

Impact of the Invoice System at Regideso/Sud-Kivu (A Public Enterprise to Supply Potable Water) on the Payment of the Invoices by the Customers of the Household Grade, South Kivu, Eastern D.R. Congo

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Abstract: *The present study aimed at appreciating the impact of the invoice system at REGIDESO/South-Kivu on the payment of the invoices by the customers of the household grade. In order to achieve the assigned goal, a retrospective study was conducted at the Provincial Management of REGIDESO/Sud-Kivu to the customers of the household grade from year 2010 to 2016. The data-gathering was carried out using the customer satisfaction questionnaire addressed to 540 persons of the household grade in six Agencies of the afore said Direction. The encoding and the statistical processing of these data were carried out by the Excel2007 and SPSS17 multilanguage softwares. At the end of the investigations, we came to the results that 334 out of 540 subjects surveyed, that is 61.9% and 163 out of 540, that is 30.2% successively acknowledged that the system of invoicing at REGIDESO/Sud-Kivu is unsatisfactory and satisfactory, 8% abstained of the afore mentioned question. All the subscribers support that the REGIDESO has not put at their disposal the intelligent meters yet. 292 out of 540 domestic customers, that is 54.1% are charged in a lump sum while 248 out of 540, that is 45.9% are invoiced on the basis of indices found in the meter. The present study highlighted the negative impact of the current system of invoicing of REGIDESO/Sud-Kivu on the payment of the invoices by the domestic customers. The invoicing based on real consumption, the adaptation to the standards of new technology could correct this negative impact.*

Keywords: Impact, invoice system, invoices payment, domestic customers, REGIDESO/Sud-Kivu in Bukavu

1. Introduction

The importance of water for life and as component of the world ecosystem is not to demonstrate anymore. This resource that answers to needs fundamental of the man is a key element of the development, in particular to generate and to maintain the prosperity (European Commission: www.europa.eu.int/comm/environment/water/) [1].

Without appropriate water, healthy water, available in sufficient quantity, a lot of transferable illnesses will continue their deadly race [2].

Once nearly free, water constitutes today a real station of expense in the budget of consumers.

Thus, men are not equal in the access to water.

Conditions hydriques, but also social, economic and infrastructurelles drag some extremely important contrasts in terms of access and consumption.

The access to water is given back possible, by the very complex infrastructure existence that requires a regular and

specialized maintenance, as well as of sources capable to answer to needs of more important population.

The treatment, the distribution and the purification before dismissal in the nature require the technical means, financiers and humans more or less important and sometimes complex, reason for which water has a price. Following it, an adequate invoicing system imposes itself [3]. Several businesses that choose to invest in the sector of water opt for a system of invoicing that allows the enterprise to reach the relative ultimate objective to the maximization of returns [4]. A number important of businesses like Veolia, Lyons of Waters, Sauris in France, REGIDESO (a public enterprise to supply potable water) in Democratic Republic of Congo doesn't escape this reality.

To invest to produce and to sell the drinking water presents a panoply of requirements as the " intelligent " meters, of the " communicating " meters,... currently in vogue respectively in France and in Sweden as well as in Italy [5].

The recourse to the intelligent meters is a measure aiming to assure the objectivity in the invoicing and therefore to limit complaints of subscribers to these businesses. However, in

Democratic Republic of Congo, particularly within the Provincial Direction of the REGIDESO/South Kivu (a public enterprise to supply potable water), complaints of customers of the domestic class against the system of invoicing are in force again legions. Because of this dramatic situation, meters in vogue in this structure would be finalized in reason by certain subscribers holders these meters that sometimes these last have tendency to envy the no holders.

Had consideration to what precedes, the present survey tries to value the impact of the system of invoicing of the REGIDESO/South-Kivu on the payment of invoices by customers of the domestic class.

2. Methodology

2.1 Area of Study

A retrospective survey has been led close to customers of the domestic class of the Provincial Direction of the REGIDESO/South-Kivu during the period going from 2010 to 2016.

The Provincial Direction of the REGIDESO/South Kivu is situated on MANIEMA avenue at N°380 in the township of Ibanda, city of Bukavu in Democratic Republic of Congo.

This survey has been done within Agencies and Auxiliary Offices of the REGIDESO/South Kivu below: Agency of MUHUNGU, Agency of IBANDA, Agency of KADUTU, Agency of BAGIRA, Agency of PANZI, Agency of NGUBA and the Auxiliary Offices of CIMPUNDA/KADUTU and INDEPENDANCE/Ibanda.

The population of survey was constituted of all subscribers of the REGIDESO/South Kivu who live in the city of Bukavu and belongs to the class domestic customer.

Criteria of inclusion were kept below: to have subscribed of the living REGIDESO/South Kivu to Bukavu during years 2010 and 2016; to be holder of an active retail outlet; to belong to the class domestic customer, to take the payment of the invoice of drinking water consumption in charge, present being during the period of the investigation and to have accepted to answer to our questionnaire of investigation freely.

2.2 Material and Method

The size of the population rose to 14255 domestic customers. The one of the sample has been calculated according to the formula of Alain Bouchard [6] as demonstrated as follows:

$T_e = \cdot$ Where T_e = The size of the sample; N = the total number of the population and n = the formula of departure.

For this survey $N=14255$ and $n=90$. So that, the uncertain sample stratified of 540 customers of the domestic class distributed in six Agencies of the REGIDESO/South Kivu in the city of Bukavu at the rate of 90 domestic customers by Agency made the object of the present survey.

In order to treat and to analyze data in view to value the impact of the system of invoicing of the REGIDESO, the statistical descriptive has been used to present results under shape of faces.

The interpretation of faces permitted us to appreciate the impact. The free observation permitted us to identify customers invoiced without meter during the investigation. The restrained information exploitation in various documents has been facilitated by the documentary technique.

These data have been collected with the help of the investigation pushed by the questionnaire of investigation. The interview permitted the interview with the illiterate topics.

These data have been encoded then by means of the software Excel 2007 treated by the software SPSS17 multilanguages.

It suits to signal that the dependent variable is the payment of invoices. While the independent variable is the system of invoicing. We translated the other behaviors bound to the payment and system of invoicing in questionnaire.

Figures put below in relief the relative information to results gotten during the present survey.

Information centering with the slice of drinking water consumed per month in households investigated are presented below in the figure 1:

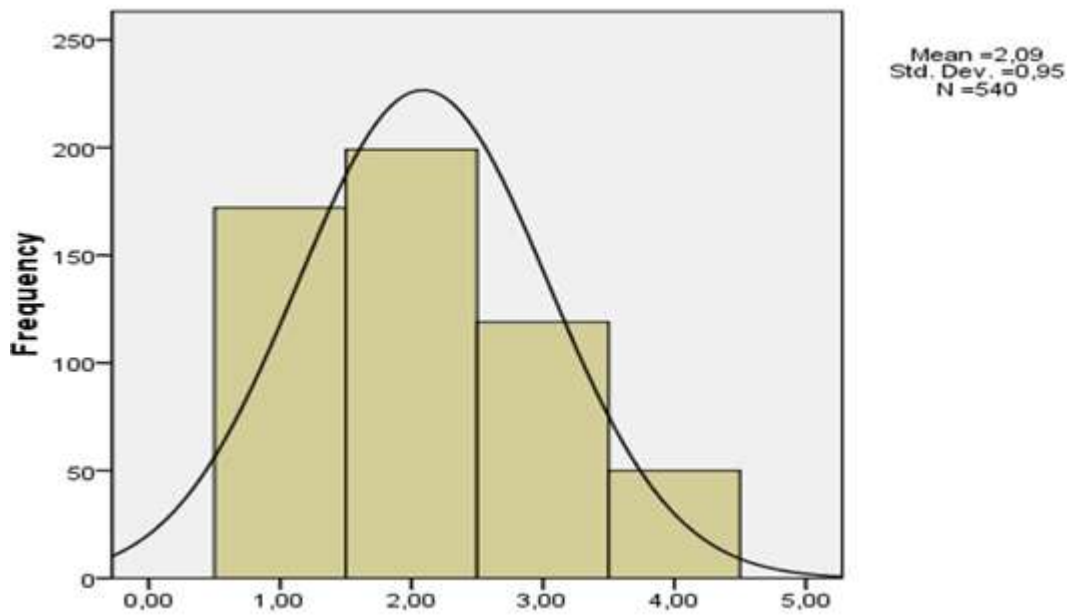


Figure 1: Quantity of drinking water consumed monthly in households

Legende

1= 1 to 10 m³ ; 2= 11 to 25 m³ ; 3= 26 to 40 m³ ; 4= more than 40 m³

In report with results presented above in the figure 1, the big consumers of drinking water are 199 on 540 investigated, either 36.9% in this sense that monthly they consume 11 to

25 m³. While little customer of the domestic class, 50 on 540 investigated, either 9.3% consume more than 40 m³. The figure 2 below, present data in report with the possession of meters at subscribers of the REGIDESO having participated to this survey.

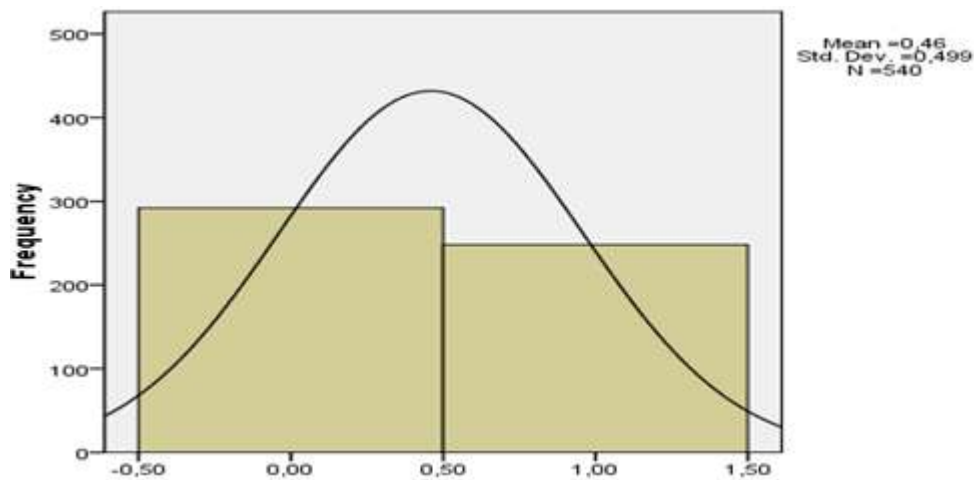


Figure 2: Distribution of investigated subjects according to the possession of the meter

Legende

0= no use of the meter

1= use of the meter

To the look of data of which overflows the here-high figure 2, he/it proves to be that good number of topics investigated, 292 on 540 people, either 54.1% don't use meters contrary to

an equivalent minimal number to 248 on 540, either 45.9% that use meters.

The relative coordinates to the appreciation of the present system of invoicing of the Provincial Direction of the REGIDESO / South Kivu are consigned below in the figure 3:

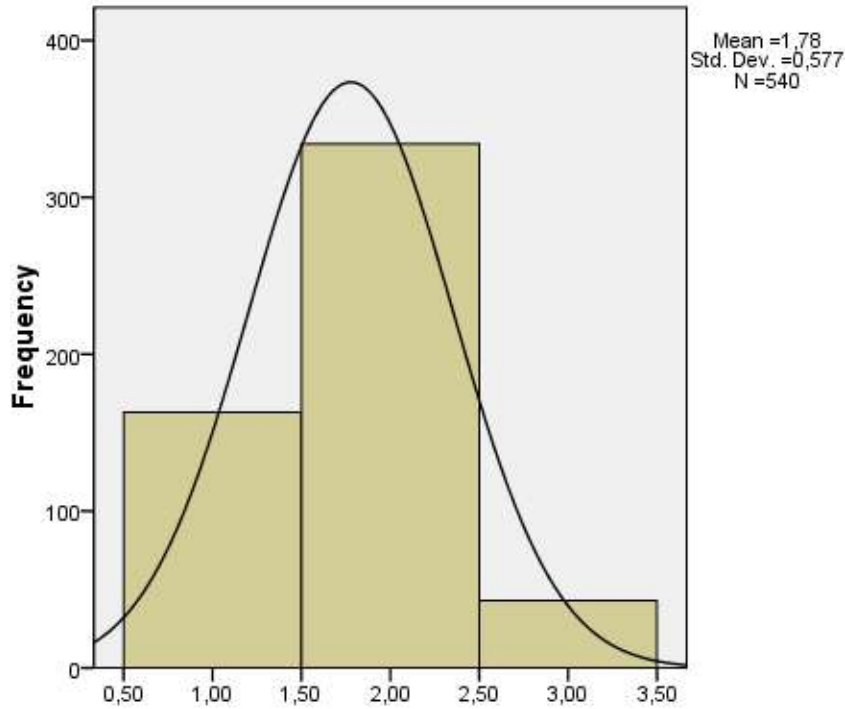


Figure 3: Appreciation of the present system of invoicing of the Provincial Direction of the REGIDESO / South Kivu by investigated them

Legende

1= system judged satisfactory; 2= system judged dissatisfactory; 3= abstention

satisfactory. However, 8% of topics investigated abstained to this question.

It takes out again results presented in the figure 3 that most investigated them appreciate the present system of invoicing of the Provincial Direction of the REGIDESO negatively / South Kivu contrary to others investigated in this sense that respectively 334 on 540 topics investigated, either 61.9% and 163 on 540, either 30.2% confess successively that the system of invoicing of the Provincial Direction of the REGIDESO / South-Kivu is in force dissatisfactory, and

The figure 4 contains data centering with the incentive of the satisfaction or the dissatisfaction of the present system of invoicing of the Provincial Direction of the REGIDESO below / South Kivu by individuals investigated of the class domestic customer.

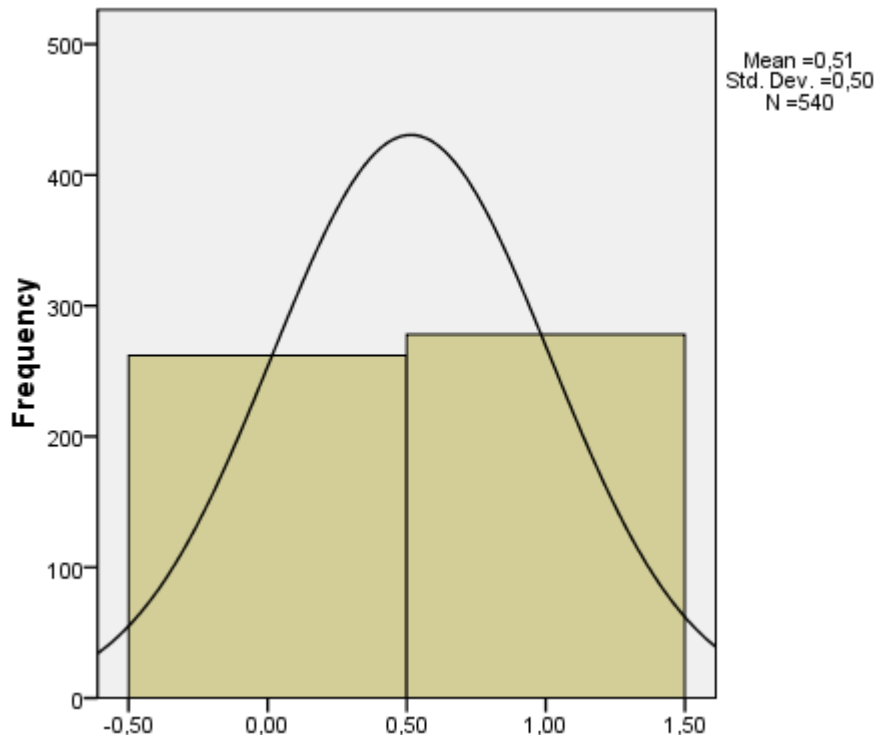


Figure 4: Incentive of the satisfaction or the dissatisfaction of the present system of invoicing of the Provincial Direction of the REGIDESO / South Kivu by individuals investigated

Legend

0= motivated by the real consumption; 1= motivated by the forfeit

To seen it of results presented above in the figure 4, it suits to signal that 278 on 540, either 51.5% of individuals investigated affirm that their dissatisfaction is motivated by the inclusive invoicing while 262 on 540, either 48.5% declare that their satisfaction is motivated by the invoicing

based on the real consumption of the drinking water in households of subscribers of the class domestic customer of the Provincial Direction of the REGIDESO / South Kivu.

Information having milked to the demonstration of the satisfaction of investigated them to the consideration of the present system of invoicing are presented below in the figure 5:

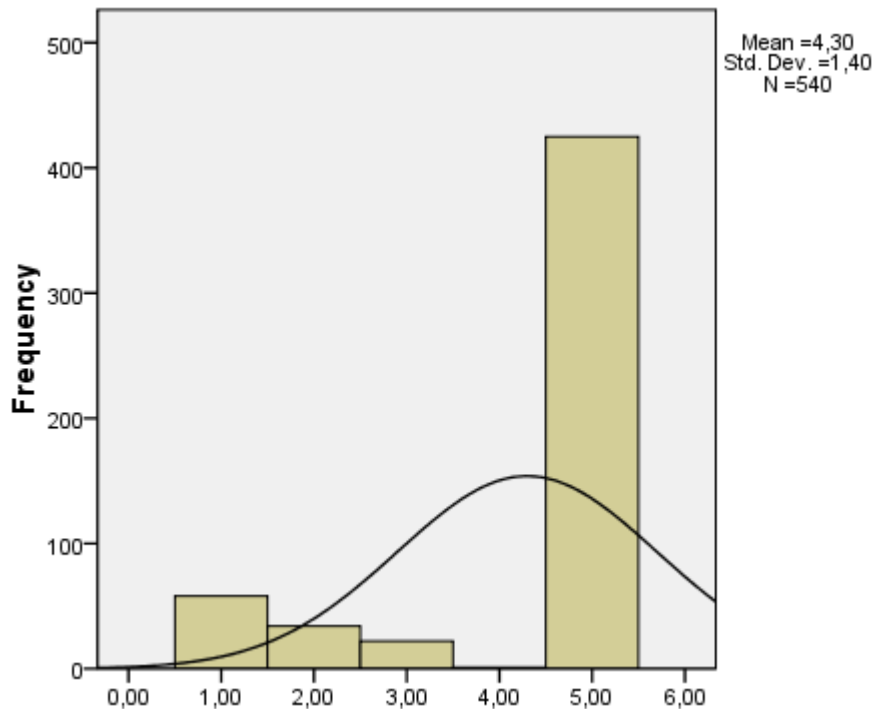


Figure 5: Demonstration of the satisfaction to the consideration of the present system of invoicing calm question with like motive that they are not concerned by this one.

Legende

- 1= to balance the invoice in the deadline of 8 days foreseen by the REGIDESO
- 2= to pay by slice the invoice since his/her/its
- 3= to balance the invoice of the month in full recovery as well as the unpaid invoices of the previous months
- 4= otther ; 5= no concerned by the calm question

It takes out again results of which overflow the here-high face 5 that 58 on 540, 10.7%; 34 on 540, either 6.3%; 22 on 540, either 4.1%; 1 on 540, either 0.2% of topics investigated show their satisfaction respectively while balancing the invoice in the deadline of 8 days foreseen by the REGIDESO, while paying by slice the invoice since his/her/its receipt, while balancing the invoice of the month in full recovery as well as the unpaid invoices of the previous months or while mortgaging the electrical devices. However, 425 on 540 investigated don't have react to the

The figure 6 puts below in evidence the relative data to the demonstration of dissatisfaction to the consideration of the present system of invoicing.

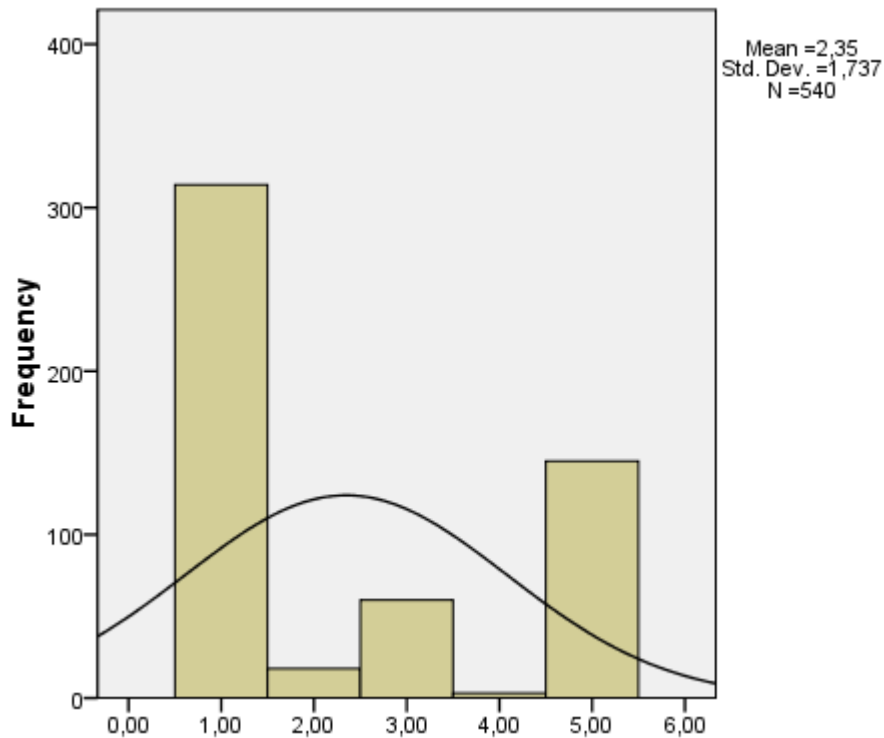


Figure 6: Demonstration of dissatisfaction to the consideration of the present system of invoicing

Legende

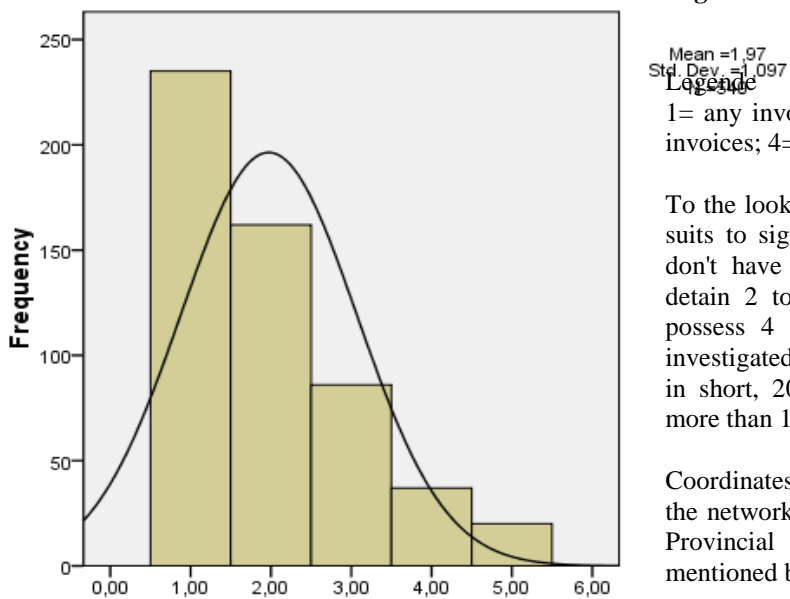
- 1= I advertising before paying for the invoice
- 2= I refuses to pay for the invoice
- 3= I pay after exchange of words with agents recouvreuses
- 4= Other
- 5= non concerned by the question

To seen it of results presented in the here-high face 6, it proves to be that 314 on 540 investigated, either 58.1% ask before paying for their invoices following dissatisfaction; 18

on 540, either 3.3% refuse to pay for their invoices; 60 on 540, either 11.1% wait for the forced recovery to pay for those invoices; 3 on 540, either 0.6% pay after exchange of words with agents recouvreuses. However, 145 on 540, either 26.9% say themselves no concerned by the question.

The figure 7 contains the relative results to the number of the unpaid invoices of which detain subscribers of the class domestic customer of the Provincial Direction of the REGIDESO here below / South Kivu having participated to the present survey.

Figure 7: Number of the detained unpaid invoices by topics investigated



- Legende**
- 1= any invoice;
 - 2= two to three invoices;
 - 3= four to six invoices;
 - 4= seven to 12 invoices;
 - 5= more than 12 invoices

To the look of results presented in the here-high figure 7, it suits to signal that 235 on 540 investigated, either 43.5% don't have any unpaid invoice; 162 on 540, either 30% detain 2 to 3 unpaid invoices; 86 on 540, either 15.9% possess 4 to 6 unpaid invoices; 37 on 540 individuals investigated, either 6.9% reach 7 to 12 unpaid invoices and in short, 20 on 540 investigated, either 3.7% accumulate more than 12 unpaid invoices.

Coordinates in report with the use of the intelligent meter in the network of distribution of the drinking water within the Provincial Direction of the REGIDESO/South Kivu are mentioned below in the figure 8:

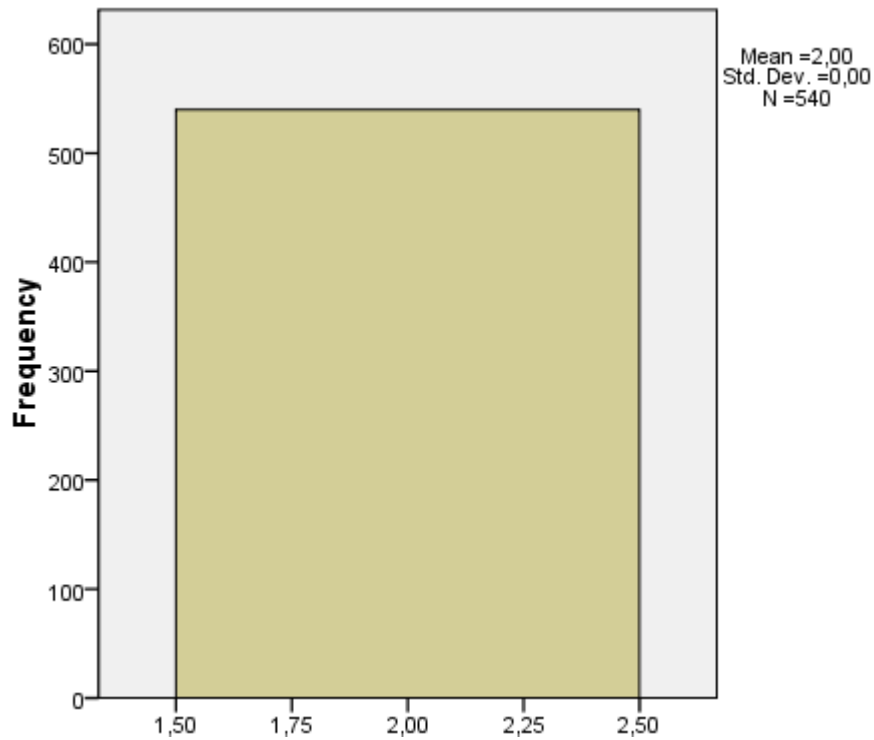


Figure 8: Use of the intelligent meter

Legende

1= Yes; 2= No

To seen it of results of the figure 8, let's signal that all investigated sustain that the REGIDESO didn't put to their disposition the intelligent meters again susceptible to do some from afar operations as the interruption of the water supplying in case of no payment of invoices without displacement of a technician.

The relative results to reasons of no payment of invoices at subscribers of the Provincial Direction of the REGIDESO/South Kivu is consigned in the following figure 9:

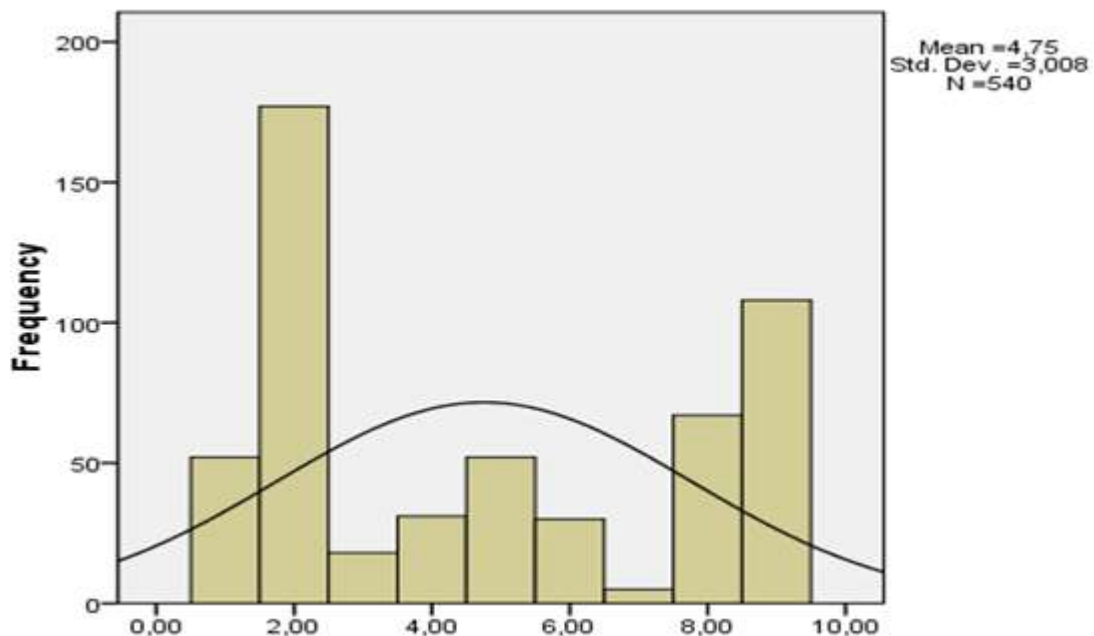


Figure 9: Reasons of no payment of invoices at subscribers of the Provincial Direction of the REGIDESO/Sud-Kivu

Legende

1= unemployment; 2=the weak level of income; 3= bad behavior of recouvreurs ; 4= at the REGIDESO every subscriber pays according to his/her/its means even after the deadline; 5= the delay of payment of salary; 6= the unsolvability of my coins subscribers or my locateurs; 7=

payment of the invoice of water consumption doesn't represent in my domestic budget ; 8= no motivation; 9= I am not concerned by the question ;

To the look of data of which contains the face 9 above, it suits to signal that 52 on 540 investigated, either 9.6% don't

pay for their invoices following unemployment, 177 on 540, either 32.8% don't honor their invoices because of the weak level of income; 18 on 540 of investigated them, either 3.3% have some unpaid invoices because recouvreurs display a bad behavior to their consideration; 31 on 540, either 5.7% affirm that the unpaid invoices are owed to the delay of payment of salary; 52 on 540 either 9.6% justify the no payment of invoices by the insolvency of their coins subscribers either tenants; 5 on 540 investigated, either 0.9%

don't pay for their invoices in delay impari because the consumption of water doesn't represent in their domestic budget; 67 on 540, either 12.4% accumulate some unpaid invoices following the démotivation; 108 on 540, either 20% declare that they are not concerned by the question.

The figure10 below deal in detail results in report with the insoluble subscriber attitude facing recouvreurs of the REGIDESO:

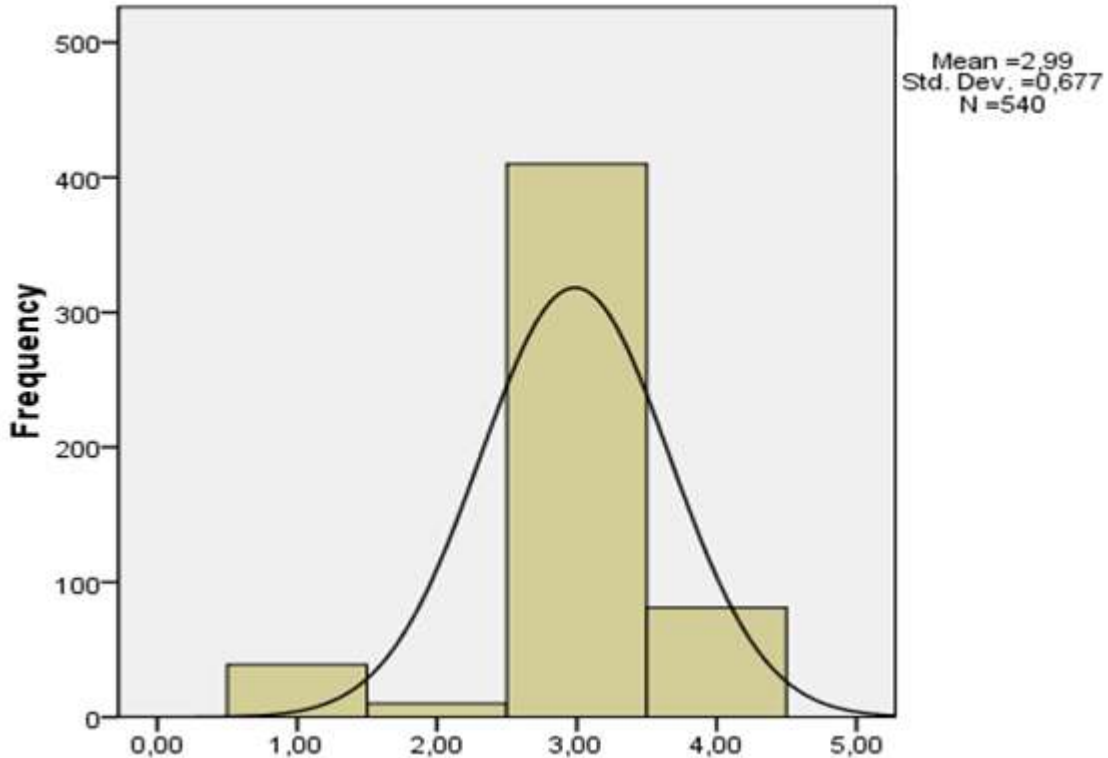


Figure 10: Insoluble subscriber attitude facing recouvreurs of the REGIDESO

Legende

1= I give up; 2= I threatens agents of the REGIDESO and stop them from reaching facilities; 3= partially negotiates with recouvreurs and wage or my invoices; 4= other

To seen it of results presented in the known face 10 presented, he/it proves to be what follows respectively: 39 on 540, either 7.5%; 10 on 540, either 1.9%; 410 on 540, either 75.9% and in short 81 on 540, either 15% of investigated them hide themselves at the time of operations of recovery, some threaten agents of the REGIDESO, others privilege the negotiation with recouvreurs and in short some demonstrator so many other behaviors.

3. Discussion

The big consumers of drinking water represent 36.9% of households investigated in this sense that monthly they consume 11à25m³. While little customer of the domestic class, 50 on 540 investigated, either 9.3% consume more than 40 m³.

This submissive consumption to a progressive rating observed in the present survey is from afar lower to a middle" consumption slice (40 to 120 meters cubes by

Parisian household), fixed to a middle unit tariff, and that corresponds to the individual consumption courante[7]. Other studies showed that the essential needs for the man are of about 15m³ per year and per person (either, 42 liters person and per day), these needs defer needs of water, more elevated, that are necessary to assure the food provision of populations, in particular the feeding in water of cultures irrigated. This quantity passes 40 liters per day and by people in cities of countries industrialized.

In France, the consumption of water to domestic use is 100m³ per year and per person of which about 70m³ invoiced per person [7].

According to Wolf, "the man consumes 2200g of water on average per day, or 3.1% per day of his/her/its own weight "[8].

On the other hand, in the poorest countries, the consumption in water is the order of 20m³ per year and per person [9].

This difference of consumptions observed in the industrialized countries and in countries in development would explain himself by the fact that in countries in development, measures of inopportune interruptions of

drinking water suppleness are more frequent than in the industrialized countries.

The utilization of meters by topics investigated is limited to an equivalent minimal number to 248 on 540, either 45.9%. This weak rate of meter possession is near of the one signalled in a survey achieved to Bukavu in 2009, which rises to less than 50% [10].

This rate would be bound to a management little advisable of returns generated by the payment of renting meter "expenses, to the no assignment of meters to certain subscribers and the no recourse to the replacement investment.

The domestic customer insolvency takes a troubling pace more and more to the REGIDESO/South Kivu so that the short-term credences on customers prolong themselves in the means, long term and lead to the interruption of the drinking water sometimes late in households of payment.

It suits to signal that 20 on 540 topics investigated, either 3.7% accumulate more than 12 unpaid invoices in the city of Bukavu.

Cette croissance des factures impayées expose la firme aux difficultés de fonctionnement, à l'augmentation des points de ventes inactifs. Ceci pourrait entraîner des cas de vol d'eau, d'approvisionnement en eau potable auprès des revendeurs d'eau et d'autres points d'eau non potable.

This unpaid invoice growth exposes the business to difficulties of working, to the increase of the inactive sale points. It could drag cases of water flight, of provision in drinking water close to dealers of water and other points of water no drinkable.

This situation could justify itself by unemployment, the weak level of income, the belated payment of salary, the under subscription, the behavior of certain agents of the REGIDESO, the no budgeting of water by households, the bad will of customers, etc.

The other studies led in Republic South-African assign the no payment of invoices to the financial logic characterizing businesses of this sector called to reconcile the social logic and the financial logic. With the financial logic, the South-African subscribers saw the amount of their water invoices to burden itself/themselves and accumulated often of the late of bordering payment to the interruption of the service [11].

Several studies propose tracks of solution to this problem between other the privatization of the REGIDESO, the deprived partnership-public, the lasting and harmonious conciliation of the social logic and the financial logic. In certain districts of the city of Bukavu, the REGIDESO tries to assure a servicing in turns in drinking water [10,11].

It has been noted in this survey that a domestic customer category poster the bad will to pay on the other hand for invoices of water consumption another category doesn't arrive to pay following the weak income, to the belated

payment of wages, to the unmotivation and other exogenous factors.

Results of the investigation showed that most topics investigated appreciate the system of present invoicing of the Provincial Direction of the REGIDESO/South Kivu negatively contrary to others investigated in this sense that respectively 334 on 540 topics investigated, either 61.9% and 163 on 540, either 30.2% confess successively that the system of invoicing of the Provincial Direction of the REGIDESO/Sud-Kivu is in force dissatisfactory and satisfactory. However, 8% of topics investigated abstained to the so-called question.

In the industrialized countries, the report of the Court of Accounts had indicated that the diversity of fashions of ratings doesn't facilitate the understanding by the user of amounts who is invoiced him. The institution of a subscription, stationary part of the price no bound at the level of consumption, is unlike more frequent and cause a lot of incomprehension on behalf of users, in particular the small consumers, who explain pain the progression of the amount of their invoice bound to the subscription (+30% bring in 1995 and 2000)[12].

This noted well dissatisfaction that to the different degrees in countries in development that in the industrialized countries, is motivated according to 278 on 540, either 51.5% of topics investigated by the inclusive invoicing and appear by complaints before payment of invoices, the payment after forced recovery either after exchange of words with agents recouvreuses.

Numerous studies, showed that he/it is possible to grant the necessary water volumes free to the water of drink (with often for basis 3 liters by day are 1m³ by family per year). This exemption from payment is 6kl by month per family in Republic South-African, [11].

The domestic customers of the Provincial Direction of the REGIDESO/South Kivu didn't affirm that they benefit a measure of exemption from payment at the time of this survey.

All topics investigated sustain that the REGIDESO didn't put to their disposition the intelligent meters again susceptible to do some from afar operations as the interruption of the water supplying in case of no payment of invoices without displacement of a technician.

The intelligent " meter use, of the " communicating " meters, etc. presently t in vogue respectively in France and in Sweden as well as in Italy facilitates some operations and save enterprises and their customers of time losses [5].

4. Conclusion

It appeared in the present survey that the system of invoicing of the REGIDESO/South Kivu is dissatisfactory and his/her/its impact on the payment of invoices is negative.

The network of production and distribution of the drinking water by the technical service of the Provincial Direction of

the REGIDESO/Sud-Kivu is no compliant to norms of the new technology. It observes himself/itself that several customers are invoiced inclusively.

To reach the desirable performance level, the system of drinking water invoicing is to improve. The REGIDESO/Sud-Kivu is called to adapt his/her/its production if need be of the population that doesn't quit to grow while reinforcing the production of the factory of Murhundu. The demand in drinking water is to anticipate and to satisfy to solve so many problems as fights, losses in human lives, the sexual violence, the sexual harassment, illnesses hydriqueses, etc.

The utilization of meters, the modernization of the factory and the circuit of distribution is an imperative as for the competitiveness of the enterprise. The deposit of the invoice of the month is to observe before the complete consumption of the customer's income.

The interruption of the water supplying should not intervene before 25 days, from the date limits initial of payment of the invoice and inform the customer before interruption of supplying is a previous. The mutualisation of payment of water, the seasonal rating and the creation of committees of subscriber framing is to initiate.

The state should improve the spending power of his/her/its population while using a good politics of redistribution of the national income.

Subscribers should produce, to show the good faith to pay and to manage their consumption rationally.

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