

# Inclusive and Green Rural Roads:

Beyond Connectivity, Accelerating Green Growth  
Contribution to the SUM4ALL Initiative



Frank van Steenberg, MetaMeta





# Rural Roads: Development Vectors



# Rural Roads: Development Vectors



Rural roads – a formidable development opportunity:

- Annual investment 1-2 Trillion USD
- Expected new roads to be added from 2010-2050: 25M kilometres (60% increase)
- 20% of land surface within 1 kilometer of a road – 50% of remaining patches < 1km<sup>2</sup>
- Current connectivity, i.e. population > 2kilometer of all weather road: 1 Billion people globally unconnected; only 30% in SSA

How to capitalize on the opportunity?

How to make roads inclusive and green development vectors?

How to have roads systematically and effectively contribute to many SDGs?





# Rural Roads: Development Vectors

- (1) Unblock access for goods and services
- (2) Create direct employment/ skills development opportunities
- (3) Enormously trigger local economy activities
- (4) Change land and water environment – for the better





## AMBITIONS

- **Equitable:** ensure everyone has access to good-quality transport to reduce economic and social disparities
- **Efficient:** allow people and goods to move from A to B quickly and seamlessly
- **Safe:** halve the number of global deaths and injuries from road traffic accidents
- **Clean:** lower the environmental footprint of the sector to combat climate change and pollution.

# SUSTAINABLE mobility<sup>TM</sup> FOR ALL



A robust global vision  
around 4 objectives



A global tracking framework  
to measure global progress

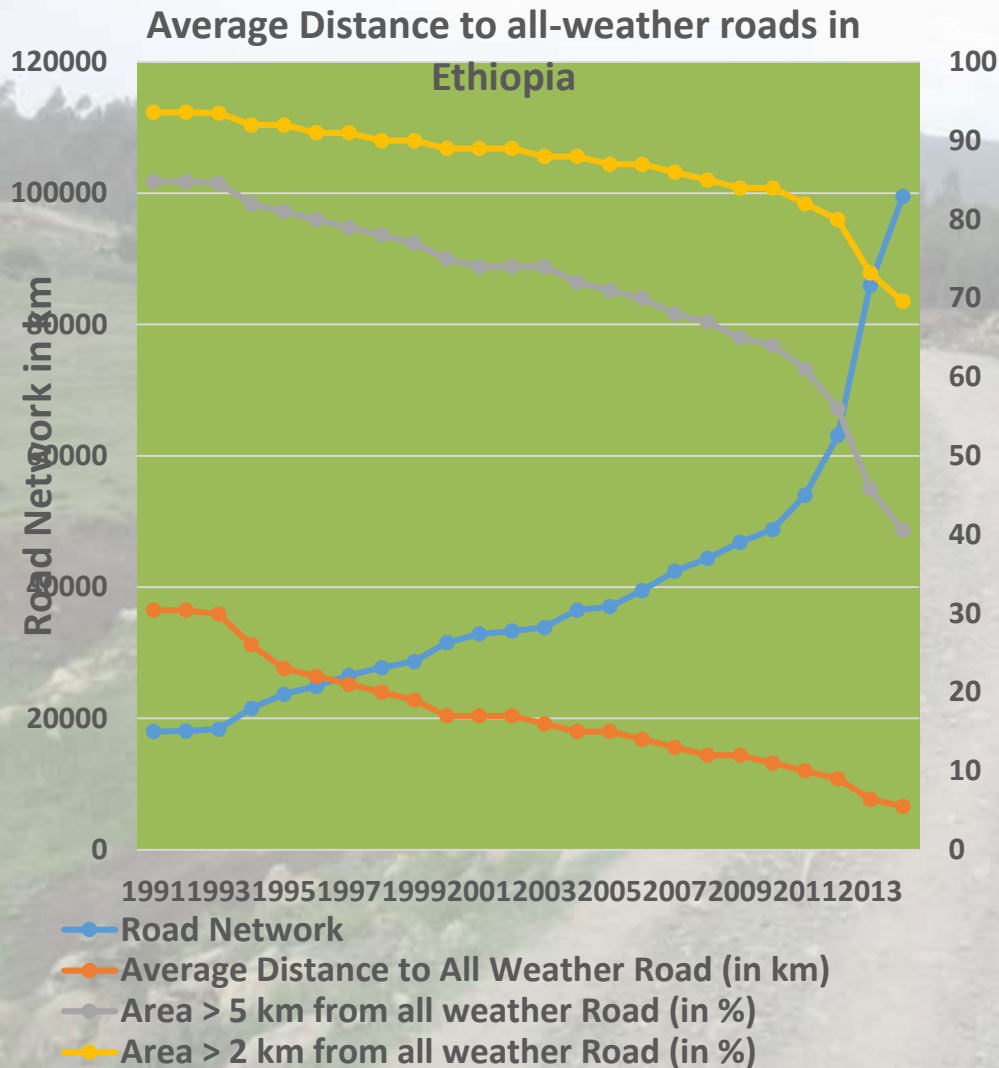


Bold and ambitious actions



Build a global coalition  
to carry the agenda forward

# Case: Ethiopia's road building program



100

90

80

70

60

50

40

30

20

10

0



# (1) Increased access to services and opportunities

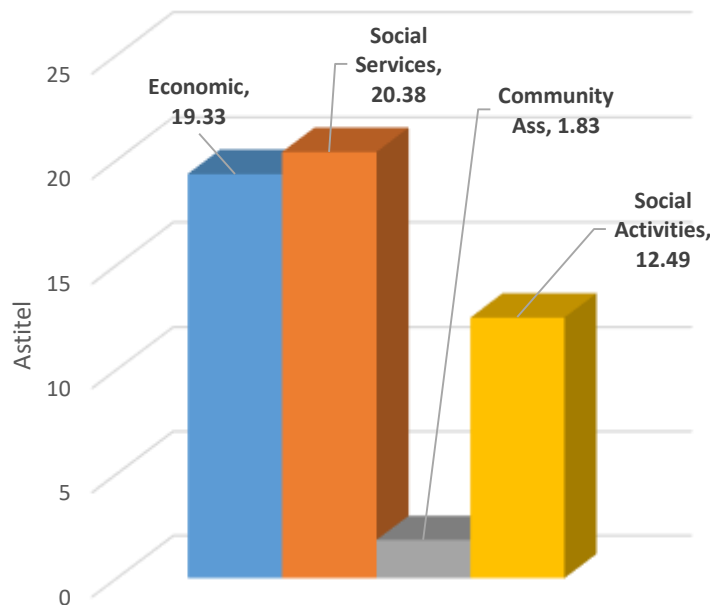
- Access to services (health and education)
- Access to economic opportunities
- General freedom that comes with mobility



# Rural mobility by trip purpose

- Trips in rural areas are often made for economic activities, social services, social activities and community association

Fig 3: Average monthly distance travelled by trip purpose



The dominant form of travel in the rural area in Ethiopia is social services mainly education and health, followed by economic activities which includes travel for market, agricultural activities and travel for employment

# Access to health – the importance of ambulances





**Access to education: apart from connectivity cost of transport is a main factor**

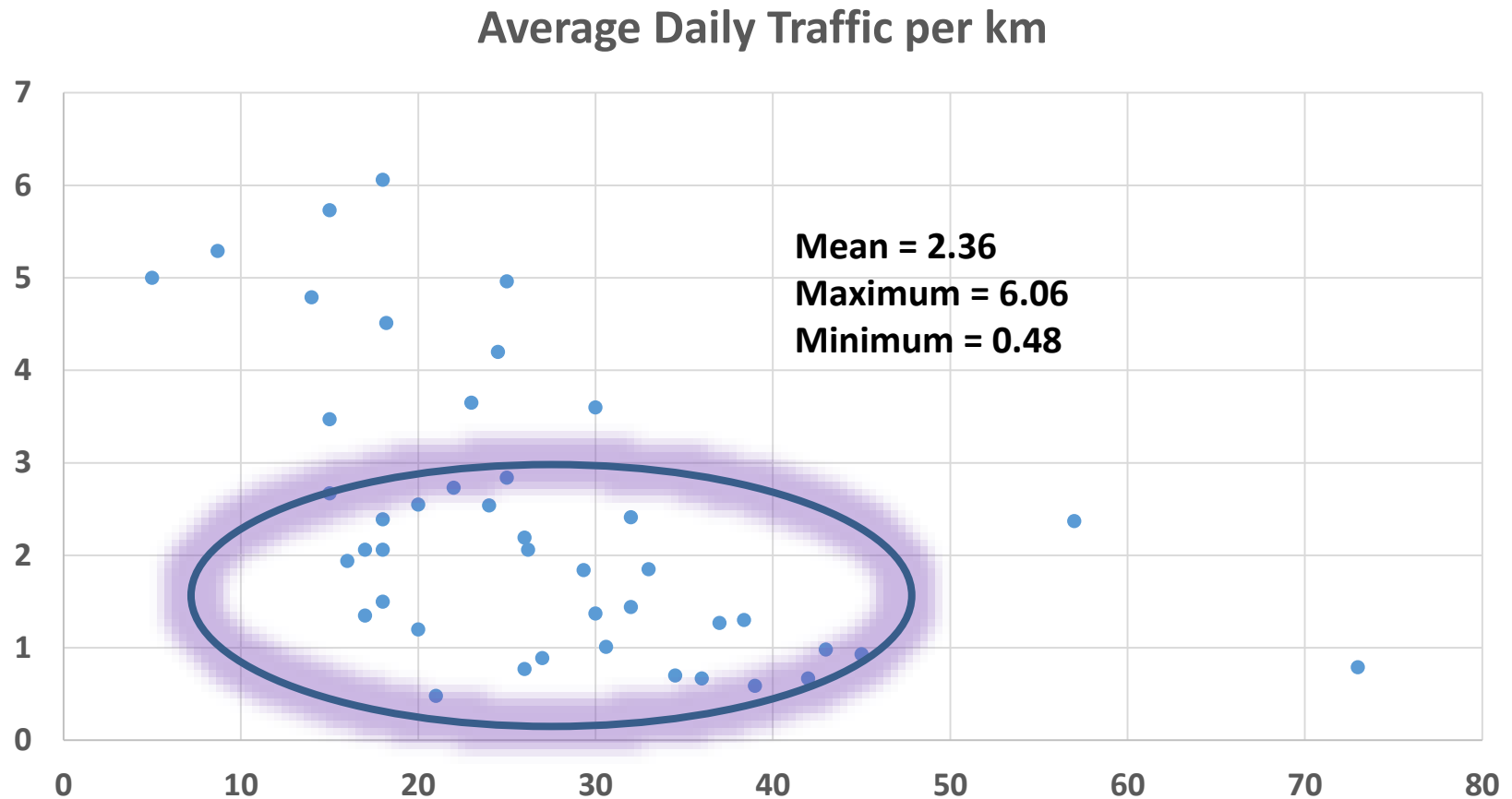


# Market access and distance to road

- In developing countries like Ethiopia, transport cost constitutes more than half of the marketing costs.
- More than three fourth of respondents in surveys revealed an increase in marketing of agricultural products after road construction
- More negotiation-minded – have more options

| Product type   | Changes in sales |          |           | Changes in sales attributed to road |                    |
|----------------|------------------|----------|-----------|-------------------------------------|--------------------|
|                | Increase         | Decrease | No change | All of the change                   | Part of the change |
| Cereals        | 69               | 3        | 28        | 24                                  | 74                 |
| Vegetables     | 81               |          | 19        | 34                                  | 66                 |
| Fruits         | 81               |          | 19        | 35                                  | 65                 |
| Other products | 87               | 2        | 11        | 34                                  | 64                 |

Yet on feeder roads it is also the traffic that matters

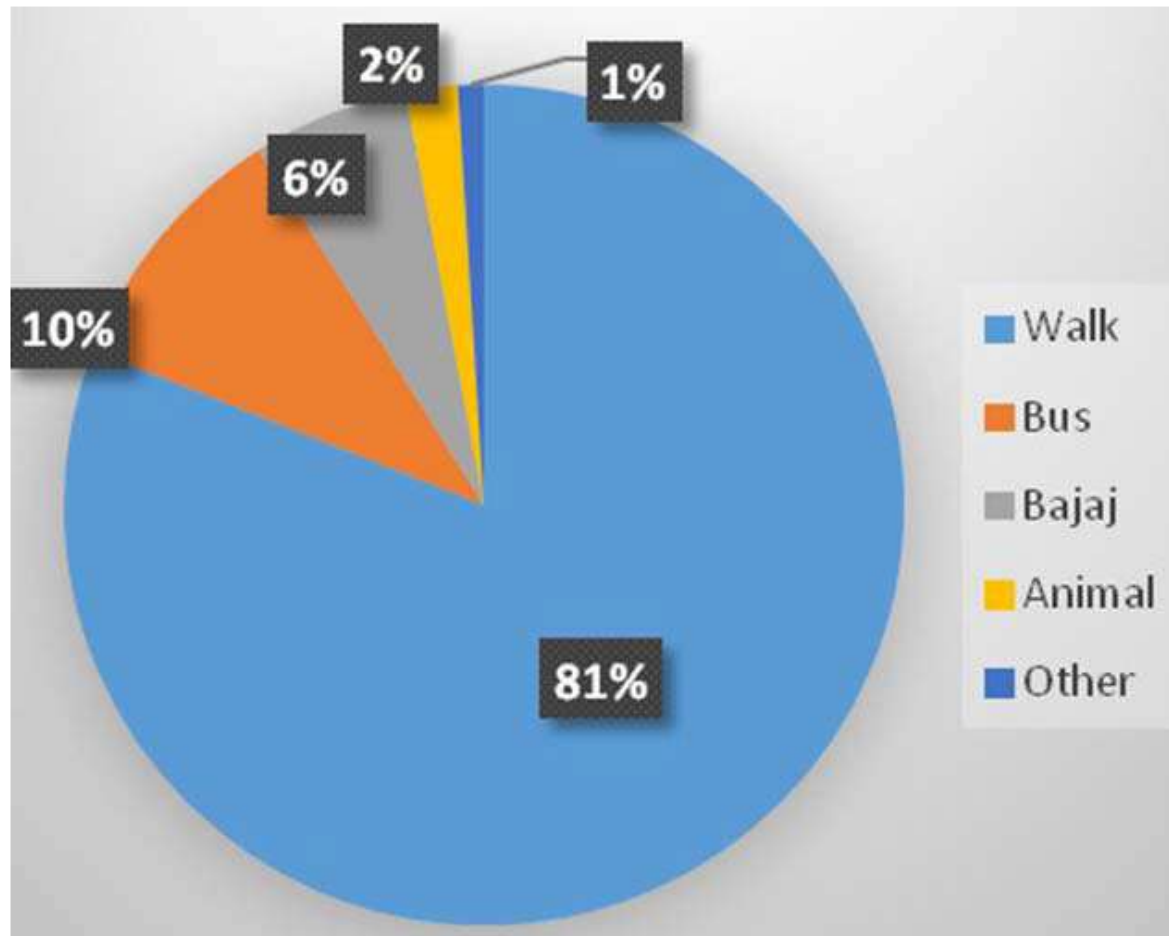




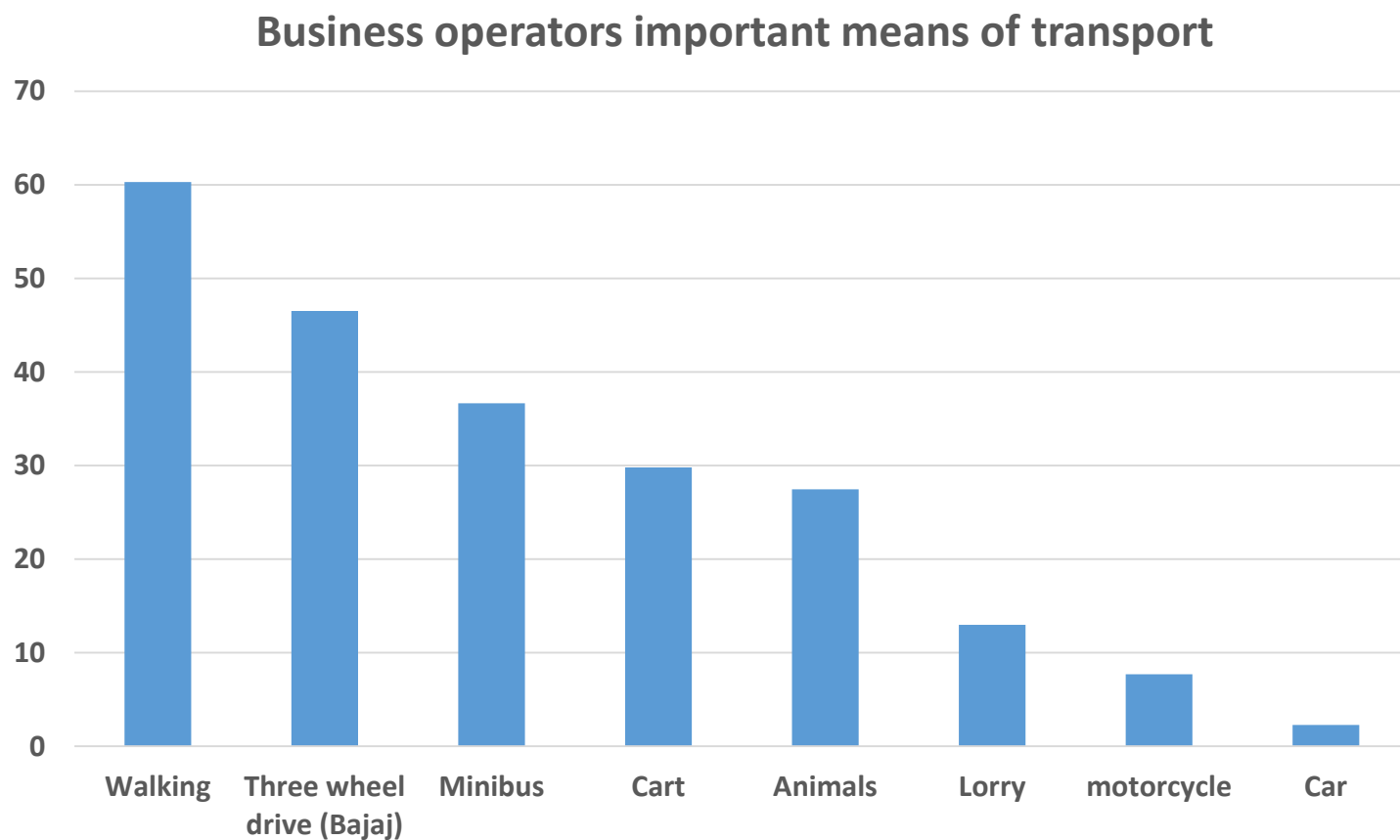
Roads are empty



# Walking remains most important means of transport



# Business operators' means of transport



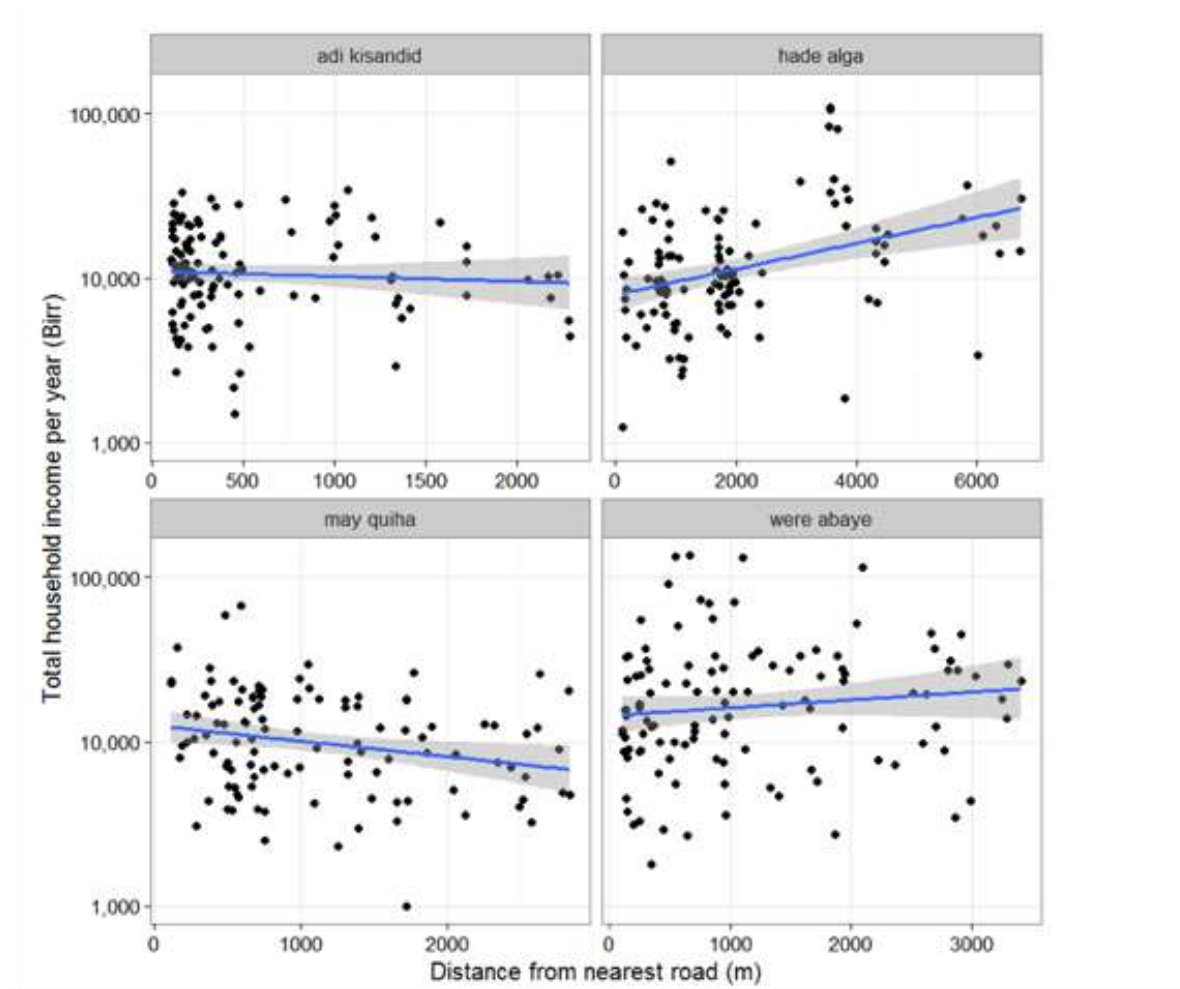


Lack of intermediate means of transport – **only** ‘bajaj’ **fill** the gap between walking and trucks/busses



# Equity and distance from feeder road (up to 3km)

- no clear bias to those along side the road
- depends on other factors too



## (2) Direct employment opportunities

Jobs

Opportunities for skill development

Capitalizing the local economy





## (2) Direct employment: local jobs and injection of cash flow



Table 1: Working Places of Feeder Road Workers


| Workers categories                   | Within the project site (%) | Elsewhere /Outside (%) |
|--------------------------------------|-----------------------------|------------------------|
| <b>Feeder Road Workers</b>           |                             |                        |
| Skilled construction worker(builder) | 59.7                        | 40.3                   |
| Unskilled wage labourer              | 100                         | 0                      |
| Sub-contactors                       | 30.2                        | 69.8                   |
| <b>Building material suppliers</b>   |                             |                        |
| Sand                                 | 61.4                        | 38.6                   |
| Concrete materials                   | 47                          | 53                     |
| Stone                                | 62.2                        | 37.8                   |

Source: Authors compilation, 2016

# Direct employment: developing useful skills

|                         |                   | As Skilled workers |          |                                       |       |       | As Unskilled workers |          |                           |      |      |
|-------------------------|-------------------|--------------------|----------|---------------------------------------|-------|-------|----------------------|----------|---------------------------|------|------|
|                         |                   | Mean Days worked   | Mean DWR | Level of satisfaction of the work (%) |       |       | Mean Days worked     | Mean DWR | Level of satisfaction (%) |      |      |
|                         |                   |                    |          | WR                                    | WC    | TD    |                      |          | WR                        | WC   | TD   |
| Employment Modality     | Daily base        | 349                | 98.6     | 60                                    | 61.5  | 61.5  | 333.6                | 71.6     | 74.4                      | 70.9 | 65.1 |
|                         | As a foreman      | 755.5              | 41.7     | 50                                    | 50    | 50    |                      |          |                           |      |      |
| Construction activities | Land clearing     |                    |          |                                       |       |       | 173.8                | 21.6     | 52.9                      | 70.6 | 68.8 |
|                         | Earth work        | 60                 | 7        | 100                                   | 50    | 50    | 126.7                | 64.4     | 70.4                      | 55.2 | 48.3 |
|                         | Culverts/ditches  | 336.7              | 45       | 33.33                                 | 66.67 | 66.67 | 59.9                 | 40.7     | 50                        | 50   | 33.3 |
|                         | Minor maintenance |                    |          |                                       |       |       | 475.7                | 57.2     | 58.8                      | 62.5 | 64.7 |
|                         | Major maintenance |                    |          |                                       |       |       | 100                  | 107.5    | 100                       | 100  | 100  |

# Direct employment: decent wages and labour arrangements

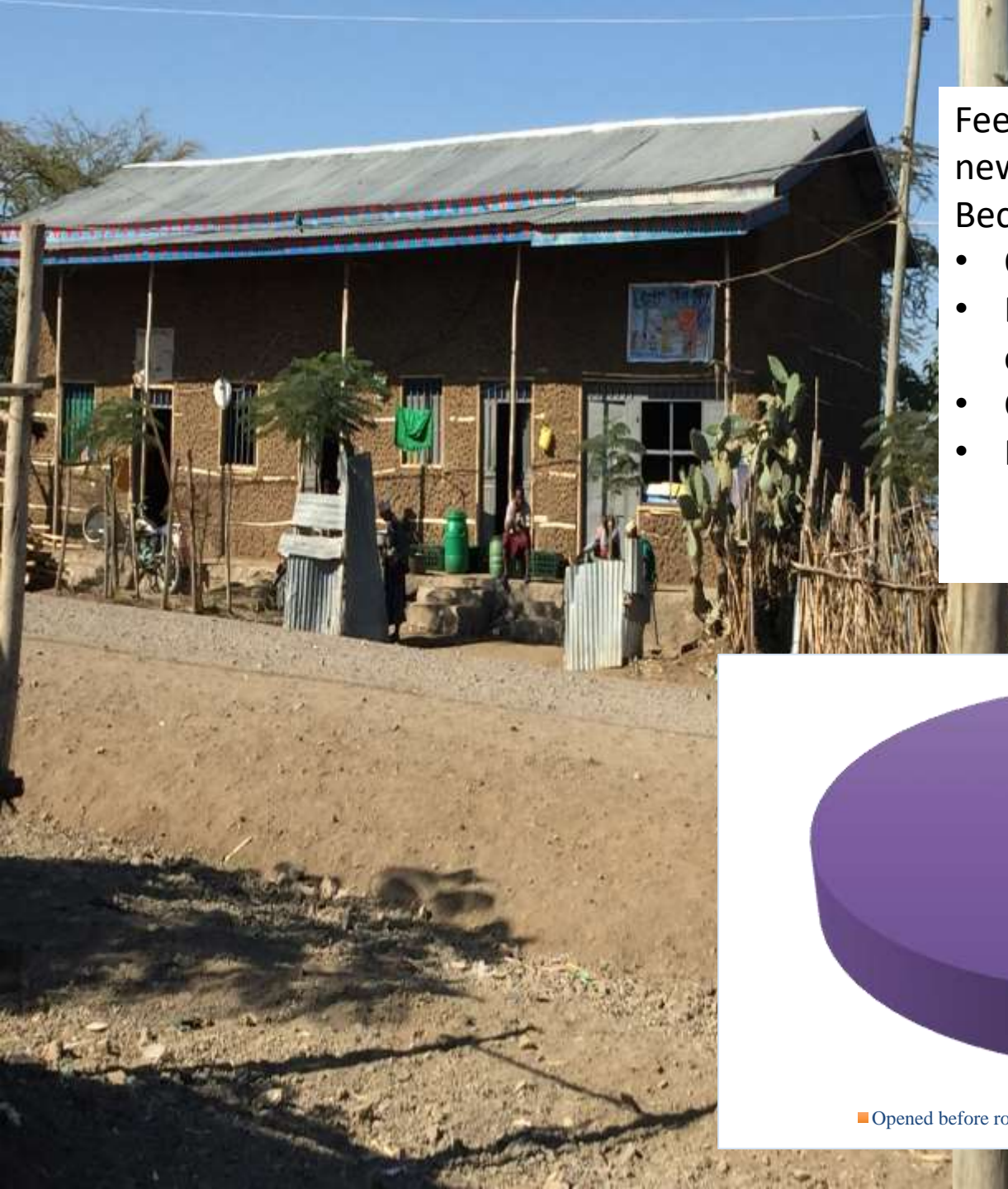


| Construction Materials    | N  | Mean<br>Income<br>in EB | Percentage of satisfied workers |                     |        |
|---------------------------|----|-------------------------|---------------------------------|---------------------|--------|
|                           |    |                         | Income                          | Working suitability | Timing |
| Material supply (sand)    | 47 | 1522.8                  | 75.5                            | 79.6                | 78.7   |
| Material supply(concrete) | 31 | 1073.9                  | 90.3                            | 86.7                | 81.8   |
| Material supply (stone)   | 55 | 1340.9                  | 80                              | 75.9                | 73.2   |

### (3) Creating new business opportunities



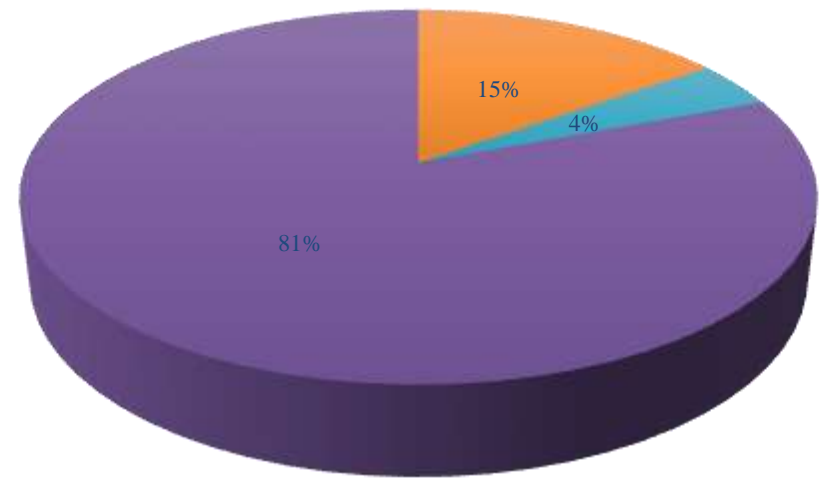




Feeder roads are major boost for new business (81% of business)

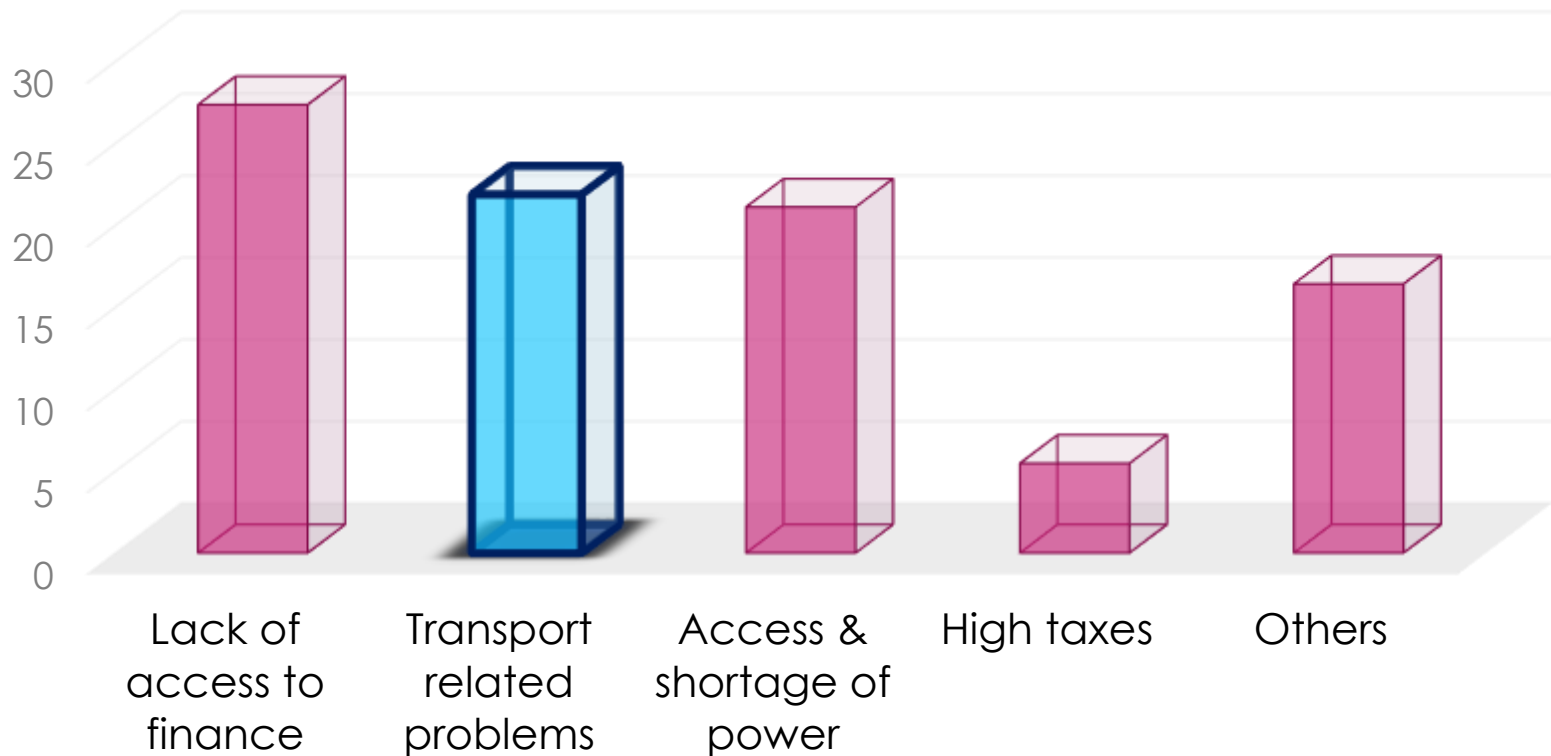
Because of:

- Open connectivity
- Bundling of customers and commodities
- Capitalization of economy
- New orientations



Opened before road   Reopened after road   Opened after road

# What are the primary constraints for non-farm business operations and growth?

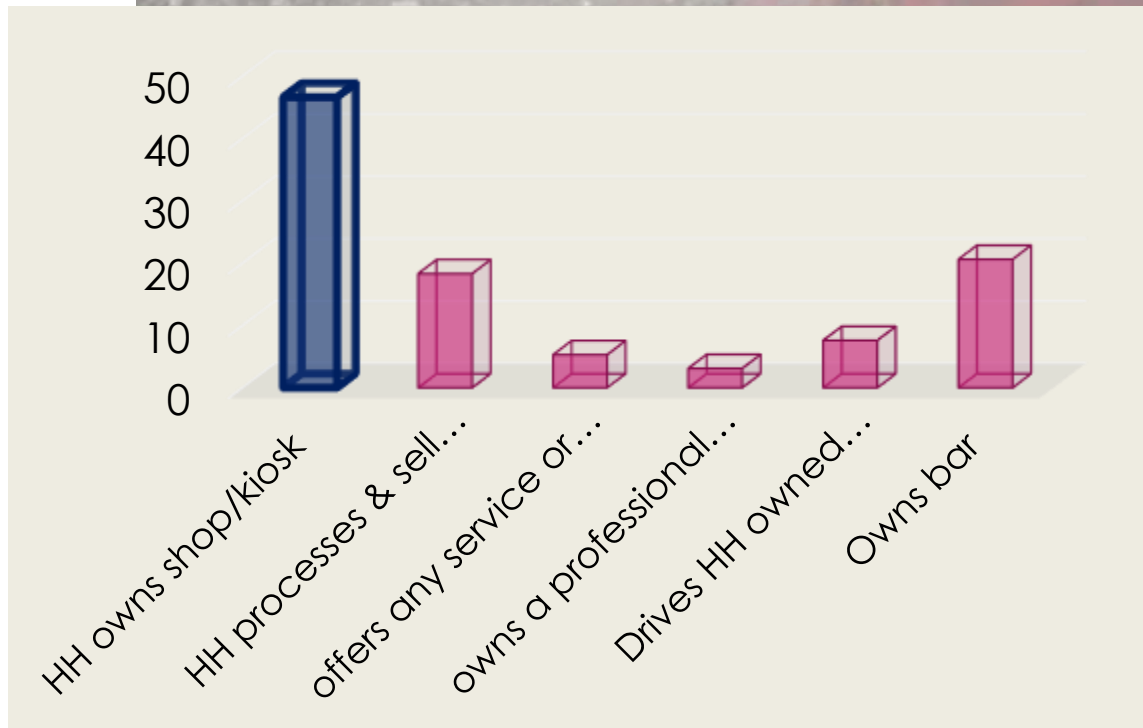


New activities are not much diversified

- mainly small convenience stores, bars, hairdressers
- few hardware shops, producers of productive assets/ value addition of local produce

> opportunities for much more? “economy as circular flow of activities”







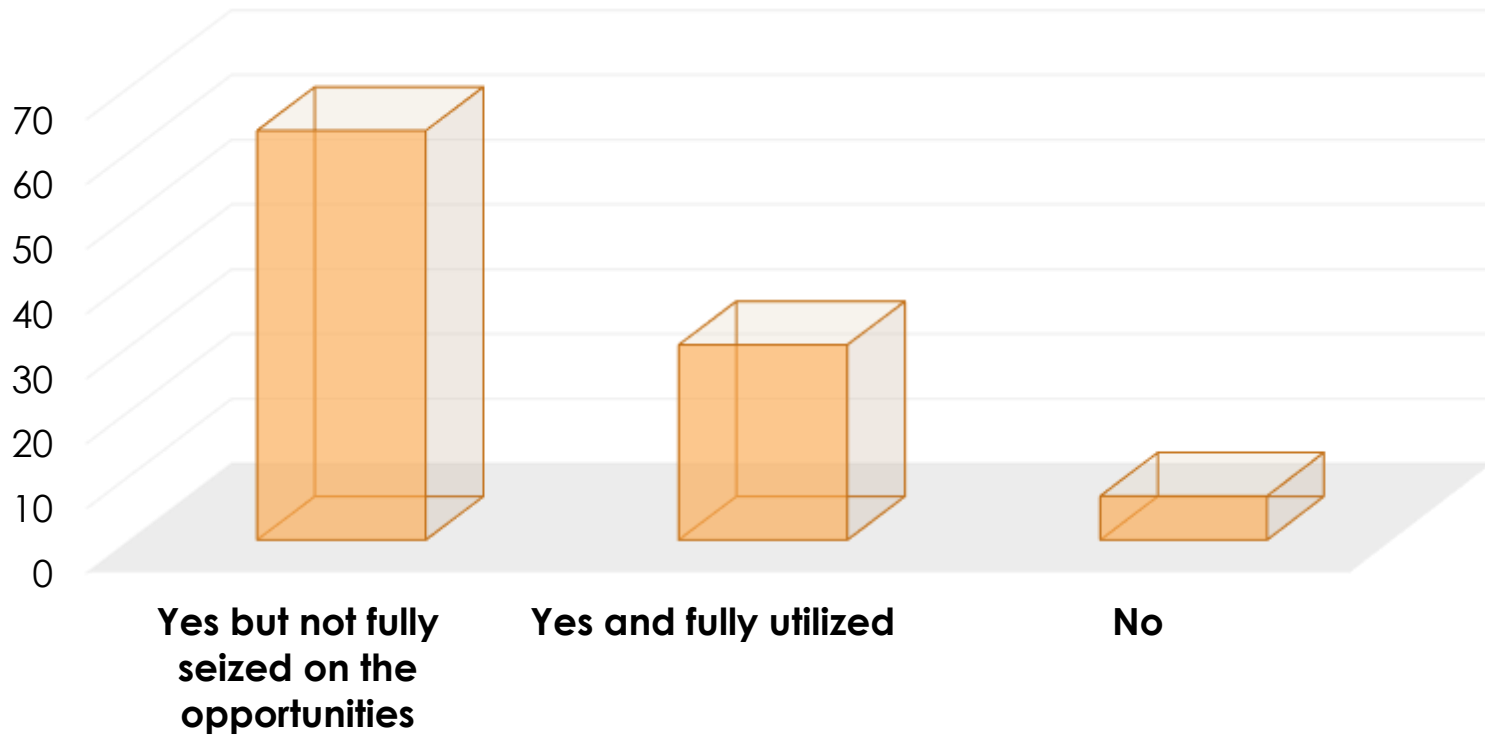
# To whom does/did the enterprise mostly sell its product or service?



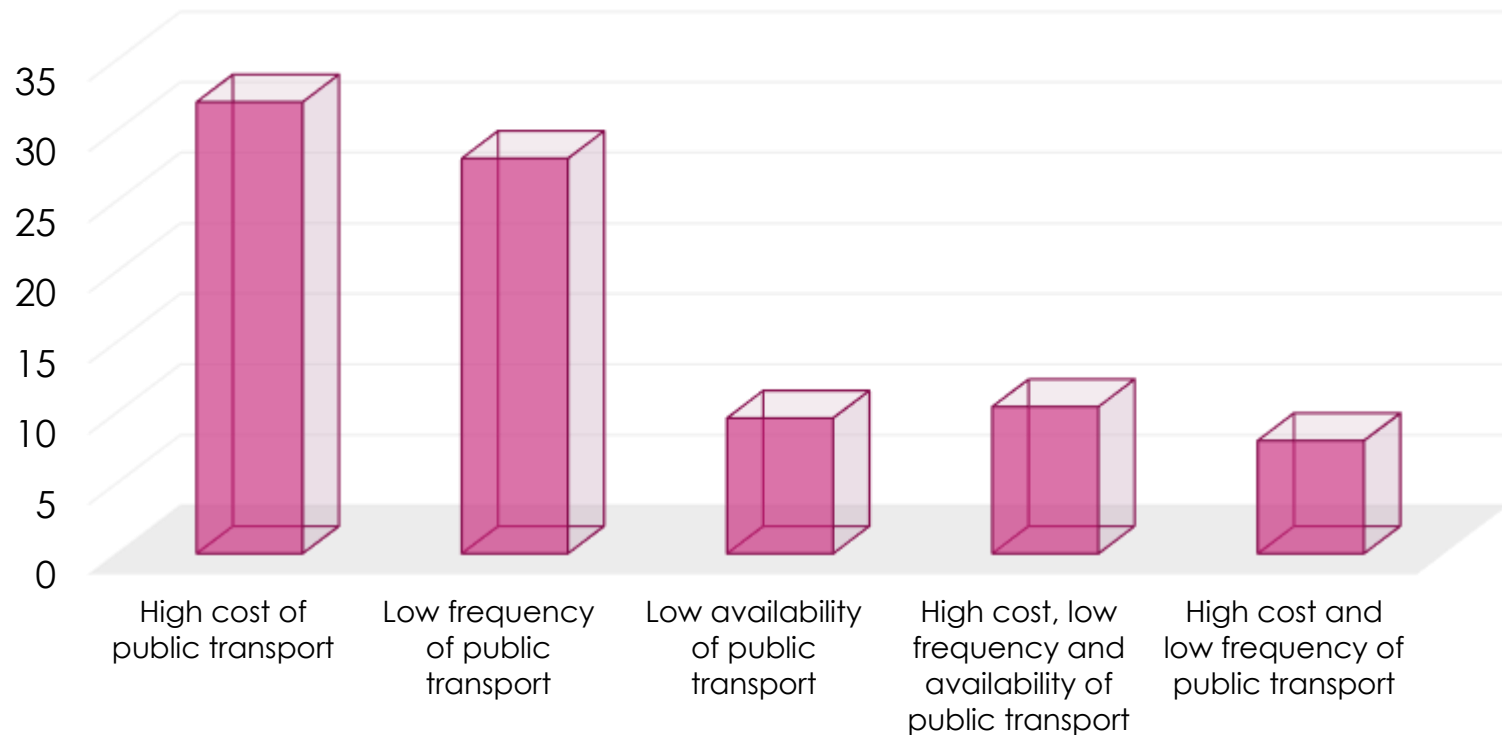
Increasing service provision and potential penetration  
Of useful products



# Has the road created new opportunities for your business?



# Issues affecting business related to the use of the road network



## (4) Effect on land, water and air

Roads can have unwanted environmental consequences that affect the livelihood of rural communities

| Effects of roads    | Frequency | Percent |
|---------------------|-----------|---------|
| Flooding            | 179       | 34      |
| Water logging       | 61        | 12      |
| Erosion             | 153       | 29      |
| Sediment deposition | 95        | 18      |
| Dust                | 229       | 44      |
| Weeds               | 47        | 10      |

The environmental consequences of roads in the order of number of respondents are:

1. Dust
2. Flooding
3. Erosion
4. Sediment deposition
5. Water logging
6. Weeds

Total observations = 525



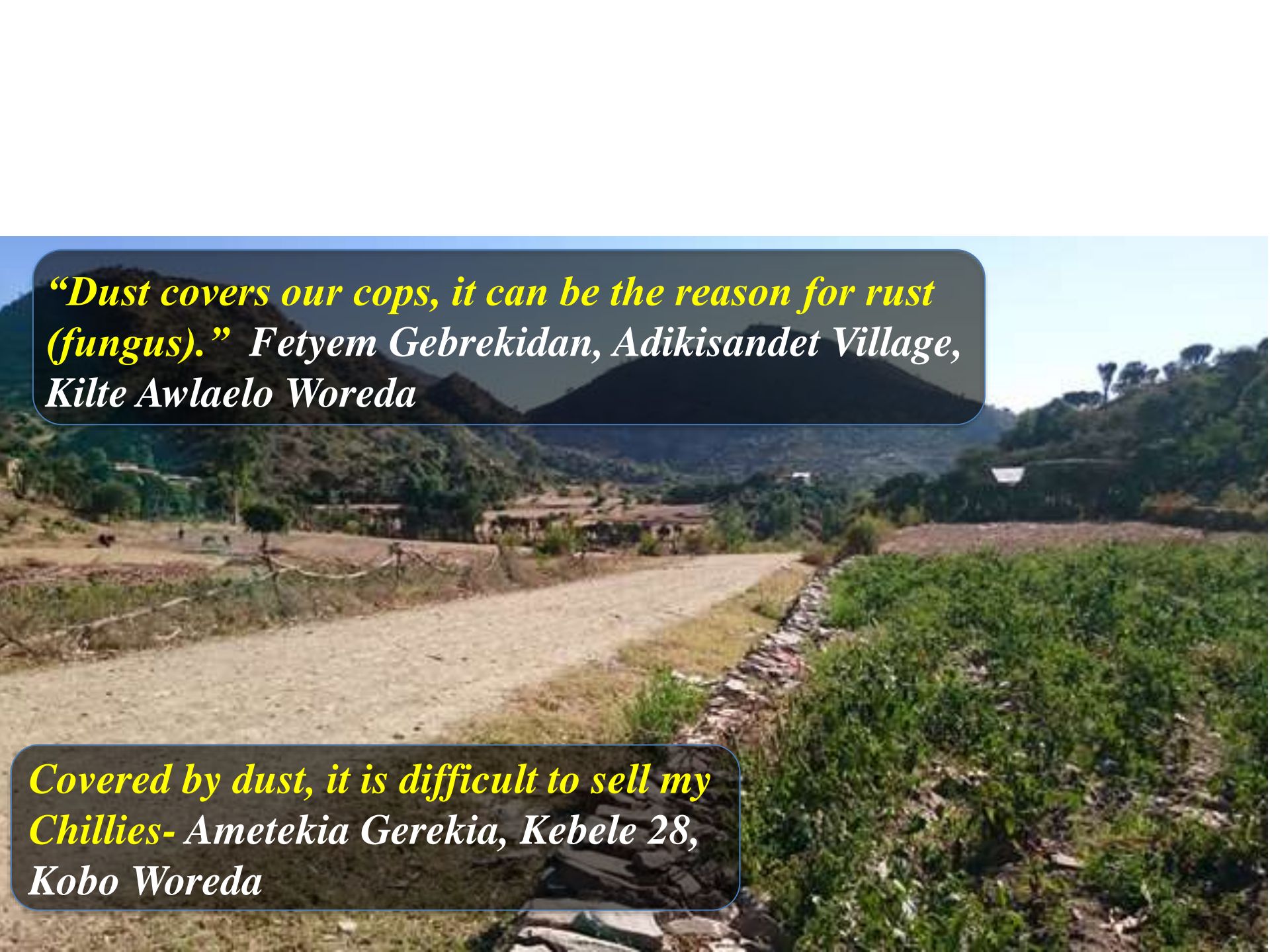


*Unpaved roads contribute almost 40% of all dust. Long-term exposure to traffic-generated dust has been known to contribute to 1.5-2 million deaths annually*

*Layering of dust on crops in road-adjacent fields is known to affect photosynthesis, respiration, transpiration, and to lead to an increase in fungal spots on several crops. Impact of dust from the estimated 13 million km of unpaved roads worldwide is estimated to affect around 26 million hectares of productive land, and lead to a reduction in agricultural revenue to the tune of USD 260 million*

## Affects:

- Human health
- Animal health
- Crop production



***“Dust covers our crops, it can be the reason for rust (fungus).” Fetyem Gebrekidan, Adikisandet Village, Kilte Awlaelo Woreda***

***Covered by dust, it is difficult to sell my Chillies- Ametekia Gerehia, Kebele 28, Kobo Woreda***



Roads change the surface hydrology in a major way – now often negative..



- Road surfaces contribute 15-40% of all sediment in watersheds
- To this the sediment produced by road gullies should be added
- Gullies also cause moisture depletion and are safety hazard and can isolate villages



# Results of transects: 'roads and water as enemies' (

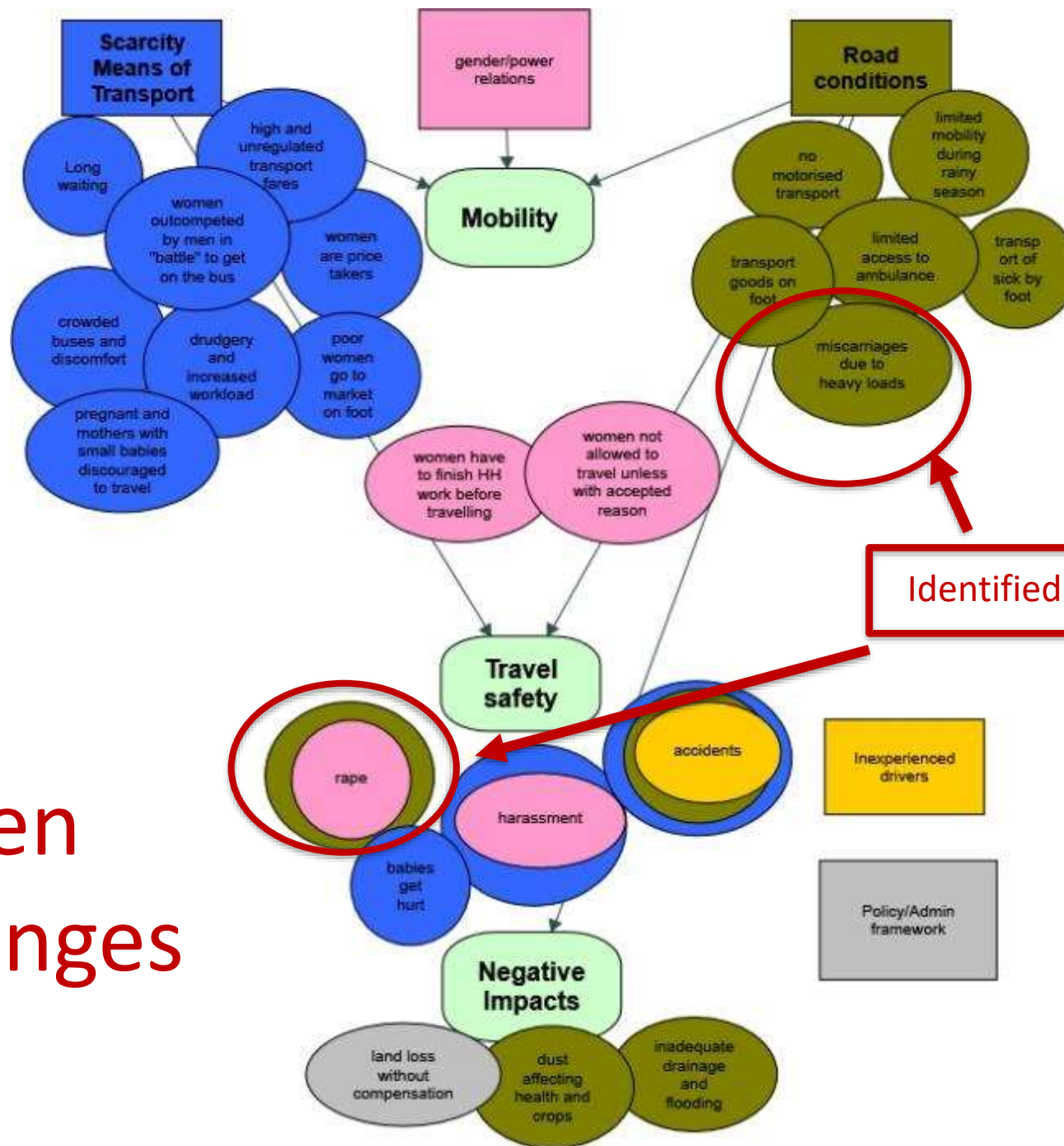
- On average in 10 kilometer > 13-25 problem spots
  - Erosion and sedimentation: 55% of locations
  - Flooding of houses and land: 15% of locations
  - Persistent waterlogging: 30% of locations
  - Lost opportunity to capture water 4 M m<sup>3</sup>
- Deficiencies in governance process
  - Missing from guidelines
  - No coordination
  - No interaction with road-side communities





# Women, Roads, and Transport





# Men and women

# Men

## Women top challenges

- Scarcity MoT
- High transport fares
- Accidents
- Dust
- First mile is a challenge
- Land loss without compensation
- Bad road conditions
- Road is too narrow
- Suboptimal design and maintenance of drainage infrastructure

- Alignment of roads is not impartial
- Flooding and water-borne diseases
- Paying taxes on expropriated land

## Men top challenges

## Women priorities

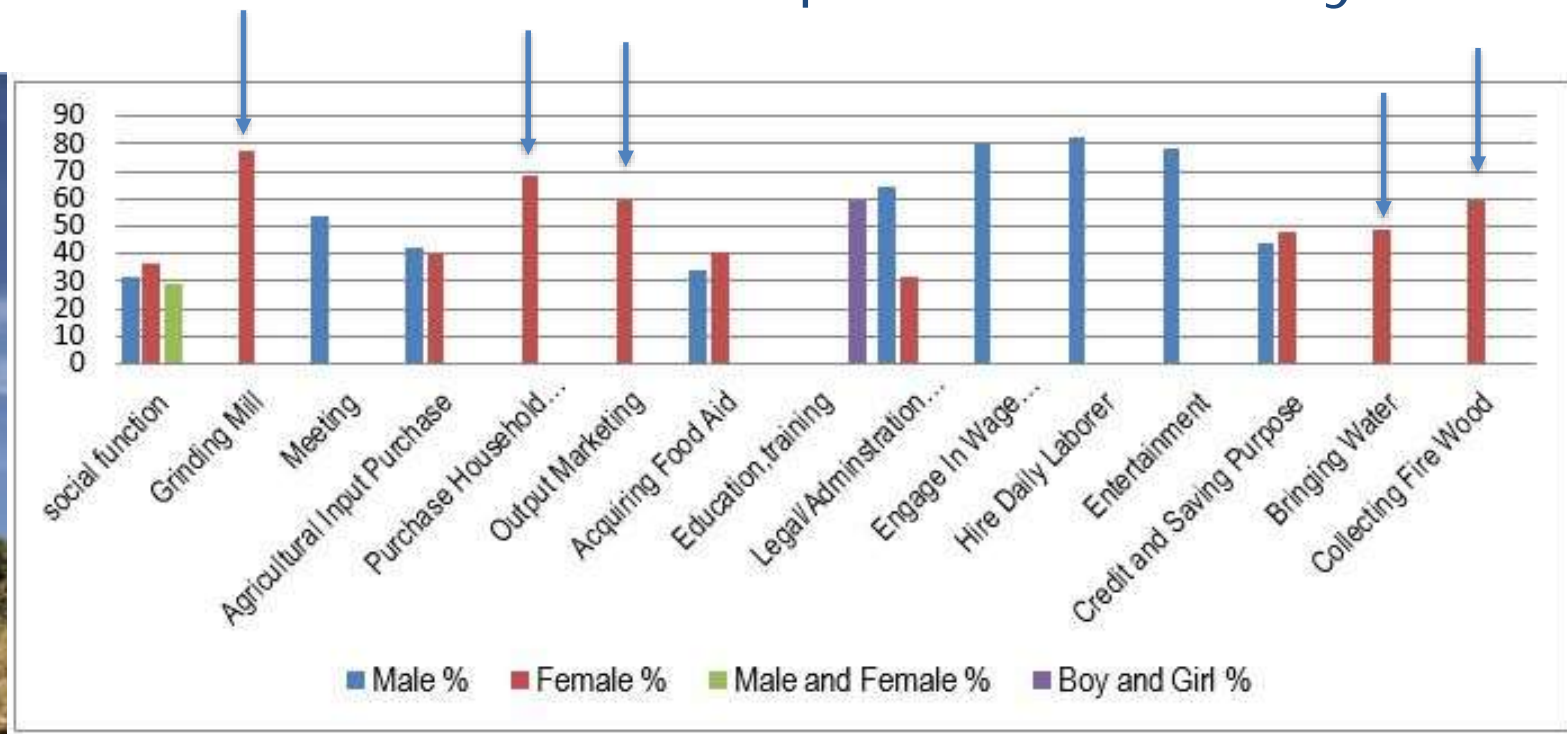
1. Improved access to MoT
2. Upgrading of feeder road and footpaths (to address risks of accidents and increase motorised transport)
3. Lower and regulated transport fares

## Men priorities

1. Improve design of roads and bridges and maintenance of road drainage
2. Upgrading to asphalt
3. Make road wider
4. Regulate transport fares




# Key Findings: Gender, Transport, Mobility



# Importance of the 'first mile'



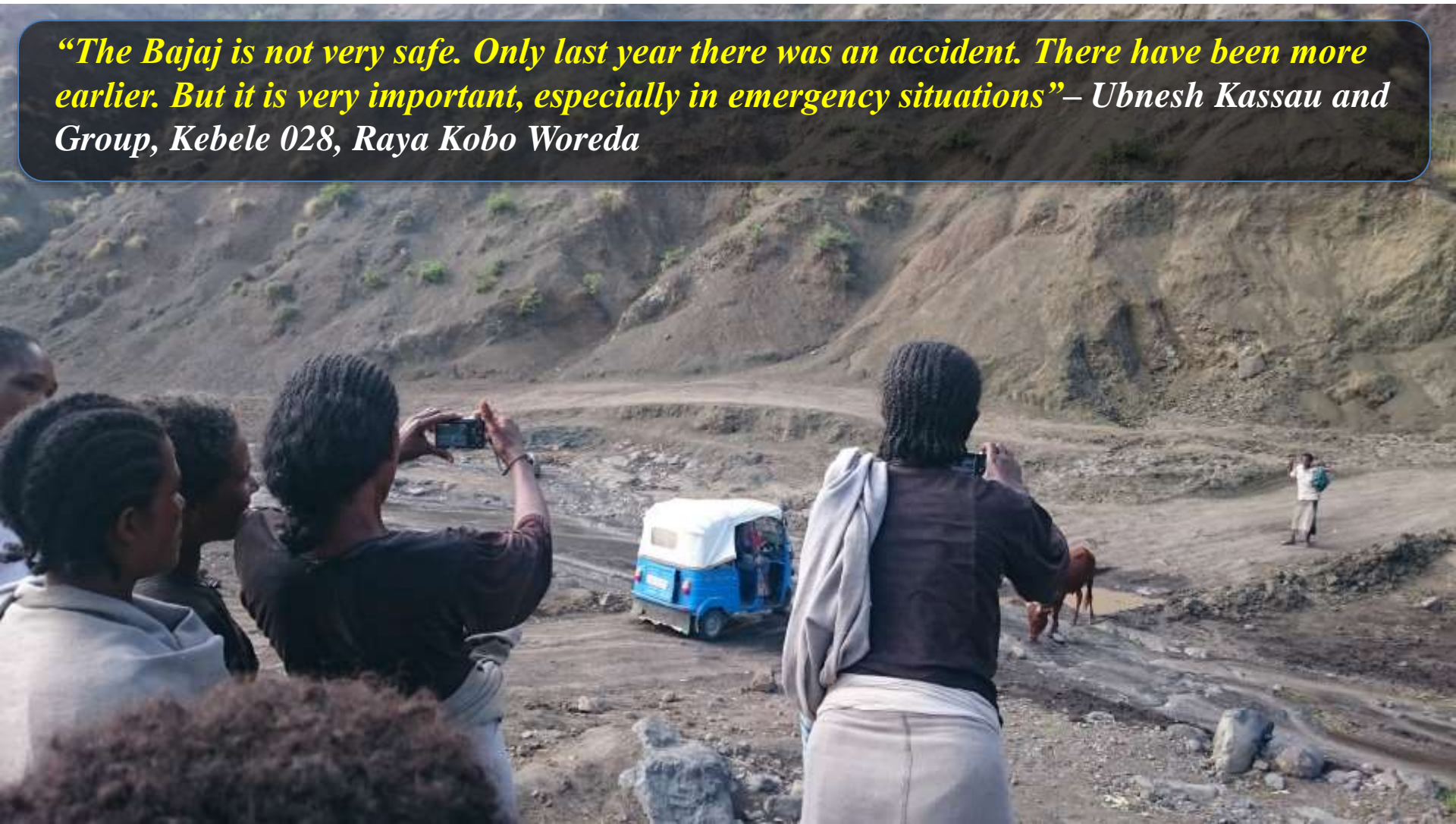




*“Forget the (feeder) road. The walkway to it from our homes is so difficult. Pregnant women will have to think many times before using it.” – Melesh Haregu, Aynalem Village, Kilte Awlaelo Woreda, November 2016*

# Need appropriate transport

*“The Bajaj is not very safe. Only last year there was an accident. There have been more earlier. But it is very important, especially in emergency situations” – Ubnes Kassau and Group, Kebele 028, Raya Kobo Woreda*





*“The buses are too few, and too crowded. They also overcharge, especially the younger conductors. We often prefer walking to Wukro (10 km) instead.”*

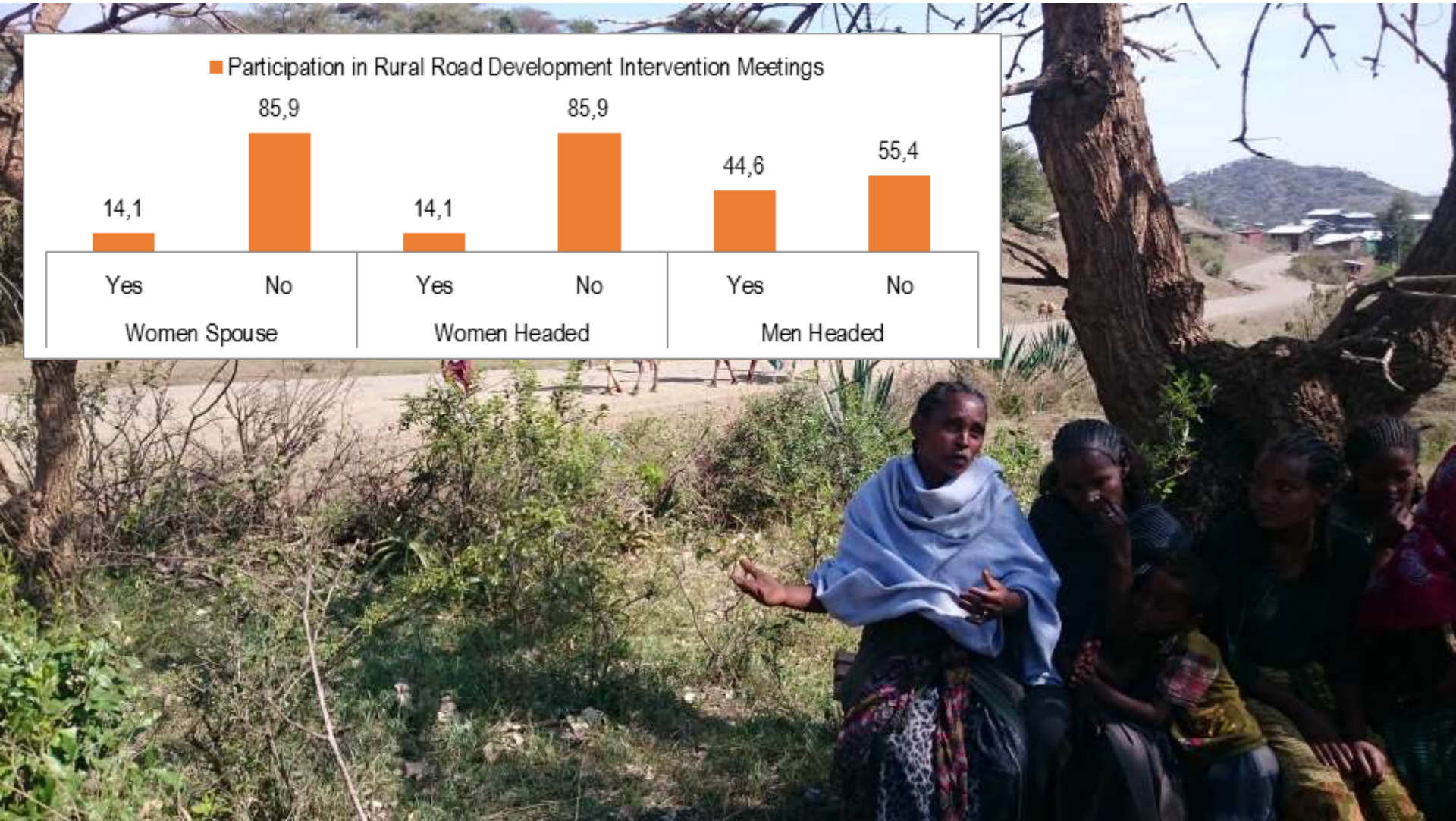
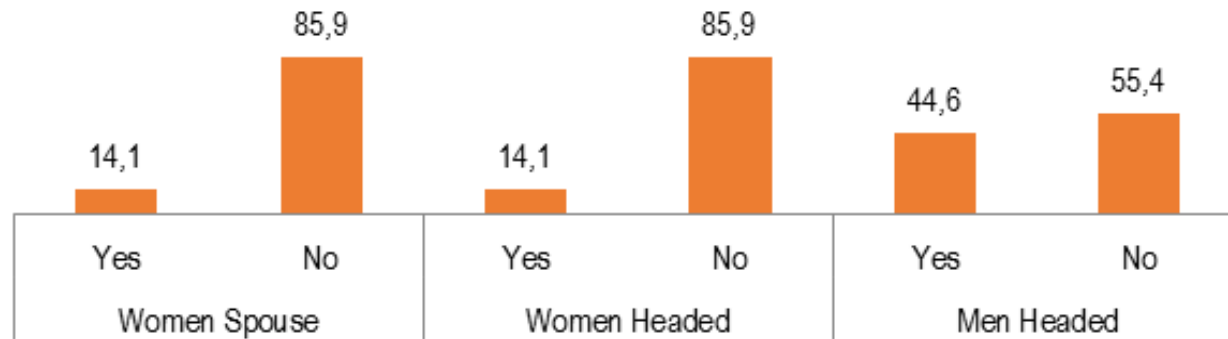
*– Melesh Haregu and Group,  
Aynalem Village, Kilte Awlalo  
Woreda*



*“If we were men, we could elbow our way through the crowd and capture the empty seats” Tsegaye Meharet and Group,  
Aynalem Village, Kilte Awlalo Woreda,*

# Differential Participation in Road Planning

■ Participation in Rural Road Development Intervention Meetings



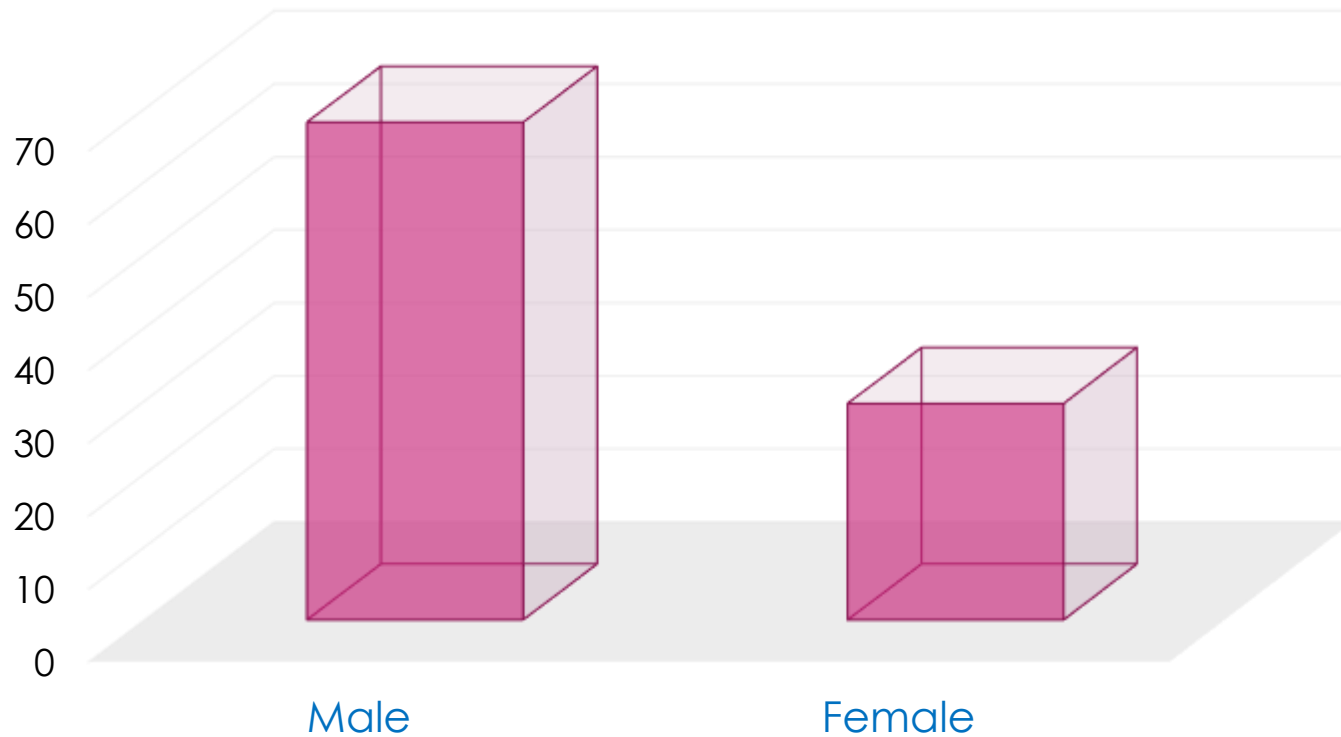


# Differential Participation in Road Construction

- Paid maternity leave of up to 17 months from PSNP targets and obligations
- Exemption of women from hard physical work
- Exemption of elderly, sick, and disabled
- Lower daily work targets for women



# Non-farm Business ownership structure by gender – work on more opportunities for women






# Yield impacts of road form water in Sinqata



# Rural Roads as Development Vectors



Rural roads – a formidable development opportunity:

How to capitalize on the opportunity?

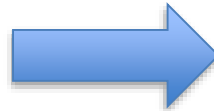
How to make roads inclusive and green development vectors?

How to have roads systematically and effectively contribute to all SDGs?

# Conclusions:

How can road infrastructure planning, road development, and transport be more inclusive, so its benefits accrue to a larger section of rural societies?

## 1. Prioritize not only roads but also rural transport



# Conclusions:

How can road infrastructure planning, road development, and transport be more inclusive, so its benefits accrue to a larger section of rural societies?

**2. Intermediate Means of Transport (IMTs) need to be promoted as priority**





# Mode of transportation

EITHER



**Missing  
Middle (IMT)**

Need to make it available  
and affordable

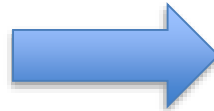


OR

# Conclusions:

How can road infrastructure planning, road development, and transport be more inclusive and greener, so its benefits accrue to a larger section of rural societies?

## 3. Rethink transport designs – for instance buses





# Conclusions:

How can road infrastructure planning, road development, and transport be more inclusive and greener, so its benefits accrue to a larger section of rural societies?

## 4. Work on the first mile





# Conclusions:

How can road infrastructure planning, road development, and transport be more inclusive and greener, so its benefits accrue to a larger section of rural societies?

5. Use investment in roads to create jobs and capitalize local economy



# Conclusions:

How can road infrastructure planning, road development, and transport be more inclusive and greener, so its benefits accrue to a larger section of rural societies?

## 6. Systematically engage women in road development planning



*As more and more women come forward and participate in planning of public works... this has many effects that are difficult to quantify. Women's self-confidence has increased. They are more and more visible in public life; they are more self-reliant now.*

***Kebrom Hadush,  
Head, Women's Bureau, Kilte Awlalo Woreda***

*We pled with Woreda officials again and again... until we could get the ambulance service connect to our village, even though there is no feeder road yet. We could also get wells dug right here in the village, so we no longer have to walk for many hours everyday.*

***Women at a Focus Group Discussion in Buku village, Kobo Woreda***



## 7. Implement and enforce special work arrangements



- Maternity leave of 6 months before and 6 months after the birth
- Child care
- Equal wages, equal time, equal opportunities

# Conclusions:

How can road infrastructure planning, road development, and transport be more inclusive and greener, so its benefits accrue to a larger section of rural societies?

8. Use investment in roads to build new skills and introduce new techniques



Tree  
puller

# Conclusions:

How can road infrastructure planning, road development, and transport be more inclusive and greener, so its benefits accrue to a larger section of rural societies?

**9. Coordinate road/transport development with other development activities (banks, clinics, schools, ambulance services, employment programs) to diversify economy**

Special fares  
For students/  
Eldery/PWD?



Sand mining  
youth employment  
program



# Conclusions:

How can  
road infrastructure planning, road development, and transport  
be more inclusive and greener, so its benefits accrue to a larger section of rural  
societies?

**10. Use work on roads can set the basis for  
increases in local wages/employment conditions**



# Conclusions:

How can  
road infrastructure planning, road development, and transport  
be more inclusive and greener, so its benefits accrue to a larger section of rural  
societies?

## 11. Integrate beneficial road water management in road development



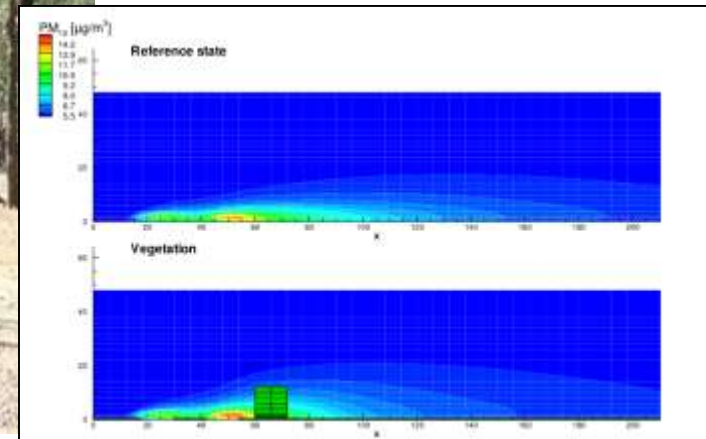




# Conclusions:

How can  
road infrastructure planning, road development, and transport  
be more inclusive and greener, so its benefits accrue to a larger section of rural  
societies?

## 12. Promote road side tree planting



[fvansteenbergen@metameta.nl](mailto:fvansteenbergen@metameta.nl)

[www.metameta.nl](http://www.metameta.nl)

[www.roadswater.org](http://www.roadswater.org)

Thanks for listening..



Frank van Steenbergen, MetaMeta