

Optimization of Routes for the Collection of Waste from Food and Beverage Establishments in the Canton of Riobamba through the Vehicle Rout Problem (VRP) Method

Diego Alexander Haro Avalos¹, Miguel Angel Avalos Pérez¹, Alex Santiago Mantilla Miranda¹, Jorge Luis Haro Ávalos²

¹Escuela Superior Politécnica de Chimborazo (ESPOCH)

²Universidad nacional de Chimborazo

Email: diego.haro@epoch.edu.ec

Abstract

The objective of this study was to optimize routes for the collection of waste from food and beverage establishments in the canton of Riobamba through the Vehicle Trout Problem (VRP) method, in particular, the solution of a VRP consists of determining the set of routes, each of them traveled by a single vehicle, which begin and end in the same warehouse. So that all customer requirements are met, all operational constraints are met, and the total cost of transportation is minimized. The methodology of the study was inductive, descriptive, analytical, with a qualitative and quantitative approach, in which 26 establishments were intervened, whose main problem was the preserves by route executed, therefore applying the VRP Solver Console method, which contains characteristics such as Locations, Distances, Vehicles, Solution and Visualization, which when applied were obtained positive results in travel times as well as distances. considering the different operational restrictions that can be imposed for the construction of the routes, and the possible target functions to be optimized.

Keywords: Food establishments; Vehicle Routing Problem; Routes, Restrictions; Transport.

1. Introduction

Currently in a globalized, growing world, waste issues are a great social, environmental, and economic problem that is associated with the increase in population, and excessive consumption. This waste can be solid, liquid or gaseous, and can be generated by domestic, industrial, commercial or agricultural activities.

Solid waste, in particular, poses a significant challenge, as it can be difficult to manage and can cause soil, water, and air pollution if not properly managed. In addition it is indicated that 1.4 billion tons of Municipal Solid Waste (MSW) are generated per year, an average of 1.2 kg generated per person per day. There are about 198 countries on 5 continents, but almost half of all waste is generated by just 30 countries (15%) and, coincidentally, they are the richest places. These data leave a clear relationship between waste generation and economic power [1]

Globally, efforts to address the waste problem include recycling, reuse, composting, and proper waste management initiatives. However, there are still many challenges to overcome, such as the lack of adequate infrastructure in some regions, the lack of awareness of the importance of proper waste management, and the need for stronger policies to regulate waste production and disposal [2]

The Environment Department of the World Bank (2022) indicates that solid waste management, both globally and in Latin America and the Caribbean (LAC), is a central concern for the authorities. Approximately 85% of solid waste is collected through door-to-door collection systems. Subsequently, this waste is mostly transported to landfills. A study carried out by the Inter-American Development Bank (IDB) in 2018 revealed that the costs associated with collection and transportation alone vary between \$22 and \$197 USD per ton collected, taking 8 cities in Latin America as a reference.[3][4]

In Ecuador, as in many other countries, waste is a major problem. Cities face significant challenges in waste management, including proper collection and treatment. Therefore the Integrated Management of Solid Waste in the Municipal Decentralized Autonomous Governments of 2022, which are the agencies that are responsible for managing solid waste, argue that each urban resident generates an average of 0.86 kg of solid waste per day, and at the national level 12,337.26 tons are collected daily [5]

This waste is transferred in 45.7% to landfills, 28.8% to pop-up cells and 25.6% to open landfills. The costs associated with the management of this waste are mainly covered by the Municipal Decentralized Autonomous Governments (GADM), generally through the billing of services such as electricity and drinking water. However, on average, 43.9% of these costs are subsidized by the municipalities themselves [6]. Therefore, the Lack of adequate infrastructure and lack of environmental awareness often exacerbate this problem. Despite efforts to implement recycling and environmental education programs, there is still much work to be done to improve the situation.

Also, the situation may vary by region, some provinces may have more efficient waste management systems than others, depending on factors such as population density, level of economic development, and local policies. Overall, however, waste management remains a challenge across the country and requires continued attention from local authorities and society at large.[7]

Waste collection activities can be grouped into five stages corresponding to the life cycle of waste: generation, collection and transport, transformation, treatment and final disposal. The cost of waste collection and transport represents between 60 and 80% of the total costs of the Waste Management System (RMS), which is the critical factor in the fiscal expenditure of the RMS, and for this reason improvements in this field play an important role in saving municipal expenditure.[8] [9]

The studies focus on minimizing the costs of transport operations of the waste generated in food and beverage establishments can be classified into organic waste that comes from the remains of inedible food, inorganic waste that falls on paper, plastic, cardboard, glass, which can be recycled and reused, they can also generate hazardous waste such as cooking oils, used oils, greases, cleaning chemical products, among others; using the Vehicle Trout Problem (VRP) method, which is nothing more than determining the combinatorial optimization challenges that seeks to determine the optimal routes for multiple vehicles visiting a set of locations.

From a practitioner's perspective, there are several barriers when trying to develop an in-house VRP solver. Creating an algorithm to solve VRP is perceived as a daunting task, even if open source is employed. Data must be extracted repeatedly from a Geographic Information System (GIS), given its dynamic nature, which introduces a recurring cost of acquisition or the need for in-house expertise. In addition, to solve VRP, any tool must be integrated with the existing software infrastructure in the companies and understood by those responsible for planning. Most software packages for VRP will contain a black box component: the algorithm that determines vehicle routes, as developers want to safeguard their intellectual property [10]

In the real world, each VRP application has specific requirements that each software must adapt to, which implies close collaboration with the development companies. Therefore, this study introduces the VRP Spreadsheet Solver, designed to overcome the challenges mentioned above through a familiar interface, ease of use, flexibility, and accessibility. Microsoft Excel is widely used in small and medium-sized businesses, and the solver code, developed with Visual Basic for Applications (VBA), is open source, allowing mid-level programmers to understand and modify it as needed. The VRP Spreadsheet Solver has built-in functions to access a GIS web service, from where distances, driving times and maps can be obtained [11]

The main objective of this study is to optimize routes for the collection of waste from food and beverage establishments in the canton of Riobamba through the Vehicle Trout Problem (VRP) method, using methods and algorithms of vehicle routing problems in order to minimize the associated costs.

I. Scientific and technical foundation (State of the Art)

Waste in food and beverage establishments

Food waste, packaging, food packaging, kitchen utensils, and packaging materials are common in food and beverage establishments, which can be classified as organic, inorganic, or a combination of both. This problem represents one of the greatest challenges today, so it is essential to acquire knowledge on how to manage them efficiently. There are several strategies to reduce waste in food businesses. One option is to minimize the use of containers and packaging when buying products for the business, preferring those that are sold in bulk.

Likewise, you can opt for recyclable or reusable alternatives, such as water bottles, glasses, cups and plates.[12]

The important aspect of reducing food waste is to buy only the amount needed and store it correctly to avoid losses. In this sense, it is essential to know the regulations on waste management in each country, to have adequate containers and to distribute them appropriately to facilitate recycling or reuse in the future.[13]

Waste management in health and beverage facilities

The importance of managing waste lies in the fact that all kitchens have adequate rubbish bins. That is, they must be drip-proof, waterproof and pest-proof, and have well-fitted lids. In turn, they should be cleaned and disinfected frequently. The type of material, the location and design of the bins are the main factors to consider when handling hazardous food waste. The environmental policies that regulate waste management in hotels, restaurants and bars are very persuasive in complying with current regulations [14]

Proper management of this waste is critical to minimizing environmental impact and complying with local waste management regulations. Reduction, reuse, and recycling practices are key to addressing this challenge, as well as implementing waste separation programs at the source and educating staff on sustainable waste management practices

Proper waste management

The proper management of waste from restaurants begins by separating it into two main categories: organic and inorganic. Organic waste must be disposed of through differentiated collection or composting. On the other hand, inorganic waste can be recycled according to its material composition. However, there is a percentage of waste that cannot be reused and in these cases it is crucial to have an efficient and convenient final disposal system.[15]

Proper waste management is essential to protect the environment and the health of the people who work in the facilities and involves actions such as the combination of reduction at source, reuse, recycling, composting and safe management of hazardous waste, along with education and awareness of the community. These practices are critical to promoting environmental sustainability and protecting the natural environment for future generations.

Route optimization

Route optimization refers to all actions aimed at improving the distribution function, whether in terms of service level, quality, cost reduction, etc. It is important to note that in the field of solid waste management, collection can represent one of the most expensive services if it is not carried out properly. In this sense, route optimization, among other strategies, can contribute to reducing associated costs, both in labor and in maintenance and fuel consumption of vehicles.[16]

Depending on the collection of Waste collection from food and beverage establishments leads to the Optimize waste collection, considering it essential to address a series of activities that include the selection of vehicles, the design of routes, the assignment of personnel, the frequency of collection and the times required for the collection and transport of waste. When improving collection systems, the need to perform the service at the lowest possible cost, benefiting the greatest number of users and guaranteeing an adequate and efficient service must be taken into account.[17]

Definition of VRP

The Vehicle Routing Problem (Vehicle Routing Problem, VRP) as: looking for the most efficient route to distribute products to customers, who are randomly located. VRPs are very varied, as they have many restrictions, although each variant has four common components. Normally the VRP is made up of three components: customers, vehicles and warehouses; and these, in turn, are included within a fourth called the transport network [18]

Evolution of the Formulation of VRP (Vehicle Routing Problem)

The VRP challenge is one of the most prevalent challenges in optimizing logistics operations and has been extensively researched. This problem involves the search for the optimal solution considering various constraints, such as the number of vehicles available, their capacity, destinations (customers) and customer demands, among other factors. The formulation of this problem can involve a large number of variables and diverse parameters. This topic is of great practical and academic interest, as it represents a challenge in combinatorial optimization and most cases belong to the NP-Hard class, which means that it is not possible to solve them in polynomial time.[19][20][21]

CVRP (Capacited VRP) leads to a vehicle routing problem where the capacity of the fleet becomes restrictive for formulation. The objective function of the CVRP minimizes the total cost to supply all consumers. In this type of problem, consumers have a deterministic demand, all vehicles are the same and leave a distribution center.[22]

Vehicle Routing Problem Trained (CVRP)

The VRP is defined as a set of vehicles with identical capacities that must meet the needs of a specific set of customers, in this case, solid waste containers. These vehicles follow a series of routes that start and end at the same location, with the goal of minimizing associated costs. In addition, the Vehicle Routing Problem (VRP) in its simplest form seeks to solve the problem of the distribution of products and/or services, designing routes that meet the demand of geographically dispersed customers from a warehouse using a homogeneous fleet of vehicles [23][24]

The problem of Vehicle Routing Trained (CVRP) represents one of the fundamental challenges in vehicle route management. In essence, it involves the distribution of a predetermined amount of goods from a single point of departure to multiple customers, taking into account the capacity constraints of the available vehicles. These vehicles depart and return to the same depot, each visiting only one customer, ensuring that the demand of each customer served by a vehicle does not exceed its transport capacity. The main objective of solving this type of problem is usually to minimize the total cost, which can be determined by factors such as time or distance traveled, or to minimize the number of vehicles used.[25]

2. Methodology

Research modality

Documentary research is a scientific procedure, a systematic process of inquiry, collection, organization, analysis and interpretation of information or data around a certain topic. Like other types of research, this one is suitable for knowledge building. Documentary research has the particularity of using as a primary source of inputs, but not the only and exclusive one, the written document in its different forms: printed, electronic and audiovisual documents.[26]

Bibliographic research is used because it provides knowledge of existing research in relation to the optimization of routes through the VRP method for the collection of waste from food and beverage establishments, for this purpose books and scientific journals were used with the contribution of several authors, for the collection, selection, and suitable analysis of the information obtained.

Field research is that which consists of collecting data directly from the subjects under investigation, or from the reality where the events occur (primary data), without manipulating or controlling any variable, that is, the researcher obtains the information, but does not alter the existing conditions. Of course, in field research, secondary data are also used, especially those from bibliographic sources, from which the theoretical framework is developed. However, it is the primary data obtained through field design that are essential for the achievement of the objectives and the solution of the problem posed. [27]

Research Focus

The research approach is mixed, that is, qualitative and quantitative, since they are defined as; a set of systematic, empirical, and critical research processes and involve the collection and analysis of quantitative and qualitative data, as well as their integration and joint discussion, to make inferences from all the information collected (meta-inferences) and achieve a greater understanding of the phenomenon under study. .[28]

Therefore, the processing of the collection of information in the field was carried out through the database, which will be analyzed and interpreted said information collected through the Vehicle

Routing Problem (VRP) method, in order to optimize the routes of the transportation of waste from food and beverage establishments in the Riobamba canton, in order to acquire a greater perspective of the phenomenon studied, the qualitative aspect allows arguing and deepening the costs of transporting such waste.

Research Level

The research is descriptive because it worked on real events routes of the transport of waste from food and beverage establishments in the Riobamba canton, through the criteria of Locations, Distances, Vehicles, Solution and Visualization, which are found in the VRP Solver Console worksheet, in addition to which the conceptual framework is detailed, the processing and analysis of information.

The exploratory research obtained a general vision of the problem that arises in the food and beverage establishments of the Riobamba canton, the subject has been scarcely explored, so the level of familiarity with this phenomenon has increased, later it will serve as a basis for other research so that they are responsible for compiling the consequences that lead to the pertinent conclusions.

In addition, the population under study is considered to be 26 food and beverage establishments in the Riobamba canton, therefore, the sample study is not carried out because the population does not exceed 100, therefore the total population will be worked on.

Application methodology

The VRP Spreadsheet Solver organizes data related to items in a VRP into separate spreadsheets and follows an incremental flow of information. At first, the workbook only includes the sheet called VRP Solver Console. The other sheets, such as Locations, Distances, Vehicles, Solution, and Display, are generated in a specific order according to their indexes.

Cells with a black background are predefined by worksheets and should not be modified, while cells with a green background represent parameters or decisions that the user must configure. Those with a yellow background must be calculated in the worksheets, but the user can edit them for what-if analysis. Cells with an orange background indicate warnings, such as when a vehicle arrives before the start of a customer's time window. On the other hand, cells with a red background point to errors, such as a vehicle's violation of capacity limitation. This color scheme is applied in the worksheets mentioned below.

In the VRP Spreadsheet Solver menu structure, it is located in the "Add-ons" tab of the toolbar, and is composed of 5 main commands and 3 optional commands for the configuration of worksheets. In addition, it contains the command to activate the resolver, as well as the options to call a feasibility checker for manually modified solutions and an external resolver that

advanced users can create and compile into a Dynamic Link Library (DLL) file. The numbers in the commands match those in the worksheets for easier navigation.

In this case, a unified algorithmic formulation is developed for the VRP and the solution, where a comprehensive formulation of the Vehicle Routing Problem (VRP) is presented, which includes all its variants handled by the VRP Spreadsheet Solver. The pseudocode of the metaheuristic solution algorithm implemented using the VRP Spreadsheet Solver is also offered, along with explanations on how unfeasible solutions are managed.

3. Results

VRP Solver Console Application

The spreadsheet stores and supplies data to the other spreadsheets, including various parameters associated with the size and characteristics of the instance being addressed, such as the number of warehouses and customers, the variety of vehicle types, and the width of the time windows. In addition, the user has the possibility to configure options related to obtaining data from the GIS web service and the time allowed for such data retrieval, as shown in Figure 1.

Sequence	Parameter	Value	Remarks
0.Optional GIS License	Bing Maps Key	AlliD4ObjxApqt1nRRMCYy1G5CeNSc_81cD SICP4GPxGPA0RTRUmcN_s-uv1PCK2	You can get a free key at https://www.bingmapsportal.com/
1.Locations	Number of depots	1	[1,20]
	Number of customers	26	[5,200]
2.Distances	Distance / duration computation	Bing Maps driving distances (km)	Recommendation: use postcodes for addresses
	Bing Maps route type	Shortest	Recommendation: use Fastest
	Average vehicle speed		Not used for the 'Bing Maps driving distances' options
3.Vehicles	Number of vehicle types	1	Heterogeneous VRP if greater than 1
4.Solution	Vehicles must return to the depot?	Yes	Open VRP if no return
	Time window type	Hard	
	Backhauls?	No	If activated, delivery locations must be visited before pickup locations
5.Optional Visualization	Visualization background	Bing Maps	
	Location labels	Location names	
6.Solver	Warm start?	Yes	
	Show progress on the status bar?	Yes	May slow down the optimization algorithm
	CPU time limit (seconds)	60	Recommendation: At least 60 seconds

Figure 1. VRP Solver Console Spreadsheet

Source: Authors' elaboration based on the study's database

Analysis and interpretation

In figure 1 of the console, the GIS license is configured in the first instance, in the case it is Bing Maps Key, it is done with a specific key, then in item number one the locations of a distribution center are placed and it is placed that deliveries will be made to 26 customers, the next points to be configured are the distances, the recommendation is that these be executed in kilometers and that they are calculate in Big maps, followed to use the route equipment is placed the fastest route in the real time of traffic in speed and monitoring a types of vehicles that have in this case different cost considering also the different capacity of vehicles in the solution item the vehicle must return to the distribution center, in addition, the obligations of the time windows that customers have must be respected. In the visualization item, Bing Maps is placed to identify the locations of the centers of the food and beverage establishments of the Riobamba canton

1. Locations

Detailed information about locations, including names, addresses, coordinates, times, and pickup and delivery requirements, is stored in this document. Coordinates can be entered manually, copied and pasted from an external source, or completed using a GIS web service based on user-provided addresses. It is advisable to include a zip code with each address to avoid inaccuracies, as ambiguous addresses could result in unreachable locations. In addition, the options available in this document allow certain customers to prohibit the visit of vehicles, thus facilitating a quick analysis of scenarios without the need to modify the data. Figure 2 shows a screenshot of the locations spreadsheet.

Location ID	Name	Address	Latitude (y)	Length (x)	Time window start	Time window end	Must be visited?	Service time	Pickup amount	Delivery amount	Profit
0	ESPOCH	Av. Panamericana Sur km 1 1/2	-1,6566100	-78,6782600	08:30	17:00	Starting location	0:00	0	0	0
1	SEAFOOD RESTAURANT "DELICIAS DEL MAR"	Av. Daniel Leon Borja 42-51 Autachi	-1,663512	-78,660874	09:00	16:00	Must be visited	0:10	0	1	0
2	"LA ANDALUZA DELI" SAUSAGES	Larrea 21-16 and Guayaquil	-1,672854	-78,650553	09:00	16:00	Must be visited	0:10	0	1	0
3	RESTAURANT "BONNY"	Primera Constituyente S/N and Darquea	-1,677777	-78,643375	09:00	16:00	Must be visited	0:10	0	1	0
4	RESTAURANT "LENTEJITAS EL SABOR"	Rocafuerte 27-78 and Venezuela	-1,666313	-78,649255	09:00	16:00	Must be visited	0:10	0	1	0
5	THE RODEO GRILL	Av. Daniel León Borja 42-35 and Duchicela	-1,6	-78,6	09:00	16:00	Must be	0:10	0	1	0

						635 37	607 76			visite d				
6	VALENTINE'S DAY CLUB	Av. Daniel León Borja 22-19 and Vargas Torres	- 1,6 683 96	- 78,6 547 41	09:00	16:00	Must be visite d	0:1 0	0	1	0			
7	TAURO BY BONNY	Alvarado 25-26 and Orozco	- 1,6 739 35	- 78,6 448 04	09:00	16:00	Must be visite d	0:1 0	0	1	0			
8	BURGER MACHINE BY LA MANUELA GARDEN	Pablo Chiriboga S/N and Evangelista Calero	- 1,6 779 86	- 78,6 371 25	09:00	16:00	Must be visite d	0:1 0	0	1	0			
9	CAPORETO - CAFETERIA	Colombia 17-12 and Uruguay	- 1,6 699 67	- 78,6 586 71	09:00	16:00	Must be visite d	0:1 0	0	1	0			
10	BALTIMORE FOOD & DRINKS	Av. Daniel León Borja 35-54 and Uruguay	- 1,6 671 42	- 78,6 562 02	09:00	16:00	Must be visite d	0:1 0	0	1	0			
11	ZEAA FOOD EXPERIENCE	Av. 9 de Octubre between Yugoslavia and Bulgaria	- 1,6 898 68	- 78,6 370 06	09:00	16:00	Must be visite d	0:1 0	0	1	0			
12	NATIVE ECUADORIAN GASTRONOMY	Segundo Rosero S/N and Juan Chiriboga	- 1,6 578 14	- 78,6 651 31	09:00	16:00	Must be visite d	0:1 0	0	1	0			
13	SEA AND SIERRA MEAT AND SEAFOOD	Av. La Prensa 36-37 and Argentinos	- 1,6 583 91	- 78,6 609 84	09:00	16:00	Must be visite d	0:1 0	0	1	0			
14	BULLS RESTO BAR	Av. Daniel León Borja 42-25 and Autachi	- 1,6 635	- 78,6 607 6	09:00	16:00	Must be visite d	0:1 0	0	1	0			
15	FUMI SUSHI & ASIAN FOOD	Los Nogales S/N and Argentinos	- 1,6 626 66	- 78,6 572 22	09:00	16:00	Must be visite d	0:1 0	0	1	0			
16	SEAFOOD RESTAURANT "LA CHOZA DÁL"	Av. Lizarzaburu S/N and Joaquín Pinto	- 1,6 495 56	- 78,6 701 32	09:00	16:00	Must be visite d	0:1 0	0	1	0			
17	"D'AMELITA" RESTAURANT	New York between Jimenez and Mayor Ruiz	- 1,6 634 15	- 78,6 506 64	09:00	16:00	Must be visite d	0:1 0	0	1	0			
18	CORBAN COFFEE TO GO	Av. Daniel León Borja between Juan Montalvo and El Espectador	- 1,6 695 05	- 78,6 539 2	09:00	16:00	Must be visite d	0:1 0	0	1	0			
19	TRIVENTO RIOBAMBA	Av. Daniel León Borja and Brasil	- 1,6 662 03	- 78,6 577 66	09:00	16:00	Must be visite d	0:1 0	0	1	0			
20	"ROMASANTA" RESTAURANT	Carabobo between Junín and Argentinos	- 1,6	- 78,6	09:00	16:00	Must be	0:1 0	0	1	0			

			677 26	511 5			visite d				
21	MMWINGS	Duchicela between Av. Daniel León Borja and Reina Pacha	- 1,6 643 3	- 78,6 605 26	09:00	16:00	Must be visite d	0:1 0	0	1	0
22	TACO NACO	Brazil between Luis A. Falconí and Luis A. Costales	- 1,6 678 57	- 78,6 580 43	09:00	16:00	Must be visite d	0:1 0	0	1	0
23	GASTROPUB LAMPOST	Av. Canónigo Ramos between Nicolás Delgado and Joaquín Pinto	- 1,6 528 98	- 78,6 748 43	09:00	16:00	Must be visite d	0:1 0	0	1	0
24	HERITAGE	Juan de Velasco between José de Orozco and José Veloz	- 1,6 734 34	- 78,6 465 25	09:00	16:00	Must be visite d	0:1 0	0	1	0
25	SEAFOOD RESTAURANT "BETWEEN ROCKS"	Argentinos and Av. Carlos Zambrano	- 1,6 629 87	- 78,6 567 97	09:00	16:00	Must be visite d	0:1 0	0	1	0
26	SAMAY	Av. José Veloz and Diego de Ibarra	- 1,6 661 64	- 78,6 557 37	09:00	16:00	Must be visite d	0:1 0	0	1	0

Figure 2. Locations Worksheet

Source: Authors' elaboration based on the study's database

Analysis and interpretation

In the distribution center, the names of the localities of the food and beverage establishments of the Riobamba canton are placed, considering in the first instance the location of the ESPOCH with a time window in interval from 8:30 a.m. to 5:00 p.m., with its different latitudes and longitudes, executed in the same way the times executed for each waste collection in said establishments.

2. Distances

In this worksheet of distances in Figure 3. the distances and travel times between each pair of points indicated in the "Locations" worksheet are included. At the time of writing, using the GIS web service to complete these distances and driving times takes approximately 2.14 minutes for 729 locations. The number of locations for which the distance matrix can be calculated is restricted by the limitations of the GIS Web service and the level of access the user has to it.

Note: VRP Spreadsheet Solver provides an estimate of the time required for this step by simply multiplying the number of entries in the distance matrix by a factor of 0.1 sec,

From	To	Distance	Duration
ESPOCH	ESPOCH	0,00	0:00
ESPOCH	SEAFOOD RESTAURANT "DELICIAS DEL MAR"	2,92	0:07
ESPOCH	"LA ANDALUZA DELI" SAUSAGES	4,15	0:10
ESPOCH	RESTAURANT "BONNY"	5,31	0:13
ESPOCH	RESTAURANT "LENTEJITAS EL SABOR"	4,46	0:10
ESPOCH	THE RODEO GRILL	2,93	0:07
ESPOCH	VALENTINE'S DAY CLUB	3,99	0:09
ESPOCH	TAURO BY BONNY	5,17	0:13
ESPOCH	BURGER MACHINE BY LA MANUELA GARDEN	6,10	0:12
ESPOCH	CAPORETO - CAFETERIA	3,37	0:09
ESPOCH	BALTIMORE FOOD & DRINKS	3,59	0:08
ESPOCH	ZEAA FOOD EXPERIENCE	6,62	0:11
ESPOCH	NATIVE ECUADORIAN GASTRONOMY	2,35	0:07
ESPOCH	SEA AND SIERRA MEAT AND SEAFOOD	3,34	0:09
ESPOCH	BULLS RESTO BAR	2,93	0:07
ESPOCH	FUMI SUSHI & ASIAN FOOD	3,71	0:09
ESPOCH	SEAFOOD RESTAURANT "LA CHOZA DÁL"	2,41	0:08
ESPOCH	"D'AMELITA" RESTAURANT	4,51	0:11
ESPOCH	CORBAN COFFEE TO GO	3,66	0:08
ESPOCH	TRIVENTO RIOBAMBA	3,37	0:07
ESPOCH	"ROMASANTA" RESTAURANT	4,34	0:10
ESPOCH	MMWINGS	2,93	0:08
ESPOCH	TACO NACO	3,30	0:08
ESPOCH	GASTROPUB LAMPOST	2,07	0:06
ESPOCH	HERITAGE	5,08	0:13
ESPOCH	SEAFOOD RESTAURANT "BETWEEN ROCKS"	3,59	0:08
ESPOCH	SAMAY	3,74	0:09
SEAFOOD RESTAURANT "DELICIAS DEL MAR"	ESPOCH	3,04	0:06
SEAFOOD RESTAURANT "DELICIAS DEL MAR"	SEAFOOD RESTAURANT "DELICIAS DEL MAR"	0,00	0:00
SEAFOOD RESTAURANT "DELICIAS DEL MAR"	"LA ANDALUZA DELI" SAUSAGES	1,81	0:03
SEAFOOD RESTAURANT "DELICIAS DEL MAR"	RESTAURANT "BONNY"	2,63	0:04
SEAFOOD RESTAURANT "DELICIAS DEL MAR"	RESTAURANT "LENTEJITAS EL SABOR"	1,79	0:03
SEAFOOD RESTAURANT "DELICIAS DEL MAR"	THE RODEO GRILL	0,01	0:00
SEAFOOD RESTAURANT "DELICIAS DEL MAR"	VALENTINE'S DAY CLUB	1,34	0:03
SEAFOOD RESTAURANT "DELICIAS DEL MAR"	TAURO BY BONNY	2,49	0:05
SEAFOOD RESTAURANT "DELICIAS DEL MAR"	BURGER MACHINE BY LA MANUELA GARDEN	3,46	0:05
SEAFOOD RESTAURANT "DELICIAS DEL MAR"	CAPORETO - CAFETERIA	1,23	0:04
SEAFOOD RESTAURANT "DELICIAS DEL MAR"	BALTIMORE FOOD & DRINKS	1,12	0:02
SEAFOOD RESTAURANT "DELICIAS DEL MAR"	ZEAA FOOD EXPERIENCE	4,29	0:09
SEAFOOD RESTAURANT "DELICIAS DEL MAR"	NATIVE ECUADORIAN GASTRONOMY	1,12	0:02
SEAFOOD RESTAURANT "DELICIAS DEL MAR"	SEA AND SIERRA MEAT AND SEAFOOD	1,09	0:04
SEAFOOD RESTAURANT "DELICIAS DEL MAR"	BULLS RESTO BAR	0,01	0:00
SEAFOOD RESTAURANT "DELICIAS DEL MAR"	FUMI SUSHI & ASIAN FOOD	0,79	0:02
SEAFOOD RESTAURANT "DELICIAS DEL MAR"	SEAFOOD RESTAURANT "LA CHOZA DÁL"	2,58	0:06
SEAFOOD RESTAURANT "DELICIAS DEL MAR"	"D'AMELITA" RESTAURANT	1,60	0:04
SEAFOOD RESTAURANT "DELICIAS DEL MAR"	CORBAN COFFEE TO GO	1,02	0:01
SEAFOOD RESTAURANT "DELICIAS DEL MAR"	TRIVENTO RIOBAMBA	0,46	0:01
SEAFOOD RESTAURANT "DELICIAS DEL MAR"	"ROMASANTA" RESTAURANT	1,43	0:04
SEAFOOD RESTAURANT "DELICIAS DEL MAR"	MMWINGS	0,12	0:00
SEAFOOD RESTAURANT "DELICIAS DEL MAR"	TACO NACO	0,71	0:01

SEAFOOD RESTAURANT "DELICIAS DEL MAR"	GASTROPUB LAMPOST	2,32	0:04
SEAFOOD RESTAURANT "DELICIAS DEL MAR"	HERITAGE	2,41	0:05
SEAFOOD RESTAURANT "DELICIAS DEL MAR"	SEAFOOD RESTAURANT "BETWEEN ROCKS"	0,68	0:02
SEAFOOD RESTAURANT "DELICIAS DEL MAR"	SAMAY	1,10	0:02
"LA ANDALUZA DELI" SAUSAGES	ESPOCH	4,27	0:08
"LA ANDALUZA DELI" SAUSAGES	SEAFOOD RESTAURANT "DELICIAS DEL MAR"	1,98	0:04
"LA ANDALUZA DELI" SAUSAGES	"LA ANDALUZA DELI" SAUSAGES	0,00	0:00
"LA ANDALUZA DELI" SAUSAGES	RESTAURANT "BONNY"	1,16	0:02
"LA ANDALUZA DELI" SAUSAGES	RESTAURANT "LENTEJITAS EL SABOR"	0,97	0:01
"LA ANDALUZA DELI" SAUSAGES	THE RODEO GRILL	1,99	0:04
"LA ANDALUZA DELI" SAUSAGES	VALENTINE'S DAY CLUB	0,87	0:02
"LA ANDALUZA DELI" SAUSAGES	TAURO BY BONNY	1,01	0:02
"LA ANDALUZA DELI" SAUSAGES	BURGER MACHINE BY LA MANUELA GARDEN	1,99	0:04
"LA ANDALUZA DELI" SAUSAGES	CAPORETO - CAFETERIA	1,53	0:04
"LA ANDALUZA DELI" SAUSAGES	BALTIMORE FOOD & DRINKS	1,09	0:02
"LA ANDALUZA DELI" SAUSAGES	ZEAA FOOD EXPERIENCE	2,81	0:07
"LA ANDALUZA DELI" SAUSAGES	NATIVE ECUADORIAN GASTRONOMY	2,74	0:04
"LA ANDALUZA DELI" SAUSAGES	SEA AND SIERRA MEAT AND SEAFOOD	2,56	0:05
"LA ANDALUZA DELI" SAUSAGES	BULLS RESTO BAR	1,99	0:04
"LA ANDALUZA DELI" SAUSAGES	FUMI SUSHI & ASIAN FOOD	1,82	0:04
"LA ANDALUZA DELI" SAUSAGES	SEAFOOD RESTAURANT "LA CHOZA DÁL"	3,98	0:09
"LA ANDALUZA DELI" SAUSAGES	"D'AMELITA" RESTAURANT	1,37	0:03
"LA ANDALUZA DELI" SAUSAGES	CORBAN COFFEE TO GO	0,90	0:02
"LA ANDALUZA DELI" SAUSAGES	TRIVENTO RIOBAMBA	1,64	0:03
"LA ANDALUZA DELI" SAUSAGES	"ROMASANTA" RESTAURANT	1,00	0:02
"LA ANDALUZA DELI" SAUSAGES	MMWINGS	1,76	0:03
"LA ANDALUZA DELI" SAUSAGES	TACO NACO	1,33	0:03
"LA ANDALUZA DELI" SAUSAGES	GASTROPUB LAMPOST	3,94	0:06
"LA ANDALUZA DELI" SAUSAGES	HERITAGE	0,93	0:02
"LA ANDALUZA DELI" SAUSAGES	SEAFOOD RESTAURANT "BETWEEN ROCKS"	1,67	0:04
"LA ANDALUZA DELI" SAUSAGES	SAMAY	1,07	0:02
RESTAURANT "BONNY"	ESPOCH	5,13	0:09
RESTAURANT "BONNY"	SEAFOOD RESTAURANT "DELICIAS DEL MAR"	2,84	0:04
RESTAURANT "BONNY"	"LA ANDALUZA DELI" SAUSAGES	1,19	0:02
RESTAURANT "BONNY"	RESTAURANT "BONNY"	0,00	0:00
RESTAURANT "BONNY"	RESTAURANT "LENTEJITAS EL SABOR"	1,82	0:03
RESTAURANT "BONNY"	THE RODEO GRILL	2,85	0:04
RESTAURANT "BONNY"	VALENTINE'S DAY CLUB	1,73	0:02
RESTAURANT "BONNY"	TAURO BY BONNY	0,87	0:02
RESTAURANT "BONNY"	BURGER MACHINE BY LA MANUELA GARDEN	1,18	0:02
RESTAURANT "BONNY"	CAPORETO - CAFETERIA	2,38	0:05
RESTAURANT "BONNY"	BALTIMORE FOOD & DRINKS	1,94	0:03
RESTAURANT "BONNY"	ZEAA FOOD EXPERIENCE	2,00	0:06
RESTAURANT "BONNY"	NATIVE ECUADORIAN GASTRONOMY	3,59	0:05
RESTAURANT "BONNY"	SEA AND SIERRA MEAT AND SEAFOOD	3,47	0:07
RESTAURANT "BONNY"	BULLS RESTO BAR	2,84	0:04
RESTAURANT "BONNY"	FUMI SUSHI & ASIAN FOOD	2,68	0:05
RESTAURANT "BONNY"	SEAFOOD RESTAURANT "LA CHOZA DÁL"	4,83	0:10
RESTAURANT "BONNY"	"D'AMELITA" RESTAURANT	2,22	0:04
RESTAURANT "BONNY"	CORBAN COFFEE TO GO	1,75	0:03

RESTAURANT "BONNY"	TRIVENTO RIOBAMBA	2,50	0:04
RESTAURANT "BONNY"	"ROMASANTA" RESTAURANT	1,84	0:03
RESTAURANT "BONNY"	MMWINGS	2,61	0:04
RESTAURANT "BONNY"	TACO NACO	2,18	0:04
RESTAURANT "BONNY"	GASTROPUB LAMPOST	4,79	0:07
RESTAURANT "BONNY"	HERITAGE	0,79	0:02
RESTAURANT "BONNY"	SEAFOOD RESTAURANT "BETWEEN ROCKS"	2,52	0:05
RESTAURANT "BONNY"	SAMAY	1,92	0:03
RESTAURANT "LENTEJITAS EL SABOR"	ESPOCH	4,31	0:08
RESTAURANT "LENTEJITAS EL SABOR"	SEAFOOD RESTAURANT "DELICIAS DEL MAR"	2,02	0:04
RESTAURANT "LENTEJITAS EL SABOR"	"LA ANDALUZA DELI" SAUSAGES	1,38	0:04
RESTAURANT "LENTEJITAS EL SABOR"	RESTAURANT "BONNY"	2,20	0:03
RESTAURANT "LENTEJITAS EL SABOR"	RESTAURANT "LENTEJITAS EL SABOR"	0,00	0:00
RESTAURANT "LENTEJITAS EL SABOR"	THE RODEO GRILL	2,03	0:04
RESTAURANT "LENTEJITAS EL SABOR"	VALENTINE'S DAY CLUB	0,91	0:01
RESTAURANT "LENTEJITAS EL SABOR"	TAURO BY BONNY	1,38	0:04
RESTAURANT "LENTEJITAS EL SABOR"	BURGER MACHINE BY LA MANUELA GARDEN	2,16	0:06
RESTAURANT "LENTEJITAS EL SABOR"	CAPORETO - CAFETERIA	1,56	0:03
RESTAURANT "LENTEJITAS EL SABOR"	BALTIMORE FOOD & DRINKS	1,11	0:02
RESTAURANT "LENTEJITAS EL SABOR"	ZEAA FOOD EXPERIENCE	3,86	0:08
RESTAURANT "LENTEJITAS EL SABOR"	NATIVE ECUADORIAN GASTRONOMY	2,59	0:06
RESTAURANT "LENTEJITAS EL SABOR"	SEA AND SIERRA MEAT AND SEAFOOD	2,11	0:03
RESTAURANT "LENTEJITAS EL SABOR"	BULLS RESTO BAR	2,03	0:04
RESTAURANT "LENTEJITAS EL SABOR"	FUMI SUSHI & ASIAN FOOD	1,24	0:04
RESTAURANT "LENTEJITAS EL SABOR"	SEAFOOD RESTAURANT "LA CHOZA DÁL"	3,86	0:09
RESTAURANT "LENTEJITAS EL SABOR"	"D'AMELITA" RESTAURANT	0,40	0:01
RESTAURANT "LENTEJITAS EL SABOR"	CORBAN COFFEE TO GO	0,92	0:02
RESTAURANT "LENTEJITAS EL SABOR"	TRIVENTO RIOBAMBA	1,68	0:03
RESTAURANT "LENTEJITAS EL SABOR"	"ROMASANTA" RESTAURANT	0,36	0:01
RESTAURANT "LENTEJITAS EL SABOR"	MMWINGS	1,79	0:03
RESTAURANT "LENTEJITAS EL SABOR"	TACO NACO	1,39	0:03
RESTAURANT "LENTEJITAS EL SABOR"	GASTROPUB LAMPOST	3,97	0:06
RESTAURANT "LENTEJITAS EL SABOR"	HERITAGE	1,30	0:03
RESTAURANT "LENTEJITAS EL SABOR"	SEAFOOD RESTAURANT "BETWEEN ROCKS"	1,15	0:03
RESTAURANT "LENTEJITAS EL SABOR"	SAMAY	1,10	0:02
THE RODEO GRILL	ESPOCH	3,03	0:06
THE RODEO GRILL	SEAFOOD RESTAURANT "DELICIAS DEL MAR"	0,33	0:01
THE RODEO GRILL	"LA ANDALUZA DELI" SAUSAGES	1,80	0:03
THE RODEO GRILL	RESTAURANT "BONNY"	2,62	0:04
THE RODEO GRILL	RESTAURANT "LENTEJITAS EL SABOR"	1,78	0:03
THE RODEO GRILL	THE RODEO GRILL	0,00	0:00
THE RODEO GRILL	VALENTINE'S DAY CLUB	1,33	0:03
THE RODEO GRILL	TAURO BY BONNY	2,48	0:05
THE RODEO GRILL	BURGER MACHINE BY LA MANUELA GARDEN	3,45	0:05
THE RODEO GRILL	CAPORETO - CAFETERIA	1,22	0:04
THE RODEO GRILL	BALTIMORE FOOD & DRINKS	1,11	0:02
THE RODEO GRILL	ZEAA FOOD EXPERIENCE	4,28	0:09
THE RODEO GRILL	NATIVE ECUADORIAN GASTRONOMY	1,11	0:02
THE RODEO GRILL	SEA AND SIERRA MEAT AND SEAFOOD	1,08	0:04
THE RODEO GRILL	BULLS RESTO BAR	0,34	0:01
THE RODEO GRILL	FUMI SUSHI & ASIAN FOOD	0,78	0:02

THE RODEO GRILL	SEAFOOD RESTAURANT "LA CHOZA DÁL"	2,57	0:06
THE RODEO GRILL	"D'AMELITA" RESTAURANT	1,59	0:04
THE RODEO GRILL	CORBAN COFFEE TO GO	1,01	0:01
THE RODEO GRILL	TRIVENTO RIOBAMBA	0,45	0:01
THE RODEO GRILL	"ROMASANTA" RESTAURANT	1,42	0:04
THE RODEO GRILL	MMWINGS	0,11	0:00
THE RODEO GRILL	TACO NACO	0,70	0:01
THE RODEO GRILL	GASTROPUB LAMPOST	2,31	0:04
THE RODEO GRILL	HERITAGE	2,40	0:05
THE RODEO GRILL	SEAFOOD RESTAURANT "BETWEEN ROCKS"	0,67	0:02
THE RODEO GRILL	SAMAY	1,09	0:02
VALENTINE'S DAY CLUB	ESPOCH	3,57	0:07
VALENTINE'S DAY CLUB	SEAFOOD RESTAURANT "DELICIAS DEL MAR"	1,27	0:03
VALENTINE'S DAY CLUB	"LA ANDALUZA DELI" SAUSAGES	1,26	0:03
VALENTINE'S DAY CLUB	RESTAURANT "BONNY"	2,08	0:03
VALENTINE'S DAY CLUB	RESTAURANT "LENTEJITAS EL SABOR"	0,89	0:01
VALENTINE'S DAY CLUB	THE RODEO GRILL	1,28	0:03
VALENTINE'S DAY CLUB	VALENTINE'S DAY CLUB	0,00	0:00
VALENTINE'S DAY CLUB	TAURO BY BONNY	1,61	0:04
VALENTINE'S DAY CLUB	BURGER MACHINE BY LA MANUELA GARDEN	2,70	0:07
VALENTINE'S DAY CLUB	CAPORETO - CAFETERIA	1,11	0:03
VALENTINE'S DAY CLUB	BALTIMORE FOOD & DRINKS	0,37	0:01
VALENTINE'S DAY CLUB	ZEAA FOOD EXPERIENCE	3,74	0:08
VALENTINE'S DAY CLUB	NATIVE ECUADORIAN GASTRONOMY	2,02	0:04
VALENTINE'S DAY CLUB	SEA AND SIERRA MEAT AND SEAFOOD	1,85	0:04
VALENTINE'S DAY CLUB	BULLS RESTO BAR	1,28	0:03
VALENTINE'S DAY CLUB	FUMI SUSHI & ASIAN FOOD	1,11	0:03
VALENTINE'S DAY CLUB	SEAFOOD RESTAURANT "LA CHOZA DÁL"	3,26	0:08
VALENTINE'S DAY CLUB	"D'AMELITA" RESTAURANT	0,96	0:03
VALENTINE'S DAY CLUB	CORBAN COFFEE TO GO	0,47	0:01
VALENTINE'S DAY CLUB	TRIVENTO RIOBAMBA	0,93	0:02
VALENTINE'S DAY CLUB	"ROMASANTA" RESTAURANT	0,59	0:01
VALENTINE'S DAY CLUB	MMWINGS	1,05	0:02
VALENTINE'S DAY CLUB	TACO NACO	0,65	0:01
VALENTINE'S DAY CLUB	GASTROPUB LAMPOST	3,22	0:05
VALENTINE'S DAY CLUB	HERITAGE	1,53	0:04
VALENTINE'S DAY CLUB	SEAFOOD RESTAURANT "BETWEEN ROCKS"	0,95	0:02
VALENTINE'S DAY CLUB	SAMAY	0,35	0:01
TAURO BY BONNY	ESPOCH	4,92	0:09
TAURO BY BONNY	SEAFOOD RESTAURANT "DELICIAS DEL MAR"	2,63	0:05
TAURO BY BONNY	"LA ANDALUZA DELI" SAUSAGES	0,98	0:03
TAURO BY BONNY	RESTAURANT "BONNY"	0,80	0:02
TAURO BY BONNY	RESTAURANT "LENTEJITAS EL SABOR"	1,28	0:03
TAURO BY BONNY	THE RODEO GRILL	2,64	0:05
TAURO BY BONNY	VALENTINE'S DAY CLUB	1,52	0:03
TAURO BY BONNY	TAURO BY BONNY	0,00	0:00
TAURO BY BONNY	BURGER MACHINE BY LA MANUELA GARDEN	1,31	0:03
TAURO BY BONNY	CAPORETO - CAFETERIA	2,17	0:05
TAURO BY BONNY	BALTIMORE FOOD & DRINKS	1,73	0:03
TAURO BY BONNY	ZEAA FOOD EXPERIENCE	2,46	0:07

TAURO BY BONNY	NATIVE ECUADORIAN GASTRONOMY	3,38	0:06
TAURO BY BONNY	SEA AND SIERRA MEAT AND SEAFOOD	2,93	0:08
TAURO BY BONNY	BULLS RESTO BAR	2,64	0:05
TAURO BY BONNY	FUMI SUSHI & ASIAN FOOD	2,14	0:06
TAURO BY BONNY	SEAFOOD RESTAURANT "LA CHOZA DÁL"	4,62	0:10
TAURO BY BONNY	"D'AMELITA" RESTAURANT	1,68	0:05
TAURO BY BONNY	CORBAN COFFEE TO GO	1,54	0:03
TAURO BY BONNY	TRIVENTO RIOBAMBA	2,29	0:04
TAURO BY BONNY	"ROMASANTA" RESTAURANT	1,30	0:04
TAURO BY BONNY	MMWINGS	2,41	0:04
TAURO BY BONNY	TACO NACO	1,97	0:04
TAURO BY BONNY	GASTROPUB LAMPOST	4,58	0:07
TAURO BY BONNY	HERITAGE	0,25	0:01
TAURO BY BONNY	SEAFOOD RESTAURANT "BETWEEN ROCKS"	1,98	0:06
TAURO BY BONNY	SAMAY	1,71	0:03
BURGER MACHINE BY LA MANUELA GARDEN	ESPOCH	5,96	0:11
BURGER MACHINE BY LA MANUELA GARDEN	SEAFOOD RESTAURANT "DELICIAS DEL MAR"	3,70	0:06
BURGER MACHINE BY LA MANUELA GARDEN	"LA ANDALUZA DELI" SAUSAGES	2,04	0:05
BURGER MACHINE BY LA MANUELA GARDEN	RESTAURANT "BONNY"	0,86	0:01
BURGER MACHINE BY LA MANUELA GARDEN	RESTAURANT "LENTEJITAS EL SABOR"	1,99	0:07
BURGER MACHINE BY LA MANUELA GARDEN	THE RODEO GRILL	3,71	0:06
BURGER MACHINE BY LA MANUELA GARDEN	VALENTINE'S DAY CLUB	2,58	0:04
BURGER MACHINE BY LA MANUELA GARDEN	TAURO BY BONNY	1,46	0:04
BURGER MACHINE BY LA MANUELA GARDEN	BURGER MACHINE BY LA MANUELA GARDEN	0,00	0:00
BURGER MACHINE BY LA MANUELA GARDEN	CAPORETO - CAFETERIA	3,24	0:06
BURGER MACHINE BY LA MANUELA GARDEN	BALTIMORE FOOD & DRINKS	2,80	0:04
BURGER MACHINE BY LA MANUELA GARDEN	ZEAA FOOD EXPERIENCE	1,87	0:05
BURGER MACHINE BY LA MANUELA GARDEN	NATIVE ECUADORIAN GASTRONOMY	4,45	0:07
BURGER MACHINE BY LA MANUELA GARDEN	SEA AND SIERRA MEAT AND SEAFOOD	4,27	0:07
BURGER MACHINE BY LA MANUELA GARDEN	BULLS RESTO BAR	3,71	0:06
BURGER MACHINE BY LA MANUELA GARDEN	FUMI SUSHI & ASIAN FOOD	3,53	0:08
BURGER MACHINE BY LA MANUELA GARDEN	SEAFOOD RESTAURANT "LA CHOZA DÁL"	5,69	0:11
BURGER MACHINE BY LA MANUELA GARDEN	"D'AMELITA" RESTAURANT	2,39	0:08
BURGER MACHINE BY LA MANUELA GARDEN	CORBAN COFFEE TO GO	2,61	0:04
BURGER MACHINE BY LA MANUELA GARDEN	TRIVENTO RIOBAMBA	3,35	0:05
BURGER MACHINE BY LA MANUELA GARDEN	"ROMASANTA" RESTAURANT	2,32	0:07
BURGER MACHINE BY LA MANUELA GARDEN	MMWINGS	3,47	0:06
BURGER MACHINE BY LA MANUELA GARDEN	TACO NACO	3,08	0:05
BURGER MACHINE BY LA MANUELA GARDEN	GASTROPUB LAMPOST	5,65	0:08
BURGER MACHINE BY LA MANUELA GARDEN	HERITAGE	1,38	0:03
BURGER MACHINE BY LA MANUELA GARDEN	SEAFOOD RESTAURANT "BETWEEN ROCKS"	3,11	0:08
BURGER MACHINE BY LA MANUELA GARDEN	SAMAY	2,78	0:04
CAPORETO - CAFETERIA	ESPOCH	3,26	0:07
CAPORETO - CAFETERIA	SEAFOOD RESTAURANT "DELICIAS DEL MAR"	1,17	0:03
CAPORETO - CAFETERIA	"LA ANDALUZA DELI" SAUSAGES	1,20	0:03
CAPORETO - CAFETERIA	RESTAURANT "BONNY"	2,32	0:04
CAPORETO - CAFETERIA	RESTAURANT "LENTEJITAS EL SABOR"	1,47	0:02
CAPORETO - CAFETERIA	THE RODEO GRILL	1,18	0:03
CAPORETO - CAFETERIA	VALENTINE'S DAY CLUB	1,04	0:02
CAPORETO - CAFETERIA	TAURO BY BONNY	2,18	0:04

CAPORETO - CAFETERIA	BURGER MACHINE BY LA MANUELA GARDEN	3,15	0:05
CAPORETO - CAFETERIA	CAPORETO - CAFETERIA	0,00	0:00
CAPORETO - CAFETERIA	BALTIMORE FOOD & DRINKS	0,64	0:02
CAPORETO - CAFETERIA	ZEAA FOOD EXPERIENCE	3,98	0:09
CAPORETO - CAFETERIA	NATIVE ECUADORIAN GASTRONOMY	2,11	0:05
CAPORETO - CAFETERIA	SEA AND SIERRA MEAT AND SEAFOOD	2,09	0:06
CAPORETO - CAFETERIA	BULLS RESTO BAR	1,18	0:03
CAPORETO - CAFETERIA	FUMI SUSHI & ASIAN FOOD	1,43	0:04
CAPORETO - CAFETERIA	SEAFOOD RESTAURANT "LA CHOZA DÁL"	3,52	0:08
CAPORETO - CAFETERIA	"D'AMELITA" RESTAURANT	1,40	0:04
CAPORETO - CAFETERIA	CORBAN COFFEE TO GO	0,71	0:01
CAPORETO - CAFETERIA	TRIVENTO RIOBAMBA	0,98	0:02
CAPORETO - CAFETERIA	"ROMASANTA" RESTAURANT	1,18	0:02
CAPORETO - CAFETERIA	MMWINGS	0,98	0:02
CAPORETO - CAFETERIA	TACO NACO	0,34	0:01
CAPORETO - CAFETERIA	GASTROPUB LAMPOST	3,30	0:06
CAPORETO - CAFETERIA	HERITAGE	2,09	0:04
CAPORETO - CAFETERIA	SEAFOOD RESTAURANT "BETWEEN ROCKS"	1,20	0:03
CAPORETO - CAFETERIA	SAMAY	0,79	0:02
BALTIMORE FOOD & DRINKS	ESPOCH	3,28	0:06
BALTIMORE FOOD & DRINKS	SEAFOOD RESTAURANT "DELICIAS DEL MAR"	0,90	0:02
BALTIMORE FOOD & DRINKS	"LA ANDALUZA DELI" SAUSAGES	1,38	0:03
BALTIMORE FOOD & DRINKS	RESTAURANT "BONNY"	2,20	0:04
BALTIMORE FOOD & DRINKS	RESTAURANT "LENTEJITAS EL SABOR"	1,17	0:02
BALTIMORE FOOD & DRINKS	THE RODEO GRILL	0,91	0:02
BALTIMORE FOOD & DRINKS	VALENTINE'S DAY CLUB	0,72	0:02
BALTIMORE FOOD & DRINKS	TAURO BY BONNY	1,88	0:04
BALTIMORE FOOD & DRINKS	BURGER MACHINE BY LA MANUELA GARDEN	3,03	0:05
BALTIMORE FOOD & DRINKS	CAPORETO - CAFETERIA	0,82	0:02
BALTIMORE FOOD & DRINKS	BALTIMORE FOOD & DRINKS	0,00	0:00
BALTIMORE FOOD & DRINKS	ZEAA FOOD EXPERIENCE	3,86	0:09
BALTIMORE FOOD & DRINKS	NATIVE ECUADORIAN GASTRONOMY	1,66	0:03
BALTIMORE FOOD & DRINKS	SEA AND SIERRA MEAT AND SEAFOOD	1,64	0:04
BALTIMORE FOOD & DRINKS	BULLS RESTO BAR	0,91	0:02
BALTIMORE FOOD & DRINKS	FUMI SUSHI & ASIAN FOOD	0,91	0:03
BALTIMORE FOOD & DRINKS	SEAFOOD RESTAURANT "LA CHOZA DÁL"	3,07	0:07
BALTIMORE FOOD & DRINKS	"D'AMELITA" RESTAURANT	1,03	0:03
BALTIMORE FOOD & DRINKS	CORBAN COFFEE TO GO	0,59	0:01
BALTIMORE FOOD & DRINKS	TRIVENTO RIOBAMBA	0,56	0:01
BALTIMORE FOOD & DRINKS	"ROMASANTA" RESTAURANT	0,86	0:02
BALTIMORE FOOD & DRINKS	MMWINGS	0,68	0:01
BALTIMORE FOOD & DRINKS	TACO NACO	0,28	0:01
BALTIMORE FOOD & DRINKS	GASTROPUB LAMPOST	2,86	0:04
BALTIMORE FOOD & DRINKS	HERITAGE	1,80	0:04
BALTIMORE FOOD & DRINKS	SEAFOOD RESTAURANT "BETWEEN ROCKS"	0,75	0:02
BALTIMORE FOOD & DRINKS	SAMAY	0,15	0:00
ZEAA FOOD EXPERIENCE	ESPOCH	7,06	0:13
ZEAA FOOD EXPERIENCE	SEAFOOD RESTAURANT "DELICIAS DEL MAR"	5,27	0:08
ZEAA FOOD EXPERIENCE	"LA ANDALUZA DELI" SAUSAGES	3,27	0:10
ZEAA FOOD EXPERIENCE	RESTAURANT "BONNY"	2,43	0:04

ZEAA FOOD EXPERIENCE	RESTAURANT "LENTEJITAS EL SABOR"	4,25	0:06
ZEAA FOOD EXPERIENCE	THE RODEO GRILL	5,28	0:08
ZEAA FOOD EXPERIENCE	VALENTINE'S DAY CLUB	4,16	0:06
ZEAA FOOD EXPERIENCE	TAURO BY BONNY	3,30	0:06
ZEAA FOOD EXPERIENCE	BURGER MACHINE BY LA MANUELA GARDEN	2,30	0:04
ZEAA FOOD EXPERIENCE	CAPORETO - CAFETERIA	4,05	0:13
ZEAA FOOD EXPERIENCE	BALTIMORE FOOD & DRINKS	4,37	0:06
ZEAA FOOD EXPERIENCE	ZEAA FOOD EXPERIENCE	0,00	0:00
ZEAA FOOD EXPERIENCE	NATIVE ECUADORIAN GASTRONOMY	6,02	0:09
ZEAA FOOD EXPERIENCE	SEA AND SIERRA MEAT AND SEAFOOD	5,85	0:09
ZEAA FOOD EXPERIENCE	BULLS RESTO BAR	5,28	0:08
ZEAA FOOD EXPERIENCE	FUMI SUSHI & ASIAN FOOD	5,10	0:10
ZEAA FOOD EXPERIENCE	SEAFOOD RESTAURANT "LA CHOZA DÁL"	7,26	0:13
ZEAA FOOD EXPERIENCE	"D'AMELITA" RESTAURANT	4,65	0:07
ZEAA FOOD EXPERIENCE	CORBAN COFFEE TO GO	4,18	0:06
ZEAA FOOD EXPERIENCE	TRIVENTO RIOBAMBA	4,93	0:07
ZEAA FOOD EXPERIENCE	"ROMASANTA" RESTAURANT	4,28	0:07
ZEAA FOOD EXPERIENCE	MMWINGS	5,05	0:08
ZEAA FOOD EXPERIENCE	TACO NACO	4,65	0:07
ZEAA FOOD EXPERIENCE	GASTROPUB LAMPOST	7,22	0:11
ZEAA FOOD EXPERIENCE	HERITAGE	3,22	0:06
ZEAA FOOD EXPERIENCE	SEAFOOD RESTAURANT "BETWEEN ROCKS"	4,95	0:08
ZEAA FOOD EXPERIENCE	SAMAY	4,35	0:06
NATIVE ECUADORIAN GASTRONOMY	ESPOCH	2,62	0:06
NATIVE ECUADORIAN GASTRONOMY	SEAFOOD RESTAURANT "DELICIAS DEL MAR"	1,14	0:02
NATIVE ECUADORIAN GASTRONOMY	"LA ANDALUZA DELI" SAUSAGES	2,92	0:06
NATIVE ECUADORIAN GASTRONOMY	RESTAURANT "BONNY"	3,74	0:07
NATIVE ECUADORIAN GASTRONOMY	RESTAURANT "LENTEJITAS EL SABOR"	2,56	0:04
NATIVE ECUADORIAN GASTRONOMY	THE RODEO GRILL	1,15	0:02
NATIVE ECUADORIAN GASTRONOMY	VALENTINE'S DAY CLUB	2,12	0:04
NATIVE ECUADORIAN GASTRONOMY	TAURO BY BONNY	3,23	0:08
NATIVE ECUADORIAN GASTRONOMY	BURGER MACHINE BY LA MANUELA GARDEN	4,46	0:08
NATIVE ECUADORIAN GASTRONOMY	CAPORETO - CAFETERIA	2,26	0:06
NATIVE ECUADORIAN GASTRONOMY	BALTIMORE FOOD & DRINKS	1,89	0:04
NATIVE ECUADORIAN GASTRONOMY	ZEAA FOOD EXPERIENCE	5,28	0:12
NATIVE ECUADORIAN GASTRONOMY	NATIVE ECUADORIAN GASTRONOMY	0,00	0:00
NATIVE ECUADORIAN GASTRONOMY	SEA AND SIERRA MEAT AND SEAFOOD	1,12	0:04
NATIVE ECUADORIAN GASTRONOMY	BULLS RESTO BAR	1,15	0:02
NATIVE ECUADORIAN GASTRONOMY	FUMI SUSHI & ASIAN FOOD	1,50	0:04
NATIVE ECUADORIAN GASTRONOMY	SEAFOOD RESTAURANT "LA CHOZA DÁL"	1,73	0:06
NATIVE ECUADORIAN GASTRONOMY	"D'AMELITA" RESTAURANT	2,42	0:06
NATIVE ECUADORIAN GASTRONOMY	CORBAN COFFEE TO GO	2,13	0:04
NATIVE ECUADORIAN GASTRONOMY	TRIVENTO RIOBAMBA	1,46	0:04
NATIVE ECUADORIAN GASTRONOMY	"ROMASANTA" RESTAURANT	2,20	0:06
NATIVE ECUADORIAN GASTRONOMY	MMWINGS	1,15	0:03
NATIVE ECUADORIAN GASTRONOMY	TACO NACO	1,71	0:04
NATIVE ECUADORIAN GASTRONOMY	GASTROPUB LAMPOST	1,90	0:03
NATIVE ECUADORIAN GASTRONOMY	HERITAGE	3,14	0:08
NATIVE ECUADORIAN GASTRONOMY	SEAFOOD RESTAURANT "BETWEEN ROCKS"	1,45	0:04
NATIVE ECUADORIAN GASTRONOMY	SAMAY	1,87	0:04
SEA AND SIERRA MEAT AND SEAFOOD	ESPOCH	2,98	0:07

SEA AND SIERRA MEAT AND SEAFOOD	SEAFOOD RESTAURANT "DELICIAS DEL MAR"	0,76	0:02
SEA AND SIERRA MEAT AND SEAFOOD	"LA ANDALUZA DELI" SAUSAGES	2,53	0:06
SEA AND SIERRA MEAT AND SEAFOOD	RESTAURANT "BONNY"	3,35	0:07
SEA AND SIERRA MEAT AND SEAFOOD	RESTAURANT "LENTEJITAS EL SABOR"	1,93	0:07
SEA AND SIERRA MEAT AND SEAFOOD	THE RODEO GRILL	0,77	0:02
SEA AND SIERRA MEAT AND SEAFOOD	VALENTINE'S DAY CLUB	1,73	0:04
SEA AND SIERRA MEAT AND SEAFOOD	TAURO BY BONNY	2,73	0:08
SEA AND SIERRA MEAT AND SEAFOOD	BURGER MACHINE BY LA MANUELA GARDEN	4,07	0:08
SEA AND SIERRA MEAT AND SEAFOOD	CAPORETO - CAFETERIA	1,87	0:06
SEA AND SIERRA MEAT AND SEAFOOD	BALTIMORE FOOD & DRINKS	1,50	0:04
SEA AND SIERRA MEAT AND SEAFOOD	ZEAA FOOD EXPERIENCE	4,90	0:12
SEA AND SIERRA MEAT AND SEAFOOD	NATIVE ECUADORIAN GASTRONOMY	0,81	0:02
SEA AND SIERRA MEAT AND SEAFOOD	SEA AND SIERRA MEAT AND SEAFOOD	0,00	0:00
SEA AND SIERRA MEAT AND SEAFOOD	BULLS RESTO BAR	0,77	0:02
SEA AND SIERRA MEAT AND SEAFOOD	FUMI SUSHI & ASIAN FOOD	0,82	0:03
SEA AND SIERRA MEAT AND SEAFOOD	SEAFOOD RESTAURANT "LA CHOZA DÁL"	2,07	0:05
SEA AND SIERRA MEAT AND SEAFOOD	"D'AMELITA" RESTAURANT	1,92	0:04
SEA AND SIERRA MEAT AND SEAFOOD	CORBAN COFFEE TO GO	1,74	0:04
SEA AND SIERRA MEAT AND SEAFOOD	TRIVENTO RIOBAMBA	1,07	0:04
SEA AND SIERRA MEAT AND SEAFOOD	"ROMASANTA" RESTAURANT	1,70	0:05
SEA AND SIERRA MEAT AND SEAFOOD	MMWINGS	0,76	0:03
SEA AND SIERRA MEAT AND SEAFOOD	TACO NACO	1,32	0:04
SEA AND SIERRA MEAT AND SEAFOOD	GASTROPUB LAMPOST	2,26	0:04
SEA AND SIERRA MEAT AND SEAFOOD	HERITAGE	2,65	0:08
SEA AND SIERRA MEAT AND SEAFOOD	SEAFOOD RESTAURANT "BETWEEN ROCKS"	0,96	0:03
SEA AND SIERRA MEAT AND SEAFOOD	SAMAY	1,48	0:04
BULLS RESTO BAR	ESPOCH	3,03	0:06
BULLS RESTO BAR	SEAFOOD RESTAURANT "DELICIAS DEL MAR"	0,33	0:01
BULLS RESTO BAR	"LA ANDALUZA DELI" SAUSAGES	1,80	0:03
BULLS RESTO BAR	RESTAURANT "BONNY"	2,62	0:04
BULLS RESTO BAR	RESTAURANT "LENTEJITAS EL SABOR"	1,78	0:03
BULLS RESTO BAR	THE RODEO GRILL	0,00	0:00
BULLS RESTO BAR	VALENTINE'S DAY CLUB	1,34	0:03
BULLS RESTO BAR	TAURO BY BONNY	2,48	0:05
BULLS RESTO BAR	BURGER MACHINE BY LA MANUELA GARDEN	3,45	0:05
BULLS RESTO BAR	CAPORETO - CAFETERIA	1,22	0:04
BULLS RESTO BAR	BALTIMORE FOOD & DRINKS	1,11	0:02
BULLS RESTO BAR	ZEAA FOOD EXPERIENCE	4,28	0:09
BULLS RESTO BAR	NATIVE ECUADORIAN GASTRONOMY	1,12	0:02
BULLS RESTO BAR	SEA AND SIERRA MEAT AND SEAFOOD	1,08	0:04
BULLS RESTO BAR	BULLS RESTO BAR	0,00	0:00
BULLS RESTO BAR	FUMI SUSHI & ASIAN FOOD	0,79	0:02
BULLS RESTO BAR	SEAFOOD RESTAURANT "LA CHOZA DÁL"	2,57	0:06
BULLS RESTO BAR	"D'AMELITA" RESTAURANT	1,59	0:04
BULLS RESTO BAR	CORBAN COFFEE TO GO	1,01	0:01
BULLS RESTO BAR	TRIVENTO RIOBAMBA	0,45	0:01
BULLS RESTO BAR	"ROMASANTA" RESTAURANT	1,42	0:04
BULLS RESTO BAR	MMWINGS	0,11	0:00
BULLS RESTO BAR	TACO NACO	0,70	0:01
BULLS RESTO BAR	GASTROPUB LAMPOST	2,31	0:04
BULLS RESTO BAR	HERITAGE	2,40	0:05

BULLS RESTO BAR	SEAFOOD RESTAURANT "BETWEEN ROCKS"	0,67	0:02
BULLS RESTO BAR	SAMAY	1,09	0:02
FUMI SUSHI & ASIAN FOOD	ESPOCH	3,67	0:10
FUMI SUSHI & ASIAN FOOD	SEAFOOD RESTAURANT "DELICIAS DEL MAR"	1,14	0:03
FUMI SUSHI & ASIAN FOOD	"LA ANDALUZA DELI" SAUSAGES	2,06	0:05
FUMI SUSHI & ASIAN FOOD	RESTAURANT "BONNY"	2,88	0:05
FUMI SUSHI & ASIAN FOOD	RESTAURANT "LENTEJITAS EL SABOR"	1,27	0:04
FUMI SUSHI & ASIAN FOOD	THE RODEO GRILL	1,15	0:03
FUMI SUSHI & ASIAN FOOD	VALENTINE'S DAY CLUB	1,25	0:03
FUMI SUSHI & ASIAN FOOD	TAURO BY BONNY	2,07	0:06
FUMI SUSHI & ASIAN FOOD	BURGER MACHINE BY LA MANUELA GARDEN	3,17	0:09
FUMI SUSHI & ASIAN FOOD	CAPORETO - CAFETERIA	1,51	0:04
FUMI SUSHI & ASIAN FOOD	BALTIMORE FOOD & DRINKS	1,02	0:03
FUMI SUSHI & ASIAN FOOD	ZEAA FOOD EXPERIENCE	4,54	0:10
FUMI SUSHI & ASIAN FOOD	NATIVE ECUADORIAN GASTRONOMY	1,52	0:05
FUMI SUSHI & ASIAN FOOD	SEA AND SIERRA MEAT AND SEAFOOD	1,26	0:03
FUMI SUSHI & ASIAN FOOD	BULLS RESTO BAR	1,14	0:03
FUMI SUSHI & ASIAN FOOD	FUMI SUSHI & ASIAN FOOD	0,00	0:00
FUMI SUSHI & ASIAN FOOD	SEAFOOD RESTAURANT "LA CHOZA DÁL"	2,80	0:08
FUMI SUSHI & ASIAN FOOD	"D'AMELITA" RESTAURANT	1,14	0:04
FUMI SUSHI & ASIAN FOOD	CORBAN COFFEE TO GO	1,27	0:03
FUMI SUSHI & ASIAN FOOD	TRIVENTO RIOBAMBA	0,79	0:02
FUMI SUSHI & ASIAN FOOD	"ROMASANTA" RESTAURANT	1,04	0:03
FUMI SUSHI & ASIAN FOOD	MMWINGS	0,91	0:02
FUMI SUSHI & ASIAN FOOD	TACO NACO	0,97	0:02
FUMI SUSHI & ASIAN FOOD	GASTROPUB LAMPOST	2,96	0:08
FUMI SUSHI & ASIAN FOOD	HERITAGE	1,99	0:05
FUMI SUSHI & ASIAN FOOD	SEAFOOD RESTAURANT "BETWEEN ROCKS"	0,30	0:01
FUMI SUSHI & ASIAN FOOD	SAMAY	1,01	0:03
SEAFOOD RESTAURANT "LA CHOZA DÁL"	ESPOCH	1,97	0:05
SEAFOOD RESTAURANT "LA CHOZA DÁL"	SEAFOOD RESTAURANT "DELICIAS DEL MAR"	2,02	0:03
SEAFOOD RESTAURANT "LA CHOZA DÁL"	"LA ANDALUZA DELI" SAUSAGES	3,80	0:07
SEAFOOD RESTAURANT "LA CHOZA DÁL"	RESTAURANT "BONNY"	4,61	0:07
SEAFOOD RESTAURANT "LA CHOZA DÁL"	RESTAURANT "LENTEJITAS EL SABOR"	3,43	0:05
SEAFOOD RESTAURANT "LA CHOZA DÁL"	THE RODEO GRILL	2,03	0:03
SEAFOOD RESTAURANT "LA CHOZA DÁL"	VALENTINE'S DAY CLUB	2,99	0:05
SEAFOOD RESTAURANT "LA CHOZA DÁL"	TAURO BY BONNY	4,10	0:09
SEAFOOD RESTAURANT "LA CHOZA DÁL"	BURGER MACHINE BY LA MANUELA GARDEN	5,34	0:09
SEAFOOD RESTAURANT "LA CHOZA DÁL"	CAPORETO - CAFETERIA	3,13	0:07
SEAFOOD RESTAURANT "LA CHOZA DÁL"	BALTIMORE FOOD & DRINKS	2,76	0:04
SEAFOOD RESTAURANT "LA CHOZA DÁL"	ZEAA FOOD EXPERIENCE	6,16	0:12
SEAFOOD RESTAURANT "LA CHOZA DÁL"	NATIVE ECUADORIAN GASTRONOMY	1,32	0:02
SEAFOOD RESTAURANT "LA CHOZA DÁL"	SEA AND SIERRA MEAT AND SEAFOOD	2,00	0:04
SEAFOOD RESTAURANT "LA CHOZA DÁL"	BULLS RESTO BAR	2,03	0:03
SEAFOOD RESTAURANT "LA CHOZA DÁL"	FUMI SUSHI & ASIAN FOOD	2,38	0:04
SEAFOOD RESTAURANT "LA CHOZA DÁL"	SEAFOOD RESTAURANT "LA CHOZA DÁL"	0,00	0:00
SEAFOOD RESTAURANT "LA CHOZA DÁL"	"D'AMELITA" RESTAURANT	3,30	0:06
SEAFOOD RESTAURANT "LA CHOZA DÁL"	CORBAN COFFEE TO GO	2,90	0:05
SEAFOOD RESTAURANT "LA CHOZA DÁL"	TRIVENTO RIOBAMBA	2,33	0:04
SEAFOOD RESTAURANT "LA CHOZA DÁL"	"ROMASANTA" RESTAURANT	3,08	0:06

SEAFOOD RESTAURANT "LA CHOZA DÁL"	MMWINGS	2,02	0:04
SEAFOOD RESTAURANT "LA CHOZA DÁL"	TACO NACO	2,58	0:05
SEAFOOD RESTAURANT "LA CHOZA DÁL"	GASTROPUB LAMPPOST	0,80	0:02
SEAFOOD RESTAURANT "LA CHOZA DÁL"	HERITAGE	4,02	0:09
SEAFOOD RESTAURANT "LA CHOZA DÁL"	SEAFOOD RESTAURANT "BETWEEN ROCKS"	2,33	0:04
SEAFOOD RESTAURANT "LA CHOZA DÁL"	SAMAY	2,75	0:04
"D'AMELITA" RESTAURANT	ESPOCH	4,22	0:10
"D'AMELITA" RESTAURANT	SEAFOOD RESTAURANT "DELICIAS DEL MAR"	1,80	0:05
"D'AMELITA" RESTAURANT	"LA ANDALUZA DELI" SAUSAGES	1,75	0:04
"D'AMELITA" RESTAURANT	RESTAURANT "BONNY"	2,57	0:04
"D'AMELITA" RESTAURANT	RESTAURANT "LENTEJITAS EL SABOR"	0,54	0:02
"D'AMELITA" RESTAURANT	THE RODEO GRILL	1,81	0:05
"D'AMELITA" RESTAURANT	VALENTINE'S DAY CLUB	1,28	0:03
"D'AMELITA" RESTAURANT	TAURO BY BONNY	1,75	0:05
"D'AMELITA" RESTAURANT	BURGER MACHINE BY LA MANUELA GARDEN	2,53	0:08
"D'AMELITA" RESTAURANT	CAPORETO - CAFETERIA	1,76	0:06
"D'AMELITA" RESTAURANT	BALTIMORE FOOD & DRINKS	0,94	0:03
"D'AMELITA" RESTAURANT	ZEAA FOOD EXPERIENCE	4,23	0:10
"D'AMELITA" RESTAURANT	NATIVE ECUADORIAN GASTRONOMY	2,41	0:06
"D'AMELITA" RESTAURANT	SEA AND SIERRA MEAT AND SEAFOOD	1,72	0:03
"D'AMELITA" RESTAURANT	BULLS RESTO BAR	1,81	0:05
"D'AMELITA" RESTAURANT	FUMI SUSHI & ASIAN FOOD	1,06	0:03
"D'AMELITA" RESTAURANT	SEAFOOD RESTAURANT "LA CHOZA DÁL"	3,68	0:09
"D'AMELITA" RESTAURANT	"D'AMELITA" RESTAURANT	0,00	0:00
"D'AMELITA" RESTAURANT	CORBAN COFFEE TO GO	1,19	0:04
"D'AMELITA" RESTAURANT	TRIVENTO RIOBAMBA	1,46	0:04
"D'AMELITA" RESTAURANT	"ROMASANTA" RESTAURANT	0,73	0:02
"D'AMELITA" RESTAURANT	MMWINGS	1,58	0:05
"D'AMELITA" RESTAURANT	TACO NACO	1,22	0:04
"D'AMELITA" RESTAURANT	GASTROPUB LAMPPOST	3,75	0:08
"D'AMELITA" RESTAURANT	HERITAGE	1,67	0:04
"D'AMELITA" RESTAURANT	SEAFOOD RESTAURANT "BETWEEN ROCKS"	0,96	0:03
"D'AMELITA" RESTAURANT	SAMAY	0,93	0:03
CORBAN COFFEE TO GO	ESPOCH	3,69	0:07
CORBAN COFFEE TO GO	SEAFOOD RESTAURANT "DELICIAS DEL MAR"	1,59	0:03
CORBAN COFFEE TO GO	"LA ANDALUZA DELI" SAUSAGES	0,79	0:02
CORBAN COFFEE TO GO	RESTAURANT "BONNY"	1,61	0:02
CORBAN COFFEE TO GO	RESTAURANT "LENTEJITAS EL SABOR"	0,76	0:01
CORBAN COFFEE TO GO	THE RODEO GRILL	1,60	0:03
CORBAN COFFEE TO GO	VALENTINE'S DAY CLUB	0,59	0:01
CORBAN COFFEE TO GO	TAURO BY BONNY	1,47	0:03
CORBAN COFFEE TO GO	BURGER MACHINE BY LA MANUELA GARDEN	2,44	0:04
CORBAN COFFEE TO GO	CAPORETO - CAFETERIA	0,97	0:02
CORBAN COFFEE TO GO	BALTIMORE FOOD & DRINKS	0,72	0:02
CORBAN COFFEE TO GO	ZEAA FOOD EXPERIENCE	3,26	0:07
CORBAN COFFEE TO GO	NATIVE ECUADORIAN GASTRONOMY	2,38	0:04
CORBAN COFFEE TO GO	SEA AND SIERRA MEAT AND SEAFOOD	2,28	0:04
CORBAN COFFEE TO GO	BULLS RESTO BAR	1,60	0:03
CORBAN COFFEE TO GO	FUMI SUSHI & ASIAN FOOD	1,54	0:04
CORBAN COFFEE TO GO	SEAFOOD RESTAURANT "LA CHOZA DÁL"	3,70	0:08

CORBAN COFFEE TO GO	"D'AMELITA" RESTAURANT	1,16	0:02
CORBAN COFFEE TO GO	CORBAN COFFEE TO GO	0,00	0:00
CORBAN COFFEE TO GO	TRIVENTO RIOBAMBA	1,28	0:03
CORBAN COFFEE TO GO	"ROMASANTA" RESTAURANT	0,72	0:02
CORBAN COFFEE TO GO	MMWINGS	1,40	0:03
CORBAN COFFEE TO GO	TACO NACO	0,77	0:02
CORBAN COFFEE TO GO	GASTROPUB LAMPOST	3,58	0:06
CORBAN COFFEE TO GO	HERITAGE	1,38	0:03
CORBAN COFFEE TO GO	SEAFOOD RESTAURANT "BETWEEN ROCKS"	1,39	0:03
CORBAN COFFEE TO GO	SAMAY	0,79	0:02
TRIVENTO RIOBAMBA	ESPOCH	3,24	0:06
TRIVENTO RIOBAMBA	SEAFOOD RESTAURANT "DELICIAS DEL MAR"	1,15	0:03
TRIVENTO RIOBAMBA	"LA ANDALUZA DELI" SAUSAGES	1,35	0:03
TRIVENTO RIOBAMBA	RESTAURANT "BONNY"	2,17	0:03
TRIVENTO RIOBAMBA	RESTAURANT "LENTEJITAS EL SABOR"	1,32	0:02
TRIVENTO RIOBAMBA	THE RODEO GRILL	1,16	0:03
TRIVENTO RIOBAMBA	VALENTINE'S DAY CLUB	0,89	0:02
TRIVENTO RIOBAMBA	TAURO BY BONNY	2,03	0:04
TRIVENTO RIOBAMBA	BURGER MACHINE BY LA MANUELA GARDEN	3,00	0:05
TRIVENTO RIOBAMBA	CAPORETO - CAFETERIA	0,79	0:02
TRIVENTO RIOBAMBA	BALTIMORE FOOD & DRINKS	0,66	0:02
TRIVENTO RIOBAMBA	ZEAA FOOD EXPERIENCE	3,83	0:08
TRIVENTO RIOBAMBA	NATIVE ECUADORIAN GASTRONOMY	2,09	0:05
TRIVENTO RIOBAMBA	SEA AND SIERRA MEAT AND SEAFOOD	2,07	0:06
TRIVENTO RIOBAMBA	BULLS RESTO BAR	1,16	0:03
TRIVENTO RIOBAMBA	FUMI SUSHI & ASIAN FOOD	1,40	0:04
TRIVENTO RIOBAMBA	SEAFOOD RESTAURANT "LA CHOZA DÁL"	3,55	0:08
TRIVENTO RIOBAMBA	"D'AMELITA" RESTAURANT	1,25	0:03
TRIVENTO RIOBAMBA	CORBAN COFFEE TO GO	0,56	0:01
TRIVENTO RIOBAMBA	TRIVENTO RIOBAMBA	0,00	0:00
TRIVENTO RIOBAMBA	"ROMASANTA" RESTAURANT	1,03	0:02
TRIVENTO RIOBAMBA	MMWINGS	0,96	0:02
TRIVENTO RIOBAMBA	TACO NACO	0,25	0:00
TRIVENTO RIOBAMBA	GASTROPUB LAMPOST	3,29	0:06
TRIVENTO RIOBAMBA	HERITAGE	1,95	0:04
TRIVENTO RIOBAMBA	SEAFOOD RESTAURANT "BETWEEN ROCKS"	1,19	0:03
TRIVENTO RIOBAMBA	SAMAY	0,64	0:02
"ROMASANTA" RESTAURANT	ESPOCH	4,28	0:08
"ROMASANTA" RESTAURANT	SEAFOOD RESTAURANT "DELICIAS DEL MAR"	1,98	0:04
"ROMASANTA" RESTAURANT	"LA ANDALUZA DELI" SAUSAGES	1,02	0:03
"ROMASANTA" RESTAURANT	RESTAURANT "BONNY"	1,83	0:03
"ROMASANTA" RESTAURANT	RESTAURANT "LENTEJITAS EL SABOR"	0,31	0:00
"ROMASANTA" RESTAURANT	THE RODEO GRILL	1,99	0:04
"ROMASANTA" RESTAURANT	VALENTINE'S DAY CLUB	0,87	0:02
"ROMASANTA" RESTAURANT	TAURO BY BONNY	1,03	0:03
"ROMASANTA" RESTAURANT	BURGER MACHINE BY LA MANUELA GARDEN	2,12	0:06
"ROMASANTA" RESTAURANT	CAPORETO - CAFETERIA	1,53	0:03
"ROMASANTA" RESTAURANT	BALTIMORE FOOD & DRINKS	1,08	0:02
"ROMASANTA" RESTAURANT	ZEAA FOOD EXPERIENCE	3,49	0:08
"ROMASANTA" RESTAURANT	NATIVE ECUADORIAN GASTRONOMY	2,56	0:06
"ROMASANTA" RESTAURANT	SEA AND SIERRA MEAT AND SEAFOOD	2,20	0:06

"ROMASANTA" RESTAURANT	BULLS RESTO BAR	1,99	0:04
"ROMASANTA" RESTAURANT	FUMI SUSHI & ASIAN FOOD	1,21	0:04
"ROMASANTA" RESTAURANT	SEAFOOD RESTAURANT "LA CHOZA DÁL"	3,82	0:09
"ROMASANTA" RESTAURANT	"D'AMELITA" RESTAURANT	0,71	0:02
"ROMASANTA" RESTAURANT	CORBAN COFFEE TO GO	0,89	0:02
"ROMASANTA" RESTAURANT	TRIVENTO RIOBAMBA	1,64	0:03
"ROMASANTA" RESTAURANT	"ROMASANTA" RESTAURANT	0,00	0:00
"ROMASANTA" RESTAURANT	MMWINGS	1,76	0:03
"ROMASANTA" RESTAURANT	TACO NACO	1,36	0:03
"ROMASANTA" RESTAURANT	GASTROPUB LAMPOST	3,94	0:06
"ROMASANTA" RESTAURANT	HERITAGE	0,94	0:03
"ROMASANTA" RESTAURANT	SEAFOOD RESTAURANT "BETWEEN ROCKS"	1,11	0:03
"ROMASANTA" RESTAURANT	SAMAY	1,07	0:02
MMWINGS	ESPOCH	2,82	0:07
MMWINGS	SEAFOOD RESTAURANT "DELICIAS DEL MAR"	0,22	0:01
MMWINGS	"LA ANDALUZA DELI" SAUSAGES	1,78	0:05
MMWINGS	RESTAURANT "BONNY"	2,63	0:04
MMWINGS	RESTAURANT "LENTEJITAS EL SABOR"	1,74	0:04
MMWINGS	THE RODEO GRILL	0,23	0:01
MMWINGS	VALENTINE'S DAY CLUB	1,35	0:03
MMWINGS	TAURO BY BONNY	2,50	0:06
MMWINGS	BURGER MACHINE BY LA MANUELA GARDEN	3,47	0:06
MMWINGS	CAPORETO - CAFETERIA	1,11	0:03
MMWINGS	BALTIMORE FOOD & DRINKS	1,12	0:02
MMWINGS	ZEAA FOOD EXPERIENCE	4,29	0:09
MMWINGS	NATIVE ECUADORIAN GASTRONOMY	1,13	0:02
MMWINGS	SEA AND SIERRA MEAT AND SEAFOOD	1,09	0:04
MMWINGS	BULLS RESTO BAR	0,23	0:01
MMWINGS	FUMI SUSHI & ASIAN FOOD	0,80	0:02
MMWINGS	SEAFOOD RESTAURANT "LA CHOZA DÁL"	2,58	0:06
MMWINGS	"D'AMELITA" RESTAURANT	1,61	0:04
MMWINGS	CORBAN COFFEE TO GO	1,03	0:01
MMWINGS	TRIVENTO RIOBAMBA	0,46	0:01
MMWINGS	"ROMASANTA" RESTAURANT	1,43	0:04
MMWINGS	MMWINGS	0,00	0:00
MMWINGS	TACO NACO	0,71	0:01
MMWINGS	GASTROPUB LAMPOST	2,33	0:04
MMWINGS	HERITAGE	2,42	0:05
MMWINGS	SEAFOOD RESTAURANT "BETWEEN ROCKS"	0,68	0:02
MMWINGS	SAMAY	1,11	0:02
TACO NACO	ESPOCH	2,99	0:06
TACO NACO	SEAFOOD RESTAURANT "DELICIAS DEL MAR"	0,90	0:02
TACO NACO	"LA ANDALUZA DELI" SAUSAGES	1,19	0:04
TACO NACO	RESTAURANT "BONNY"	2,30	0:04
TACO NACO	RESTAURANT "LENTEJITAS EL SABOR"	1,46	0:02
TACO NACO	THE RODEO GRILL	0,91	0:02
TACO NACO	VALENTINE'S DAY CLUB	1,03	0:02
TACO NACO	TAURO BY BONNY	2,17	0:05
TACO NACO	BURGER MACHINE BY LA MANUELA GARDEN	3,13	0:06
TACO NACO	CAPORETO - CAFETERIA	0,50	0:02

TACO NACO	BALTIMORE FOOD & DRINKS	0,62	0:02
TACO NACO	ZEAA FOOD EXPERIENCE	3,96	0:09
TACO NACO	NATIVE ECUADORIAN GASTRONOMY	1,84	0:04
TACO NACO	SEA AND SIERRA MEAT AND SEAFOOD	1,82	0:05
TACO NACO	BULLS RESTO BAR	0,91	0:02
TACO NACO	FUMI SUSHI & ASIAN FOOD	1,17	0:03
TACO NACO	SEAFOOD RESTAURANT "LA CHOZA DÁL"	3,25	0:08
TACO NACO	"D'AMELITA" RESTAURANT	1,38	0:04
TACO NACO	CORBAN COFFEE TO GO	0,69	0:01
TACO NACO	TRIVENTO RIOBAMBA	0,72	0:01
TACO NACO	"ROMASANTA" RESTAURANT	1,16	0:03
TACO NACO	MMWINGS	0,71	0:02
TACO NACO	TACO NACO	0,00	0:00
TACO NACO	GASTROPUB LAMPPPOST	3,04	0:06
TACO NACO	HERITAGE	2,09	0:05
TACO NACO	SEAFOOD RESTAURANT "BETWEEN ROCKS"	0,94	0:02
TACO NACO	SAMAY	0,78	0:02
GASTROPUB LAMPPPOST	ESPOCH	1,17	0:03
GASTROPUB LAMPPPOST	SEAFOOD RESTAURANT "DELICIAS DEL MAR"	1,96	0:03
GASTROPUB LAMPPPOST	"LA ANDALUZA DELI" SAUSAGES	3,77	0:06
GASTROPUB LAMPPPOST	RESTAURANT "BONNY"	4,59	0:06
GASTROPUB LAMPPPOST	RESTAURANT "LENTEJITAS EL SABOR"	3,70	0:07
GASTROPUB LAMPPPOST	THE RODEO GRILL	1,97	0:03
GASTROPUB LAMPPPOST	VALENTINE'S DAY CLUB	3,31	0:05
GASTROPUB LAMPPPOST	TAURO BY BONNY	4,42	0:09
GASTROPUB LAMPPPOST	BURGER MACHINE BY LA MANUELA GARDEN	5,42	0:08
GASTROPUB LAMPPPOST	CAPORETO - CAFETERIA	3,19	0:06
GASTROPUB LAMPPPOST	BALTIMORE FOOD & DRINKS	3,08	0:05
GASTROPUB LAMPPPOST	ZEAA FOOD EXPERIENCE	6,25	0:11
GASTROPUB LAMPPPOST	NATIVE ECUADORIAN GASTRONOMY	1,39	0:02
GASTROPUB LAMPPPOST	SEA AND SIERRA MEAT AND SEAFOOD	2,39	0:05
GASTROPUB LAMPPPOST	BULLS RESTO BAR	1,97	0:03
GASTROPUB LAMPPPOST	FUMI SUSHI & ASIAN FOOD	2,76	0:05
GASTROPUB LAMPPPOST	SEAFOOD RESTAURANT "LA CHOZA DÁL"	0,93	0:04
GASTROPUB LAMPPPOST	"D'AMELITA" RESTAURANT	3,56	0:07
GASTROPUB LAMPPPOST	CORBAN COFFEE TO GO	2,98	0:04
GASTROPUB LAMPPPOST	TRIVENTO RIOBAMBA	2,42	0:03
GASTROPUB LAMPPPOST	"ROMASANTA" RESTAURANT	3,39	0:06
GASTROPUB LAMPPPOST	MMWINGS	2,08	0:03
GASTROPUB LAMPPPOST	TACO NACO	2,67	0:04
GASTROPUB LAMPPPOST	GASTROPUB LAMPPPOST	0,00	0:00
GASTROPUB LAMPPPOST	HERITAGE	4,33	0:09
GASTROPUB LAMPPPOST	SEAFOOD RESTAURANT "BETWEEN ROCKS"	2,64	0:04
GASTROPUB LAMPPPOST	SAMAY	3,06	0:05
HERITAGE	ESPOCH	4,67	0:08
HERITAGE	SEAFOOD RESTAURANT "DELICIAS DEL MAR"	2,38	0:04
HERITAGE	"LA ANDALUZA DELI" SAUSAGES	0,73	0:02
HERITAGE	RESTAURANT "BONNY"	0,89	0:02
HERITAGE	RESTAURANT "LENTEJITAS EL SABOR"	1,36	0:03
HERITAGE	THE RODEO GRILL	2,39	0:04
HERITAGE	VALENTINE'S DAY CLUB	1,27	0:02

HERITAGE	TAURO BY BONNY	0,74	0:02
HERITAGE	BURGER MACHINE BY LA MANUELA GARDEN	1,39	0:04
HERITAGE	CAPORETO - CAFETERIA	1,92	0:04
HERITAGE	BALTIMORE FOOD & DRINKS	1,48	0:03
HERITAGE	ZEAA FOOD EXPERIENCE	2,55	0:07
HERITAGE	NATIVE ECUADORIAN GASTRONOMY	3,13	0:05
HERITAGE	SEA AND SIERRA MEAT AND SEAFOOD	2,96	0:05
HERITAGE	BULLS RESTO BAR	2,39	0:04
HERITAGE	FUMI SUSHI & ASIAN FOOD	2,22	0:05
HERITAGE	SEAFOOD RESTAURANT "LA CHOZA DÁL"	4,37	0:09
HERITAGE	"D'AMELITA" RESTAURANT	1,76	0:04
HERITAGE	CORBAN COFFEE TO GO	1,29	0:03
HERITAGE	TRIVENTO RIOBAMBA	2,04	0:04
HERITAGE	"ROMASANTA" RESTAURANT	1,38	0:03
HERITAGE	MMWINGS	2,15	0:04
HERITAGE	TACO NACO	1,72	0:03
HERITAGE	GASTROPUB LAMPOST	4,33	0:07
HERITAGE	HERITAGE	0,00	0:00
HERITAGE	SEAFOOD RESTAURANT "BETWEEN ROCKS"	2,07	0:05
HERITAGE	SAMAY	1,46	0:02
SEAFOOD RESTAURANT "BETWEEN ROCKS"	ESPOCH	3,58	0:07
SEAFOOD RESTAURANT "BETWEEN ROCKS"	SEAFOOD RESTAURANT "DELICIAS DEL MAR"	0,91	0:02
SEAFOOD RESTAURANT "BETWEEN ROCKS"	"LA ANDALUZA DELI" SAUSAGES	1,83	0:04
SEAFOOD RESTAURANT "BETWEEN ROCKS"	RESTAURANT "BONNY"	2,65	0:05
SEAFOOD RESTAURANT "BETWEEN ROCKS"	RESTAURANT "LENTEJITAS EL SABOR"	1,12	0:03
SEAFOOD RESTAURANT "BETWEEN ROCKS"	THE RODEO GRILL	0,92	0:02
SEAFOOD RESTAURANT "BETWEEN ROCKS"	VALENTINE'S DAY CLUB	1,02	0:03
SEAFOOD RESTAURANT "BETWEEN ROCKS"	TAURO BY BONNY	1,85	0:05
SEAFOOD RESTAURANT "BETWEEN ROCKS"	BURGER MACHINE BY LA MANUELA GARDEN	2,94	0:09
SEAFOOD RESTAURANT "BETWEEN ROCKS"	CAPORETO - CAFETERIA	1,35	0:04
SEAFOOD RESTAURANT "BETWEEN ROCKS"	BALTIMORE FOOD & DRINKS	0,79	0:02
SEAFOOD RESTAURANT "BETWEEN ROCKS"	ZEAA FOOD EXPERIENCE	4,31	0:10
SEAFOOD RESTAURANT "BETWEEN ROCKS"	NATIVE ECUADORIAN GASTRONOMY	1,48	0:04
SEAFOOD RESTAURANT "BETWEEN ROCKS"	SEA AND SIERRA MEAT AND SEAFOOD	1,41	0:04
SEAFOOD RESTAURANT "BETWEEN ROCKS"	BULLS RESTO BAR	0,92	0:02
SEAFOOD RESTAURANT "BETWEEN ROCKS"	FUMI SUSHI & ASIAN FOOD	0,30	0:02
SEAFOOD RESTAURANT "BETWEEN ROCKS"	SEAFOOD RESTAURANT "LA CHOZA DÁL"	2,74	0:07
SEAFOOD RESTAURANT "BETWEEN ROCKS"	"D'AMELITA" RESTAURANT	1,00	0:03
SEAFOOD RESTAURANT "BETWEEN ROCKS"	CORBAN COFFEE TO GO	1,04	0:03
SEAFOOD RESTAURANT "BETWEEN ROCKS"	TRIVENTO RIOBAMBA	0,56	0:01
SEAFOOD RESTAURANT "BETWEEN ROCKS"	"ROMASANTA" RESTAURANT	0,82	0:02
SEAFOOD RESTAURANT "BETWEEN ROCKS"	MMWINGS	0,68	0:02
SEAFOOD RESTAURANT "BETWEEN ROCKS"	TACO NACO	0,75	0:02
SEAFOOD RESTAURANT "BETWEEN ROCKS"	GASTROPUB LAMPOST	2,86	0:05
SEAFOOD RESTAURANT "BETWEEN ROCKS"	HERITAGE	1,77	0:05
SEAFOOD RESTAURANT "BETWEEN ROCKS"	SEAFOOD RESTAURANT "BETWEEN ROCKS"	0,00	0:00
SEAFOOD RESTAURANT "BETWEEN ROCKS"	SAMAY	0,78	0:02
SAMAY	ESPOCH	3,46	0:07
SAMAY	SEAFOOD RESTAURANT "DELICIAS DEL MAR"	1,07	0:03
SAMAY	"LA ANDALUZA DELI" SAUSAGES	1,38	0:03

SAMAY	RESTAURANT "BONNY"	2,20	0:04
SAMAY	RESTAURANT "LENTEJITAS EL SABOR"	1,01	0:02
SAMAY	THE RODEO GRILL	1,08	0:03
SAMAY	VALENTINE'S DAY CLUB	0,57	0:01
SAMAY	TAURO BY BONNY	1,73	0:04
SAMAY	BURGER MACHINE BY LA MANUELA GARDEN	2,82	0:08
SAMAY	CAPORETO - CAFETERIA	0,99	0:03
SAMAY	BALTIMORE FOOD & DRINKS	0,34	0:01
SAMAY	ZEAA FOOD EXPERIENCE	3,86	0:08
SAMAY	NATIVE ECUADORIAN GASTRONOMY	1,64	0:04
SAMAY	SEA AND SIERRA MEAT AND SEAFOOD	1,49	0:03
SAMAY	BULLS RESTO BAR	1,08	0:03
SAMAY	FUMI SUSHI & ASIAN FOOD	0,75	0:02
SAMAY	SEAFOOD RESTAURANT "LA CHOZA DÁL"	2,91	0:07
SAMAY	"D'AMELITA" RESTAURANT	0,88	0:03
SAMAY	CORBAN COFFEE TO GO	0,59	0:02
SAMAY	TRIVENTO RIOBAMBA	0,73	0:02
SAMAY	"ROMASANTA" RESTAURANT	0,70	0:02
SAMAY	MMWINGS	0,85	0:02
SAMAY	TACO NACO	0,46	0:02
SAMAY	GASTROPUB LAMPOST	3,02	0:05
SAMAY	HERITAGE	1,65	0:04
SAMAY	SEAFOOD RESTAURANT "BETWEEN ROCKS"	0,59	0:02
SAMAY	SAMAY	0,00	0:00

Figure 3. Distance Worksheet

Source: Authors' elaboration based on the study's database

Analysis and interpretation

The parameter that determines the type of route to follow (whether it is the shortest or the fastest) is of great importance. Because when opting for the shortest route, it is common to find itineraries that cross the city centers, where strict speed limits apply and there is a high volume of traffic. Therefore, in general, choosing the fastest route is usually preferable for long-distance delivery operations. On the other hand, faster routes may tend to frequently use the city's peripheral highways, which may not be ideal for companies that deliver within the city, where shorter routes might be more appropriate.

In addition, there is the option to obtain the trip duration in real time, which is adjusted according to traffic conditions, and is calculated and supplied via the GIS web service. The user has the ability to prevent vehicles from traveling between two specific locations by manually setting a relevant distance to a high value.

The number of locations is very extensive, so the distance matrix is made by numbers of localities analyzed as follows:

ESTROPOBLAMPPOST	SEAFODRESTAURANT" LACHOZADÁL"	NATIVEECUADORIANGASTRONOMY	SEANDSIERRRAMETANDSEAFOOD	FUMISUSHI&ASIANFOOD	SEAFODRESTAURANT" BETWEENROCKS"	SAMAY	BALTIMOREFOOD&DRINKS	"D'AMELITA" RESTAURANT	RESTAURANT" LENTEEJITASSELLABOR"	"ROMASANTA" RESTAURANT	VALENTINE" SDAYCLUB	HERITAGE	TUROBYBONNY	RESTAURANT" BONNY"	BURGERMACHINEBYLAMANEUELAGARDEEN	ZEAFOODEXPERIENCE	"LANDALUZADELI" SAUSAGES	CORBANCOFFEEETOGO	CAPORRETO-CAFETERIA	TACONACO	TRIVENTORIOBAMBA	MMWINGS	THERODEOGRILL	BULLSRESTOBAR	SEAFODRESTAURANT" DELICIASDELMAR"	ESPOCH
3,46	3,58	4,67	1,17	2,99	2,82	4,28	3,24	3,69	4,22	1,97	3,67	3,03	2,98	2,62	7,06	3,28	3,26	5,96	4,92	3,57	3,03	4,31	5,13	4,27	3,04	0
1,07	0,91	2,38	1,96	0,90	0,22	1,98	1,15	1,59	1,80	2,02	1,14	0,33	0,76	1,14	5,27	0,90	1,17	3,70	2,63	1,27	0,33	2,02	2,84	1,98	2,92	2,92
1,38	1,83	0,73	3,77	1,19	1,78	1,02	1,35	0,79	1,75	3,80	2,06	1,80	2,53	2,92	3,27	1,38	1,20	2,04	0,98	1,26	1,80	1,19	1,00	0,81	4,15	"LANDALUZA

DELI "SAUSAGES"		5 , 3 1	2 , 6 3	1 , 1 6	0 , 0 0	2 , 2 0	2 , 6 2	2 , 0 8	0 , 8 0	0 , 8 6	2 , 3 2	2 , 2 0	2 , 4 3	3 , 7 4	3 , 3 5	2 , 6 2	2 , 8 8	4, 6 1	2 , 5 7	1 , 6 1	2 , 1 7	1 , 8 3	2 , 6 3	2 , 3 0	4 , 5 9	0, 8 9	2 , 6 5	2 , 2 0
	RESTAURANT "BONNNY"	4 , 4 6	1 , 7 9	0 , 9 7	1 , 8 2	0 , 0 0	1 , 7 8	0 , 8 9	1 , 2 8	1 , 9 9	1 , 4 7	1 , 1 7	4 , 2 5	2 , 5 6	1 , 9 3	1 , 7 8	1 , 2 7	3, 4 3	0 , 5 4	0 , 7 6	1 , 3 2	0 , 3 1	1 , 7 4	1 , 4 6	3 , 7 0	1, 3 6	1 , 1 2	1 , 0 1
	RESTAURANT "LENTETEJITASSEL SAVOR"	2 , 9 3	0 , 0 1	1 , 9 9	2 , 8 5	2 , 0 3	0 , 0 0	1 , 2 8	2 , 6 4	3 , 7 1	1 , 1 8	0 , 9 1	5 , 2 8	1 , 1 5	0 , 7 7	0 , 0 0	1 , 1 5	2, 0 3	1 , 8 1	1 , 6 0	1 , 1 6	1 , 9 9	0 , 2 3	0 , 9 1	1 , 9 7	2, 3 9	0 , 9 2	1 , 0 8
	THERODEOGRILL	3 , 9 9	1 , 3 4	0 , 8 7	1 , 7 3	0 , 9 1	1 , 3 3	0 , 0 0	1 , 5 2	2 , 5 8	1 , 0 4	0 , 7 2	4 , 1 6	2 , 1 2	1 , 7 3	1 , 3 4	1 , 2 5	2, 9 9	1 , 2 8	0 , 5 9	0 , 8 9	0 , 8 7	1 , 3 5	1 , 0 3	3 , 3 1	1, 2 7	1 , 0 2	0 , 5 7

CLUB	T A U R O B Y B O N N Y	5 , 1 7	2 , 4 9	1 , 0 1	0 , 8 7	1 , 3 8	2 , 4 8	1 , 6 1	0 , 0 0	1 , 4 6	2 , 1 8	1 , 8 8	3 , 3 0	3 , 2 3	2 , 7 3	2 , 4 8	2 , 0 7	4, 1 0	1 , 7 5	1 , 4 7	2 , 0 3	1 , 0 3	2 , 5 0	2 , 1 7	4 , 4 2	0, 7 4	1 , 8 5	1 , 7 3
	B U R G E R M A C H I N E B Y L A M A N N U E L A G A R D E N	6 , 1 0	3 , 4 6	1 , 9 9	1 , 1 8	2 , 1 6	3 , 4 5	2 , 7 0	1 , 3 1	0 , 0 0	3 , 1 5	3 , 0 3	2 , 3 0	4 , 4 6	4 , 0 7	3 , 4 5	3 , 1 7	5, 3 4	2 , 5 3	2 , 4 4	3 , 0 0	2 , 1 2	3 , 4 7	3 , 1 3	5 , 4 2	1, 3 9	2 , 9 4	2 , 8 2
	C A P O R E T O - C A F F E T E R I A	3 , 3 7	1 , 2 3	1 , 5 3	2 , 3 8	1 , 5 6	1 , 2 2	1 , 1 1	2 , 1 7	3 , 2 4	0 , 0 0	0 , 8 2	4 , 0 5	2 , 2 6	1 , 8 7	1 , 2 2	1 , 5 1	3, 1 3	1 , 7 6	0 , 9 7	0 , 7 9	1 , 5 3	1 , 1 1	0 , 5 0	3 , 1 9	1, 9 2	1 , 3 5	0 , 9 9
	B A L L T I M O R E F O O D & D R I N K	3 , 5 9	1 , 1 2	1 , 0 9	1 , 9 4	1 , 1 1	1 , 1 1	0 , 3 7	1 , 7 3	2 , 8 0	0 , 6 4	0 , 0 0	4 , 3 7	1 , 8 9	1 , 5 0	1 , 1 1	1 , 0 2	2, 7 6	0 , 9 4	0 , 7 2	0 , 6 6	1 , 0 8	1 , 1 2	0 , 6 2	3 , 0 8	1, 4 8	0 , 7 9	0 , 3 4

[illegible]

[illegible]

S E A F O O D R E S T A U R A N T " B E T W E E N R O C K S "	3, 5 9	0, 6 8	1, 6 7	2, 5 2	1, 1 5	0, 6 7	0, 9 5	1, 9 8	3, 1 1	1, 2 0	0, 7 5	4, 9 5	1, 4 5	0, 9 6	0, 6 7	0, 3 0	2, 3 3	0, 9 6	1, 3 9	1, 1 9	1, 1 1	0, 6 8	0, 9 4	2, 6 4	2, 0 7	0, 0 0	0, 5 9
	S A M A Y	3, 7 4	1, 1 0	1, 0 7	1, 9 2	1, 1 0	1, 0 9	0, 3 5	1, 7 1	2, 7 8	0, 7 9	0, 1 5	4, 3 5	1, 8 7	1, 4 8	1, 0 9	1, 0 1	2, 7 5	0, 9 3	3, 2 4	0, 6 4	1, 0 7	1, 1 1	0, 7 8	3, 0 6	1, 4 6	0, 7 8

Figure 4. Distance calculation matrix

Source: Authors' elaboration based on the study's database

Analysis and interpretation

As shown in Figure 4, the returned matrix does not exhibit symmetry, which is understandable given that the round trips do not always follow the same route. Although these discrepancies in distances in both directions are not critical to the current problem, they do play an important role in urban logistics, where some roads are one-way and others are used in the opposite direction.

3. Vehicles

The information relative to the type of vehicle is relevant to the study, in this case the user has the ability to determine the number of vehicles of each type that are in each depot. This data encompasses various cost parameters, such as cost per unit of distance and per trip, as well as operational parameters including the location of the depot, its capacity, time limits, and driving distance of vehicles. In addition, a single capacity parameter is presented, which may vary depending on the type of operation, such as the weight capacity for trucks according to figure 5.

Starting depot	Vehicle type	Capacity	Fixed cost per trip	Cost per unit distance	Distance limit	Work start time	Driving time limit	Working time limit	Return depot	Number of vehicles
ESPOCH	Diesel Truck	3500	20,00	1,20	560,00	08:00	9:00	10:00	ESPOCH	1

Figure 5. Vehicle spreadsheet.

Source: Authors' elaboration based on the study's database

Analysis and interpretation

The study focuses on a diesel truck with a capacity of 3.5 tons with a fixed cost of mobilization for each trip of 20 US dollars and cost per distance of kilometers is 1.20 US dollars considering a distance limit of 560 kilometers in the day, while the start of the working day is executed at 8:00 am and the driving time is referred to 9 hours and has a total working hours of 10 hours, the points of origin and destination is the Polytechnic School of Chimborazo (ESPOCH)

4. Solution

This spreadsheet is created in solution with the purpose of recording the stops of the truck to Diesel specifying its characteristics as the tonnage capacity which is 3.5 Ton. Locations to set service schedules and pickup/delivery quantities, as well as distance and travel times between customers coming from distances. Instead of calculating the cost, the spreadsheet determines the net profit, thus adapting to the variations in the VRP that generate profits when visiting customers selectively. This document includes a variety of conditional formatting features designed to visually detect unworkable solutions and make it easier to manually create solutions. For example, cases in which a vehicle exceeds its capacity or distance limit, or when a customer is visited outside its time window, are highlighted in red. It is also possible to copy and paste customer lists between vehicle routes to manually modify the routes see Figure 6.

Total net profit											-47.78
Warning: The data has changed since the last solver run / Feasibility check											
Vehicle:	VI	Stops:		27	Net profit:		-47.78				
Stop cost	Location name	Location	Latitude (°)	Longitude	Distance travel	Driving time	Arrival time	Departure time	Working time	Profit collected	Loss
0	ESPOCH	0	-1.65661	-78.67826	0.00	0:00	08:00	08:00	0:00	0	26
1	MARISQUERIA "DELICIAS DEL MAR"	1	-1.663512	-78.660874	2.92	0:07	08:07	09:10	1:10	0	25
2	BULLS RESTO BAR	14	-1.6635	-78.66076	2.91	0:07	09:10	09:20	1:20	0	24
3	EL RODEO GRILL	5	-1.663537	-78.660776	2.91	0:07	09:20	09:30	1:30	0	23
4	MMWINGS	21	-1.66433	-78.660526	3.04	0:07	09:30	09:40	1:40	0	22
5	TRIVENTO RIOBAMBA	19	-1.666201	-78.657766	3.50	0:08	09:41	09:51	1:51	0	21
6	TACO NACO	22	-1.667857	-78.658043	3.75	0:08	09:51	10:01	2:01	0	20
7	CAPORETO - CAFETERIA	9	-1.669967	-78.658671	4.25	0:10	10:03	10:13	2:13	0	19
8	CORBAN COFFEE TO GO	18	-1.669505	-78.65192	4.96	0:11	10:14	10:24	2:24	0	18
9	EMBU TIDOS "LA ANDALUZA DELI"	2	-1.672854	-78.650553	5.74	0:13	10:26	10:36	2:36	0	17
10	ZEAA FOOD EXPERIENCE	11	-1.689868	-78.637006	8.56	0:20	10:43	10:53	2:53	0	16
11	BURGUER MACHINE BY LA MANUELA GA	8	-1.677986	-78.637125	10.85	0:24	10:57	11:07	3:07	0	15
12	RESTAURANT "BONNY"	3	-1.677777	-78.643375	11.71	0:25	11:08	11:18	3:18	0	14
13	TAURO BY BONNY	7	-1.673935	-78.644804	12.58	0:27	11:20	11:30	3:30	0	13
14	PATRIMONIO	24	-1.673434	-78.646525	12.83	0:28	11:31	11:41	3:41	0	12
15	SAN VALENTIN CLUB	6	-1.668396	-78.654741	14.09	0:30	11:43	11:53	3:53	0	11
16	RESTAURANTE "ROMASANTA"	20	-1.667726	-78.65115	14.68	0:31	11:54	12:04	4:04	0	10
17	RESTAURANTE "LENTEJITAS EL SABOR"	4	-1.666313	-78.649255	14.99	0:31	12:04	12:14	4:14	0	9
18	RESTAURANTE "D'AMELITA"	17	-1.663415	-78.650664	15.39	0:32	12:15	12:25	4:25	0	8
19	BALTIMORE FOOD & DRINKS	10	-1.667142	-78.656202	16.33	0:35	12:28	12:38	4:38	0	7
20	SAMAY	26	-1.666164	-78.655737	16.48	0:35	12:38	12:48	4:48	0	6
21	MARISQUERIA "ENTRE ROCAS"	25	-1.662987	-78.656797	17.08	0:37	12:50	13:00	5:00	0	5
22	FUMI SUSHI & ASIAN FOOD	15	-1.662666	-78.657222	17.38	0:39	13:02	13:12	5:12	0	4
23	MAR Y SIERRA CARNES Y MARISCOS	13	-1.658391	-78.660984	18.64	0:42	13:15	13:25	5:25	0	3
24	NATIVA GASTRONOMIA ECUATORIANA	12	-1.657814	-78.665131	19.45	0:44	13:27	13:37	5:37	0	2
25	MARISQUERIA "LA CHOZA D ALEX"	16	-1.649556	-78.670132	21.18	0:50	13:43	13:53	5:53	0	1
26	FAROLA GASTROPUB	23	-1.652898	-78.674843	21.97	0:52	13:55	14:05	6:05	0	0
27	ESPOCH	0	-1.65661	-78.67826	23.15	0:55	14:08		6:08	0	0

Figure 6. Solution spreadsheet

Source: Authors' elaboration based on the study's database

5. Visualization

Figure 7 shows the locations and routes from truck to diesel, you can optionally generate this worksheet in the VRP. The Solver Console user interface can be adjusted to display various details about locations, such as pickup/delivery volumes or service times. This worksheet simply includes a scatter chart that shows the map of the region obtained from the GIS web service. It can be formatted, for example, by adjusting the size of elements or display axes, according to the user's needs, just like any other graphical object in Excel.

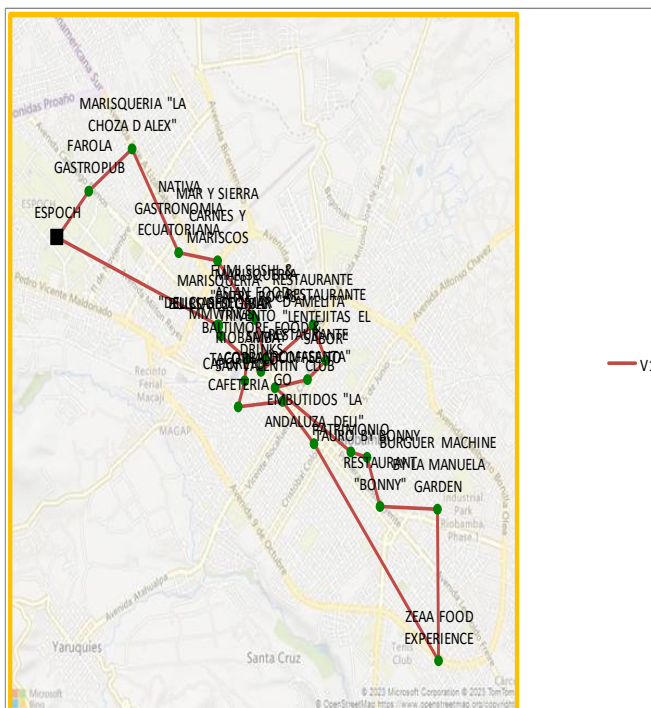


Figure 7. Visualization spreadsheet.

Source: Authors' elaboration based on the study's database

Analysis and interpretation

The route that the diesel truck allows to run through the different waste collection routes of food and beverage establishments of the Riobamba canton is evidenced, starting and returning from the ESPOCH reference point, considering a travel distance of 23.15 km in an arrival time of 14:08; the optimization of the route complies with the restriction conditions.

Using the Vehicle Trout Problem (VRP) method, distances have been obtained that provide invaluable additional information for vehicle route planning, including the times required for a

vehicle to travel between various points, as well as for the final solution. Representing this information in a time matrix makes it easier to calculate fleet availability and associated costs, which will expand the usefulness and applicability of the model.

5. Conclusions

In this study, a qualitative and quantitative approach was developed and applied to solve the problem of vehicle routing with capacity restrictions and optimization of routes for waste collection from food and beverage establishments in the canton of Riobamba by introducing the Vehicle Routing Problem (VRP) method, which involves the characteristics of the study such as the Locations, Distances, Vehicles, Solution and Visualization, and that when applied positive results were obtained in travel times and distances.

The results show that the performance applying the aforementioned method was satisfactory compared to the computation time needed to improve the initial solution and the quality of the final solution. Specifically, in the specific problem selected, a high-quality solution was achieved in a considerably shorter period of time compared to an exact approach. These findings suggest that using the rough method could hold great promise for tackling larger problems effectively.

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