

APPENDIX I
ASSESSMENT OF SOCIO-ECONOMIC AND ENVIRONMENTAL
IMPACTS OF PMGSY ROADS IN RAJASTHAN
(HABITATION- LEVEL QUESTIONNAIRE FOR FOCUS GROUP
DISCUSSION)

Date:.....Habitation:.....Block:.....District.....

1. General Information

Give the population details of the village:

Population	Number of households	Population (No.)			Others
		Scheduled Caste	Scheduled Tribe	OBC	

2. Perception of villagers on Transport facility

Travel time (min)

Public transportation

[] Less than 30 [] 30-45 [] 45-60 [] 60-90 [] More than 90

Private transportation

[] Less than 30 [] 30-45 [] 45-60 [] 60-90 [] More than 90

Public and private transportation (units)

Type	None	1-3	3-5	5-10	More than 10
Public transportation					
Private Transportation					

Transportation frequency (Public transportation)

[] every 30min [] 30-45min [] 45-60min [] 60-120min
 [] more than 120min

Travel Cost (Rs)

Public transportation

[] Less than 5 [] 5-10 [] 10-15 [] 15-20 [] More than 20

Private transportation

[] less than 5 [] 5-10 [] 10-15 [] 15-20 [] more than 20

Road usability

[] whole year [] 9months [] 6months [] 3months

[] less than 3months

Level of satisfaction on transport facility

Variables	Level of satisfaction				
	Highly Satisfied	Moderately Satisfied	Undecided	Dissatisfied	Not Acceptable
Travel time					
Transportation facility					
Frequency of transportation facility					

Travel cost					
Road usability					

Comments on transportation Facility

3. Perception of villagers on Income and employment Opportunities

Income level (Rs) Monthly

Level	<5000	5000-10000	10000-15000	15000-20000	>20000
Individual					
Household					

Income diversification opportunity (%)

Income Type	0-20	20-40	40-60	60-80	80-100
Agricultural (self-employed)					
Agricultural (Wage labor)					
Livestock					
Non- agricultural (self-employed)					
Non- agricultural (Wage labor)					

Unskilled labour livelihood (Rs) Daily

livelihood Type	≤150	150-300	300-500	500-700	>700
Agricultural					
Non- agricultural					

Level of satisfaction on Income and employment Opportunities

Variables	Level of satisfaction				
	Highly Satisfied	Moderately Satisfied	Undecided	Dissatisfied	Not Acceptable
Income level					
Income diversification					
Unskilled labour livelihood					

Comments on Income and employment Opportunities

4. Perception of villagers on Health facility.

Use of Health care

[] The entire community [] Most of the community [] About half the community
 [] Less than half/ few [] None in the community

Availability of Health Centres (No.)

Level	None	1-3	3-5	5-7	More than 7
Clinic					
Primary Health Centre					
Community health centre					

Mode of access

[] By walk [] 2 wheeler [] car/jeep [] Bus
 [] other

Travel Time (Minutes)

[] less than 10 [] 10- 15 [] 15-20 [] 20-30 [] more than 30

Anthropometric measures

[] Normal [] Mild [] Moderate [] Severe

Level of satisfaction on Health facility

Variables	Level of satisfaction				
	Highly Satisfied	Moderately Satisfied	Undecided	Dissatisfied	Not Acceptable
Use of Health care					
Availability of Health Centre					
Mode of access					
Travel Time					
Anthropometric measures					

Comments on Health facility**5. Perception of villagers on Education facility****Level of schooling attended by Individuals**

Male

[] preschool [] Primary school [] Secondary school [] College

[] other

Female

[] preschool [] Primary school [] Secondary school [] College

[] other

School attendance (%)

Male

[] less than 10 [] 10-30 [] 30-50 [] 50-70 [] 100

Female

[] less than 10 [] 10-30 [] 30-50 [] 50-70 [] 100

Mode of access

[] By walk [] Bicycle [] School bus [] personal vehicle

[] other

Travel Time (Minutes)

[] less than 10 [] 10-15 [] 15-20 [] 15-20 [] more than 20

Availability by Level (No.)

Level	None	1-3	3-5	More than 5
Pre-School				
Primary school				
Secondary School				
Girl school				
College				

Level of satisfaction on Education facility

Variables	Level of satisfaction				
	Highly Satisfied	Moderately Satisfied	Undecided	Dissatisfied	Not Acceptable
Level					
School attendance					

Mode of access					
Travel Time					
Availability by Level					

Comments on Education facility

6. Perception of Quality of Neighbourhood Facilities/Environment

Public telephone service (No.)

[] none [] 1-3 [] 3-5 [] 5-7 [] More than 7

Personal telephone/mobile (No.)

[] The entire community [] Most of the community [] About half the community
 [] Less than half/ few [] None in the community

Public Internet facility (No.)

[] none [] 1-3 [] 3-5 [] 5-7 [] More than 7

TV

[] The entire community [] Most of the community [] About half the community
 [] Less than half/ few [] None in the community

Liveability Status

[] Better [] good [] moderate [] the same [] Worse

Involvement in social gathering (within village)

[] The entire community [] Most of the community [] About half the community
 [] Less than half/ few [] None in the community

Involvement in social gathering (outside village)

[] The entire community [] Most of the community [] About half the community
 [] Less than half/ few [] None in the community

Level of satisfaction on condition quality of neighbourhood facilities/Environment

Facilities	Level of satisfaction				
	Highly Satisfied	Moderately Satisfied	Undecided	Dissatisfied	Not Acceptable
Public telephone service					
Public Internet Service					
TV					
Liveability Status of marginal groups					
Involvement in social gathering (within village)					
Involvement in social gathering					

Comments on Quality of Neighbourhood Facilities/Environment

APPENDIX II

ASSESSING LIVELIHOOD DIVERSIFICATION DUE TO CONSTRUCTION OF PMGSY ROADS (QUESTIONNAIRE FOR FOCUS GROUP DISCUSSION-HABITATION LEVEL)

Date: Habitation: Block: District

1. General Information

Population details of the village:

Population	Number of households	Population (No.)			Others
		Scheduled Caste	Scheduled Tribe	OBC	

2. Perception of villagers on Income and employment Opportunities

(i) Income level (Rs) Monthly

Level	<5000	5000-10000	10000-15000	15000-20000	>20000
Individual income					
Self-employed income from agriculture					
Income from livestock					

(ii) Wage labour livelihood (Rs) Daily

livelihood Type	≤150	150-300	300-500	500-700	>700
Income of wage labor from agriculture	□		□		□
Income of un-skilled labor from agricultural activities					

Income of un-skilled labor from non-agricultural activities			
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(iii) Income diversification opportunity (%)

Income Type	0-20	20-40	40-60	60-80	80-100
Self-employed income from agriculture					
Income of wage labor from agriculture					
Income from livestock					
Income of un-skilled labor from agricultural activities					
Income of un-skilled labor from non-agricultural activities					

1. Qualitative information on income and employment Opportunities

Income type	Highly Satisfied	Moderately Satisfied	Undecided	Dissatisfied	Not Acceptable
Individual income					
Self-employed income from agriculture					
Income of wage labor from agriculture					
Income from livestock					
Income of un-skilled labor from agricultural activities					

Income of un-skilled labor from non-agricultural activities					
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4. Perception of villagers and information on demographic and transport facility

(i) Average number of working individuals in a family (No.)

None	1-3	3-5	5-7	More than 7

(ii) Dependency ratio

Description	No.
Population less than 15 years of age	
Population greater than 65 years of age	
Population between 15 and 65 years of age	

(iii) Number of non-farm activities within the habitation (No.)

None	1-3	3-5	5-7	More than 7

(iv) Travel Cost (Rs)

Less than 5	5-10	10-15	15-20	More than 20

(v) Travel time (min)

Less than 30	30-45	45-60	60-90	More than 90

APPENDIX III
ASSESSMENT OF NEGATIVE IMPACTS OF PMGSY ROADS
(QUESTIONNAIRE FOR FOCUS GROUP DISCUSSION-
HABITATION LEVEL)

Date: Village: Block: District

Indicators defining negative impacts on rural community due to the construction of PMGSY roads.

1: Perception of focus group on quality of physical environment in the instant neighborhood due to the construction of PMGSY roads.

1.1 Information on air quality (pollution)

Variables		Perception			
		Poor	Moderate	Satisfactory	Good
Before	Quality of air (dust particles)				
After	Quality of air (dust particles)				

1.2 Information on vegetation quality

Variables		Perception			
		Poor	Moderate	Satisfactory	Good
Before	On adequacy of vegetation cover in the neighborhood.				
After	On adequacy of vegetation cover in the neighborhood.				

1.3 Information on water bodies

Variables		Perception			
		Insignificant	Moderately significant	Significant	Very significant
Before	Change in course of good water bodies if any (streams/river/naalas) within neighbourhood.				
After	Change in course of good water bodies if any (streams/river/naalas) within neighbourhood.				

1.4 Information on noise pollution

Variables		Perception			
		Insignificant	Moderately significant	Significant	Very significant
Before	Noise felt outside the home (vehicles, machinery etc)				
After	Noise felt outside the home (vehicles, machinery etc)				

Satisfaction level rating on quality of physical environment in the instant neighbourhood due to the construction of PMGSY roads

Before the construction of PMGSY roads

Variables	Level of satisfaction			
	Highly Satisfied	Moderately Satisfied	Unsatisfied	Not Acceptable
Air quality (pollution)				
Vegetation quality				
Water bodies				
Noise pollution				

After the construction of PMGSY roads

Variables	Level of satisfaction			
	Highly Satisfied	Moderately Satisfied	Unsatisfied	Not Acceptable
Air quality (pollution)				
Vegetation quality				
Water bodies				
Noise pollution				

2: Perception of focus group on quality of social-environment in the instant neighborhood due to the construction of PMGSY roads

2.1 Information on liability of rural population to epidemic/diseases

Variables		Perception			
		High	Moderate	Low	Negligible
Before	No of inhabitants prone to transmissible diseases				
After	No of inhabitants prone to transmissible diseases				

2.2 Information on safety and security

Variables		Perception			
		High	Moderate	Low	Negligible
Before	Status of crime (robbery, burglary etc.) in the neighborhood				
After	Status of crime (robbery, burglary etc.) in the neighborhood				

2.3 Information on liability to immoral acts/habits (especially youth)

Variables		Perception			
		High	Moderate	Low	Negligible
Before	Status of immoral behavior/habits in the neighborhood				
After	Status of immoral behavior/habits in the neighborhood				

2.4 Information on accidents

Variables		Perception			
		High	Moderate	Low	Negligible
Before	No of accidents occurring per year				
After	No of accidents occurring per year				
Before	Fatalities				
	Major accident				
	Minor accident				
After	Fatalities				
	Major accident				

	Minor accident				
Before	Truck				
	Bus				
	Car/jeep/tempo				
	Two-wheeler				
	Other				
After	Truck				
	Bus				
	Car/jeep/tempo				
	Two-wheeler				
	Other				

Satisfaction level rating on quality on quality of social-environment in the instant neighborhood due to the construction of PMGSY roads

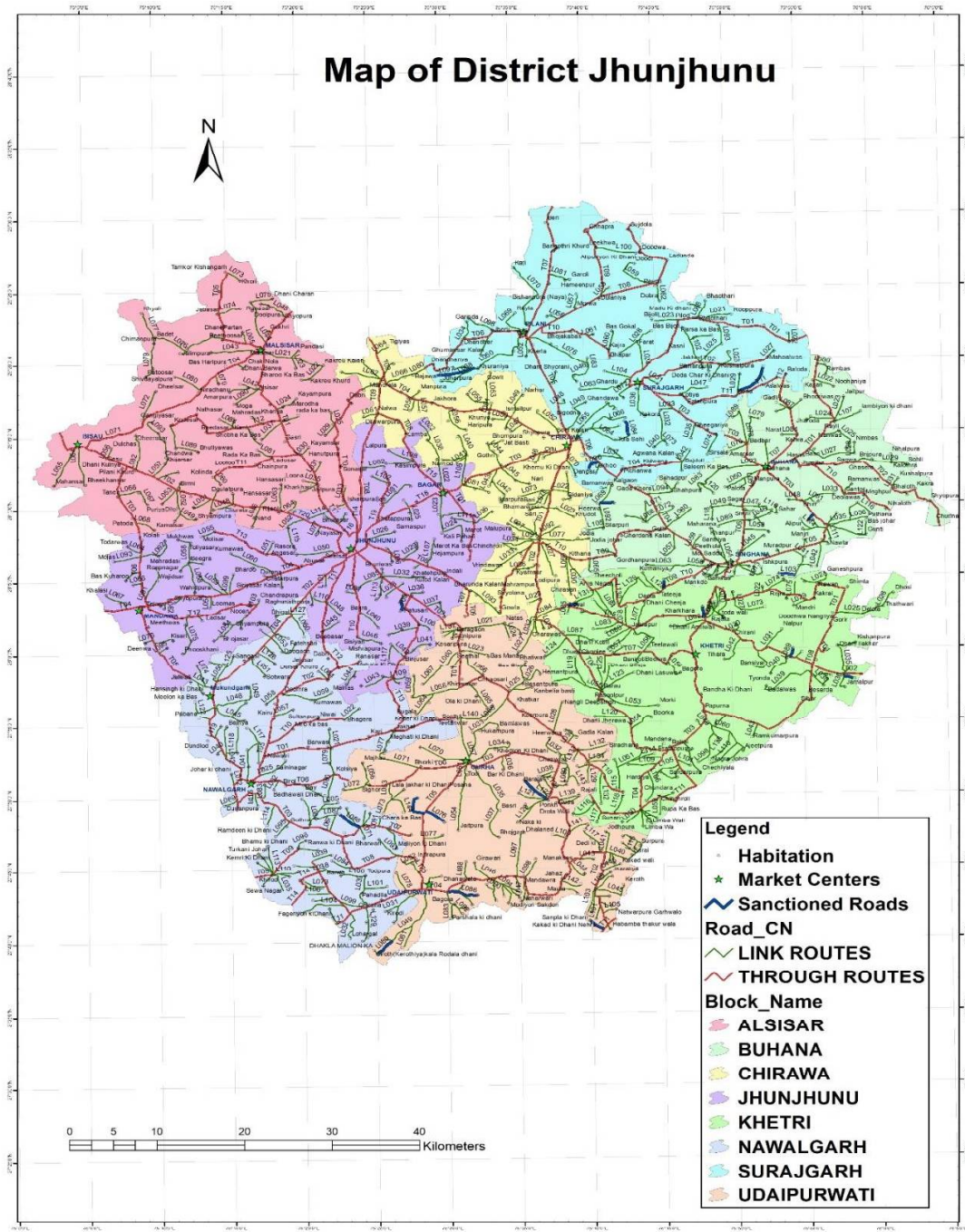
Before the construction of PMGSY roads

Variables	Level of satisfaction			
	Highly Satisfied	Moderately Satisfied	Unsatisfied	Not Acceptable
Liability of rural population to transmissible diseases				
Safety and security				
Liability to immoral acts/habits (especially youth)				
Road accidents				

After the construction of PMGSY roads

Variables	Level of satisfaction			
	Highly Satisfied	Moderately Satisfied	Unsatisfied	Not Acceptable
Liability of rural population to transmissible diseases				
Safety and security				
Liability to immoral acts/habits (especially youth)				
Road accidents				

APPENDIX IV ROAD NETWORK MAP



LIST OF PUBLICATIONS

Papers published (Book chapter)

Wagale M., Singh A.P., Sarkar A.K. “Exploring Rural Road Impacts Using Fuzzy Multi-criteria Approach” In: Advances in Transportation Engineering. (Pulugurtha S., Ghosh I., Biswas S. Eds), Lecture Notes in Civil Engineering, Springer, Singapore. 2019, 34: 1-12.

Papers published (Refereed Journals of International/National Repute)

Wagale M., Singh A. P., Sarkar A. K. “Impact of rural road construction on the local livelihood diversification: Evidence from Pradhan Mantri Gram Sadak Yojana in Jhunjhunu district, India”. *GeoJournal*. 2019, 1-18. <https://doi.org/10.1007/s10708-019-10007-3>. **(Scopus indexed)**

Singh A. P., Sharma A., Mishra R., Wagle M., Sarkar A. K. “Pavement condition assessment using soft computing techniques”. *International Journal of Pavement Research and Technology*. 2018, 11(6): 564-81. **(Scopus Indexed)**

Wagale M., Singh A. P., Sarkar A. K. “The application of adaptive neuro-fuzzy inference system and fuzzy delphi technique to assess socio-economic impacts of construction of rural roads”. *Journal of Transport and Telecommunication*. 2019. **(Accepted in Scopus Indexed)**

Wagale M., Singh A. P., Sarkar A. K. “Socio-economic impacts of Low-volume roads using mixed-method approach of PCA and Fuzzy-TOPSIS”. *International Review for Spatial Planning and Sustainable Development*. 2019. **(Communicated)**

Papers published (Refereed International/National Conference Proceedings)

Wagale M., Singh A. P., Sarkar A. K. “Assessment of Socio-economic Impacts of PMGSY Roads using Fuzzy Multi-criteria Decision-Making Tool”. Urbanization Challenges in