	27	20	11	13	1	6	1	6
Total	114	88	39	48.5	2	19.5	45	54

Calculation Table:

Water supply	Ti	ni	Ti ²	Ti ² /ni
Municipal pipe	88	5	7744	1548.5
Tube well	48.5	5	2352.25	470.45
Public tap	19.5	5	380.25	76.05
RO water	54	5	2916	583.2
Total	210			$\sum \frac{T_i^2}{n_i}$ = 2678.65

Test statistics: Under H₀,

$$H = \frac{12}{n(n+1)} \sum \frac{T_i^2}{n_i} - 3(n+1)$$

Where,

n_1 = No. of observation having Municipal pipe line

n_2 = No. of observation having well

n_3 = No. of observation having Public tap

n_4 = No. of observation having RO water

& $n = n_1 + n_2 + n_3$

K = no. of classes

Calculation:

$$H = \frac{12}{n(n+1)} \sum \frac{T_i^2}{n_i} - 3(n+1)$$

$$= \frac{12}{20(20+1)} * 2678.65 - 3(20 + 1)$$

$$H = 13.5328$$

Now,

$$\chi_{table}^2 = \chi_{(k-1), 5\% \text{ l.o.s}}^2$$

$$= \chi_{3, 0.05}^2$$

$$\chi_{table}^2 = 7.815$$

Result: Since, $H > \chi_{table}^2$

Therefore, we reject H_0 at 5% level of significance and conclude that there is no significant difference in water supply in different areas.

ANOVA:

Hypothesis:

H₀: The average health expenses by sector of economy (primary, secondary, tertiary) is equal.

H₁: The average health expenses by sector of economy (primary, secondary, tertiary) is not equal.

Calculation:

$$\begin{aligned} 1) \ G &= \sum y_{ij} \\ &= 302660 \end{aligned}$$

$$\begin{aligned} 2) \ C.F. &= G^2 / n \\ &= 458015378 \end{aligned}$$

$$\begin{aligned} 3) \ TSS &= \sum Y_{ij}^2 - C.F. \\ &= 1410160000 - 458015378 \\ &= 952144622 \end{aligned}$$

$$\begin{aligned} 4) \ SSTr &= \sum_{ri} T_{ri}^2 - C.F. \\ &= 3339984.38 \end{aligned}$$

$$\begin{aligned} 5) \ SSE &= TSS - SSTr \\ &= 948804637.62 \end{aligned}$$

$$\begin{aligned} 6) \ S_{tr}^2 &= \frac{SSTr}{2} = \frac{3339984.38}{2} \\ &= 169992.19 \end{aligned}$$

$$\begin{aligned} 7) \ S_E^2 &= \frac{SSE}{197} = \frac{948804637.62}{197} \\ &= 4816267.19 \end{aligned}$$

ANOVA Table :

	Sum of Square	Degrees of freedom	Mean Sum of square	F- ratio
Between Groups	3339984.38	2	1669992.19	0.3467
Within Groups	948804637.62	197	4816267.19	
Total	952144622	199		

Test statistics:

$$F = \frac{S_{tr}^2}{S_E^2}$$

$$F = \frac{1669992.19}{4816267.19}$$

$$F_{cal} = 0.3467$$

$$F_{tab} = F_{(2,197),0.05} = 3.0417$$

Conclusion:

Since, $F_{cal} < F_{tab}$

Hence, we accept H_0 and conclude that there is no evidence at 5% level of significance to suggest a difference between three sectors of economy (primary, secondary, tertiary) as regards to average health expenses of family.

Run Test to check the randomness of type of house in Rajiv Nagar :

To test the sequence of type of house (Kutchra or Pucca) is random or not in Rajiv Nagar . Then by using Non parametric Run test.

Here we obtain the sequence of type of house is random or not.

KK P KKKKKKKK P K PPPP KK P K P K P KKKKKKKKKKK PP KKK P

Hypothesis:

H_0 : The given sequence is random

H_1 : The given sequence is not random

Let us consider the level of significance $\alpha = 5\%$

Calculation:

n = Total number of samples observed

n_1 = Number of kutchra houses in the sample

n_2 = Number of pucca houses in the sample

r = Number of runs

$n = 40 > 20$ (i.e n is large)

$r = 16, n_1 = 28, n_2 = 12$

$$E(r) = \frac{n + 2}{2}$$

$$E(r) = \frac{40 + 2}{2} = 21$$

$$V(r) = \frac{n(n - 2)}{4(n - 1)}$$

$$V(r) = \frac{40(40 - 2)}{4(40 - 1)} = 9.7435$$

Test statistic is

$$|Z| = \left| \frac{r - E(r)}{\sqrt{V(r)}} \right|$$

$$|Z| = \left| \frac{16 - 21}{\sqrt{9.7435}} \right| = 1.6018$$

Critical value at 5% level of significance is

$$Z_{\alpha/2} = Z_{0.025} = 1.96$$

Result: since, $|Z| < Z_{\alpha/2}$

Hence we accept H_0 at 5% level of significance

Conclusion: The sequence of type of house in Rajiv Nagar is random.

Mann Whitney U-Test to check the distribution of garbage management in Phule Nagar and Malhar Khani area.

Hypothesis:

H_0 : Distribution of garbage management in Phule Nagar and Malhar Khani are same. H_1 : Distribution of garbage management in Phule Nagar and Malhar Khani are different.

Phule Nagar	20	17	3	0
Malhar Khani	12	23	5	0

Observation Table:

S. No	Arrange data in ascending order	Rank	Rank (Phule Nagar)	Rank (Malhar Khani)
1	0	1.5	1.5	-
2	0	1.5	-	1.5
3	3	3	3	-
4	5	4	-	4
5	12	5	-	5
6	17	6	6	-
7	20	7	7	-
8	23	8	-	8

Test Statistics

$$U_1 = n_1 n_2 + \frac{n_1(n_1 + 1)}{2} - R_1$$

$$U_2 = n_1 n_2 + \frac{n_2(n_2 + 1)}{2} - R_2$$

Here,

$$n_1 = 4, \quad n_2 = 4, \quad R_1 = 17.5, \quad R_2 = 18.5$$

$$U_1 = n_1 n_2 + \frac{n_1(n_1 + 1)}{2} - R_1$$

$$U_1 = 4 * 4 + \frac{4(4 + 1)}{2} - 17.5$$

$$U_1 = 8.5$$

$$U_2 = n_1 n_2 + \frac{n_2(n_2 + 1)}{2} - R_2$$

$$U_2 = 4 * 4 + \frac{4(4 + 1)}{2} - 18.5$$

$$U_2 = 7.5$$

Calculated value of test statistics is:

$$U = \min\{U_1, U_2\}$$

$$U = \min\{8.5, 7.5\}$$

$$U = 7.5$$

Critical value,

For $\alpha = 5\%$ level of significance

$$U_{n_1 n_2 \alpha/2} = U_{4*4 \ 0.025} = 0$$

Since,

$$U > U_{n_1 n_2 \ \alpha/2}$$

Therefore, We reject null hypothesis.

Conclusion: Distribution of Garbage management in Phule Nagar and Malhar Khani is different.

Mann Whitney U-Test to check the distribution of garbage management in Bajarang Vadi and Vadarwadi.

Hypothesis:

H₀: Distribution of garbage management in Bajarang Vadi and Vadarwadi are same.

H₁: Distribution of garbage management in Bajarang Vadi and Vadarwadi are different.

Bajarang Vadi	11	24	4	0
Vadarwadi	16	17	5	2

Observation Table:

S. No	Arrange data in ascending order	Rank	Rank (Bajarang Vadi)	Rank (Vadarwadi)
1	0	1	1	-
2	2	2	-	2
3	4	3	3	-
4	5	4	-	4
5	11	5	5	-
6	16	6	-	6
7	17	7	-	7
8	24	8	8	-

Test Statistics

$$U_1 = n_1 n_2 + \frac{n_1(n_1 + 1)}{2} - R_1$$

$$U_2 = n_1 n_2 + \frac{n_2(n_2 + 1)}{2} - R_2$$

Here,

$$n_1 = 4, \quad n_2 = 4, \quad R_1 = 17, \quad R_2 = 19$$

$$U_1 = n_1 n_2 + \frac{n_1(n_1 + 1)}{2} - R_1$$

$$U_1 = 4 * 4 + \frac{4(4 + 1)}{2} - 17$$

$$U_1 = 9$$

$$U_2 = n_1 n_2 + \frac{n_2(n_2 + 1)}{2} - R_2$$

$$U_2 = 4 * 4 + \frac{4(4 + 1)}{2} - 19$$

$$U_2 = 7$$

Calculated value of test statistics is:

$$U = \min\{U_1, U_2\}$$

$$U = \min\{9, 7\}$$

$$U = 7$$

Critical value:

For $\alpha = 5\%$ level of significance

$$U_{n_1 n_2 \alpha/2} = U_{4*4 \ 0.025} = 0$$

Since,

$$U > U_{n_1 n_2 \alpha/2}$$

We reject null hypothesis,

Conclusion: Distribution of Garbage management in Bajarang Vadi and Vadarwadi is different.

MAJOR FINDINGS :

- Most of the families are engaged in secondary and tertiary sector of economy.
- About 3/4th (73.40%) of the slum children are admitted in Government schools/colleges.
- According to survey, majority of the families are provided with cheap and good quality ration from the government, while few people claimed the ration to be of poor quality.
- There is negligible awareness among people living in slum areas about government schemes especially health schemes.
- Type of accommodation, monthly expenses, type of ration card, type of house and water supply are equally distributed in all areas.
- Majority of the families agreed that government health centers provide good health facilities.
- Negligible no. of families have annual income less than 30,000 i.e they possess lower socio-economic status.
- Garbage management is average in all given areas.
- Drainage system is not well developed in all areas.
- Majority of the families who lives in a rented house prefers kutcha house and who owns the house lives in pucca house
- According to survey, majority of the families are provided with cheap and good quality ration from the government, while few people claimed the ration to be of poor quality.
- Majority of the families lies above the poverty line.

QUESTIONNAIRE :

Project Questionnaire

1) Name of respondent: _____

2) Gender: Male ☐ Female ☐ Other: _____

3) Age: _____

4) a) Occupation of head of family: _____

b) In which sector of economy you are considered into?

i) ☐ Primary Sector ii) ☐ Secondary Sector iii) ☐ Tertiary Sector

5) a) Total Annual income of family:

i) Below 30000 ☐ ii) 30000-60000 ☐ iii) 60000-100000 ☐ iv) Above 100000 ☐

b) Monthly expenses of the family :

i) Below 3000 ☐ ii) 3000-6000 ☐ iii) 6000-10000 ☐ iv) Above 10000 ☐

6) Accommodation type: i) Own house ☐ ii) Rented house ☐

7) Type of house: i) Kutch House ☐ ii) Pucca House ☐ iii) Semi-Pucca House ☐

Family Members:

Sr No.	Name	Age	Gender	Relation with Head	Marital Status	Education	Occupation	Income per Month
1								
2								
3								
4								
5								
6								

8) No. of children in your family: _____

Male: ☐ female: ☐

9) Did your child had pursued pre-primary education? ☐ Yes ☐ No

10) In which school is your child admitted?

i) Government ☐ ii) Private ☐

Male ☐ Female ☐ Male ☐ Female ☐

11) Are your children beneficiary of free primary and secondary education? ☐Yes ☐No

12) a) Educational assistance provided by Government to your children?

☐ Uniform ☐ Books ☐ Other Expenses ☐ No Expenses

b) Have you availed the additional nutrition for pre-primary students provided by govt? ☐Yes ☐No

13) Are your children availing any government scholarship? ☐Yes ☐No

*If yes then mention the scholarship _____

14) Type of Ration card: i) BPL (Yellow) ☐ ii) APL(Orange) ☐ iii) White ☐

15) Do you avail the facilities of monthly ration provided by Government? ☐Yes ☐No

16) What difficulties you face while availing ration?

A) The ration is of poor quality ☐ b) The ration shop opens irregularly ☐

c) The ration shop is too far ☐ d) Quantity of ration is Improper ☐

17) Are you able to fulfill the basic food needs of your family? ☐Yes ☐No

18) Can you easily feed your family 2 meals a day? ☐Yes ☐No

19) How's the price and quality of food grains available in Ration shop?

☐ Expensive but of good quality ☐ Cheap and poor quality

☐ Expensive and of poor quality ☐ Cheap and good quality

20) How do you utilise your ration?

i) To feed family ☐ ii) Sell to the shopkeeper ☐ iii) To feed animals ☐

21) Service provided by municipal corporation:

☐ Water supply ☐ LPG ☐ Garbage collection ☐ Indoor insect spray

22) Source of drinking water

☐ Public Hand pump ☐ Municipal pipe in house ☐ Public tap

☐ Well within house ☐ Public well ☐ Pond

☐ Tube well within House ☐ RO Water bought from shops in cans ☐ Other: _____

23) What is the quality of drinking water? ☐Clean ☐Contaminated ☐Partially contaminated

24) Do you have proper drainage system available in your area?

☐Proper ☐Improper ☐Good but needs improvement

25) Is sanitary latrine present at your house?

☐ Present and using ☐ Present but not using ☐ Absent

26) How is the garbage management in your area?

☐ Excellent ☐ Good ☐ Average ☐ Worst

27) Do you think of any improvement required for garbage management and cleanliness of your area? ☐ Yes, What: _____ ☐ No

28) Do you face any diseases due to unhygienic conditions? ☐ Yes ☐ No

29) Is there any government health center located in your area? ☐ Yes ☐ No

30) Are you satisfied with the facilities provided in the health center? ☐ Yes ☐ No

31) How will you rate the facilities available in health center? Rating (1-10) : _____

☐ Excellent

☐ Good

☐ Average

☐ Not satisfied

32) Have your children taken all the vaccines he is eligible for? ☐ Yes ☐ No

33) When someone in your family falls sick, where do you go for treatment?

(Write the most common option)

☐ Don't go anywhere, prefer home remedy

☐ Local clinic/doctor

☐ Government hospital

☐ Private qualified Doctor

Reason for preferring the option (2,3,4) : _____

34) Is there any health-related issue possessed by any family member? ☐ Yes, no. ____ ☐ No

35) What are Approximate average annual health expenses of your family? _____

36) Are you aware of the government healthcare schemes launched for the welfare of poor people?

☐ Yes

☐ No

37) Have you ever been benefitted by a government healthcare scheme? ☐ Yes ☐ No

If yes, name the scheme: _____

38) Is any of the family member a victim of any serious disease in last 5 years? ☐ Yes ☐ No

If yes, where are you taking the treatment?

Name of Disease	Yes / No	Government Dispensary	Private OPD	Medicine from Chemist Shop	Didn't took Any Medicine
1.Cancer					
2.Heart-disease					
3.Respiratory-disease					
4.Diabetes					
5.Covid					
6.Other					

39) Who owns the majority of a property in your house? ☐ Male ☐ Female

Data Entry Format

Gender	Male- M Female- F	
Occupation	Direct answer	
Sector of economy	Primary Secondary Tertiary	P S T
Monthly expenses	Below 3000 3000-6000 6000-10000 Above 10000	1 2 3 4
Annual Income	Below 30000 30000-60000 60000-100000 Above 100000	1 2 3 4
Monthly Income	Direct answer	
Accommodation type	Own Rented	1 0
Type of house	Kutchha Pucca	1 0
Number of family members	Male Female	Direct answer
Age	Children: ____ Adult: ____ Old age: ____	
Education	Primary Secondary Higher Secondary Degree	
Pre-primary education	No. of children	_____
Type of School	Government Private	Male Female
Free education	Yes No	1 2
Educational Assistance	Uniform Books No expenses	Yes- 1 No- 0
Scholarship	Yes No	1 0

Ration card	BPL APL WHITE	Yes- 1 No- 0
Ration availability	Yes No	1 0
Difficulties faced in ration	Poor quality Distance Irregularity Quantity	Yes- 1 No- 0
Quality of ration	Cheap, expensive Good, poor	Yes- 1 No- 0
Service provided by Municipal corporation	Water supply LPG Garbage Collection Insect spray	Yes- 1 No- 0
Source of drinking water	Municipal pipeline Tube well Public tap Other	Yes- 1 No- 0
Quality of drinking water	Clean Contaminated Partially contaminated	Yes- 1 No- 0
Drainage system	Proper Improper Needs improvement	Yes- 1 No- 0
Sanitary Latrine	Absent Present	0 1
Garbage management	Excellent Good Average Worst	Yes- 1 No- 0
Diseases due to unhygienic condition	Yes No	1 0
Government Health center	Absent Present	0 1
Facilities in PHC (Satisfaction)	Rating 1 to 10	Direct answer
Facilities in Health center	Excellent Good Average Worst	Yes- 1 No- 0
Hospitalization	Government Private Local clinic	Yes- 1 No- 0
No. of sick members	Direct answer	

Annual health expenses	Direct answer		Dat
Awareness of health scheme	Yes No	1 0	
Serious Diseases	Heart Diabetes COVID-19 Other	Yes- 1 No- 0	
Treatment	Government Private	Yes- 1 No- 0	
Property holder	Male Female	Yes- 1 No- 0	

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