Demand-responsive transport in rural areas
Case study of the municipality of Boticas
Why?
Congestion

Car dependency
But in *rural areas*...

**Congestion**

**Car dependency**
In rural areas...

Reduced and disperse demand
In *rural areas*...

- Reduced and disperse demand
- Long distances and long travel times
In **rural areas**...

- Reduced and disperse demand
- Long distances and long travel times
- Unattractive offer
In rural areas...

- Reduced and disperse demand
- Long distances and long travel times
- Increased operating deficits
- Unattractive offer
In **rural areas**...

- Reduced and disperse demand
- Long distances and long travel times
- Increased operating deficits
- Unattractive offer
- Offer reduction
In rural areas...

- Reduced and disperse demand
- Long distances and long travel times
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  - Unattractive offer
  - Offer reduction
    - Services suppression
    - Fewer schedules
    - No service at all
In rural areas...

- Reduced and disperse demand
- Long distances and long travel times
- Increased operating deficits
- Unattractive offer
- Offer reduction
  - Services suppression
  - Fewer schedules
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In rural areas...

- Reduced and disperse demand
- Long distances and long travel times
- Increased operating deficits
- Unattractive offer
- Offer reduction
- Social exclusion
- Services suppression
- Fewer schedules
- No service at all
How to respond to demand when it is decreasing?
How to create sustainable offer in this case?
Demand-responsive transport
An innovative solution
What is DRT?
Why **DRT** in rural areas?

- Adapts to the **existing demand**
- Ensures the **necessary mobility**
- Is **effective, efficient** and more **sustainable**
- Contributes to the **economical and social development**
Implement examples

Norway and Portugal
Østfold
284,962 inhabitants
3,887 km²
~68 inhabitants per km²

- Complements the regular bus service;
- No users, no trip;
- Semi-fixed routes (until 2 km away from the route);
- Fixed schedule;
- Minibuses service the lines;
- Offers two circular routes.

ROUTE [N] 3 days per week 3h-3h
ROUTE [N] 2 days per week 3h-3h
Hedmark
27,397 inhabitants
26,084 km$^2$
~8 inhabitants per km$^2$

- Complements the regular bus service;
- No users, no trip;
- Standard fees;
- Fixed stops;
- No fixed route or schedule (departures every hour);
- Regular cabs service the lines.
Médio Tejo
247,000 inhabitants
3,344 km²
~74 inhabitants per km²

- Complements the existing supply;
- No users, no trip;
- Fixed routes, stops and schedules;
- Guarantees minimum levels of service;
- Regular cabs service the lines.
- Ticket price discrimination.
Context Analysis

Boticas and Alto Tâmega
Alto Tâmega
Intermunicipal Community

94,143 inhabitants
~3,000 km²
~33 inhabitants per km²

Boticas, Chaves, Montalegre, Ribeira de Pena, Valpaços e Vila Pouca de Aguiar
Alto Tâmega
Intermunicipal Community

94,143 inhabitants
~3,000 km²
~33 inhabitants per km²

Boticas, Chaves, Montalegre, Ribeira de Pena, Valpaços, Vila Pouca de Aguiar
Boticas Municipality

5,943 inhabitants
322 km²

~18 inhabitants per km²

Alturas do Barroso e Cerdedo, Ardãos e Bobadela, Beça, Boticas e Granja, Codeçoso, Curros e Fiães do Tâmega, Covas do Barroso, Dornelas, Pinho, Sapiãos, Vilar e Viveiro
28,5%  
> 64 years old  
vs. 20,3% in Portugal

501  
vehicles per 1000 inhabitants  
vs. 472 in Portugal

18%  
use collective transport

Boticas Municipality
Taxi
2.61 vehicles per 1000 inhabitants

Bus
Auto Viação do Tâmega

Boticas
Municipality
Boticas Municipality

Auto Viação do Tâmega
Discussion

Critical Analysis and Proposal
# SWOT

## CURRENT SERVICES

<table>
<thead>
<tr>
<th></th>
<th>Helpful</th>
<th>Harmful</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>S</strong></td>
<td>System covers every settlement</td>
<td>Less offer on weekends</td>
</tr>
<tr>
<td></td>
<td>Taxis are able to respond to the current weekday demand</td>
<td>Buses are not prepared for reduced mobility citizens</td>
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<tr>
<td></td>
<td>Public services are organised with the current offer</td>
<td>Taxis offer a traditional on-demand system (phone calls)</td>
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<tr>
<td></td>
<td>Existence of on-demand services (taxis)</td>
<td>Bus network lack zones and shelters in certain areas</td>
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<td></td>
<td>Strong flows and high occupancy rates</td>
<td>Insufficient resources for improving the services</td>
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<td></td>
<td>School buses allow other passengers</td>
<td>Conditions of stakeholders in rural areas are more challenging</td>
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<tr>
<td><strong>O</strong></td>
<td>Road network connects every settlement</td>
<td>Population is decreasing by the day</td>
</tr>
<tr>
<td></td>
<td>Some services are brought to customers/citizens</td>
<td>Road network is in poor conditions in certain areas</td>
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<td></td>
<td>Legislation enables reorganization of mobility services</td>
<td>Remarkable rise in costs</td>
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<td>No competition with other types of services</td>
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<td></td>
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<td>Car-based community</td>
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<tr>
<td>Internal</td>
<td>Helpful</td>
<td>Harmful</td>
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<td>----------</td>
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<tr>
<td>S</td>
<td>Stakeholders are local, and more connected to people</td>
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<td>Good predictability of demand</td>
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<td></td>
<td>Solidarity associated with culture</td>
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<td></td>
<td>Support of authorities</td>
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<td>W</td>
<td>Concentration of business and residents in the seat</td>
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<td></td>
<td>Mobility based on personal cars</td>
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<td></td>
<td>Seasonal changes</td>
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<td></td>
<td>Lack of culture of experimentation</td>
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<td></td>
<td>Bringing services to customers</td>
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<tr>
<td>T</td>
<td>Population is ageing and decreasing</td>
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<td></td>
<td>No new market-based services</td>
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<td>People without a driving license are dependent on the</td>
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<td>Decision-makers are aware of the needs of people</td>
<td>Silo effect between other stakeholders</td>
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<td>Lack of financial resources</td>
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<td>Intermunicipal collaboration in mobility services</td>
<td>Reducing support and subventions</td>
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<td>Legislation enables reorganization of mobility services</td>
<td>Special groups cannot be taken sufficiently into account</td>
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<td>Inefficient investment allocation from the state</td>
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<td>Lack of collaboration and separate visions of stakeholders</td>
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Main issues

- There is a lack of offer during the weekends and summer overall.
- Buses and taxis are not prepared with the amenities for reduced mobility users;
- People without a driving license are largely dependent on the mobility of others;
- There is a lack of culture of experimentation.
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<td>Population</td>
<td>284,962</td>
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<td>Area</td>
<td>3,887</td>
<td>26,084</td>
<td>3,344</td>
<td>3000</td>
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<td>Density</td>
<td>68</td>
<td>8</td>
<td>74</td>
<td>33</td>
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Main features

Simplicity
It consists in a very basic approach of a DRT system, that would only work on weekends, which have no offer.

Offer on weekends
It focuses on creating offer on weekends, as there is no bus services and not all the taxis operate.

Fixed schedules and stops
The target settlements are not big, and their inner streets are not easily accessible by car. Customers would be picked up from the designated bus stops and scheduled time.

Service vehicles
Depending on the number of passengers and their particular needs the lines would be performed by minibuses or regular taxis.

Educating the population
Several information sessions would need to be carried out through the municipality, in order to people to take full advantage of this new system.
Main features

- Prior reservation by phone (24h-1h before the trip);
- Circular routes.
DRT is not holy grail
DRT by itself will not accomplish all the public transport needs in rural areas.

We will get there...
The fact that the new legislation enables the implementation of DRT systems in Portugal is a great advantage for rural municipalities.
Thanks!

Any questions?