

## *Microcredits as an engine for agricultural development: The before and after in the sustainability of family units*

### *Microcréditos como motor de desarrollo agrícola: Un antes y después en la sustentabilidad de unidades familiares*

Enriqueta Lorena Santafé-Pozo<sup>1</sup>, Lucía del Rocío Vásquez-Hernández<sup>2</sup>,  
Galo Jacinto Pabón-Garcés<sup>3</sup>



Siembra 10 (2) (2023): e4465

Received: 20/03/2023 Revised: 17/04/2023 / 22/05/2023 Accepted: 01/06/2023

<sup>1</sup> Gobierno Provincial de Imbabura. Bolívar 7-44 y Oviedo. 100104. Ibarra, Imbabura, Ecuador.

✉ [kettylorena@hotmail.com](mailto:kettylorena@hotmail.com)

<https://orcid.org/0009-0005-6082-2983>

<sup>2</sup> Universidad Técnica del Norte. Avenida Av. 17 de Julio 5-21. 100104. Ibarra, Imbabura, Ecuador.

✉ [ldvasquez@utn.edu.ec](mailto:ldvasquez@utn.edu.ec)

<https://orcid.org/0000-0002-1876-0759>

<sup>3</sup> Universidad Técnica del Norte. Avenida Av. 17 de Julio 5-21. 100104. Ibarra, Imbabura, Ecuador.

✉ [gjpabon@utn.edu.ec](mailto:gjpabon@utn.edu.ec)

<https://orcid.org/0000-0001-6044-4429>

\*Corresponding author:  
[kettylorena@hotmail.com](mailto:kettylorena@hotmail.com)

#### Abstract

This research analyzes two time periods to determine the impact of agricultural microcredits and their contribution to the sustainability of productive family units. The first evaluation was conducted in the period 2016-2017, and the second in the period 2021, in order to know the before and after of the socio-economic realities of the families. This work evaluated the impact of agricultural microcredits on the sustainability of productive family units in the Apuela parish, through the characterization of the families that accessed microcredits, the analyses of the use of the funds, the relationship between microcredits and the design of guidelines for their granting. A field documentary and descriptive research was carried out, through the application of inductive and deductive methods, and surveys as an instrument for gathering primary information. Microsoft Excel statistical tools were used for tabulation. The results showed that agricultural microcredits had a positive impact on the economic, social, and environmental aspects of the productive family units, generating an improvement in sustainability and an increase in income. It was concluded that financial entities should motivate their clients with incentives, and that the state should create credit public policies to support microenterprises and entrepreneurship.

**Keywords:** subsistence agriculture, agricultural credit, agricultural development, rural economy, agricultural policy.

#### Resumen

La presente investigación analiza dos períodos de tiempo para conocer el impacto de los microcréditos agrícolas y su contribución a la sustentabilidad de las unidades familiares productivas. La primera evaluación fue realizada en el período 2016-2017, y la segunda en el período 2021, con la finalidad de conocer el antes y después de las realidades socioeconómicas de las familias. Esta investigación evaluó el impacto de los microcréditos agrícolas en la sustentabilidad de las unidades familiares productivas en la parroquia Apuela, mediante la caracterización de las familias que accedieron a microcréditos, el análisis del destino del dinero, la relación entre los microcréditos y el diseño de orientaciones para su otorgamiento. Se realizó una investigación de campo, documental y descriptiva, con la

SIEMBRA

<https://revistadigital.uce.edu.ec/index.php/SIEMBRA>

ISSN-e: 2477-8850

ISSN: 1390-8928

Frequency: half-yearly

vol. 10, issue 2, 2023

[siembra.fag@uce.edu.ec](mailto:siembra.fag@uce.edu.ec)

DOI: <https://doi.org/10.29166/siembra.v10i2.4465>



This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License

aplicación de métodos inductivos y deductivos, y la encuesta como instrumento para el levantamiento de información primaria. Las herramientas estadísticas de Microsoft Excel se utilizaron para la tabulación. Los resultados mostraron que los microcréditos agrícolas tuvieron un impacto positivo en los aspectos económico, social y ambiental de las unidades familiares productivas, generando una mejoría en la sustentabilidad y un incremento en los ingresos. Se concluyó que las entidades financieras deben motivar a sus clientes con incentivos y que el Estado debe crear políticas públicas crediticias para apoyar a las microempresas y emprendimientos.

**Palabras clave:** agricultura de subsistencia, crédito agrícola, desarrollo agrícola, economía rural, política agraria.

## 1. Introduction

Several countries in Latin America have conducted research on microcredit and its impact on the most vulnerable population. Londoño-Bedoya et al. (2021) proposed a model to measure the impact of microcredit on quality of life in Colombia. In Brazil, Caçador (2014) evaluated whether the state microcredit program “*Nuestro Crédito*” had an impact on the socioeconomic indicators of the population. Aguilar Pinto et al. (2017) analyzed the Banmujer microcredit program in Chiapas, Mexico, and found that 78% of the people surveyed formalized their ventures, allowing them to increase their small business, become self-employed and generate employment. Salinas Vásquez (2011) investigated in Ecuador the most relevant causes that justify the differentiated rate in loans according to their amount and the type of institution that grants them. Ruiz Mena (2013) demonstrated in his research in La Maná that 78% of the farmers surveyed required microcredits during the planting season. Rodríguez Loo (2015) in his research work conducted in the city of Portoviejo, showed that 85% of microentrepreneurs consider microcredit positively for the development of the canton.

Apuela Parish is developed on activities corresponding to the primary, secondary and tertiary sectors, including agriculture, livestock, forestry, fishing and manufacturing industry, commerce and tourism services (Gobierno Autónomo Descentralizado Parroquial Rural de Apuela, 2015). According to the Development and Land Management Plan of Apuela Parish, there are 430 families engaged in agro-productive activities, which are characterized by the use of family labor, i.e., they belong to peasant family farming [PFF]. The most representative crops in Apuela Parish are beans, corn, coffee, sugar cane, tree tomatoes, blackberries, oranges, naranjilla, lemons and passion fruit. In terms of livestock activities, the breeding of minor species such as guinea pigs, rabbits and chickens stands out, as well as major species such as beef, dairy and dual-purpose cattle (Aragón et al., 2019).

Access to credit in the parish is almost nonexistent because the financial sector does not provide adequate and timely services for agricultural production. Existing cooperatives prefer to place microcredits in short periods of time, which is not profitable for perennial crops and do not have longer-term lines of credit (Gobierno Autónomo Descentralizado Parroquial Rural de Apuela, 2015). BanEcuador is another financial institution that intervenes in the area, and although it serves the agricultural sector, it allocates only 7% of its placement to the Bono de Desarrollo Humano program and maintains lines of credit similar to existing cooperatives (BanEcuador, 2021).

The lack of capital, technification and technical advice directly on the producers' farms causes production costs to increase, decreases crop profitability and leaves no surplus to cover basic needs such as health and education (Gobierno Autónomo Descentralizado Parroquial Rural de Apuela, 2015). In addition, the parish has a high percentage of unsatisfied basic needs per household, indicating that most of them, being dispersed in communities, have greater shortages.

Despite the fact that Apuela parish has a wide variety of economic activities, the lack of access to adequate credit, capital and technification, as well as the high percentage of unmet basic needs per household, hinder the sustainable development of the area (Aragón et al., 2019; BanEcuador, 2021; Gobierno Autónomo Descentralizado Parroquial Rural de Apuela, 2015).

The 2030 Agenda for Sustainable Development establishes 17 goals and 169 targets to strengthen universal peace and eradicate poverty as the greatest global challenge (United Nations [UN], 2015). Goal 8 of the Agenda seeks to promote sustained and inclusive economic growth, full and productive employment and decent work for all (UN, 2015). In line with this, the National Secretariat for Planning and Development (Secretaría Nacional de Planificación y Desarrollo, 2017) in its National Development Plan 2017-2021 contemplates the objective of guaranteeing a decent life with equal opportunities for all people, and in the Development Plan

Creating Opportunities 2021-2025 (Secretaría Nacional de Planificación, 2021) it proposes to promote employment and productivity, protect families and eradicate poverty.

To achieve these objectives, one alternative would be to implement a low-interest credit policy, especially for families in the rural sector (Chaise, 2023). However, the real impact of these microcredits on the sustainability of the productive family units that received them is unknown, including whether the money was properly invested and whether the families obtained benefits after paying their financial obligations (Chaise, 2023).

This study sought to analyze the impact of agricultural microcredits on the sustainability of productive family units in the Apuela Parish, by comparing two time periods, 2016-2017 and 2021 (ex post analysis), to determine their contribution to the improvement of the socioeconomic conditions of the families that accessed these credits. The families that accessed the microcredits were characterized to determine their impact on economic, social and environmental aspects of the productive family units, in order to propose recommendations for the improvement of public credit policies and financial entities that grant these credits.

This research is innovative because it uses microcredit as a tool to promote sustainable agricultural development in family units. Its focus on sustainability, the impact on families and its replicable potential make this research a valuable contribution to the field of agricultural development.

## 2. Materials and Methods

Apuela parish is located in northwestern Ecuador, in the province of Imbabura, Cotacachi canton, in the Intag area; it is bordered by the parishes of Cuellaje and Imantag to the north, Plaza Gutiérrez and Vacas Galindo to the south, Imantag to the east and Peñaherrera to the west. It has an area of 220.8 km<sup>2</sup>.

This research focused on analyzing the economic income of the family productive units, the amount of microcredit granted and the profit obtained, as well as the level of schooling, access to housing, access to health, employment and basic services. To this end, a quantitative approach was employed and three types of research were used: field research, documentary research and descriptive research. The field research allowed the characterization of the study area and the identification of the productive units that had access to microcredit, while the documentary research focused on collecting similar experiences at the regional level. Finally, descriptive research was used to describe the characteristics of each of the family productive units that accessed microcredit, such as their housing and access to basic services.

### 2.1. Research Procedure

This research was developed in four phases:

#### 2.1.1. Phase 1: Identification and characterization of family production units

The family productive units of Apuela parish that accessed microcredits in the period 2016-2017 were identified and characterized. An inductive method was used to identify the families that accessed microcredits and a survey was applied as a data collection technique to characterize them in social, environmental and economic aspects. In addition, the deductive method was used to classify the use of microcredits in different productive areas, using the survey and direct observation as data collection techniques. This study allowed to understand the situation of the family productive units in Apuela parish and to identify the most common productive items in which microcredits are invested. This can help field technicians and financial institutions make informed decisions and provide better support to family productive units in the future.

#### 2.1.2. Phase 2: Analysis of the use of the money granted through the microcredit by each family unit

The use that the family productive units made of the money granted through microcredit in Apuela parish was studied. A structured survey with closed questions was used as a data collection technique to determine whether each family used the money responsibly and invested it in their productive unit. The analysis of the data collected was carried out using Microsoft Excel. This study made it possible to evaluate the effectiveness of microcredit granting and its impact on the development of family productive units in the Apuela parish.

### 2.1.3. Phase 3: Determination of the relationship between microcredits and their impact on household sustainability

The ex post analysis method, which consists/consisting of comparing two stages of time, was used: the before and after of the people who accessed the microcredit was evaluated. This research was based on information collected through semi-structured surveys containing open and closed questions.

### 2.1.4. Phase 4: Design of technical guidelines to be considered for the granting of microcredits to family productive units that promote their sustainability.

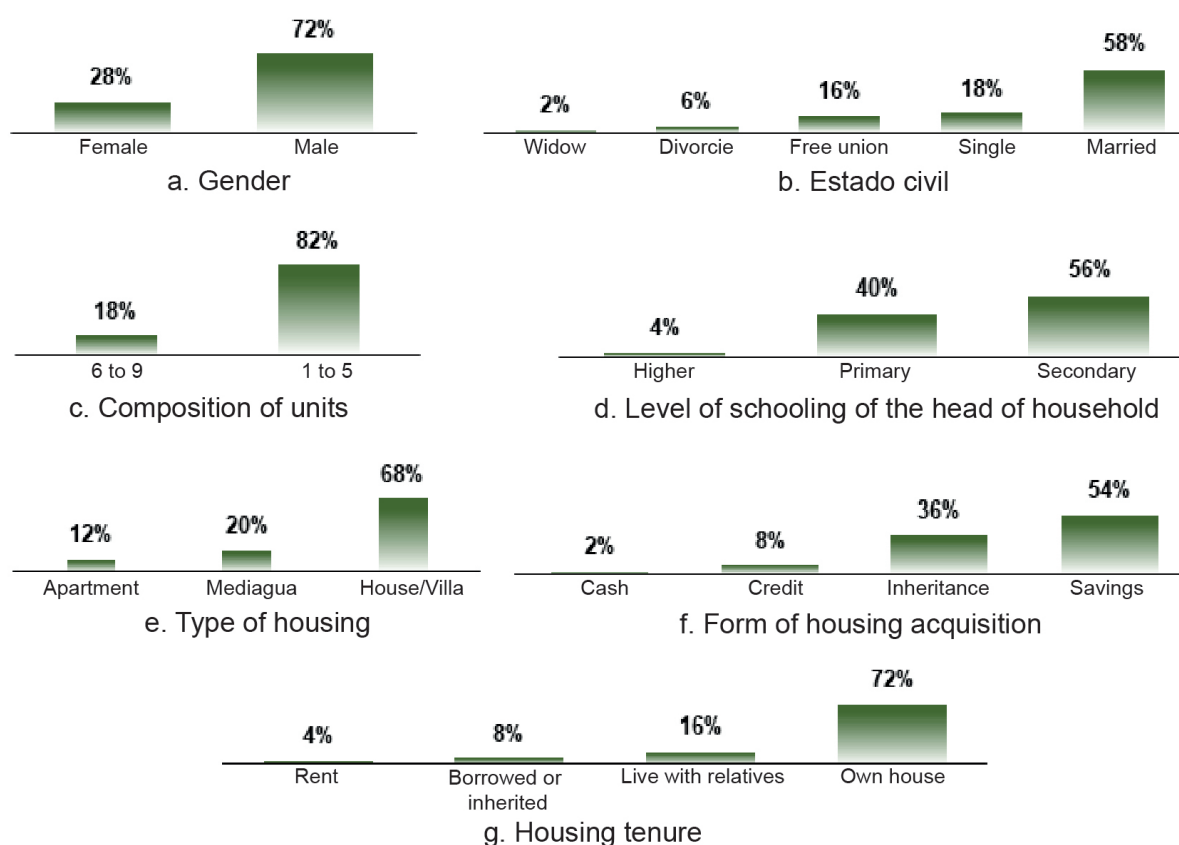
Important aspects to be taken into account in order for the microcredit obtained to be of real benefit were considered through literature review on the subject, in addition to taking into account the recommendations collected in zone 1 through meetings with farmers.

## 3. Results

### Phase 1. Identification and characterization of family production units

During the 2016-2017 analysis period fifty families were able to access a microcredit from the public bank, these represent the population under study. Table 1 details the indicators and parameters considered for the characterization of the families of Apuela parish that accessed microcredits in the 2016-2017 analysis period.

100 % of the respondents self-identify as mestizos. Twenty-eight percent of the population are females and 72% are males (Figure 1a.), which indicates that men are more likely to meet the requirements requested by the bank to be credit subjects, being the owners of the land where the investment is directed, justify income economic activities through the Registro Único de Contribuyentes [RUC, the unified taxpayers registry], unlike women who are engaged in unpaid activities.



**Figure 1.** Results of the characterization of microcredit beneficiaries in productive family units of Apuela parish in the analysis period 2016-2017.

The people who accessed microcredit ranged in age from 28 to 61 years old. It was determined that 58 % are married, 18 % are single, 16 % are in a free union, 6 % are divorced and 2 % are widowed (Figure 1b). It was identified that 82% of the family productive units are composed of 1 to 5 members, 18% have 6 to 9 members (Figure 1c).

Fifty-six percent of those surveyed attended secondary school education, followed by 40% with primary education, and only 4% with higher education (Figure 1d). The level of schooling can be related to the savings culture of each family, allowing them not only to remain in the productive area, but also to add value to it.

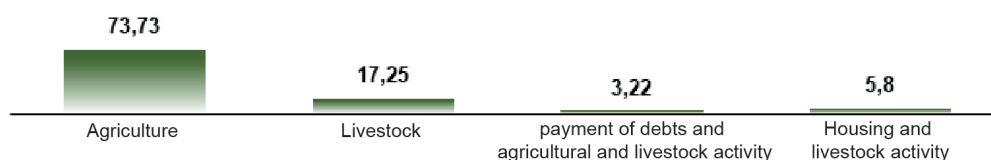
Sixty-eight percent of the families live in a house or villa, 20% in a “mediagua” (shack) and 12% in an apartment (Figure 1e). Among the main materials used for the construction of the houses, 60% are mixed houses (wood and cement), 34% are cement houses and 6% are wooden houses. This information allows us to evaluate whether, after obtaining the microcredit, the families improved the infrastructure of the houses, thanks to the surplus income obtained from the profits of their economic activity.

Regarding the form of housing acquisition, 54% of families bought their homes with money produced by savings, 36% acquired their homes by inheritance, 8% built their home with credit, and 2% bought their home in cash (Figure 1f). Hence, 72% of the beneficiaries own their homes, while 16% live with relatives, 4% rent, and 8% live in a borrowed or inherited house, but do not have legal documents to support their possession (those who did not have legal documents accessed the credit by presenting a guarantor with real estate tenure) (Figure 1g). This information is relevant because in order to access a microcredit it is necessary to present the property tax, lease contract or some document that supports the possession of an asset that guarantees the equity for the credit operation, as explained by-process statute of BanEcuador.

### 3.2. Phase 2: Analysis of the use of the money granted through the microcredit by each family unit

The type of credit accessed by the 50 families under study is microcredit, which is granted to individuals whose annual sales, or income is less than USD 100,000, and can be used for various activities such as production, trade, processing of products, raw materials, among others.

Information is presented about the distribution of land use in a specific region. The data presented indicate that most of the land in the region is used for agricultural activities, representing 73.73% of the total. On the other hand, livestock activity is also important and occupies 17.25% of the land. In addition, the information provided highlights that a smaller percentage of land is used for specific purposes, such as the payment of debts related to agricultural activities (3.22%), as well as housing and livestock activities (5.8%) (Figure 2).



**Figure 2.** Use of microcredit money granted to productive family units in Apuela parish.

In Ecuador, public banks mainly manage three lines of microcredit: agricultural, livestock, and commercial or service industries, according to the literature cited. This research found that of the 50 people who applied for and accessed microcredit, its use was mainly for agricultural and livestock activities, in order to reduce their poverty level, improving their income from their productive activity, and for commercial or service purposes to strengthen their enterprises. However, there were also cases in which the microcredits issued by the public banks were not used for the relevant types of credits, but rather for the payment of debts, or home repairs.

### 3.3. Phase 3: Relationship between microcredits and their impact on the sustainability of family units in Apuela Parish

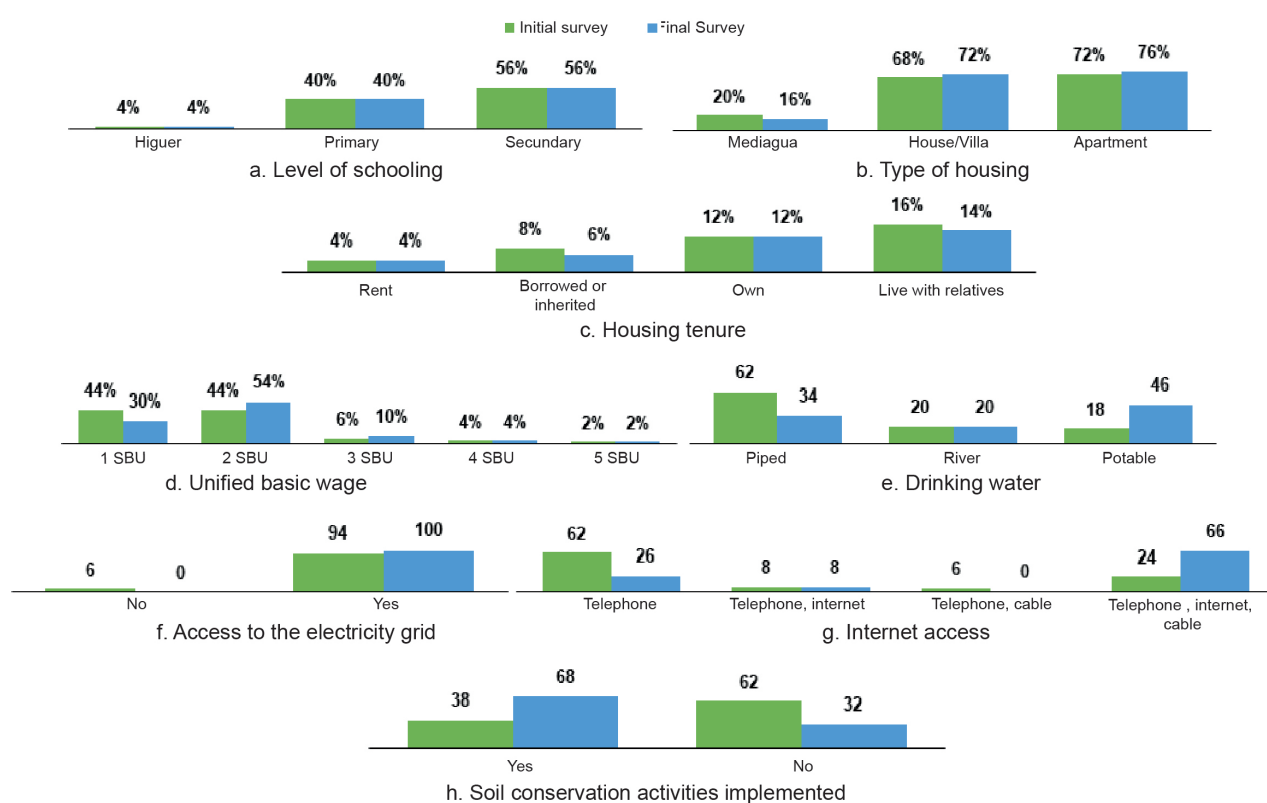
The social, economic and environmental conditions of the surveyed families were evaluated, and socioeconomic and environmental indicators and parameters were analyzed (Table 1).



**Table 1.** Structure of the indicators for the identification and characterization of the families and productive items of the family units beneficiary of microcredits in the periods 2016-2017 and 2021.

Indicator	Parameter:	
Socioeconomic impact	Education	Level of schooling
	Housing	Type and tenure of housing
	Economic income	Monthly salary
	Access to basic services	Drinking water, access to electricity grid, access to telecommunications networks
Environmental impact	Management of environmentally sustainable practices	Application of soil care techniques

The data obtained in the 2016-2017 period were compared and contrasted with those obtained during the 2021 period (Figure 3). As to education, the level of schooling that each head of household was able to access remained constant in the time elapsed between the initial to the final evaluation (Figure 3a).



**Figure 3.** Results of the comparison of the surveys conducted in the periods 2016-2017 and 2021 of the characterization of microcredit beneficiaries in productive family units of Apuela parish.

Respondents stated that after paying off the loan, they invested the surplus money obtained from the profits of their economic activity in improving their housing infrastructure, since they were living in “mediaguas”, and after four years they expanded their housing (Figure 3b). The percentage of families living with relatives decreased by 4%. This appears to be related is related to the fact that the family units improved their income and were able to have access to their own housing (Figure 3c). On the other hand, construction materials are an indicator of physical security; in this sense, there was an increase in houses made of cement, and a decrease in the construction of wooden houses. There is evidence of a variation in the size of the house, as 7 of the 50 families surveyed increased the size of their house, which equals 14% of the beneficiaries. It is important to

mention that in rural areas it is common for the bathroom to be located outside the dwelling; in the initial survey all the families under study had only one bathroom, and 66% of those surveyed had it outside the dwelling. The people surveyed were aware of the need to have a bathroom inside the house that meets characteristics such as having a shower, toilet and secure door.

In 2016-2017, the distribution of the unified basic wage [SBU] in Apuela households was concentrated in the first two ranges, with 44% of the families receiving the unified basic wage, and another 44% receiving double the basic wage. Six percent of the families received three unified basic salaries, 4 percent received four salaries and the remaining 2 percent received five salaries. In comparison, in 2021 the SBU distribution in Apuela households changed significantly. While the percentage of families receiving only one unified basic wage decreased to 30 %, the percentage of families receiving twice the unified basic wage increased to 54 %. In addition, there was an increase in the percentage of families receiving three unified basic wages, from 6 % to 10 % (Figure 3d).

For the analysis of 'access to services', it is necessary to describe the state of the roads, both for the entrance to the parish main town, and for the entrance to each of the communities. At the beginning of the study, the entrance to the parish capital was an asphalt road, after four years this the road is completely deteriorated, and has not received any maintenance; although it is considered the main road. Access to the different communities within the parish is by third-order roads, which are permanently damaged during the winter season, and suffer landslides. However, it should be noted that this parameter is not directly dependent on the family units under study, being road maintenance is the responsibility of government entities.

The data provided shows 'access to drinking water' in 2016-2017, and 2021 in a given region. The information indicates that access to piped water has decreased from 62 % to 34 % over the time period analyzed, while access to drinking water has increased from 18 % to 46 %. On the other hand, access to river water remained constant at 20 % over the five years (Figure 3e). Access to quality drinking water is reflected in the health of each family member; the final survey confirms a positive impact, because families with access to safe water have less intestinal diseases.

The data presented show the evolution of 'access to the electricity grid' in a given region during the years 2016-2017 and 2021. In 2016-2017, 94 % of the population had access to the electricity grid, while 6 % did not. However, in 2021, it is observed that 100 % of the population has access to the electricity grid. This improvement is achieved thanks to the investment made; there were also cases where productive units acquired their own transformer, so that energy could reach their property (Figure 3f). This service is indispensable if we take into account that there are children, and young people who are students, and required internet to carry out their school activities, especially during the pandemic period, when online education was implemented.

Internet access has increased significantly during this period, from 8 % in 2016-2017 to 66 % in 2021. On the other hand, cable and telephone access decreased from 6 % in 2016-2017 to 0 % in 2021. In 2016-2017, 62 % of the population had access to a telephone, while in 2021 this percentage decreased to 26 %. This decrease in telephone access may be due to an increase in access to other means of communication, such as the internet and social networks. Access to telephone, internet and cable increased significantly from 24 % in 2016-2017 to 66 % in 2021 (Figure 3g). This (increase) can be attributed to the need for connectivity during the pandemic, as remote work and online education became more common. Access to telecommunications was critical for education, especially during the covid-19 pandemic, when many educational institutions switched to online learning.

A change was recorded in the management of crops and livestock farms, in 2016-2017 38% of the productive family units were carrying out soil conservation activities, and by 2021 this figure increased to 68%; several crops were affected by fungi present in the soil causing a drop in the productivity of fruit trees, especially passion fruit, a very important crop for a very large percentage of farmers in the parish. Respondents believe that the excessive use of agrochemicals such as fertilizers, fungicides and insecticides caused pests to become stronger and more dangerous for their plants. For this reason, among the measures applied are crop rotation, making compost, bokashi, and organic fertilizers to apply to their plants, making biols and sulfocalic broths, and, in the case of livestock activities, the collection and dispersion of livestock feces (and disperse them) to reduce methane gas production. This is being achieved with/through the technical assistance received from governmental institutions, NGOs, and through the interest of farmers in the area.

Soil conservation is essential for the health and productivity of agricultural land. The data presented show a significant increase in the proportion of people reporting conserving soil from 38% in 2016-2017 to 68% in 2021 (Figure 3h). These practices promote soil nutrient retention, reduced erosion and improved soil quality. However, there is still a significant proportion of people who are not conserving soil, suggesting that there is still work to be done in terms of education and awareness of the importance of soil conservation.

It is also important to show how trash disposal methods have evolved during 2016-2017 and 2021. In 2016-2017, 56% of garbage was collected, followed by composting (28%) and burning (10%). The rest of the garbage was disposed of outdoors. In 2021, collection increased slightly to 58%, and composting also increased to 36%. Burning decreased to only 6 %, and outdoor disposal was completely eliminated. These changes are attributable to the fact that the municipality arranged for the garbage collector to enter the parish on a regular basis, and also to the fact that households compost organic waste in order to improve the quality of their land by incorporating organic matter, which helps to reduce the use of chemical fertilizers.

#### *3.4. Phase 4: Design of technical guidelines to be considered for the granting of microcredits to productive family units that promote their sustainability*

In order for access to microcredit by family production units to be sustainable, a real public policy that favoring rural farmers must be generated, taking into account the following suggestions made by producers in the survey:

- That business officers should know the area and make inspections at the place of investment, with the producers themselves, and work in coordination with local authorities.
- That minimum and accessible requirements be established, such as identity documents, utility invoices. In case of not having the property tax, or deed, a lease contract should be taken into account; and, in order to justify the agricultural activity, the parish authorities could issue a certification.
- That the process from the credit application to the disbursement of the money does not take more than eight working days, since when a credit is requested the capital is needed immediately to be invested, since we are dealing with living beings (plants and animals) that require immediate inputs.
- That the interest rate to be charged by financial institutions for productive microcredit be the lowest in the market, since agricultural or livestock activities take considerable time, from planting to harvest, when the recovery of capital begins; this rate could be a maximum of 5% per annum.
- That the term to repay the letter of credit be based on the crop, or livestock operation. In the case of semi-perennial or perennial crops, it should be longer, since/as the first harvest, depending on the species and variety, begins three years after the implementation of the crop. In the case of 'infrastructure for livestock activities', the entire capital cannot be recovered with the first litter of animals, yet it must be divided for two, or three litters according to the species.
- That a grace period be given for the payment of capital and interest, especially in the case of perennial or semi-perennial crops, which could be until production begins.
- That financial institutions, which have agricultural micro-credits among their financial products, have the advice of agronomists or agricultural engineers, who are familiar with crop cycles, reproduction stages, fattening and others, so that they can make calculations adapted to the reality of installments, and payment terms.
- That loan officers carry out a constant follow-up of credit operations, in order to guarantee investment and reduce late payments in loans granted.
- That an incentive plan be created for people who have accessed credit for prompt payment, green production, loyalty, savings; in order to motivate the renewal of credits, and to see in financial entities an ally for the development of enterprises.

Access to microcredit is essential for the sustainable development of family production units in rural areas. However, to make this access effective, a public policy taking into account the needs and suggestions of producers is needed. The implementation of these factors can significantly improve effective access to microcredit in rural areas, and boost the sustainable development of family production units in these areas.

## **4. Discussion**

Carvajal Salgado and Espinoza Párraga (2020) pointed out that microcredits are financial instruments that allow low-income households to access resources to start, or expand productive activities. The self-identification of respondents as mestizos coincides with what is mentioned in the book "Genómica mestiza. Race, nation and science in Latin America" (López Beltrán et al., 2017), where it is stating that the mestizo population in Latin America



represents the majority in the region. Furthermore, as explained by Castro *et al.* (2020), the lack of paid income on the part of women may be a factor that prevents them from accessing credit, as observed in this research.

The level of schooling of the families surveyed is an important factor to consider, since according to Carvajal Salgado and Espinoza Párraga (2020), financial education and savings are skills that are directly related to accessing credit and making responsible financial decisions. Thus, it can be deduced that the population of Apuela that accesses microcredit mainly is composed of mestizos men, with a limited level of schooling. Despite this, these families have been able to access credit to invest in their productive units and improve their quality of life, which demonstrates the importance of microcredit as a financial tool for economic inclusion.

Access to microcredit has proven to be a key factor for the sustainable development of rural households in Ecuador. Berrú Chamba's (2016) study shows how access to productive credit significantly improves the quality of life of families in terms of income and access to basic services. In addition, the Development and Land Management Plan of the Apuela parish highlights the importance of the family structure in accessing credit, especially in households led by women (Gobierno Autónomo Descentralizado Parroquial Rural de Apuela, 2015). In other words, microcredit is an important tool for the sustainability of rural households, as it allows them/these to improve their income and access basic services. However, it is important to consider family structure, and gender in the design of policies and programs for credit access, in order to ensure their effectiveness in reducing poverty and promoting sustainable development.

Lack of access to education can be an obstacle to/for the economic growth of families. As far as housing is concerned, the study by Morales Londoño *et al.* (2005), shows the importance of 'access to housing' as a factor in economic and social development. Additionally, the lack of land titles relates to the study by León Paz and Rivera (2020), which refers to land tenure as a problem in developing countries such as Ecuador.

Microcredit can be an important tool to reduce poverty and improve productivity in the agricultural sector (Prado Chinga *et al.*, 2022). In addition, it has been found that access to microcredit can have a positive impact on the health of families, improving their nutrition and reducing the incidence of diseases (Jamal *et al.*, 2021). Even more, financial education and counseling can improve the effectiveness of microcredit in reducing poverty (Ardila Leiva and Medina Vergara, 2019).

Microcredits have a positive impact on the sustainability of family units in Apuela Parish, especially in terms of improving housing infrastructure, and access to basic services such as potable water and electricity. There was a decrease in the percentage of families living with relatives, and an increase in the construction of cement houses instead of wood. According to a study by Banerjee *et al.* (2015), families that obtain microcredit have greater accessibility to basic services, such as drinking water and electricity, compared to those who do not have access to credit. Further assessment and implementation of public policies to improve access to basic services and road maintenance in rural areas is needed (United Nations Development Programme [UNDP], 2020).

The implementation of public policies that promote access to microcredit for family productive units in rural areas is a relevant and necessary issue for the sustainable development of these areas. According to Chikwira *et al.* (2022), access to credit is a key factor for economic growth and poverty reduction in rural areas. In this sense, suggestions from producers are an important starting point for generating technical guidelines that allow effective access to microcredit. For example:

- proposing that business officers be familiar with local realities and work in coordination with local authorities;
- proposing to establish minimum and accessible requirements for accessing microcredits;
- suggesting that the application and disbursement process for microloans should not exceed eight working days;
- recommending that the interest rate should not exceed 5% per annum;
- proposing that the term for repayment of the loan should be longer in the case of semi-perennial or perennial crops;
- suggesting that a grace period be granted for the principal payment, and interest on crops that take several years to start production;
- Finally, it is important to have the advice of agronomists, and to implement an incentive plan to encourage loan renewal.

These recommendations are in line with recent studies by authors such as Rayo Cantón *et al.* (2010); Perugachi *et al.* (2022); Chikwira *et al.* (2022); y, Baquero Céspedes *et al.* (2015).

## 5. Conclusions

The analysis of the family productive units that accessed microcredit in Apuela parish during the 2016-2017 period revealed that the majority of beneficiaries were of mestizo origin, with an unequal gender representation favoring men. Men were found to be more likely to comply with credit requirements due to their status as landowners, and their ability to justify income, while women were mainly engaged in non-remunerated activities. In addition, it was observed that most of the beneficiary families consisted of 1 to 5 members and had an educational level ranging from secondary to primary education. Most of the dwellings were houses or villas built with mixed materials of wood and cement, and housing acquisition was mainly based on personal savings and inheritance.

The analysis of the type and destination of the money from the microcredits granted to productive family units in Apuela parish revealed that most families used the funds for agricultural and livestock activities, with the objective of improving their income and reducing poverty. It was also observed that some beneficiaries used the microcredits inappropriately, earmarking them for debt repayment or home repairs. These findings highlight the importance of providing adequate counseling to beneficiaries and establishing control mechanisms to ensure that the funds are used effectively in the intended productive activities.

This study evaluated the impact of microcredits on the sustainability of family units in the Apuela parish. Socioeconomic and environmental indicators were analyzed, and data obtained in the periods 2016-2017 and 2021 were compared. The results show that the level of education remained constant, while improvements in housing, economic income and access to basic services such as drinking water, electricity and telecommunications were evident. In addition, an increase in soil care practices, and an improvement in waste management were observed. These findings demonstrate the positive impact of microcredit on the sustainability, and quality of life of beneficiary families in Apuela Parish.

The design of technical guidelines for granting microcredits to productive family units in rural areas, with the aim of promoting their sustainability, requires a public policy that takes into account the needs of farmers and producers. It is essential to consider aspects such as coordination with local authorities, accessible requirements, fast processes, low interest rates, adequate payment terms, specialized advice, constant follow-up and incentive plans. These measures will strengthen effective access to microcredit, promoting the sustainable development of family production units in rural areas and fostering a solid relationship between financial institutions and entrepreneurs.

Microcredits have a positive impact on the sustainability of family units in the Apuela parish, especially in terms of improving housing infrastructure and access to basic services such as drinking water and electricity. It is also highlighted that the implementation of public policies that promote access to micro-credits for family productive units in rural areas is a relevant, and necessary issue for the sustainable development of these areas. On the other hand, the suggestions of local producers are an important starting point to generate technical guidelines that allow effective access to microcredits.

## Acknowledgments

To the inhabitants of Apuela parish, who contributed with the information.

## Contributor Roles

- Enriqueta Lorena Santafé-Pozo: conceptualization, methodology, resources.
- Lucía del Rocío Vásquez-Hernández: supervision, research, writing - original draft.
- Galo Jacinto Pabón-Garcés: validation, writing - revision and editing.

## Ethical Issues

The authors declare that a verbal Informed Consent was obtained from the respondents for the application of the survey, and that their rights were not violated.

The authors declare that the Universidad Técnica del Norte only requires to obtain permission, or authorization from the Ethics Committee in the area of Health.

## Conflict of interest

The authors declare that there are no financial or non-financial conflicts of interest that could have influenced the work presented in this article.

## References

- Aguilar Pinto, E. del C., Tuñón Pablos, E., Zapata Martelo, E., & Evangelista García, A. A. (2017). Mujeres, empoderamiento y microcrédito. El programa de microempresas sociales de Banmujer en Chiapas. *Agricultura, Sociedad Y Desarrollo*, 14(3), 479-501. <https://doi.org/10.22231/asyd.v14i3.646>
- Aragón, J. P., Albuja, M., Guzmán Paz, J., Burbano, E., & Aragón, M. (2019). Financiamiento productivo a los agricultores en la zona de Intag, Cantón Cotacachi. *Anales Científicos*, 80(2), 355-363. <http://dx.doi.org/10.21704/ac.v80i2.1449>
- Ardila Leiva, D. de J., & Medina Vergara, G. (2019). La falta de educación financiera y su incidencia en la pobreza en los Montes de María. *Revista de Jóvenes Investigadores AD Valorem*, 2(1), 37-56. <https://doi.org/10.32997/RJIA-vol.2-num.1-2019-2566>
- BanEcuador. (2021). *Informe de gestión 2021*. <https://www.banecuador.fin.ec/?mdocs-file=30924>
- Banerjee, A., Duflo, E., Glennerster, R., & Kinnan, C. (2015). The Miracle of Microfinance? Evidence from a Randomized Evaluation. *American Economic Journal: Applied Economics*, 7(1), 22-53. <https://doi.org/10.1257/app.20130533>
- Baquero Céspedes, X., Cárdenas Becerra, A., & Robles García, J. (2015). *La influencia de los microcréditos en las finanzas de los agricultores: un acercamiento a la realidad en el municipio de Cáqueza, en el periodo 2010-2014*. Universidad de La Salle. [https://ciencia.lasalle.edu.co/finanzas\\_comercio/169](https://ciencia.lasalle.edu.co/finanzas_comercio/169)
- Berrú Chamba, G. M. (2016). *Análisis de la aplicación de la metodología Grameen y bancos comunales en la otorgación de microcréditos por las entidades financieras y no financieras en la ciudad de Loja*. Universidad Nacional de Loja. <http://dspace.unl.edu.ec/jspui/handle/123456789/11603>
- Caçador, S. B. (2014). Impactos socioeconômicos do microcrédito: o caso do Nossocrédito no Espírito Santo. *Revista de Administração Pública*, 48(6), 1475-1502. <https://doi.org/10.1590/0034-76121701>
- Carvajal-Salgado, A. L., & Espinoza-Párraga, L. (2020). Microcréditos ecuatorianos: incentivo a la reducción de la pobreza y mejora del ingreso familiar. *Vínculos*, 5(3). <https://doi.org/10.24133/vinculospe.v5i3.1671>
- Castro, F., Londoño, D., Parga Cruz, A. J., & Peña Gómez, C. (2020). ¿Qué factores inciden en la demanda de crédito de la microempresa en Colombia?. *Archivos de Economía*, Documento 522. [https://www.banca-delasoportunidades.gov.co/sites/default/files/2020-11/522%20\(1\).pdf](https://www.banca-delasoportunidades.gov.co/sites/default/files/2020-11/522%20(1).pdf)
- Chaise, M. F. (2023). El programa de créditos para la reducción de la pobreza: trayectorias políticas divergentes en Brasil bajo el PT y en México bajo el PAN. *Les Études du CERI*, (264-265), 72-87. <https://sciencespo.hal.science/hal-03968496/>
- Chikwira, C., Vengesai, E., & Mandude, P. (2022). The Impact of Microfinance Institutions on Poverty Alleviation. *Journal of Risk and Financial Management*, 15(9), 393. <https://doi.org/10.3390/jrfm15090393>
- Gobierno Autónomo Descentralizado Parroquial Rural de Apuela. (2015). *Plan de desarrollo y ordenamiento territorial PDOT, de la parroquia rural de "Apuela" 2015-2019*. Gobierno Autónomo Descentralizado Parroquial Rural de Apuela. <https://www.imbabura.gob.ec/phocadownloadpap/K-Planes-programas/PDOT/Parroquial/PDOT%20APUELA.pdf>
- Jamal, W. N., Hafeez, R. M. Z., Shafique, O., Razzaq, R., Asif, G., & Ashraf, M. W. (2021). Impact of microcredit finance on the socioeconomic status of the underprivileged populace of Punjab: Through the mediating effect of knowledge sharing ability and financial and legal awareness. *Bulletin of Business and Economics*, 10(4), 113-125. <https://doi.org/10.5281/zenodo.6338666>
- Leon Paz, J. R., & Rivera, A. (2020). Ilegalidad de la tenencia y desigualdad en la distribución de la tierra en Ecuador como condiciones de vulnerabilidad. *Geopauta*, 4(1), 34-48. <https://doi.org/10.22481/rg.v4i1.6150>

- Londoño-Bedoya, D. A., Garzón-Quintero, C. M., & Collazos-Ortiz, M. A. (2021). El efecto del microcrédito en el PIB de Colombia, 2005-2018. *Problemas Del Desarrollo. Revista Latinoamericana De Economía*, 52(204), 3-34. <https://doi.org/10.22201/iiiec.20078951e.2021.204.69630>
- López Beltrán, C., Wade, P., Restrepo, E., & Ventura Santos, R. (eds.). (2017). *Genómica mestiza. Raza, nación y ciencia en Latinoamérica*. Fondo de Cultura Económica. <https://www.fondodeculturaeconomica.com/Ficha/9786071651334/F>
- Morales Londoño, M., Vega, J. A., Aroca, J. A., & Ramírez Atehortúa, F. H. (2005). Financiación de la vivienda de interés social. *Revista Ingenierías*, 4(6), 123-142. <http://www.redalyc.org/articulo.oa?id=75040609>
- Organización de las Naciones Unidas [ONU]. (2015). *Transformar nuestro mundo: la Agenda 2030 para el Desarrollo Sostenible*. ONU. <https://www.un.org/sustainabledevelopment/es/development-agenda/>
- Perugachi, L. M., Jaramillo, D. F., & Flores, E. L. (2022). Propuesta sistema de gestión de crédito, para reducir el riesgo en microempresas no financieras del cantón Otavalo, Cayambe y Tabacundo (Ecuador). *Revista Espacios*, 43(10), 6. <https://doi.org/10.48082/espacios-a22v43n10p06>
- Prado Chinga, A. E., Alcivar Soria, E. E., Preciado Ramírez, J. D., & Tapia Agualsaca, L. C. (2022). Microfinanzas y su incidencia en el sector agrícola y comercial en Ecuador. *Revista de Ciencias Sociales*, 28(5), 198-209. <https://doi.org/10.31876/rcs.v28i.38156>
- Programa de las Naciones Unidas para el Desarrollo [PNUD]. (2020). *Informe sobre Desarrollo Humano 2019. Más allá del ingreso, más allá de los promedios, más allá del presente: Desigualdades en el desarrollo humano en el siglo XXI*. Programa de las Naciones Unidas para el Desarrollo. <https://doi.org/10.18356/3308412d-es>
- Rayo Cantón, S., Lara Rubio, J., & Camino Blasco, D. (2010). Un Modelo de Credit Scoring para instituciones de microfinanzas en el marco de Basilea II. *Journal of Economics, Finance and Administrative Science*, 15(28), 89-124. <https://doi.org/10.46631/jefas.2010.v15n28.04>
- Rodríguez Loor, D. V. (2015). *Análisis del impacto de los microcréditos y su contribución hacia el sector de la Economía Popular y Solidaria en Portoviejo 2012-2013*. Universidad de Guayaquil. <http://repositorio.ug.edu.ec/handle/redug/16957>
- Ruiz Mena, V. M. (2013). *Los microcréditos y su relación con la proyección financiera de crecimiento de la cooperativa de ahorro y crédito "Futuro Lamanense" cantón La Maná - provincia de Cotopaxi, Período 2012*. Universidad Técnica Estatal de Quevedo. <http://repositorio.uteq.edu.ec/handle/43000/308>
- Salinas Vásquez, J. (2011). Ecuador, microcrédito: ¿Negocio o inclusión financiera?. *Retos*, 1(2), 39-47. <https://doi.org/10.17163/ret.n2.2011.06>
- Secretaría Nacional de Planificación. (2017). Plan Nacional de Desarrollo 2017-2021. <https://www.planificacion.gob.ec/wp-content/uploads/downloads/2017/06/PND-2017-2021-SENPLADES-FINAL-06-06-2017.pdf>
- Secretaría Nacional de Planificación. (2021). Plan de Desarrollo Creación de Oportunidades 2021-2025. <https://www.planificacion.gob.ec/plan-de-desarrollo-de-creacion-de-oportunidades-2021-2025/>