

Improving The Municipal Solid Waste Management Plan Of The Municipality Of Nemocón (Colombia)

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Nemocón



Figure 1. Municipality Of Nemocón

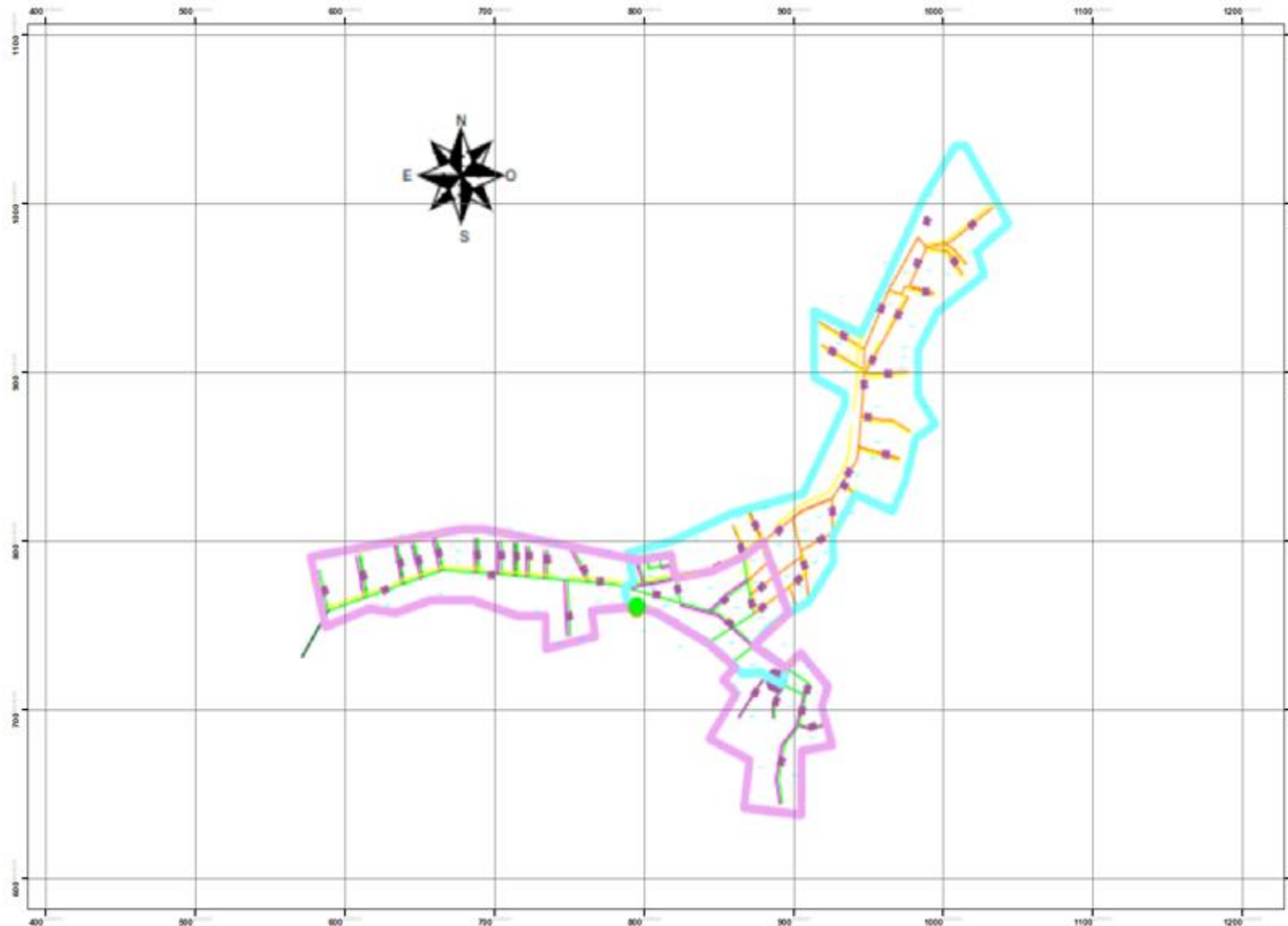
Population: 11.243

Nemocón Solid Waste Management
Plan (SWMP) of 2005

Final destination of waste

810.3 t/year of municipal solid waste
(MSW)

Waste Collection Routes in Nemocón



ROUTE 1



ROUTE 1	Data
Km	78.3
Right turns	40
Left turns	11
Time (h)	3h 20 min

ROUTE 2



ROUTE 2	Data
Km	80.2
Right turns	26
Left turns	13
Time (h)	3h 10 min

Figure 2. Waste Collection Routes

Classification and Use Station (CUS) in Nemocón



Figure 3. Infrastructure

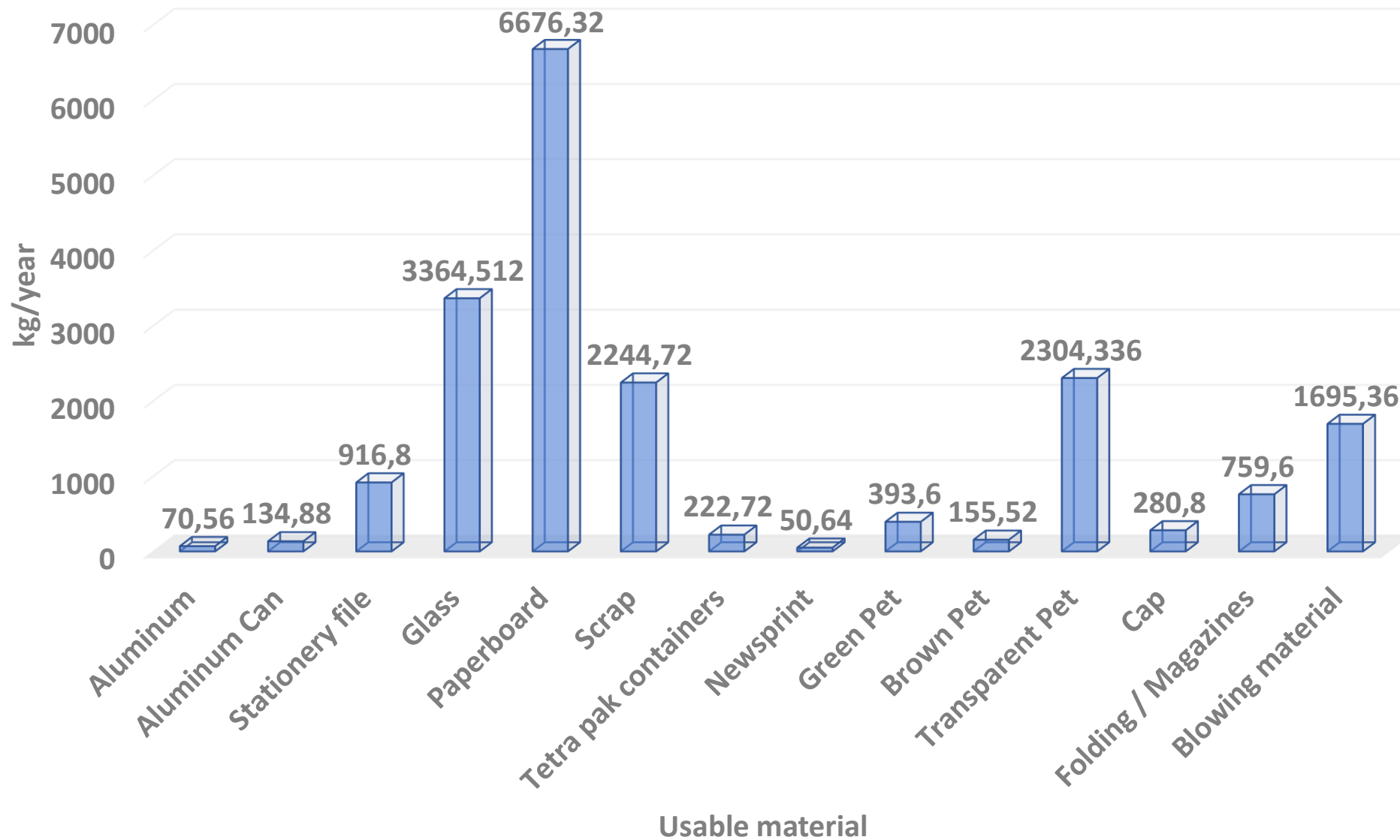
CUS Adaptation

7 hand-drawn vehicles

Association of Environmental Waste Pickers

Ecological Containers

Reusable waste



TOTAL
19270,368 kg/year

Figure 4. Annual average of quantities of reusable waste in Nemocón (2019)

Tax System

Characteristics of the Solid Waste System

USE RATE				
		Unit		Amount
LMMW	188,18 €	EURO	Work hour per day	0,78 €
Working time	4	h/day		
Waste	20	kg/year	Work per person per month	62,73 €
Hours work per month	240	hour	Collection per month per property	0,04 €
Days work per month	20	day/month	Bi-monthly collection by property	0,08 €
Inorganic waste	1666	kg/month		

-Average value in hours that a Waste Picker would earn
-kg produced per month

-Projection of rate for 2019 according to 2018 amount rate

Tax System

Zone	Discount (%)	Amount to discount	Full rate 2018
Residential			
Social Stratum 1	50	€ 0,04	€ 0,04
Social Stratum 2	40	€ 0,03	€ 0,05
Social Stratum 3	15	€ 0,01	€ 0,06
Zone	Increase (%)	Amount to increase	Full rate 2018
Commercial	50	€ 0,04	€ 0,11
Industrial	50	€ 0,04	€ 0,11
Official	0	€ 0,08	€ 0,08

SWMP
Subsidies or Contributions
depending on the economic
activity

Figure 6. Applying discount or increase according to the socioeconomic division

**Combined full rate:
Waste management service
rate
+
Use rate**

Zone	Waste management service full rate 2018	Use full rate 2018	Combined full rate
Residential			
Social Stratum 1	€ 1,85	€ 0,04	€ 1,89
Social Stratum 2	€ 2,16	€ 0,05	€ 2,21
Social Stratum 3	€ 3,09	€ 0,06	€ 3,15
Commercial	€ 6,95	€ 0,11	€ 7,06
Industrial	€ 8,92	€ 0,11	€ 9,03
Official	€ 1,91	€ 0,08	€ 1,98

Figure 7. Full rate of waste management service and use rate

Tax System

		Collect 2018	
Zone	Properties	Without Use	With Use
Residential			
Social Stratum 1	1646	€ 3.043,96	€ 3.105,90
Social Stratum 2	5136	€ 11.095,33	€ 11.327,29
Social Stratum 3	764	€ 2.360,03	€ 2.408,91
Total, Residential		€ 16.499,32	€ 16.842,11
Commercial	260	€ 1.806,68	€ 1.836,04
Total, Commercial		€ 1.806,68	€ 1.836,04
Industrial	6	€ 53,52	€ 54,20
Total, Industrial		€ 53,52	€ 54,20
Official	8	€ 15,25	€ 15,85
Total, Official		€ 15,25	€ 15,85
Total, General		€ 18.374,77	€ 18.748,19

Management of usable material, according to the number of properties of the different types of users.

Figure 8. Collection of waste management service with or without Use. (2018)

Conclusions

- The analysis made to Nemocón Solid Waste Management Plan (SWMP) , evidenced that there were no policies or tangible evidence at that time that promote optimization, the use of waste in the urban area of the municipality.
- Alternatives in waste management system referred to the adaptation of a Classification and Use Station (CUS), the design of selective routes for waste, and a training work for interest groups in each of the municipal sectors.
- There is a socio-economic sectorization in Nemocón, which serves as the basis for the definition of a relationship of the cost of waste management service costs based on the amount of population for each socio-economic stratum.
- The money collected with the uses rate will serve as additional income for the management of usable waste by the Association of Environmental Waste Pickers.

Future research

- ✓ Updating of SWMP to have real data.
- ✓ Alternatives to inorganic waste management as part of a circular economy model.
- ✓ Implementation of equipment for waste treatment in the CUS.
- ✓ The proposal for the use rate was based on factors such as the amounts of waste generated annually, the current costs of the waste management service, which includes the collection and transportation of solid waste, subsidies and increases granted for each socioeconomic level, and all of the properties by area or user that have a cleaning service.

References

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THANKS FOR YOU ATTENTION

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