

para todos

por siempre

Aqua Potable y Saneamiento en Honduras

Application Manual for the AtWhatCost Tool

3

September 2017

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1. Introduction

Providing potable water service in a sustainable manner requires there to be financial mechanisms to be self-sufficient.

Costing tools are an initiative of Water for People in Bolivia, IRC and Aguiconsult in the format of BID-FOMIN, affirming that we understand what those costs are or the different financial mechanisms, in order to achieve everyone forever; and to what degree are they being achieved in municipalities.

IN the following diagram we observe what those tools are and what analysis each one accomplishes.

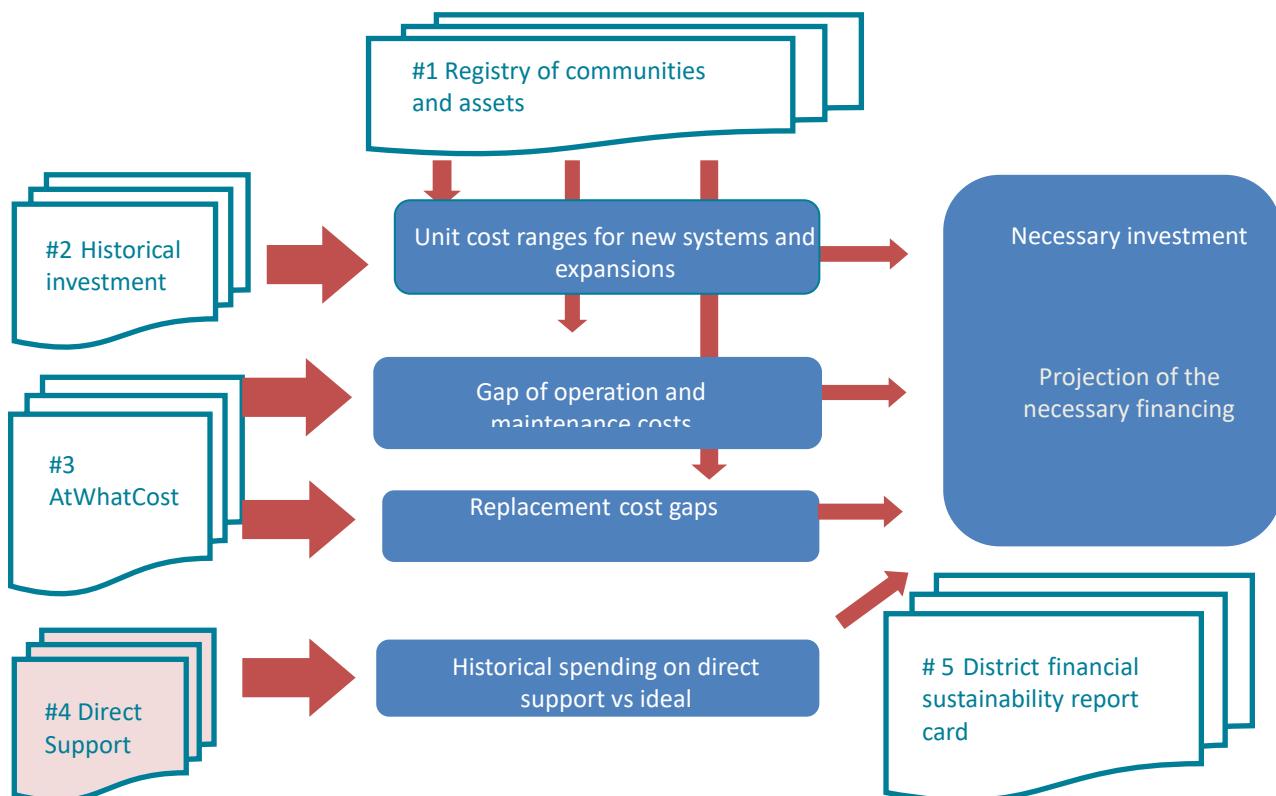


Figure 1. Interrelation of costing tools.

The costing tools have been applied and contextualized to the Honduran environment.

The following document will serve as a guide in the use and application of tool number 3 At What Cost.

2. Conceptual Framework

What is the objective of this tool?

The main objective of the tool AtWhatCost (AWC) is to evaluate the balance between cost and income for a rural Administrative Water Council (local water committee), to enable them to make adjustments toward a balanced budget that will facilitate adequate operation and maintenance, and stay affordable for system users.

A secondary objective of the tool is to establish reference rates. Upon applying the tool in a certain number of water councils, reference rates can be modeled for different types of councils.

Who needs to apply the tool?

The target audience of the tool is the Administrative Water and Sanitation Council (JAAS in Honduras). It serves to orient them on the different budgetary aspects of their office.



Given the complexity of the tool, it's too much to hope that many of the councils will use it in a direct manner. Furthermore, the tool is to be facilitated and filled out by municipal water and sanitation technicians in conjunction with the Association of Administrative Councils for District Water and the Supervision and Local Control Unit (SULC). It can also be utilized by Non-governmental Organizations, or by a national government entity that supports a particular council.

Finally, we recommend that the tool be used by national government entities such as ERSAPS and SANAA with the objective of modeling user rates. In this case, it would imply a cross analysis between a certain number of Water Councils, or apply it to a number of typical Water Councils as a model. The result of such an analysis would give rise to identifying reference rates.

Functionality of the tool “AtWhatCost”.

In its typical form, the application of the tool is accomplished in four steps.

1. **Develop** a projection of expenditures for the Administrative Water Council for a period of 20 years.



In this projections, annual operation and maintenance costs, preventative as well as corrective, in addition to necessary replacement costs based on useful life of key components, and a percentage of the expected contribution on the part of the community for these replacements are added together to determine the base.



2. Project the expected income for the Administrative Water Council.



These incomes are the product of the user rates (tariffs), new connections and whatever other source of income, considering factors such as population growth and adjusting for the inflation rate of the country.



3. Calculate the budget on an annual basis, determining the amount of funds the Water Council will have in reserve.



The budget takes into account the spending projection (from step 1) and the income projection (from step 2). In this way, the budget can be evaluated over a 20 year period.



4. Scenario analysis

In the fourth step, the user creates base scenarios changing data for expenses and/or income and analyzing the impact on the budget. This leads to identifying which changes are needed in the expenditures to have adequate operation and maintenance as well as adjustments in income – primarily user rates – in order to pay the expenses.



3. Structure of the tool

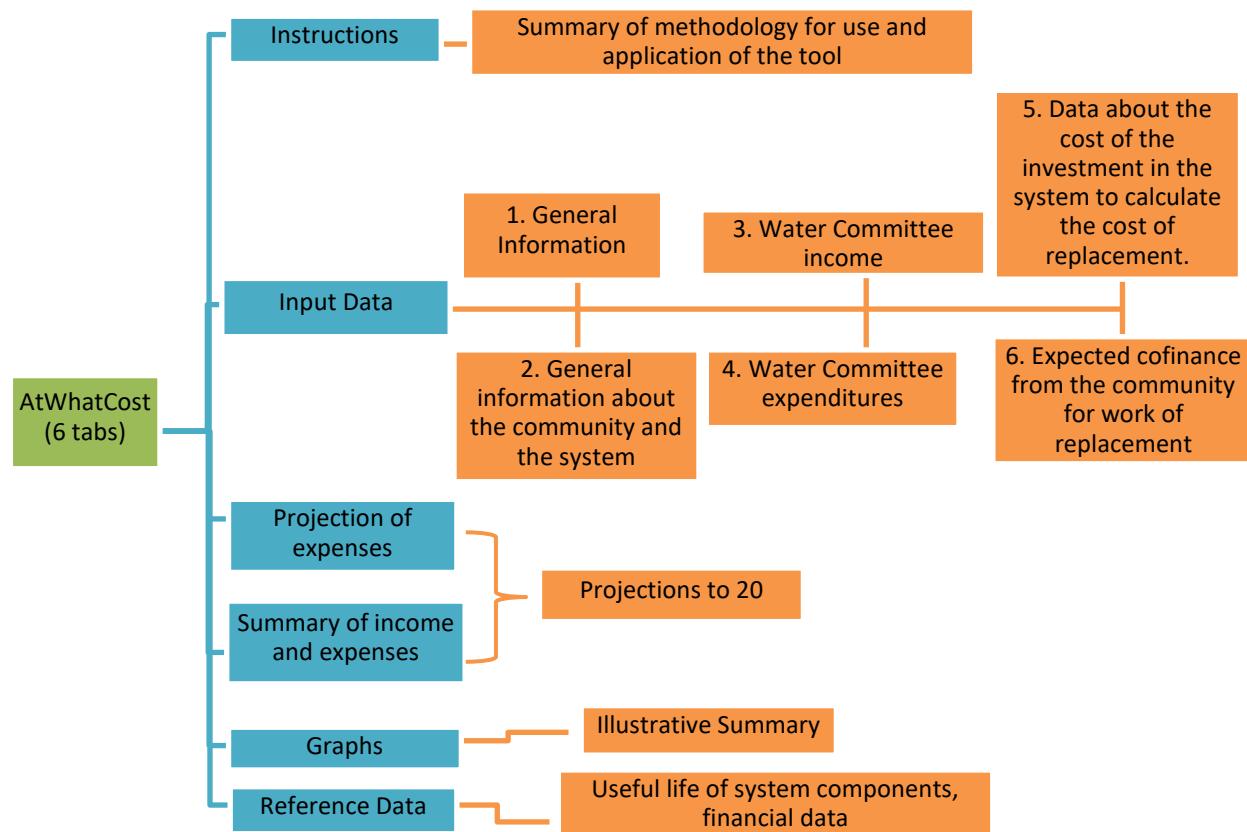
The tool, AtWhatCost, is an Excel spreadsheet that consists of six tabs as can be seen in diagram No. 1.

- The first tab contains instructions.
- The second tab is for input data. It contains seven fields to fill which are a) general information, b) general information on the community and system, c) the income of the Administrative Council of Water and Sanitation (JAAS), d) the expenses of the JAAS e) data on the cost investments made in the system to calculate the replacement cost f) information about the contribution anticipated from the community for replacement projects and g) a field to calculate the break-even point.

Later, the tool has three tabs for automated calculations:

- Expense projections. This is a tab with the detailed calculations for the expenses that are projected over the next 20 years, differentiating among the minor operation and maintenance costs, replacement, and the capital costs.
- Summary of income and expenses. Presents a summary of the expenses calculated on the previous tab, and the income projection. Based on this, it calculates the annual balance, as well as the amount that the service provider will have in reserve at the end of each year.
- Graphics. The graphs included here present the data in the summary tab.
- The last tab is the one that contains the reference data, about the useful life of different infrastructure components, and financial data to calculate depreciation.

Diagram No.1 Content of the tabs contained in the workbook in Excel:

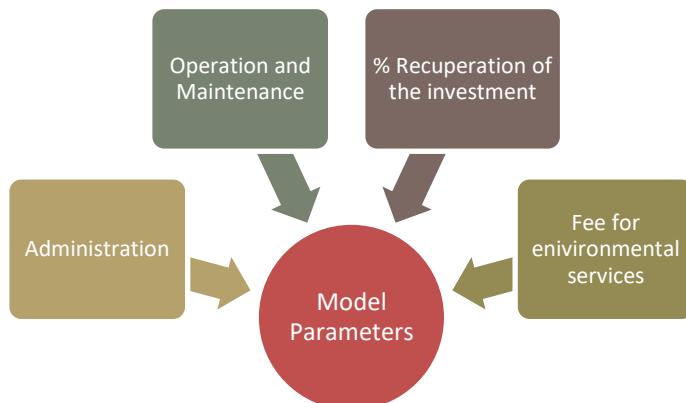


4. Methodology and Application of the Tool.

Data collection through interview and review of accounting data

The District Water and Sanitation Technician calls a meeting to the Administrative Council of Drinking Water and Sanitation (JAAS), in this meeting the Association of Water Boards (AJAAM) and Local Supervision and Control Unit (USCL) can participate.

Through a participatory meeting, the financial management of the Water Management Board is learned about. This consists of collecting the necessary information on expenses and income and financial management. In addition, it may consist of the review of accounting books.



Filling the fields

The next step, to obtain the necessary information is the technical application, either for the design of a new sustainable rate or the revision of the existing rate, for this we begin by emptying the information as indicated as follows:

Filling the “Input Data” tab

The second tab "Input Data" consists of seven (7) tables (see Image No. 2) in which we enter information as appropriate, it is important to highlight that only the orange cells are filled in.

Cuadro 1: Información general		
Año actual:	2017	Tasa de inflación:
	5.0%	
País:	Honduras	
Departamento:	Cortes	
Municipio:	San Antonio de Cortes	
Comunidad:	Las Casitas	
Viviendas en la comunidad	176	
Personas por vivienda:	4.5	
Indicador de población del municipio según INE	4.5	
Porcentaje de población rural:	0.0%	
Gobernabilidad:		
Junta de Agua:		
Responsable de Operación/Mantenimiento:		
Caudal (litros por segundo)	1.35	
Litros diarios requeridos por cápita	94.835	
Población total en la comunidad	788	
Población estimada	120	
Se presentan socios nuevos	50	
La vida útil del diseño del sistema	20	
Table 1		

Cuadro 3: Información de ingresos de la Junta de Agua en 2017		
Ingresos mensual familiar promedio (Fuente INE)	HNL 1,699.00	
En caso que es tarifa fija, cuánto es la tarifa mensual	HNL 88.00	
En caso que es un precio por m3, cuánto es el precio por m3	HNL 0.00	
En caso que es un precio por m3, cuánto es el consumo promedio mensual	HNL 0.00	
En caso que es otro, cuánto es el consumo de tarifa mensual que se paga	HNL 88.00	
Porcentaje de los ingresos que se destinan a la tarifa mensual:	100%	
Contraparte de la Junta de Agua en la tarifa de la tarifa:	0%	
Comisión correspondiente al año:	2017	
Se hacen ajustes por inflación	0%	
Ingresos por multas del último año	HNL 3,253.00	
Ingresos por cuotas de emergencia del último año	HNL 0.00	
Saldo del banco	HNL 226,567.00	
Tasa de interés de la cuenta de ahorro del banco	2%	
Otro ahorro (caja de ahorro o otro)	HNL 3,937.35	
Monto de los préstamos actuales	0%	
Tasa de interés cobrado por la Junta de Agua (anual)	0%	
Contraparte por familia para reemplazos futuros (Valor en Lps. actuales)	HNL 0.00	
Table 3		

Cuadro 4: Información de gastos anuales en operación y mantenimiento en 2017		
Sueldos, pagos mensuales y ocasionales para personal (Fontanero, administrador, etc)	HNL 36,850.00	
Materiales de oficina	HNL 1,000.00	
Transporte	HNL 0.00	
Visticos para Miembros de la Junta de Agua	HNL 5,000.04	
Sede: alquilar, paga de luz, mantenimiento	HNL 0.00	
El agua eléctrica o molina de la bomba	HNL 0.00	
Lubricante, aceite, gasolina, aceite de motor, aceite hidráulico, otros materiales	HNL 6,491.04	
Otros (Cuota Aportación a la Asociación de Juntas):	HNL 9,540.00	
Otros (Protección Microcuencia):	HNL 0.00	
Otros (específique):	HNL 0.00	
Otros (específico):	HNL 0.00	
Table 4		

Cuadro 5: Información de los costos de inversión en el sistema		
Año de Construcción Inicial:	2003	Año de construcción inicial o última rehabilitación
Componentes mayores	HNL 32,000.00	
Obra de Toma	HNL 1,152,000.00	
Línea de Conductores	HNL 1,152,000.00	
Tanque de Agua	HNL 0.00	
Red de Distribución y Servicio	HNL 1,152,000.00	
Estatua de bombeo	HNL 0.00	
Planta de tratamiento	HNL 0.00	
Componentes menores	HNL 0.00	
Micro-medidores	HNL 0.00	
Sistema de clorador	HNL 0.00	
Bomba y equipo eléctrico incluye geométrica eléctrica	HNL 0.00	
Gasto Total - Capital Inicial:	HNL 1,734,000.00	
Table 5		

Cuadro 6: Información de contrapartida de la comunidad		
Contraparte de la Junta de Agua en componentes mayores	30%	
Contraparte de la Junta de Agua en componentes menores	0%	
Table 7		

Cuadro 7: Análisis de punto de equilibrio		
Año en el que el balance debe estar alcanzado	2023	
Monto de las reservas finales del año 2023	(HNL 143,452)	
Table 7		

Para encontrar la tarifa necesaria para un punto de equilibrio, es necesario activar solver. Ver la guía para detalles.

- 1) En el cuadro 7, entra el año en el cual un cierto monto de reservas debe ser alcanzado
- 2) Abre solver (Data->Análisis->Solver).
- 3) Establece la "célula meta" a la celda en el cuadro 7, donde debe aparecer el balance en el año requerido
- 4) Establece la meta a "valor de" indicando un monto de reserva deseada (se sugiere que sea igual a la reserva inicial)
- 5) Establece el "Por cambiar" la celda con la tarifa (de acuerdo al sistema tarifario que tenga la Junta de Agua).
- 6) Aceptar la solución.
- 7) Análisis: la tarifa que se tiene encontrado es la necesaria para obtener un punto de equilibrio multi-anual, considerando los otros factores

Image 2. “Input data” tab.

- a) **Table 1:** Table 1 consists of filling out general information data, such as the current year and the current year inflation rate.

Cuadro 1: Información general		
Año actual:	2017	
Tasa de inflación:	5.0%	

Image 3. Table 1: General Data.

Table 2: Table 2 takes the general information of the community and the system. Some data should be taken using data from the National Institute of Statistics (INE) as a source. An important variable in this table for the analysis of different scenarios that the tool allows us is whether or not JAAS allows new connections (see Image 4), since, if the response is positive, it represents an increase in revenue from new subscribers. Another variable that stands out in table 2 is the growth rate, if this is positive, the projection of income would be higher. Although there is a trend in the country in which many municipalities categorized as concentrated and dispersed rural, have a negative growth rate due to the migration of the population to large cities in search of better living conditions. Therefore, it is important to use the latest census data on the growth rate according to the INE, and not use a generalized parameter.

Cuadro 2: Información general de la comunidad y sistema	
País:	Honduras
Departamento:	Cortes
Municipio	San Antonio de Cortes
Comunidad:	Las Casitas
Viviendas en la comunidad	175
Viviendas conectadas al sistema	159
Personas por vivienda (promedio de municipio según INE)	4.5
Tasa de Crecimiento Poblacional (INE)	0.0%
Type de Sistema:	Gravedad
Responsable de Operacion&Mantenimiento:	Junta de Agua
Caudal (litros por segundo)	1.35
Litros diarios requeridos per cápita	94.635
Población total en la comunidad	788
Población abastecida	120
Se permiten socios nuevos	Si
La vida útil del diseño del sistema	20

Image 4. Table 2: General Data of the community and the system

- b) Table 3:** In this table the information related to the income received by the Water Board is filled in, considering the tariff as the main source of income and the type of tariff used must be defined (See Annex No. 1 how to select type of tariff), Among them have been established:
- Fixed Rate: It is one where all users regardless of their consumption pay the same monthly amount.
 - Rate for consumption (m3): It is one where there is micro-metering, and a rate per m3 is established, they must be in accordance with their consumption.

- "Other" case is that there is a fixed rate, according to an established consumption and once this consumption is exceeded, you must pay for each meter of water at a defined rate per m³, for this an average rate is established set the surplus more as an average of those users who exceed the limit of the established measurement.

Other sources of income may be fines and special fees (emergency fees, family counterparts for replacements). Finally, other financial data of the community are entered, such as, balances in the bank or petty cash, the percentage of users that comply with the payment of the fee, the cost of a new connection, percentage of interest for balances in the bank. This table defines whether or not adjustments will be made for inflation for the analysis.

Cuadro 3: Información de ingresos de la Junta de Agua en 2017	
Ingresos mensual familiar promedio (Fuente INE)	HNL 5,681.73
Qué tipo de sistema tarifaria tiene	Tarifa fija
En caso que es tarifa fija, cuánto es la tarifa mensual	HNL 88.00
En caso que es un precio por m3, cuánto es el precio por m3	HNL 0.00
En caso que es un precio por m3, cuánto es el consumo promedio mensual	HNL 0.00
En caso que es otro, cuánto es el promedio de tarifa mensual que se paga	HNL 0.00
Tarifa mensual: 2017	HNL 88.00
Porcentaje de los socios que cumplen con el pago de la tarifa:	100%
Costo de conexión nuevo: 2017	HNL 0.00
Se hacen ajustes por inflación	S
Ingresos por multas del último año	HNL 3,253.00
Ingresos por cuotas de emergencia del último año	HNL 0.00
Saldo del banco	HNL 226,567.00
Tasa de interés del la cuenta de ahorro del banco	2%
Otro ahorro (caja chica o efectivo)	HNL 3,937.39
Monto de los préstamos actuales	HNL 0.00
Tasa de interés cobrado por la Junta de Agua (anual)	0%
Contraparte por familia para remplazos futuros (Valor en Lps. actuales)	HNL 0.00

Image 5. Table 3: Water Board Income Information

c) **Table 4:** In this table all the information related to the annual expenses that the water board has for the correct administration, operation and maintenance of the drinking water system is filled, the table has added lines to detail other undefined expenses.

Cuadro 4: Información de gastos anuales en operación y mantenimiento en 2017	
Sueldos, pagos mensuales y occasionales para personal (Fontanero, administrador, etc)	HNL 36,850
Material de Oficina	HNL 19,800.00
Transporte	HNL 0.00
Viaticos para Miembros de la Junta de Agua	HNL 5,000.04
Sede: alquilar, paga de luz, mantenimiento	HNL 0.00
Energía eléctrica o gasolina de la bomba	HNL 0.00
Lubricantes, cloro, otros químicos u otros insumos	HNL 17,100.00
Tubería, accesorios y otros materiales	HNL 6,491.04
Otros (Cuota Aportacion a la Asociacion de Juntas):	HNL 1,908.00
Otros (Proteccion Microcuenca):	HNL 9,540.00
Otros (especifique):	HNL 0.00
	HNL 96,689

Image 6. Table 4: Water board expense information

d) **Table 5:** In this table the cost for each component will be added, also adding the year in which they were built or rehabilitated for the last time. The table is divided into major components and minor components, considering as greater those that possibly the investment was greater, such as a storage tank has a higher cost than the chlorination system, so we consider the storage tank as a major component and as a minor component the chlorination system.

Cuadro 5: Información de los costos de inversión en el sistema		
Año de Construcción Inicial:	2003	
Componentes mayores	Costo	Año de construcción inicial o última rehabilitación
Obra de Toma	HNL 32,000.0	2003
Línea de Conducción:	HNL 1,152,000	2003
Tanque de Almacenamiento:	HNL 200,000.0	2003
Red de Distribución y Conexiones	HNL 350,000.0	2003
Pozo	HNL 0	
Estación de bombeo:	HNL 0	
Planta de tratamiento	HNL 0	
Componentes menores	Costo	Año de construcción inicial o última rehabilitación
Micro-medidores	HNL 0.00	
Sistema de clorador	HNL 0	
Bomba y equipo eléctrico Incluye acometida eléctrica	HNL 0	
Gasto Total - Capital Inicial:	HNL 1,734,000.00	

Image 7. Table 5: Information on system investment costs

e) **Table 6:** In this table it is established according to the differentiation of major and minor components in **table 5**, the percentage that the community is expected to cover for replacements.

Cuadro 6: Información de contrapartida de la comunidad	
Contraparte esperada para remplazos mayores	26%
Contraparte esperada para remplazos menores	0%

Image 8. Table 6: Community counterpart (cofinance) information.

a) **Table 7:** Finally in this table there is a break-even point, where the year in which a certain reserve amount must be reached is entered.

Cuadro 7: Análisis de punto de equilibrio	
Año en el cual balance debe estar alcanzado	2023
Monto en reserva al final del año 2023	HNL 0

Image 9. Table 6: Break-even analysis.

For the analysis of the breakeven point it is essential that several scenarios have been analyzed and the information entered has been reviewed in detail, the different scenarios are created by making changes that are considered necessary, such as increasing expenses or allowing the entry of new partners, until you find a rate that allows you to obtain a balance between income and expenses. For this, the "solver" tool can be used (see Annex 2 for details of its installation) for which a detailed explanation can be found in the input data tab.

<table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>HNL 0.00</td></tr> <tr><td>HNL 0.00</td></tr> <tr><td>HNL 0.00</td></tr> <tr><td>HNL 88.00</td></tr> <tr><td>100%</td></tr> <tr><td>HNL 0.00</td></tr> <tr><td>SI</td></tr> <tr><td>HNL 3,253.00</td></tr> <tr><td>HNL 0.00</td></tr> <tr><td>HNL 226,567.00</td></tr> <tr><td>2%</td></tr> <tr><td>HNL 3,937.09</td></tr> <tr><td>HNL 0.00</td></tr> <tr><td>0%</td></tr> <tr><td>HNL 0.00</td></tr> </table> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>o en 2017</td></tr> <tr><td>HNL 36,860</td></tr> <tr><td>HNL 10,000.00</td></tr> <tr><td>HNL 0.00</td></tr> <tr><td>HNL 5,000.04</td></tr> <tr><td>HNL 0.00</td></tr> <tr><td>HNL 0.00</td></tr> <tr><td>HNL 17,100.00</td></tr> <tr><td>HNL 6,491.04</td></tr> <tr><td>HNL 1,908.00</td></tr> <tr><td>HNL 9,540.00</td></tr> <tr><td>HNL 0.00</td></tr> <tr><td>HNL 0.00</td></tr> </table>	HNL 0.00	HNL 0.00	HNL 0.00	HNL 88.00	100%	HNL 0.00	SI	HNL 3,253.00	HNL 0.00	HNL 226,567.00	2%	HNL 3,937.09	HNL 0.00	0%	HNL 0.00	o en 2017	HNL 36,860	HNL 10,000.00	HNL 0.00	HNL 5,000.04	HNL 0.00	HNL 0.00	HNL 17,100.00	HNL 6,491.04	HNL 1,908.00	HNL 9,540.00	HNL 0.00	HNL 0.00	<p>Cuadro 7: Análisis de punto de equilibrio</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>Año en el cual balance debe estar alcanzado</td><td>2023</td></tr> <tr><td>Monto en reserva al final del año 2023</td><td>HNL 0</td></tr> </table> <p>Recuadro: uso de solver para encontrar un punto de equilibrio Para encontrar la tarifa necesaria para un punto de equilibrio, es necesario activar solver. Ver la guía para detalles.</p> <ol style="list-style-type: none"> 1) En el cuadro 7, entra el año en el cual un cierto monto de reservas debe ser alcanzado 2) Abre solver (Data->Análisis->Solver). 3) Establece la "célula meta" a la célula en el cuadro 7, donde debe aparecer el balance en el año requerido 4) Establece la meta a "valor de" indicando un monto de reserva deseada (se sugiere que sea igual a la reserva inicial) 5) Establece el "Por cambiar" la célula con la tarifa (de acuerdo al sistema tarifario que tenga la Junta de Agua). 6) Aceptar la solución. 7) Análisis: la tarifa que se tiene encontrado es la necesaria para obtener un punto de equilibrio multi-anual, considerando los otros factores 	Año en el cual balance debe estar alcanzado	2023	Monto en reserva al final del año 2023	HNL 0
HNL 0.00																																	
HNL 0.00																																	
HNL 0.00																																	
HNL 88.00																																	
100%																																	
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Año en el cual balance debe estar alcanzado	2023																																
Monto en reserva al final del año 2023	HNL 0																																

Image 10. Solver usage detail in the input data tab.

Steps to apply the solver:

Solver is opened (see image 11) and the following parameters are defined (see image 12) as the "target cell" to the cell in table 7 in input data, where the balance must appear in the required year. Set the goal to "value of" indicating a desired reserve amount in that year. In this case we suggest that it be equal to the initial reserves. It establishes the "By changing" cell with the rate (tariff) (according to the rate system that the community has). Accept the solution. The rate found is that necessary to obtain a multi-annual break-even point, considering that the other factors remain the same.



The screenshot shows the Microsoft Excel ribbon with the 'Data' tab selected. On the far right of the ribbon, the 'Solver' button is also highlighted with a red box. Below the ribbon, a portion of a worksheet is visible. The worksheet contains the following data:

B	C	D	E	F	G
Se permiten socios nuevos	Si		Gasto Total - Capital Inicial:	HNL 1,734,000.00	
La vida útil del diseño del sistema	20				

Below the worksheet, there is a caption: "Cuadro 6: Información de contrapartida de la comunidad".

Image 11. Image on how to open the solver.

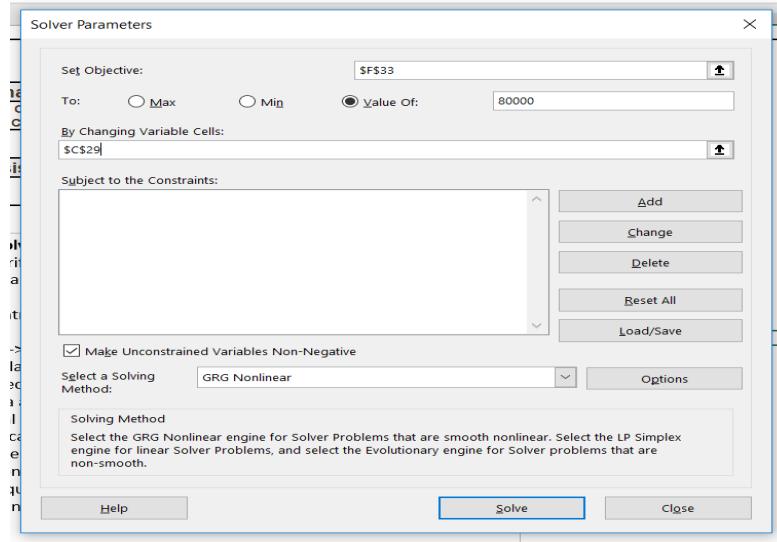


Image 12. Solver Parameters

Interpretation of Results

- a) Before carrying out any analysis it is important to review in tab number 3 (see image 13) with the projection of expenses, where each budget line added in the table of expenses number 4 of the tab "Input data" will be projected to 20 years considering the inflation rate and the growth rate, so we observe how the operation and maintenance costs, the replacement costs of the minor and major components increase each year, in the corresponding year according to their useful life. For replacement expenses, which are occasional, the counterpart percentage established in table number 6 is considered according to the classification of the components.

AQueCosto- Detalles de Gastos

Año de Construcción Inicial del Sistema:
Año actual:

2003	2017
	2017

Tabla 2.1: Gastos de Operación y Mantenimiento Menor

	2017 14	2018 15	2019 16	2020 17	2021 18	2022 19	2023 20	2024 21	2025 22			
Gastos de operación												
Sueldos, pagos mensuales y ocasionales para personal (Fontanero, administrador, etc)	HNL 36,850	HNL 38,693	HNL 40,627	HNL 42,658	HNL 44,791	HNL 47,031	HNL 49,383	HNL 51,852	HNL 54,444			
Material de Oficina	HNL 19,800	HNL 20,790	HNL 21,830	HNL 22,921	HNL 24,067	HNL 25,270	HNL 26,534	HNL 27,861	HNL 29,254			
Transporte	HNL 0	HNL 0	HNL 0	HNL 0	HNL 0	HNL 0	HNL 0	HNL 0	HNL 0			
Viajeros para Miembros de la Junta de Agua	HNL 5,000	HNL 5,250	HNL 5,513	HNL 5,788	HNL 6,078	HNL 6,381	HNL 6,701	HNL 7,038	HNL 7,387			
Sede: alquilar, paga de luz, mantenimiento	HNL 0	HNL 0	HNL 0	HNL 0	HNL 0	HNL 0	HNL 0	HNL 0	HNL 0			
Energía eléctrica o gasolina de la bomba	HNL 0	HNL 0	HNL 0	HNL 0	HNL 0	HNL 0	HNL 0	HNL 0	HNL 0			
Lubricantes, cloro, otros químicos u otros insumos	HNL 17,100	HNL 17,955	HNL 18,853	HNL 19,795	HNL 20,785	HNL 21,824	HNL 22,916	HNL 24,061	HNL 25,264			
Tubería, accesorios y otros materiales	HNL 6,491	HNL 6,816	HNL 7,156	HNL 7,514	HNL 7,890	HNL 8,284	HNL 8,699	HNL 9,134	HNL 9,590			
Otros (Cuota Aportación a la Asociación de Juntas):	HNL 1,908	HNL 2,003	HNL 2,104	HNL 2,209	HNL 2,319	HNL 2,435	HNL 2,557	HNL 2,685	HNL 2,819			
Otros (especifique):	HNL 0	HNL 0	HNL 0	HNL 0	HNL 0	HNL 0	HNL 0	HNL 0	HNL 0			
Otros (especifique):	HNL 0	HNL 0	HNL 0	HNL 0	HNL 0	HNL 0	HNL 0	HNL 0	HNL 0			
Sub-Total gastos de operación	HNL 87,149	HNL 91,507	HNL 96,082	HNL 100,886	HNL 105,930	HNL 111,227	HNL 116,788	HNL 122,628	HNL 128,759			
Gastos mantenimientos y reemplazos menores												
	Año de la inversión	Gasto por la CAPYS	Tiempo de Reposición	2017	2018	2019	2020	2021	2022	2023	2024	2025
Micro-medidores	0	HNL 0	8	HNL 0								
Sistema de clorador	0	HNL 0	10	HNL 0								
Bomba y equipo eléctrico incluye acom.	0	HNL 0	7	HNL 0								
Sub-Total gastos en mantenimientos y reemplazos menores				HNL 0								
Total Gastos de Operacion y Mantenimiento Menor				HNL 87,149	HNL 91,507	HNL 96,082	HNL 100,886	HNL 105,930	HNL 111,227	HNL 116,788	HNL 122,628	HNL 128,759

Tabla 2.2: Gastos de reemplazo mayor

Gasto de Capital para reemplazos	Año de la inversión	Gasto por la CAPYS	Vida Util	2017	2018	2019	2020	2021	2022	2023	2024	2025
Activos Principales												
Obra de Toma	2003	HNL 8,344	15	HNL 0	HNL 17,346	HNL 0	HNL 0	HNL 0				
Línea de Conducción:	2003	HNL 300,371	20	HNL 0	HNL 0	HNL 0	HNL 0	HNL 0	HNL 0	HNL 796,974	HNL 0	HNL 0
Tanque de Almacenamiento:	2003	HNL 52,148	20	HNL 0	HNL 0	HNL 0	HNL 0	HNL 0	HNL 0	HNL 138,363	HNL 0	HNL 0
Red de Distribución y Conexiones	2003	HNL 51,259	30	HNL 0	HNL 0	HNL 0	HNL 0	HNL 0	HNL 0	HNL 0	HNL 0	HNL 0
Pozo	0	HNL 0	10	HNL 0	HNL 0	HNL 0	HNL 0	HNL 0	HNL 0	HNL 0	HNL 0	HNL 0
Estación de bombeo:	0	HNL 0	20	HNL 0	HNL 0	HNL 0	HNL 0	HNL 0	HNL 0	HNL 0	HNL 0	HNL 0
Planta de tratamiento	0	HNL 0	17	HNL 0	HNL 0	HNL 0	HNL 0	HNL 0	HNL 0	HNL 0	HNL 0	HNL 0
Total gastos de reemplazo mayor				HNL 0	HNL 17,346	HNL 0	HNL 0	HNL 0	HNL 0	HNL 935,337	HNL 0	HNL 0

Image 13. Expense projection

- b) In the summary tab of expenses and income (See image 14) we can review the contrast between the projection of expenses and the projection of income in 20 years. This tab is divided into three sections or three tables.
- ✓ **Table 1:** Projects how the coverage of drinking water services could be developed, considering the growth rate and also gives an alert about whether the production of the source will be sufficient to supply all subscribers in the future.
 - ✓ **Table 2** shows the projection of all possible income and expenses, including the resulting balance for each year.
 - ✓ **Table 3** presents the annual financial balance and the cash flow forecast for each year.

Tabla 3.1: Aumento de cobertura

Año	2017	2018	2019	2020	2021	2022	2023
Población total	788	788	788	788	788	788	788
Población abastecida	716	716	716	716	716	716	716
Viviendas conectadas	159	159	159	159	159	159	159
Cobertura	91%	91%	91%	91%	91%	91%	91%
Litros diarios requeridos para todo el sistema	67758.66	67758.66	67758.66	67758.66	67758.66	67758.66	67758.66
Producción del fuente	Suficiente						

Table 1

Tabla 3.2: Ingresos y gastos

Año	2017	2018	2019	2020	2021	2022	2023
Fuentes de ingresos							
Tarifas	HNL 167,904	HNL 176,299	HNL 185,114	HNL 194,370	HNL 204,088	HNL 214,293	HNL 225,007
Conexiones nuevas	HNL 0						
Multas	HNL 3,253	HNL 0,116	HNL 3,586	HNL 3,766	HNL 3,954	HNL 4,152	HNL 4,359
Cuotas de emergencia	HNL 0						
Contraparte de usuarios hacia el remplazo	HNL 0						
Interés del saldo bancario	HNL 5,098	HNL 5,212	HNL 5,330	HNL 5,450	HNL 5,572	HNL 5,698	HNL 5,826
Interés de los préstamos a los socios de la Junta de agua	HNL 0						
Total de ingresos anuales	HNL 176,255	HNL 184,927	HNL 194,030	HNL 203,585	HNL 213,615	HNL 224,142	HNL 235,193
Gasto							
Gastos de operación y mantenimiento menor	HNL 87,149	HNL 91,507	HNL 96,082	HNL 100,886	HNL 105,930	HNL 111,227	HNL 116,788
Gastos de reemplazo	HNL 0	HNL 17,346	HNL 0	HNL 0	HNL 0	HNL 0	HNL 935,337
Total de gastos anuales	HNL 87,149	HNL 108,852	HNL 96,082	HNL 100,886	HNL 105,930	HNL 111,227	HNL 1,052,125
Balance anual	HNL 89,106	HNL 76,075	HNL 97,948	HNL 102,699	HNL 107,684	HNL 112,915	(HNL 816,933)

Table 2

Tabla 3.3: Pronóstico de flujo de efectivo

Año	2017	2018	2019	2020	2021	2022	2023
Balance	HNL 89,106	HNL 76,075	HNL 97,948	HNL 102,699	HNL 107,684	HNL 112,915	(HNL 816,933)
Monto en caja	HNL 319,610	HNL 395,685	HNL 493,633	HNL 596,333	HNL 704,017	HNL 816,933	HNL 0

Table 3

Image 14. Summary of expenses and income

- c) Tab 5 as indicated by the structure of the tool provides us with 4 different graphs to illustrate the projections of expenses and income, already reviewed in tab 3 and 4. see
- ✓ The first graph shown (See Image 15), illustrates the summary of **table 2 for a Community "X"**, where you can visualize the possible expenses and income for 20 years. In this example we can see how the expenses in operation and maintenance; Rate revenues increase annually with inflation (red bars), and that in certain years significant expenses are reflected by the possible replacements of system components (green bars). If the inflation rate were not considered in this example shown, the annual increases would not be perceived if not a linear projection.

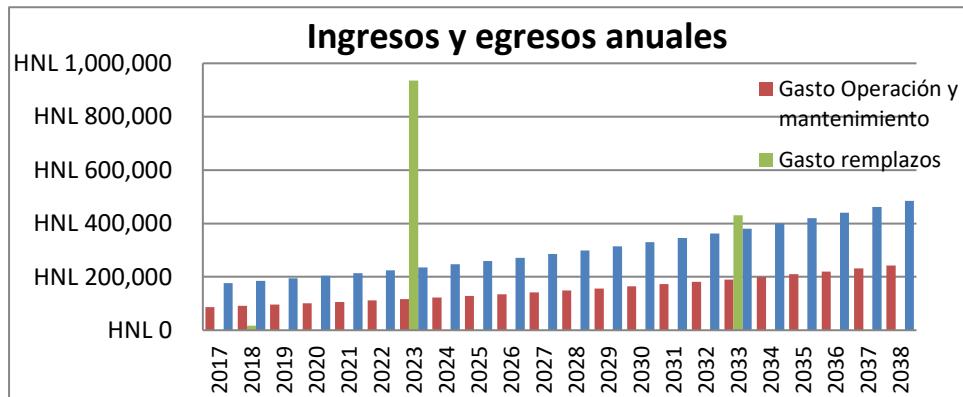


Image 15. Summary chart of expenses and income at 20 years.

- ✓ Figure 2 (Image 16) is the projection of what the balance would be for each year and the amount in cash that accumulates annually, considering an initial reserve that is held in a bank account and / or as a petty cash. Next, we see the example of the graph of a Community "X".

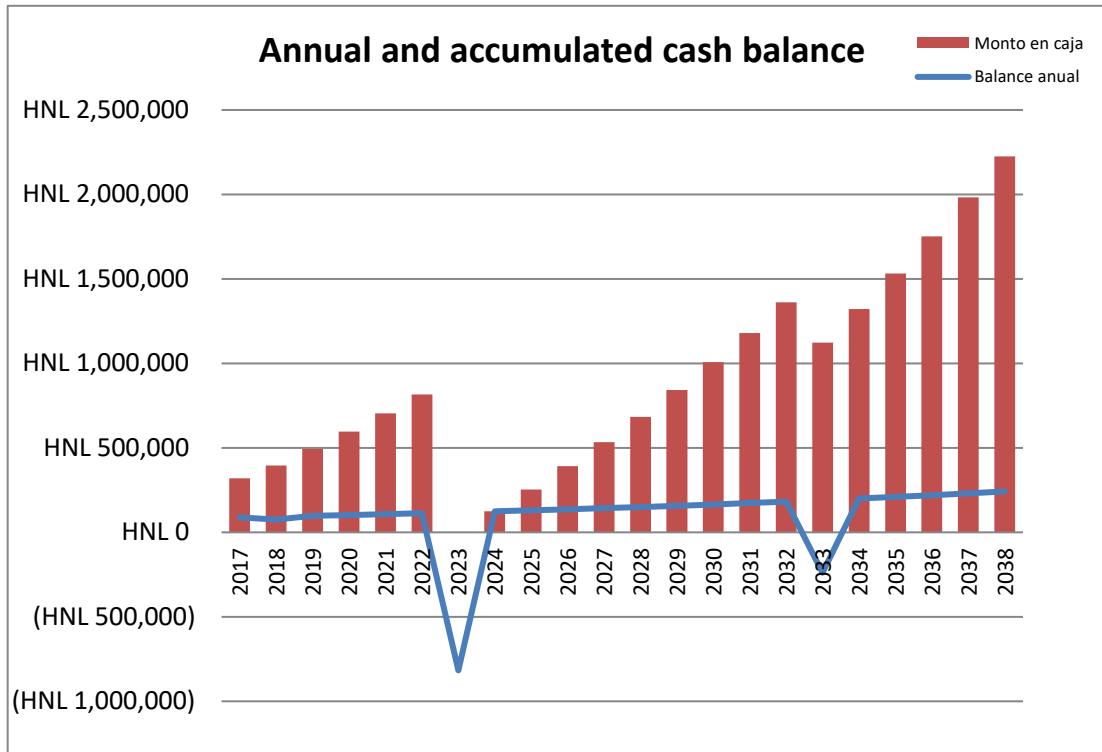


Image 16. Annual balance and accumulated cash amount.

Then analyzing the multi-annual balance for this community, we will note how it remains positive starting from the current year until year 23, in this year due to the expense for replacement of components in the system, the annual balance is negative, but the amount in cash Accumulated can assume these expenses, because the established rate allows to cover exactly a desired percentage for replacements (%). In the following sub years the rate is sufficient to recover a positive balance and to accumulate sufficient resources necessary for the next replacement according to the useful life of the components.

- ✓ Figures 3 and 4 are the illustrative representation of the breakdown of income (Image 17) and the breakdown of expenses (image 18).

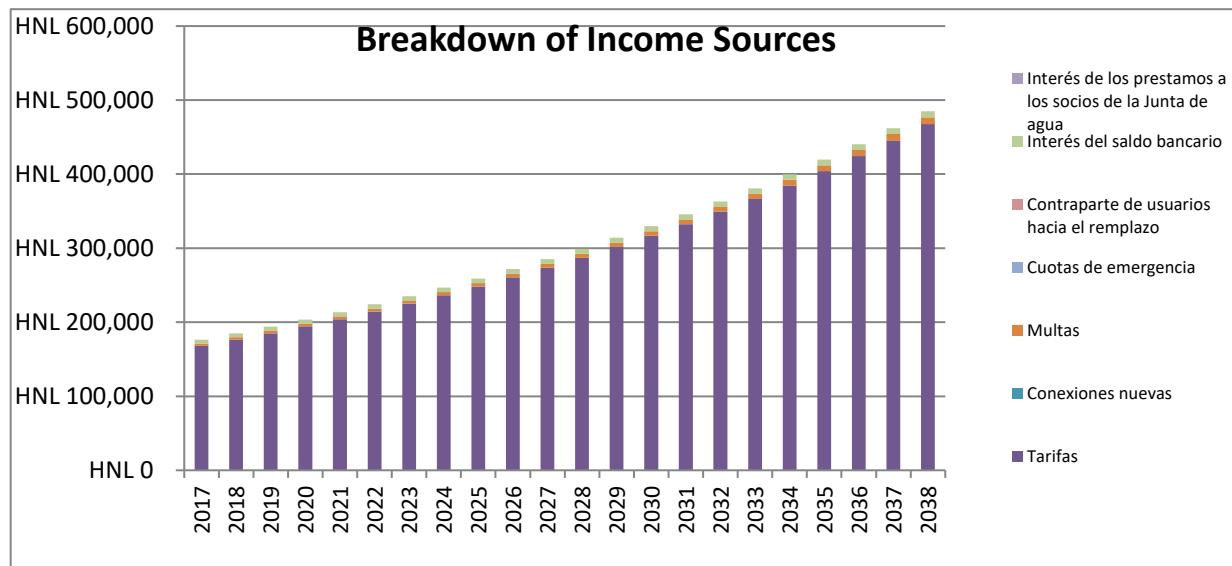


Image 17. Breakdown of different sources of annual income.

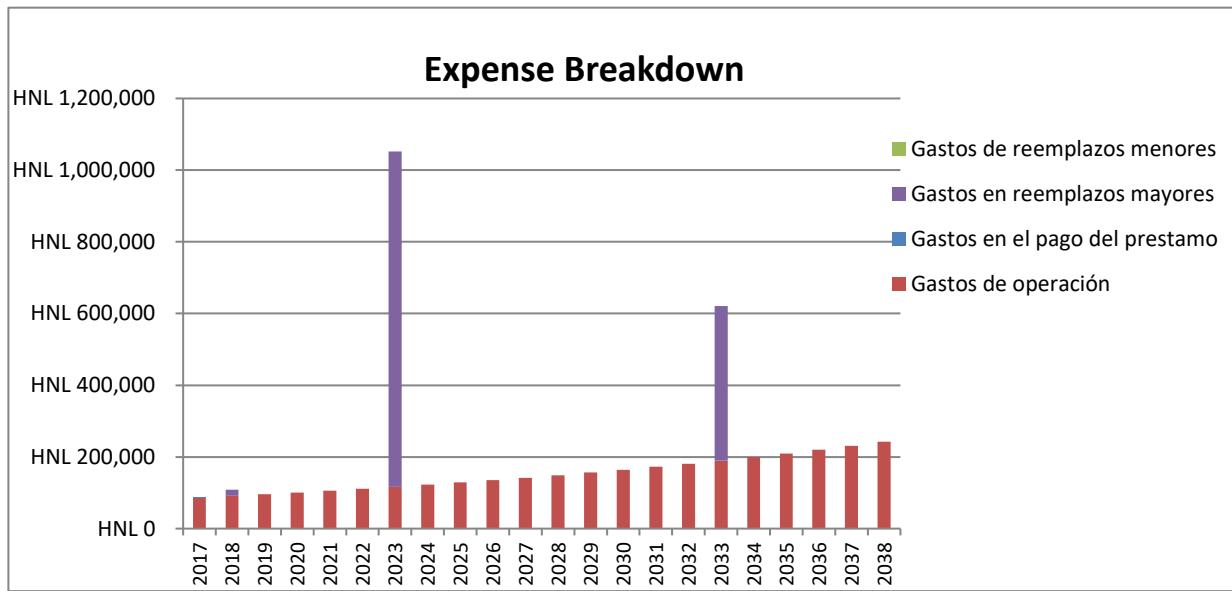


Image 18. Breakdown of annual expenses.

Analysis of results

The example used for the interpretation of results above is a possible scenario, then other possible scenarios are shown:

Scenario 1.

The current expenses of the water management board are sufficient to provide adequate service to your community.

YES

Leave box 4 as-is in the "Input Data" tab.

NO

Increase in operating and maintenance expenses, modifying table 4 in the "Input Data" tab. Example: if it is not currently being chlorinated or if there is no trained person with a salary to provide operation and maintenance to the drinking water system, the expenses that would include including them should be considered.

Scenario 2.

The current income is sufficient to cover the expenses necessary for the water committee to provide adequate service to your community.

YES

If revenues are sufficient to cover operating and maintenance expenses, verify to what extent or percentage it is capable of covering replacement costs

NO

Increase of the different sources of income that includes the possibility of including new connections, the adjustment of rates for inflation, and the main source of income; the rate (tariff). Modifying cell 3 in the "Input Data" tab.

Increases in the sources of income are considered by prioritizing to cover the operation and maintenance costs and then cover a certain level of replacement costs of your system, in table 6 of the "Input Data" tab the percentage that can be covered is modified for replacements and this at a time becomes established under negotiation with the Water Management Board.

Feedback and discussion

After having carried out the analysis with the water boards reviewing the possible scenarios, a proposal is discussed so that they can present it in a second meeting to their community, either only as transparency of information on the current financial management of the system, as well as for proposing a change in its rate and a management model that recognizes and covers the different responsibilities and rights of the entities that provide water services.

To establish a new management model and propose a new rate, it must be taken into account that it will be defined by the type of system they have; It means that it is more expensive to operate a pumping system than a gravity system.

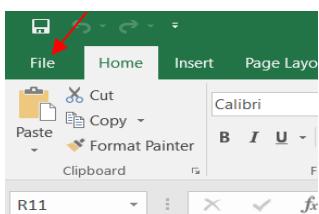
5. Appendices

Appendix 1: How to select the rate type.

Cuadro 3: Información de ingresos de la Junta de Agua en 2017	
Ingresos mensual familiar promedio (Fuente INE)	HNL 5,681.73
Qué tipo de sistema tarifaria tiene	Tarifa fija
En caso que es tarifa fija, cuánto es la tarifa mensual	
En caso que es un precio por m3, cuánto es el precio por m3	
En caso que es un precio por m3, cuánto es el consumo promedio mensual	HNL 0.00
En caso que es otro, cuánto es el promedio de tarifa mensual que se paga	HNL 0.00

Appendix 2: Steps to install the “Solver”.

1. Click on Excel sheet **File**.



2. Click on **options** and then select **add-ons**, by selecting add-ons at the bottom of the open tab select on **manage** select **Excel add-ons** and click **Go**.
3. Select the **Solver Add-in** checkbox and click **OK**.

Tip, If Solver Add-in does not appear in the list in the Available Add-ons box, click **Browse** to find the add-in.

If you are prompted that the Solver plug-in is not currently installed on the computer, click Yes to install it.

4. Once the Solver plug-in is installed, the Solver command will be available in the **Data** toolbar.

Appendix 3: Reference Data (Tab 6)

Reference data: Useful lifetime	Years
Intake structure	15
Conduction line	20
Storage tank	20
Distribution network	30
Wells	10
Pumping station (sump or service building)	20
Pump and electromechanical equipment	7
Treatment plant	17
Chlorination system	10
Micro-meters	8



Sector No Gubernamental



IRC



Comité Central Pro
Agua y Desarrollo
de Intibucá



Save the Children



**Cruz Roja
Hondureña**



ASOMAINCUPACO



Sector Gubernamental



CONASA
Consejo Nacional de Agua
Potable y Saneamiento



Servicio Autónomo Nacional de
Acueductos y Alcantarillados.

★★★★★
ENTE REGULADOR DE LOS SERVICIOS
DE AGUA POTABLE Y SANEAMIENTO