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"INTERNATIONAL COOPERATION PROJECT OF UNICEF AND CAÑARS' LOCAL GOVERNMENT: Provision of jackfruit bars to counteract indigenous child malnutrition in Ingapirca"

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TO

I dedicate this work to my parents Ángel and Ines, for the unconditional support, love and motivation they have given me in all these university years.
To my brothers Angelina and Domenic for always believing in me and cheering me up on long nights at university.
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- **Maritza Estefanía Saldaña Morales**

TO

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ABSTRACT

This study aims to propose an International Cooperation project between UNICEF and the Municipal GAD of Cañar to counteract malnutrition in elementary basic education in children between 5 and 8 years old of the Ingapirca parish, through the provision of nutritional bars based on jackfruit. This research proposal is focused on the Sisid Intercultural school where mixed methods will be applied in order to have greater precision in the information. The purpose of this study is to know the feasibility of executing the project and if it can be an alternative to mitigate chronic malnutrition in order to generate a positive and sustainable social act.

Key words: International Cooperation, Local government, bottom up strategy, malnutrition, jackfruit

RESUMEN

El desarrollo de este estudio tiene como objetivo plantear un proyecto de Cooperación Internacional entre UNICEF y el GAD Municipal del Cañar para contrarrestar la desnutrición en la educación básica elemental en los niños de 5 a 8 años de edad de la parroquia Ingapirca, mediante la dotación de barras nutricionales a base de yaca. Esta propuesta de investigación está enfocada en la escuela Intercultural del Sisid donde se aplicarán métodos mixtos para poder tener una mayor precisión en la información. La finalidad de este estudio, es saber la viabilidad de ejecución del proyecto y si puede ser una alternativa para mitigar la desnutrición crónica con el fin de generar un acto social positivo y sostenible.

Palabras claves: Cooperación Internacional, Gobierno autónomo descentralizado, modelo bottom up, desnutrición, yaca.

ACRONYM

(UNHCR): United Nations High Commissioner for Refugees

(ARCS): The National Agency for Health Regulation, Control and Surveillance

(CAF): Development Bank of Latin America

(CRC): Convention on the Rights of the Child

(CONAIE): The Confederation of Indigenous Nationalities of Ecuador

(CCM): Child Chronic Malnutrition

(FAO): Fund of the United Nations Food and Agriculture Organization

(DAG): Decentralized Autonomous Governments or Local Government

(INEC): The National Institute of Statistics and Censuses

(INEN): The Ecuadorian Institute for Standardization

(MAG): Ministry of Agriculture and Livestock

(ODNA): Observatory of the Rights of Children and Adolescents

(SDG): Sustainable Development Goals

(WHO): World Health Organization

(NGO): Non-Governmental Organization

(UN): Organization of the United Nations

(EAP): Economically Active Population

(EAS): Ecuadorian Accreditation Service

(SENADI): The National Service of Intellectual Rights

(UNICEF): The United Nations Children's Fund

(VUE): Ecuadorian Single Window

INTRODUCTION

Malnutrition is considered one of the main public health problems worldwide. It is quite alarming since many children have been victims of this event since "52 million children are underweight for height, 17 million are severely underweight, and 155 million have stunted growth" (WHO, 2021, p.1) causing future problems in their lives. Which has caused negative consequences in infants to the point that "about 45% of them have malnutrition" (WHO, 2021, p. 1).

According to the Fund of the United Nations Organization for Food and Agriculture (2018), 1.3 billion tons of food are lost for human consumption, that is, a third of the total food produced is wasted due to overproduction, however, there is a large number of people who have malnutrition because they do not have adequate food or cannot acquire it, as a consequence they do not have the amount of iron, iodine or vitamins A, B1, B2, B3, C or D that they need. Which leads to symptoms ranging from tiredness, dizziness and weakness to fatal diseases such as muscle absence, extreme thinness, edema and growth problems especially in children.

Malnutrition is a problem that affects many countries in the world and Ecuador is not the exception. In the country, 1 of 4 infants suffers from chronic malnutrition, with a greater impact on indigenous children and rural sectors. Affecting not only their emotional and physical state but also their way of dealing with the environment. It is for this reason that it is important to take this problem into account, which is why we considered essential to seek strategies to address the issue, even more if Ecuador is known for being a mega-diverse state with fertile soils and jackfruit is a local fruit that has great nutritional potential, that is not being used.

For this reason, it is intended to design an international cooperation project with UNICEF and the municipal GAD of Cañar for the provision of nutritional jackfruit bars as an alternative to counteract malnutrition in children from 5 to 8 years of age in Ingapirca, focused on the Sisid Intercultural Bilingual School of Cañar. Through this research, the causes of child malnutrition in Latin America, Ecuador and Cañar will be explored. Also, it will be analyzed how the yaca or Jackfruit could be a sustainable alternative with a bottom up model for the design of nutritional bars. In addition, the international cooperation project between UNICEF and the municipal GAD of Cañar will be formulated for the viability and nutritional contribution of indigenous children, in order to know the contribution that this project will have in the

Ingapirca parish and examine how international cooperation alliances exercise their capacities in a social purpose.

STATE OF ART

Malnutrition is one of the most alarming problems, since it is an obstacle to the well-being of the health of human beings, 480 million inhabitants in the world suffer from chronic malnutrition, which is equivalent to 10.5% of the total population. Malnutrition comes from an imbalance in the supply of nutrients in the body (Gómez, 2013, p. 16), which causes a lag in physical growth and less cognitive development. This problem is more frequent in developing countries. Therefore, the opportunities and real freedoms of children are restricted, since they do not exercise the right of a safe access to nutritious, healthy and enough food as established in the Constitution of the Republic of Ecuador, 2008 (Bacallao & Diaz, 2012).

In Ecuador, chronic malnutrition predominates in minors, since about 24.38% suffer from it, that is, around 368,541 children suffer from stunted growth in terms of their age. Although this figure is high, it is important to recognize that in the internal division of the country there are percentages of malnutrition higher than the national average, such as the provinces of Cotopaxi, Chimborazo, Bolívar and Cañar, which present figures of chronic child malnutrition of 34%, 44 %, 40% and 31% respectively. Due to this, one out of every two infants is malnourished. It is for this reason that from these percentages it is possible to visualize the territories that present high rates of malnutrition, in order to intervene and give priority to the most affected provinces (Accelerated reduction of malnutrition in Ecuador, 2015).

In the country, the programs to reduce chronic child malnutrition have not been competent, since the problem is not found in the quality of food, but in the lack of access to these food products, when talking about access, it is not referring to a physical access such as markets, it is referred to a monetary access, which is the ability of households to provide food. In different areas of Ecuador, access to basic food is difficult, which has generated high rates of chronic malnutrition, as in the case of the Cañar canton, since it has a percentage of 72%, mainly affecting its girls and boys (Flores, 2014).

To cover this problem of child malnutrition, many countries work together with international organizations such as: UNHCR, FAO, UNICEF, among others; These organizations have implemented methods to reduce malnutrition, providing nutritional supplements such as “super cereals” and “Plumpy'nut”, which contain vitamins, minerals and amino acids. They are made from ingredients such as: peanuts, vegetable oil, powdered milk, oats, corn, wheat, soybeans, among others. These supplements have the protein foods and fats

necessary to reduce and prevent the risk of diseases. In addition, these NGOs participate in social projects that defend the rights of children (UNHCR, 2019).

In this context, the project seeks the support of Unicef, due to this organization has a social approach that has humanitarian purposes independent of public administration and it is nonprofit. This NGO offers nutritional supplements and cares for children's rights established in the Human Rights Treaty and the Convention on the Rights of the Child. A large part of its funds are invested in human development programs in developing countries. UNICEF collaborates with governments to design and implement programs related to the defense, survival and protection of children. Participating with this organization promotes future well-being, ensures children's rights in order to generate positive social change, and it will favor the most vulnerable population (Keeley, 2019).

According to UNICEF, in "Ecuador this problem is not only due to the lack of food availability, but it is also due to inequity in access to adequate food" (Unicef, 2015, p. 26). This study will focus on Ingapirca because in this area it´s observed that malnutrition is mainly due to the lack of food accessibility since this is one of the biggest problems for the population due to the low socioeconomic level (GAD INGAPIRCA, 2015). The prevalence of chronic child malnutrition in the Ingapirca parish is 41.8%, it is for this reason that the analysis of this research will be on the Sisid Intercultural Bilingual School of Ingapirca in Cañar canton (Acosta Silva, 2018).

With a high rate of child malnutrition in the Ingapirca parish, it is important to propose a design for nutritional bars that have a high degree of carbohydrates, fats, vitamins and minerals. Therefore, it has been observed that the jackfruit has qualities that provide health benefits on children, however, the properties of this fruit are unknown in Ecuadorian society, despite the fact that they are easy to grow, due to the warm and temperate climate that Ecuador has, that's why arose the idea of designing nutritional bars of jackfruit to counteract malnutrition in elementary basic education in Ingapirca.

Jackfruit has great potential to reduce malnutrition in elementary basic education, because this fruit is full of benefits for our body, it is high in vitamins, minerals, proteins, healthy fats and contains a high level of carbohydrates, so it is a good source of antioxidants that protect our body. In addition, it controls and lowers blood pressure levels, has vitamins A and C, increases magnesium levels, promotes good digestion in the infant, among others. It is

for this reason that jackfruit, having a wide variety of positive qualities, helps prevent diseases such as anemia, malnutrition, among others. That is why this fruit is going to be used to provide nutritional bars as an alternative to mitigate chronic child malnutrition in Ingapirca (Esquivel, 2020).

For designing the nutritional bars, we will first focus on the production zones of the fruit. In Ecuador, the province of Santo Domingo de los Tsáchilas has a variety of jackfruit farms, however they do not promote its cultivation for productive purposes, due to lack of knowledge that the local city has about the different production techniques that can be used or applied to this fruit (Zamora, 2016).

These bars will be designed with the participation of jackfruit producers and the knowledge of experts in the field such as nutritionists and food engineers. It requires health regulations for their development as well as the ISO standards (Rambay, 2018).

METHODOLOGY

For the management of this project, a quantitative and qualitative analysis will be carried out, that is, mixed methods will be used. On the qualitative side, its scope is analytical-descriptive, since the benefits of the Ecuadorian jackfruit and its sustainability when processed as a nutritional bar will be analyzed in detail. Through this study it will be possible to reduce chronic malnutrition in elementary basic education. The segmentation on which the demographic thesis will focus, since they will be divided into age range, gender, family income, and ethnicity, will be carried out in Ingapirca.

Regarding the quantitative analysis, it will be managed through structured surveys addressed to the administrators of the educational institution in order to know what percentage of students in the range 5 to 8 years of age suffer from malnutrition and knowing what measures the institution takes to cover this problem, structured surveys will also be developed aimed at teachers, this will allow us to identify the behavior of the students, it will be necessary to carry out a quantitative analysis with structured surveys aimed at parents and students from 5 to 8 years to identify the causes of children suffering from malnutrition problems.

In addition, as a qualitative method, semi-structured interviews will be conducted with the municipal GAD of Cañar to learn about the financing it provides to social projects that improve the health of the children of the parish and to know how they manage these activities. Also, we will ask if they are aware of the problem and if their preview projects have given feasible results in the parish of Ingapirca.

The sample used for the students and parents of the Sisid Intercultural School will be the probabilistic methodology with simple random selection. This type of sample was applied so that all the students in the school have the same or known probability of selection, since it will be determined by means of a random procedure. On the other hand, a non-probabilistic sample with trial selection was carried out. This technique was obtained, since it is convenient since it is selected based on our judgment, in this case the researchers will be made to the administrators of the Educational Unit, administrators of the Municipal GAD of Cañar and UNICEF, because they are the most representative for our interest.

Surveys released

The Survey 1 consists of 23 questions divided into 5 sections.

Below are the results of the first survey, in which 68 students from 5 to 8 years of age and their legal representatives participated.

Table 1

Results of surveys

Section 1: Student Personal Information	
In question 1, 8-year-old children were asked what gender they identify with.	In the results of question 1, it was examined that of 68 students with an age range of 5 to 8 years old, 37 respondents were male and 31 were female.
Question 2 establishes that the age of the respondents is selected	In question 2 it was observed that of 68 respondents from Sisid Intercultural Bilingual School 38 belong to the age of 5 (19 surveys) to 6 (19 surveys) years of age, and the remaining 30 respondents belong to the 7 (15 surveys) and 8 (15 surveys) years of age.
In question 3, the height of the infants is consulted.	According to the reference table, 5-year-old infants must have a height of 109.4 cm, 6-year-old infants must have a height of 110 cm for girls, 7-year-old infants must have a height of 115.5 and infants 8 years old must have a height of 121 cm. The respondents are stunted in their growth, according to the guide of the basic measures of MedicosEcuador, it was observed that the boys and girls from 5 to 8 years old of Sisid

	Intercultural Bilingual School, have a height of -10.87cm, -11.35 %, -14.06%, -17%, -17.34%, -22.5%, -27% and -30%, these measurements are less than the reference base.
In question 4, the weight of the infants is consulted.	According to the referential table of MédicosEcuador, 5-year-old infants must weigh 18.2 Kg (40.12 lb), 6-year-old infants must weigh 19 Kg (41.88 lb), 7-year-old infants must have the weight of 22 Kg (48.50 lb) and the infants of 8 years must have the weight of 24 Kg (52.50 lb). To obtain the percentage of malnutrition, the expected weight was evaluated according to the weight of the infant, that is, % of malnutrition according to the expected weight for height = (real weight / expected weight) * 100 In 5-year-olds, there are children with an average weight of: - From 25 lb = 56.4% Severe Malnutrition - From 33.47 lb = 72.3% Moderate Malnutrition In 6-year-old, There are children with an average weight of: - From 30 lb = 64.80% Severe Malnutrition

	- From 36.10 lb = 77.98% Moderate Malnutrition - In children of 7 years, There are children with an average weight of: - From 26 lb = 51.28% Severe Malnutrition - From 37.8 lb = 74.55% Moderate Malnutrition In 8-year-old children, There are children with an average weight of: - 31 lb = 55.15% Severe Malnutrition - 43.06 lb = 76.60% Moderate Malnutrition
Section 2: Socioeconomic conditions - Addressed to the student's legal representative	
Question 5 establishes that the income with which the respondents identify best is selected.	This question was addressed to the 68 legal representatives of infants from 5 to 8 years old, most of the respondents were elderly adults, they explained that their income came from the dairy, so their income did not exceed $50 dollars per month, while people who earn $50 to $200 dollars a month work in restaurants in the community of Ingapirca.
Question 6 establishes the level of education that the respondents have	In question 6, it was analyzed that the majority of the legal representatives of the students from 5 to 8 years old were the grandparents,

	which is why 67% of the respondents have not completed any educational level.
Question 7 is addressed to those responsible for the care of children, in which it was established their current occupation.	Question 7 was addressed to the legal representatives, in which they must select what occupation they are performing; 63 of 68 respondents selected that they are engaged in agriculture, dairy and livestock.
Section 3: Home- Addressed to the student's legal representative	
Question 8 was addressed to the legal representatives; in which they should select the response whit they best identify.	In question 8, of the 68 respondents, 55 have their own home, this is because most of the people are elderly, own their homes and land, 9 respondents live in a borrowed home, where there is no payment monetary, then, the majority have migrated and have left the house to their friends or relatives with their children in order for them to take care of the infants and finally 4 respondents rent their home.
Question 9 establishes that the respondents select if they have basic services.	In question 9, it was analyzed that 39 of the 68 respondents from the Sisid Educational Unit do not have all the basic services such as water, electricity, and telephone, since most are low-income and there is no pressure on the municipality.
Question 10 asks the respondents to select whether they go accompany to school.	In question 10, it is analyzed that 64 students from 5 to 8 years old go to school on foot, since

	most of them live near the school. Children 5 and 6 years old are accompanied by older siblings, parents or grandparents, and children 7 to 8 years old go without the accompaniment of any adult.
Question 11, addressed to the students of the educational unit of the Sisid, establishes that the person who is in charge of the household support	In this question it was observed that, in most households, the person in charge of supporting the household is the grandparents and parents.
Question 12, addressed to the students of the Sisid educational unit, establishes that the number of people with whom they live at home	This question analyzed that, in most households, students from 5 to 8 years old live with 5 people, followed by 4 people.
Question 13, addressed to the students of the educational unit of the Sisid, establishes that it is selected if there is some type of addiction in the home.	In question 13 it was observed that in most households there is no addiction at home, however, there is a percentage of 20% in which it does exist.
In question 14, it is established that the type of addiction that exists in the home be indicated.	In question 14, it was observed that in the majority of households in which there is some type of addiction, the one with the highest percentage is alcohol.

Section 4: Everyday Life - Student Personal Information	
Question 15, addressed to the students, determines whether the respondents contribute to household chores.	In question 15, it was observed that the majority of students help their relatives with household chores, however, there is a low percentage of children who do not.
Question 16, addressed to children, determines whether students work after finishing their classes.	In question 16, it was observed that a large part of the students, after concluding their classes, they help their parents in tasks such as feeding the animals, getting the milk from the cows, selling in the market, among others, without However, there is a low percentage that does not do it, they come home and start doing their homework.
Question 17, addressed to children, determines if the students practice any sport such as soccer, volleyball, basketball.	In question 17, it was observed that most students like to practice some type of sport such as soccer or basketball, however, there is 10.85% of children who do not like it.
Question 18, addressed to the children, determines if the students spend enough time with their classmates, neighbors or friends.	In question 18, it was observed that most students spend enough time with their friends, classmates and neighbors, however, there is a small percentage of 15.55% of children who

	do not spend enough time, this is due to they are helping their parents.
Question 19, addressed to children, determines whether students consider personal cleanliness to be important.	In question 19, it was observed that 67.57% of students consider that adequate personal hygiene three times per week is necessary, however, there is a small percentage of children who consider that personal hygiene once a week is normal.
Question 20, addressed to the children, determines the times that the students consider that it is necessary to consume food.	In question 20, it has been observed that the majority of the respondents do receive the 3 meals per day, for breakfast they drink milk, coffee, hard-boiled eggs and then they consume the school kits, which is a juice and cookies or a nutritional bar and for lunch they eat only noodle soups and rice with eggs or simple noodles, however, it has been possible to analyze that very few eat nutritious foods. was also consulted. It was also analyzed that they do not know how to have adequate nutrition.
Question 21, addressed to children, determines if the students consume foods rich in protein, minerals and fiber.	In question 21, it was observed that the majority of students rarely consume foods rich in protein, however, they stated that they did so about 5 times a week.
Section 5: Social responsibility of the Municipal GAD of Cañar towards the	

inhabitants - Addressed to the legal representative of the student	
Question 22 addressed to children, it is determined if the students have received social attention at the parish.	In question 22, it was observed that the majority of people have not received support from the GAD, the situation was worse in the pandemic, the administrators of managing projects have been absent, however, if they have received the delivery of kits and a small Percentage of those surveyed have received bonuses for the elderly.
Question 23 addressed to children, determines which is the area to which the municipal GAD of del Cañar pays more attention.	In question 23, it was possible to analyze that the majority of respondents consider that the municipal GAD of Cañar gives more importance to tourism than other social projects such as feeding children or community health.

Table 2

Organization of focus group

Conclusive phase:	Report of the interview with the focus group.
Area:	Health of indigenous children from 5 to 8 years of age.

Problematic:	Testimony of chronic child malnutrition of the indigenous people of the parish of Ingapirca. **Observer:** Mgt. Diana Garcia Orellana **Moderator:** Estefania Saldaña
Testimonials	
Testimony 1:	**Administrative of the municipal GAD of Cañar:** José is 45 years, is the administrative manager of Management and Social Development of the Provincial GAD of Cañar "At the moment the GAD is doing other projects with the schools in the center of Ingapirca, with the pandemic, it has been difficult to develop new projects, especially those that are of malnutrition and that they are directed to children".
Testimony 2:	**Substitute Rector Administrative:** Wilson, is 55 years old, deputy rector of the Educational Unit: says "The school has 98% indigenous children, most of them have limited, they do not spend a lot of time at home, several thin children have been seen at school, with an inappropriate weight and height for their age, we try to give them laundry at school and keep track of what they eat, we are really concerned about the

	students and stop the malnutrition that only threatens the lives of children. The
Testimony 3:	**Teacher of 5 year olds:** María Tenesaca, is 46 years old “It is very painful and outrageous to see how malnutrition leaves serious consequences in the lives of minors, because there are repercussions on the cognitive, emotional and physical development of the child and even affects the progress of Ecuador, because, the disease diminishes the productive, intellectual capacity and the way in which infants learn”.
Testimony 4:	**Teacher of 6-year-old infants:** Lurdes Duchi, is 45 years old "There are several boys and girls who suffer from malnutrition in this parish, mainly because parents leave their children alone, since they spend time working and most of them are low-income people from this community economically”.
Testimony 5:	**Teacher of 7-year-old infants:** Zoila Padilla, is 45 years old “In the pandemic, those in charge have not seen projects from the GAD administration, it is not even known who the newly elected are for this period, they have forgotten this

	community, and the saddest thing is that they have forgotten of indigenous children. Due to the pandemic there were many problems in homes such as: domestic violence, decreased economic activity and the number of malnourished children has increased. Two years ago when there were face-to-face classes, the children ate at school and there was an acceptable control of cleanliness and adequate nutrition, but now with all this the children have lost cleanliness habits, however, we teachers try to instill that and to teach them what foods are good to eat and help their metabolism".
Testimony 6:	**Teacher of 8-year-old infants:** Elsa Ortiz, is 45 years old "In an old period of face-to-face classes there was a boy who was very skinny, the truth was very alarming, because we as teachers notice when something is not right. I asked the boy what was happening and he was just sad, I summoned the representative to come to the school to see how this inconvenience can be solved, the lady who came was his grandmother, an elderly lady, you could tell that even the lady needed care, the parents of the children leave the care to the grandparents or relatives and they neglect their child's well-being and health if they don't do their part, we teachers can't do much".

Testimony 7:	**Mother:** Rosita, is 41 years old Indigenous “I want help from the government, I want them to help my son, I want the authorities to help, I have 4 more children, I don't have a husband, the cows, little milk that little bit of what I earn doesn't exceed 70 dollars, and I have a 5-year-old son who is sick, he is weak, he has no strength or energy, I give him milk but it does not help him gain weight, he is very unfocused and it worries me but, I do not know what to give him, I know he needs vitamins but it is not enough the realito for expenses, besides he stays at home helping little with the animals at the fields
Testimony 8:	**Legal representative:** María, grandmother, is 71 years old Indigenous “With the Covid virus that is circulating, everything has become hard, there is no work, worse for us old people, the buses leave bouncing to go to Jhony (United States) and they forget about us, everything is hard here, here is a forgotten community, my 7-year-old girl eats, but she doesn't gain weight, her skin is dry, you can see her bones, the teachers attract attention, but you can't do anything”.

CHAPTER 1

1. CHILD MALNUTRITION

1.1 Child malnutrition with a focus on Latin America

Malnutrition is known as the result of insufficient food consumption and an inadequate diet. It can be classified into two types: chronic and acute. Chronic malnutrition refers to stunted growth in children, while acute malnutrition is weight deficiency in children. It is established that more than 200 million children in the world suffer from some type of malnutrition. To prevent it, it is important to have an alimentation that is full of vitamins and proteins. Malnutrition generates big headlines such as sickness, famine, and death (World Health Organization, 2021).

This problem not only occurs because children do not have enough food, this happens because they do not consume the necessary nutrients for their development. However, malnutrition is not just a matter of food. But it is also inadequate care or hoarding of infectious diseases, these two are elements that are always present in cases of child malnutrition. It is for this reason that good nutrition for kids is essential for their survival, their cognitive development, their emotional skills, their motivation to interact with other children, and their ability to learn (UNICEF, 2020).

Malnutrition develops physical and emotional problems in children. This is why child malnutrition is currently considered a violation of children's right to food and is established as one of the fundamental problems of public health and social welfare in Latin America, this is due to the deficient determinants economic, political, social and health issues that exist in most of the countries of this region. In Latin America and the Caribbean, 15% of boys and girls suffer from chronic malnutrition and it is related to half of child deaths worldwide (Economic Commission for Latin America and the Caribbean, 2018).

Between 2000 and 2018, Latin America produced chronic malnutrition in children from 16.7% to 9%. However, of these advances, there are still 4.8 million infants who are underweight for their age. Latin America is a region where there is great social inequality, which causes malnutrition as an effect, since it limits people's opportunities to access the basic food basket. It is for this reason that it is necessary to take conjunctural and structural measures,

in such a way that there are educational and employment opportunities for those who need it, since poverty is one of the main causes of food insecurity (CAF, 2020).

In Latin America, malnutrition is a problem that prevails in large quantities, according to the latest data from the FAO, the country with the highest rate of child chronic malnutrition is Guatemala, because 46.5% of its children, that is, nearly 900,000 boys and girls suffer from this problem and in rural areas the situation is critical in indigenous children, since it affects 61%. In the region there is great inequality in the prevalence of malnutrition, since countries such as: Argentina, Brazil, Chile and Jamaica present global malnutrition under 2.5% of the total index. Also, in Peru there is a high chronic malnutrition gap, reaching 54.6% in children (Economic Commission for Latin America and the Caribbean, 2018).

However, in countries such as Cuba, Costa Rica, Brazil and Chile, care systems have been implemented and therefore managed to reduce this problem. In addition, there are countries that have been able to get ahead, such as Peru, Honduras and Bolivia. The development that Peru has achieved has been incredible, since it is one of the countries that has made the most progress in combating chronic child malnutrition. In the case of Honduras, which, being a country with more poverty and less economic development, has managed to face the problem through food programs, which has allowed it to obtain good results. Guatemala and Bolivia, being countries with a relatively low level of economic development, have been able to halve CCM in the last 10 years, however, they remain in a constant struggle. Countries such as Brazil, Chile, Colombia, Costa Rica, Ecuador and Mexico have also taken measures to increase weight in children through food programs (ECLAC, 2018).

Organizations like CAF (Corporación Andina de Fomento) and the Development Bank of Latin America have implemented a specific agenda to work together with the countries of the region to combat child chronic malnutrition, generating campaigns that promote adequate health, food security and child-friendly environments, primarily water and sanitation; and thus strengthen institutional capacities to address this problem (CAF, 2020).

1.2 Definition, causes and consequences of child malnutrition

According to the World Health Organization (WHO) the word malnutrition refers to the imbalance of nutrients that exists in the body. Child malnutrition is known as insufficient food consumption and is present when the necessary calories or the adequate amount of main

nutrients, such as vitamins and minerals necessary for health, are not obtained. It is for this reason that nutrition in the first year of a child's life is essential for their growth, both for their physical and psychological development (UNICEF, 2019).

The factors that cause child malnutrition are the scarcity of drinking water, incorrect hygiene, and difficulties in accessing health and education services. In addition, it is the lack of access to support groups that each country considers adequate to combat this problem, also the inadequate care of both the children and the mother, the absence of health services and basic sanitation and finally it is the insufficient intake of food.

The causes of chronic malnutrition are divided in two groups:

● Immediate causes: these are the causes that are related to an inappropriate diet. That refers to the insufficient food consumption in terms of quality and quantity of food.
● Underlying causes: These causes are related to poor access to food products, ineffective limited health care, and difficulty in acquiring clean water:
➢ Lack of food: This is common among a group of people who have low incomes, as well as those who are homeless.
➢ In addition, it is given to that group of people who have difficulty consuming food due to lesions in the mouth.
➢ It also affects people with dysphagia, as this could cause a blockage in the passage of food due to pain in the mouth.
➢ Decreased appetite is one of the common causes of liver or kidney disease, chronic infections, etc. (ECLAC, 2018).
Malnutrition has a devastating short- and long-term effect on children's lives.

The impact on health is evident, since it multiplies the chances of suffering from diseases such as pneumonia, gastroenteritis or malaria. This is why malnutrition is one of the worst enemies of child survival. An inadequate and non-nutritious diet is linked to a large part of the deaths of children around the world. When undernourished, infants are more likely to have stunted growth for the rest of their lives. It is not necessary for there to be an advanced degree of malnutrition to suffer serious consequences, three quarters of children who die do so from causes related to malnutrition or are moderately malnourished (UNICEF, 2020).

In addition, malnutrition causes negative effects on cognitive development such as: late entry into the educational system, greater school dropout and in adulthood there is a high risk of developing chronic diseases, since there is lower productivity and difficulties for inclusion both work and social. That is why, in order to prevent chronic child malnutrition, it is necessary to work on comprehensive policies that ensure that children receive adequate nutrition, attend all required medical check-ups, they should be vaccinated, have access to clean water and sanitation, and receive stimulation for their development. from an early age (UNICEF, 2020).

1.3 Child malnutrition with a national approach

In Ecuador, child chronic malnutrition affects 24.38% of Ecuadorian children. It has worsened over the years, due to the fact that the country maintains one of the most unbalanced distributions of economic income in Latin America. This malnutrition problem affects the country's productivity since the impact it generates is present throughout people's lives. In the country, 1 in 4 children has chronic malnutrition. This situation is more severe in indigenous children, since 1 in 2 children suffer from it and 4 in 10 suffer from anemia (UNICEF, 2021).

The provinces that present the highest rates of malnutrition are Bolívar, Chimborazo, Santa Elena, Morona Santiago and Cañar, however, they are doubled in certain towns in Ecuador, especially in rural and indigenous areas, since it concentrates the highest percentages of malnutrition. It is important to know that, in these areas, chronic malnutrition reaches up to 40.71%, considering that the national average is 24.38% (Ministry of Economic and Social Inclusion, 2016).

Malnutrition in Ecuador is slowly reducing. These indexes advance slowly, because great efforts are needed to achieve improvements in development. However, it was observed that the country has decreased the malnutrition rate by 18 points, since in the 1980s it was 41%, while in 2011 it dropped to 23%, establishes the report of the Observatory of the Rights of the Childhood and Adolescence (ODNA) (Government of the Meeting, 2018).

In the country there is a wide variety of feeding programs that aim to eliminate malnutrition, these programs are mainly focused on supporting children from the early stage, that is, from the mother's womb to 5 years. According to studies carried out by UNICEF, in Ecuador one of every 5 children have short stature for their age, which means that they are more likely to suffer from chronic malnutrition. (UNICEF, 2018) Since 1993, Ecuador has managed

approximately 12 programs related to nutrition and health, however the curve of child chronic malnutrition in children under five has not decreased. Between 2014 and 2018, it increased from 24.8% to 27.2% in children under two years of age and in one in four children under five years of age in Ecuador.

In order to solve this situation, the United Nations System in Ecuador prepared a document to commit the candidates for the Presidency to generate stable policies to prevent child chronic malnutrition, which ensure controls for pregnant women; vaccination and proper medical care for children (United Nations Ecuador, 2021).

1.3.1 Malnutrition in elementary basic education of indigenous children in Ecuador

Ecuador is a multiethnic and multicultural nation, with a 40% indigenous population (INEC, 2015). It is for this reason that the Confederation of Indigenous Nationalities of Ecuador (CONAIE) recognizes the following as indigenous nationalities: Awá, Chachi, Épera, Shuar, Tsáchilas, Huancavilca, Cofán, Secoya, Woarani, Záparo, Andoas, Kichwa and 18 indigenous peoples.

Also, the Sierra is the region of the country that concentrates the highest percentage of indigenous population. The Kichwa nationality represents approximately 71.7%, and is located in five provinces: Chimborazo, Pichincha, Imbabura, Cotopaxi and Cañar (Benítez & Garcés, 2014).

The indigenous population is the most affected, since 48% of boys and girls suffer from malnutrition since 1 out of 2 children suffers from it and 4 out of 10 have infectious diseases as a consequence of it. The indigenous population is the most marginalized and tends to suffer further discrimination in the country's legal systems. To find out the determinants of these high rates of malnutrition in the indigenous population, the nutritional status of Ecuadorian households was analyzed, in which it was observed that 57.6% of the mothers were overweight and 24.8% of boys and girls presented growth retardation. It was also examined that mothers are obese and infants with anemia and zinc deficiency showed values of 12.6% and 14% malnutrition, respectively (Freire, 2014).

Malnutrition in Elementary Basic Education in the country is more persistent in rural communities, where the majority of the population is indigenous. The intervention of the Ministry of Education represented by María Ester Lemus, in charge of the management of Basic

Education Projects, highlighted that the process Education in this sector is fundamental and goes beyond the development of children's skills, calculation and literacy (Ministry of Education, 2020). Since in these projects mothers are taught to correctly dose nutritional supplements for children 0-5 years old, and the appropriate combination of nutrients for family feeding, with these projects the effects of malnutrition due to deficiency can be controlled. In this way, these workshops focus on the educational area to seek to reduce levels of malnutrition in children and guarantee mothers a correct way to nourish all household members. Although they are in a constant fight to cover this problem, their results have not been entirely efficient.

1.3.2 Effects of malnutrition on the process of psychological cognitive development of children in basic elementary education in the country

The effects of malnutrition in children of elementary basic education in Ecuador are: poor performance in class, difficulty in cognitive and intellectual abilities and attention deficit. This is because limitations in learning are linked to lower intellectual development.
Malnutrition in infants causes a delay in school entry, which increases the chances that the student will repeat the grade, since it generates a low IQ, behavior problems, social skills and poor learning and finally low grades (Early Childhood Development, 2016).

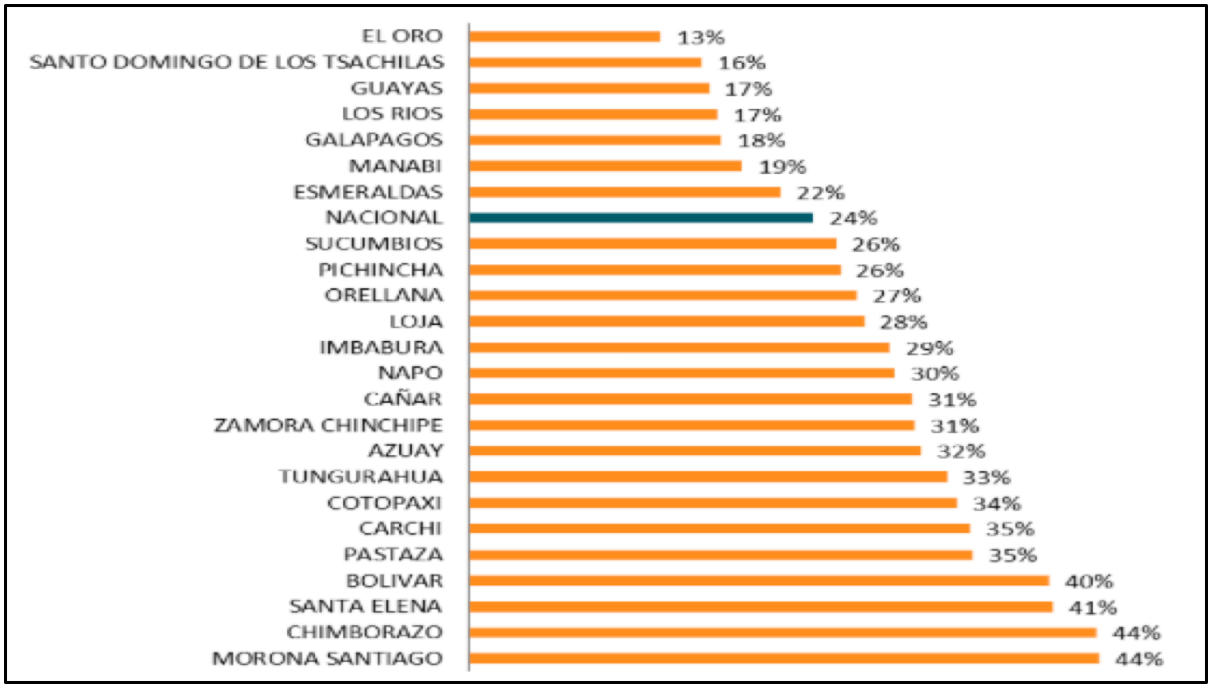
The impacts of malnutrition on cognitive and psychological development in children are directly related to the ability of students to pay attention and how their state of mind influences when receiving classes. To solve this problem, several nutrition programs have been implemented. That is why it is suggested that the earlier the child begins to benefit from these programs, the better their behavioral development at the school level.

1.3.3 Provinces with high rates of indigenous child malnutrition in elementary basic education in Ecuador

It is important to analyze figure 1, since it compares the rates of child malnutrition in the provinces of Ecuador, it will show how serious this problem is in our society and which provinces have been the most affected.

Figure 1

Percentage of child malnutrition in the provinces of Ecuador



Note. The graph represents the percentage of malnutrition existing in each province of Ecuador. Taken from ECV 2013-2014, INEC.

The UN (2016) has recognized food security as special rights for children of indigenous peoples, this special recognition has a great advantage, since it implies guaranteeing rights to this specific group that present greater violations for social reasons., historical and political reasons. This recognition promotes social implementations that focus on the most vulnerable. Figure 1, shows that the lowest rate of malnutrition belongs to the province of Oro with 13% while the highest percentage corresponds to the province of Morona Santiago with 44%.

In addition, it is analyzed that in the province of Cañar 31% of children suffer from malnutrition. A report of the plan for the Accelerated Reduction of Malnutrition managed by the Ministry of Coordination of Social Development (2015), establishes that the canton of Cañar has an index of 72% of boys and girls suffering from chronic malnutrition. It is for this reason that this proposal is for mitigating chronic malnutrition, this project will focus on Ingapirca, in order to carry out and to analyze an investigation, through surveys of indigenous children from 5 to 8 years old in the Sisid School with 98% indigenous students.

1.3.3.1 Analysis of malnutrition in the parish of Ingapirca - province of Cañar

The Ingapirca parish is located in the Cañar river basin, to the north with the Juncal parish of the Canton of Cañar, to the south the Honorato Vásquez parish, to the east the Rivera

parish, to the west the Tambo Canton. It is crossed by the Huayrapungo, Vendeleche and Molobog Silante rivers that flow into the Cañar River. According to the Ingapirca Parish Territorial Development and Planning Plan (2015), the majority of the inhabitants identify with the mestizo race, that is, it corresponds to 51.75%, followed by 45.43% of the population that calls itself indigenous. The remaining percentage with low indices, self-identifies: as white with 1.99%, mulatto and Afro-Ecuadorian with 0.195% and 0.17%, and montubia with 0.07%.

The factors that influence child chronic malnutrition in Ingapirca are: migration, due to the fact that, when this displacement of people occurs, most of the children are left in the care of relatives such as grandparents. In addition, the male gender is the one that migrates the most to places such as the United States and Spain, that is why the rate of women who work in agricultural activities in the area is high, causing that "the active population (PEA) of Canton Cañar is 48.8% and this percentage occupies 25.9% of the economically active population of the province" (Caguana, 2020, p. 5).

Next, the statistics will be presented, according to branches of activity.

Figure 2

Statistics according to the branch of activity of the inhabitants

Note. Taken from INEC- Population and Housing Census, 2010.

Translation of figure 2

Cañar: Employed population by branch of activity

- Agriculture, forestry and fishing
- Construction

- Retail trade and wholesale trade
- Education
- Manufacturing Industries
- Transportation
- Public administration and defense
- Activities of households as employers
- Human health care activities
- Hosting activities and food service
- Others

Another factor is that the inhabitants of Ingapirca profit mostly from agriculture, livestock, dairy, forestry and fishing, since these activities economically cover the Cañar canton. However, there is a main threat in the productive areas of the region due to climate change, such as drought. The negative impacts are towards the crops of corn, beans, potatoes, among others. This threat deepens chronic malnutrition in households because farming problems affect families' economic conditions.

To analyze malnutrition, a survey was developed, the same one that was carried out at the Sisid Intercultural Bilingual School of Ingapirca, aimed at students of Elementary Basic Education in an age range of 5 to 8 years old together with their legal representatives, to know the determinants of the problem, with 5 sections such as: personal information of the student, socioeconomic conditions, home, daily life and if there is a social responsibility of the Municipal GAD of Cañar towards the inhabitants.

The sample that was carried out was probabilistic with simple random selection, it was calculated taking into account the ages of the students, that is, from 5 to 8 years, considering the factors that are associated with malnutrition, a formula was used for cross-sectional studies with known population.

Figure 3

Cross-sectional study formula with known population

$$n = \frac{(N\,z^2)p.q}{e^2(N-1)+(z^2.p.q)}$$

Note. Taken from Research Design, 2020.

Table 3

Sisid School Sample Size Calculation

Number of students in the school	Population size (N):	Confidence level (z):	Expected frequency (p):	Margin of error (e):	Expected losses:
250 children	90 (children from 5 to 8 years old)	95%	48%	6%	10%

Result: n= 68

The prevalence of malnutrition in children of mestizo ethnicity is 21.85% and 48% in children of indigenous ethnicity, the majority of the inhabitants of Ingapirca are indigenous, the percentage of chronic malnutrition in the indigenous population, having a sample size of 68 infants, with a 10% margin of data loss.

The research hypothesis was based on the characteristics of the students and environmental factors; it is estimated that 44% of the respondents suffer from malnutrition.

Inclusion criteria:

- Girls and boys from 5 years to 8 years of age.

● Girls and boys residing in the Ingapirca parish.
● Girls and boys who study at the Sisid Bilingual Intercultural School
● Girls and boys authorized by the teachers to be surveyed

Next, the instruments used to carry out the surveys and the methods for the data collection procedure will be detailed.

The information was collected with the structured survey technique, from a questionnaire that contains 5 sections, the same that was approved by the thesis director, in addition, a request was processed to carry out the surveys within the institution, which was accepted by the substitute rector Wilson Andrade.

In order to know the nutritional status of children from 5 to 8 years old, anthropometric measurements were applied that were obtained by the page of Medicos Ecuador, in which reference figures were obtained to compare according to the age, height and weight of the respondents. feeding recommendations were also taken into account to prepare the questions based on the form MSP HCU-Form 028 A2/09 and MSP HCU-Form 028 A1/09 with the 2018 update of the comprehensive child care manual and the standards of Comprehensive care for children of 2011 of the Ministry of Public Health.

Table 4

Anthropometric measurements of medical assistant of children from 5 to 8 years old

	BOYS		**GIRLS**	
AGE	**Weight (kg)**	**Size (cm)**	**Weight (kg)**	**Size (cm)**
5	20,1	110	18,2	109,4
6	21	111,5	19	110
7	23	117	22	115,5
8	25,5	122	24	121

Note. Table 4 represents the anthropometric measurements that children should have according to their age range. Taken by Medico Ecuador, 2020.

In this research, there was a 3-hour training with Dr. Juan Carlos Muevecela from the Santa María Medical Center to guarantee and obtain the correct data regarding the measurements and weight of the respondents.

In September, visits were made to the Sisid School, in which a different group of children were surveyed every week, due to the COVID-19 pandemic, the children had school work in their houses and also had to assist some days to the school.

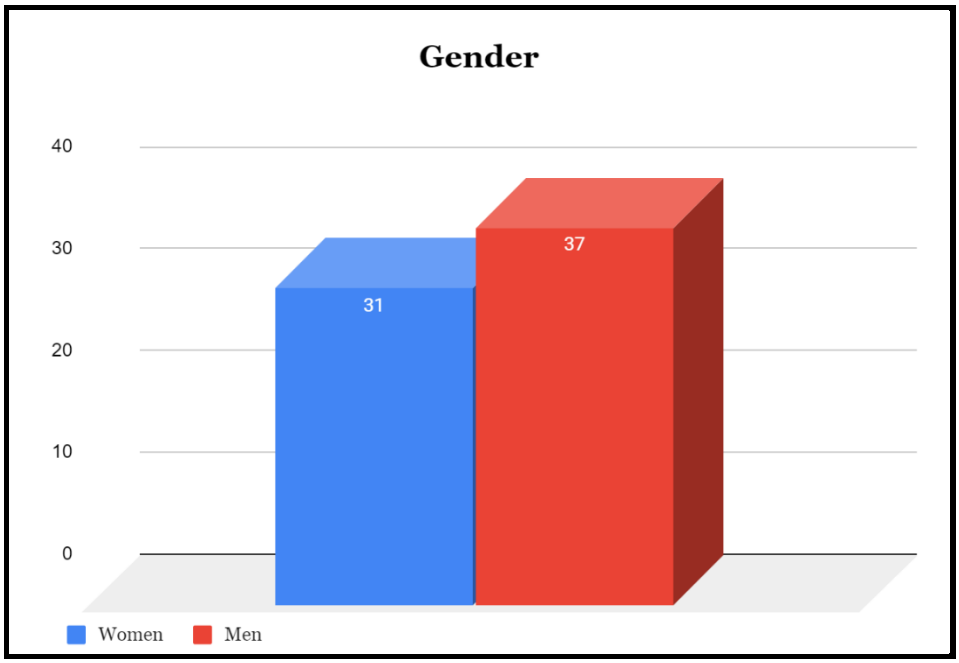
The tabulation of the collected data was carried out using the google forms and excel program to generate the graphics for the database. The results of the research, in which 68 students from 5 to 8 years old participated, are presented below.

The survey consists of 23 questions divided into 5 sections.

Section 1: Student Personal Information

Figure 4

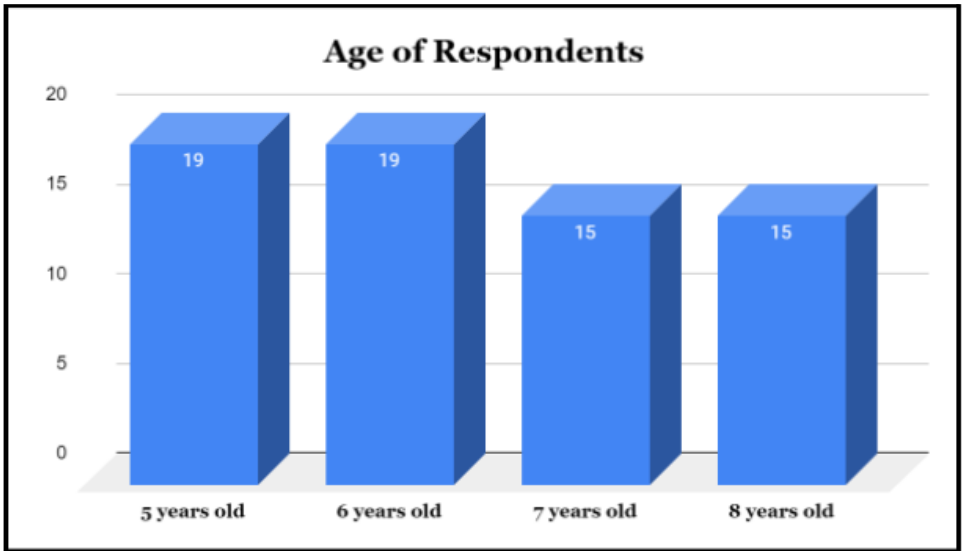
Gender of respondents aged 5 to 8 years



Question 1, addressed to students from 5 to 8 years old, establishes that the gender of the children be selected, it was examined that of 68 respondents, 37 belong to the male gender and 31 to the female gender.

Figure 5

Age category of the 68 respondents



Question 2, addressed to students from 5 to 8 years old of Sisid educational unit, establishes that the age of the infants be selected, of the 68 respondents, 19 students belong to the age of 5 years, 19 infants are 6 years, there are 15 children in the age range of 7 years and there are 15 children who are 8 years old.

Figure 6

Height of the children of the Sisid Bilingual Community Educational Unit

Estatura de los niños/as de la Unidad Educativa Comunitaria Intercultural Bilingüe de Sisid ubicada en Ingapirca

5 años

Cantidad	Estatura (cm)
1	80 cm
1	85 cm
2	88 cm
1	89 cm
3	90 cm
1	98 cm
1	99 cm
3	100 cm
1	102 cm
3	103cm
1	107 cm
1	108 cm
Total	19 Estudiantes

6 años

Cantidad	Estatura (cm)
2	89 cm
1	90 cm
2	95 cm
2	97 cm
1	98 cm
1	99 cm
1	100 cm
1	101 cm
1	102 cm
2	105 cm
1	106 cm
1	107 cm
1	108 cm
1	109 cm
1	111 cm
Total	19 estudiantes

7 años

Cantidad	Estatura (cm)
1	100 cm
4	101 cm
2	102 cm
1	105 cm
2	109 cm
2	110 cm
1	111 cm
2	115 cm
Total	15 estudiantes

8 años

Cantidad	Estatura (cm)
2	95 cm
1	99 cm
2	100 cm
3	101 cm
1	105 cm
2	107 cm
2	110 cm
1	115 cm
1	124 cm
Total	15 estudiantes

Translation of figure 6

Height of the children of the Sisid Intercultural Bilingual Community Educational Unit located in Ingapirca

Five years old

Number of Children: 19 students

Six years old

Number of Children: 19 students

Seven years old

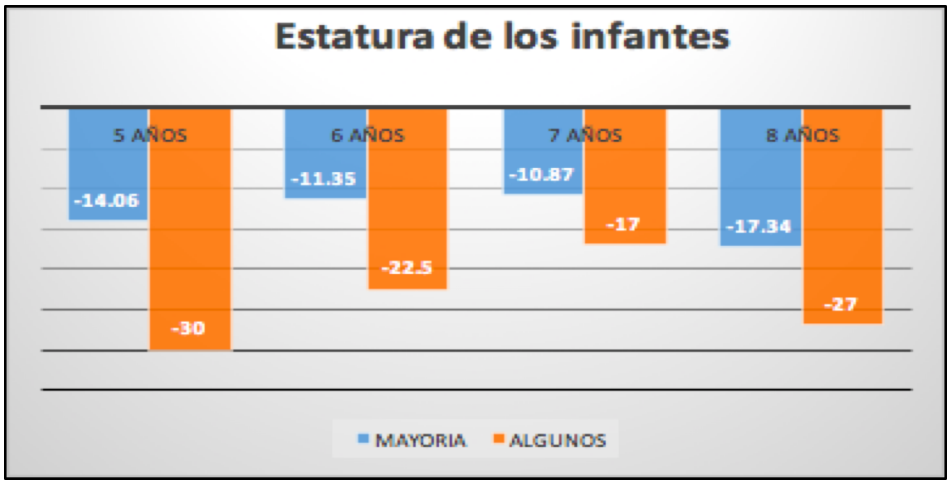
Number of Children: 15 students

Eight years old

Number of Children: 15 students

Figure 7

Height of the infants of the Sisid School



Translation of figure 7

Height of the infants

Five years old

Most: -14.06

Some: -30

Six years old

Most: -11.35

Some: -22.5

Seven years old

Most: -10.87

Some: -17

Eight years old

Most: -17.34

Some: -27

Question 3, addressed to students from 5 to 8 years old of Sisid educational unit, establishes that the current height of the infants be selected, in which it was observed that the respondents have a setback in their growth. According to the MedicosEcuador base measurements guide, it was observed that the majority of 5-year-old boys and girls have a height below -14.06% of their base height, some have a height of -30%, which, This is alarming, in the case of 6-year-olds, the majority have -11.35% of their base height and some have -22.5% of their base height, which is worrying, in the 7-year-old respondents it is observed that the majority have a height of -10.87% and some of -17%, and finally a large part of the 8-year-old students have a height of -17.34% of their base height and some - 27%. These measurements are less than the baseline. Therefore, it has been observed that there are children with chronic malnutrition.

Figure 8

Weight of the children of the Sisid Bilingual Community Educational Unit

Peso de los niños/as de la Unidad Educativa Comunitaria Intercultural Bilingüe de Sisid ubicada en Ingapirca

5 años

Cantidad	Peso (lb)
2	25 lb
1	26 lb
1	27 lb
1	28 lb
2	29 lb
3	30 lb
1	32 lb
2	35 lb
1	36 lb
2	40 lb
2	44 lb
1	51 lb
Total	19 estudiantes

6 años

Cantidad	Peso (lb)
3	30 lb
1	32 lb
5	35 lb
4	36 lb
3	40 lb
2	41 lb
1	43 lb
Total	19 estudiantes

7 años

Cantidad	Peso (lb)
1	26 lb
1	30 lb
3	33 lb
1	35 lb
1	38 lb
4	40 lb
2	41 lb
1	45 lb
1	52 lb
Total	15 estudiantes

8 años

Cantidad	Peso (lb)
3	31
1	39
2	40
1	43
2	44
2	48
1	49
1	51
1	52
1	55
Total	15 estudiantes

Translation of figure 8

Weight of the children of the Sisid Bilingual Community Educational Unit

Five years old

Number of Children: 19 students

Six years old

Number of Children: 19 students

Seven years old

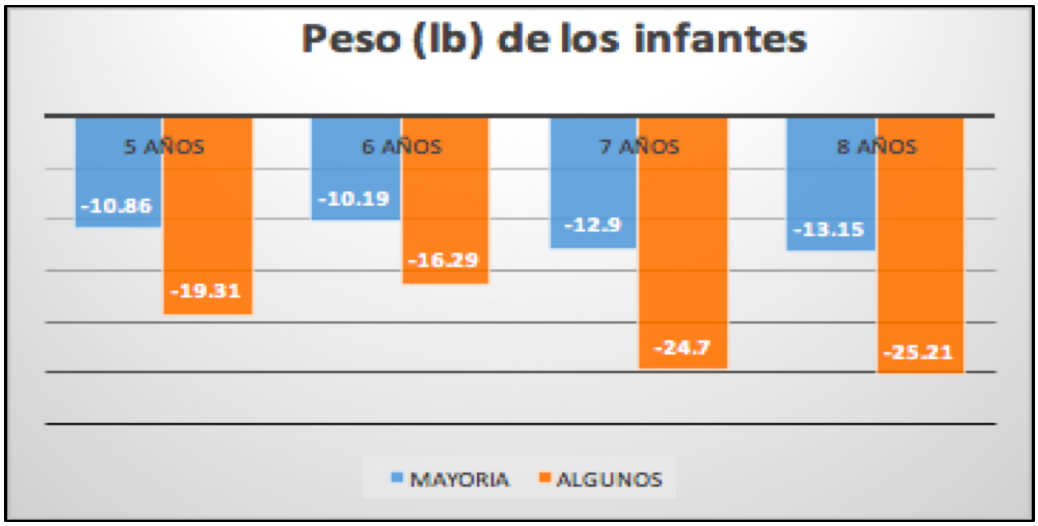
Number of Children: 15 students

Eight years old

Number of Children: 15 students

Figure 9

Weight of the children of the Sisid School



Translation of figure 9

Weight of the infants

Five years old

Most: -10.86

Some: -19.31

Six years old

Most: -10.19

Some: -16.29

Seven years old

Most: -12.9

Some: -24.7

Eight years old

Most: -13.15

Some: -25.21

Question 4, addressed to students from 5 to 8 years old of the Sisid educational unit, establishes that the current weight in pounds be selected to analyze whether or not they present malnutrition.

To obtain the percentage of malnutrition, the expected weight was evaluated according to the weight of the infant, that is, % of malnutrition according to the expected weight for height = (actual weight / expected weight) * 100.

Subsequently, the degree of malnutrition was classified according to the following table:

Table 5

Degree of malnutrition that infants have

Condition	Normal	Mild Malnutrition	Malnutrition moderate	Malnutrition Severe
Expected weight deficit according to height	90 - 100%	80 - 90%	70 - 80%	<70%

Note. Taken from MedicosEcuador, 2020.

- In children of 5 year olds,

There are children with an average weight of:

- From 25 lb = 56.4% Severe Malnutrition
- From 33.47 lb = 72.3% Moderate Malnutrition

- In children of 6 year olds,

There are children with an average weight of:

- From 30 lb = 64.80% Severe Malnutrition
- From 36.10 lb = 77.98% Moderate Malnutrition

- In children of 7 year olds,

There are children with an average weight of:

- From 26 lb = 51.28% Severe Malnutrition
- From 37.8 lb = 74.55% Moderate Malnutrition

- In children of 8 year olds,

There are children with an average weight of:

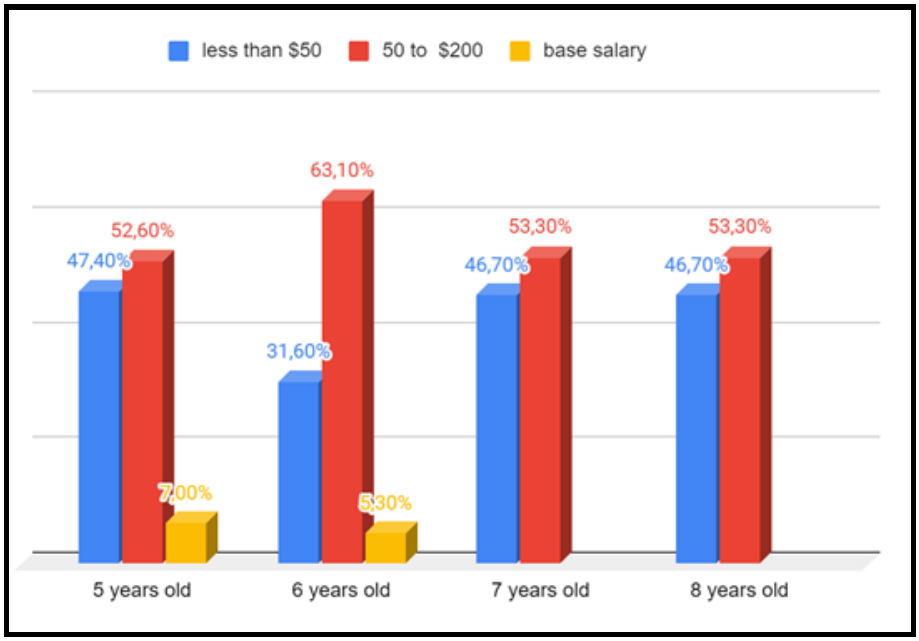
- 31 lb = 55.15% Severe Malnutrition
- 43.06 lb = 76.60% Moderate Malnutrition

It was observed that there is moderate malnutrition, since the infants are below the recommended weight. In addition, it was analyzed that there is severe malnutrition, since the weight is below the reference base, emaciation is serious and visible since they do not receive adequate nutrition.

Section 2: Socioeconomic conditions - Addressed to the student's legal representative

Figure 10

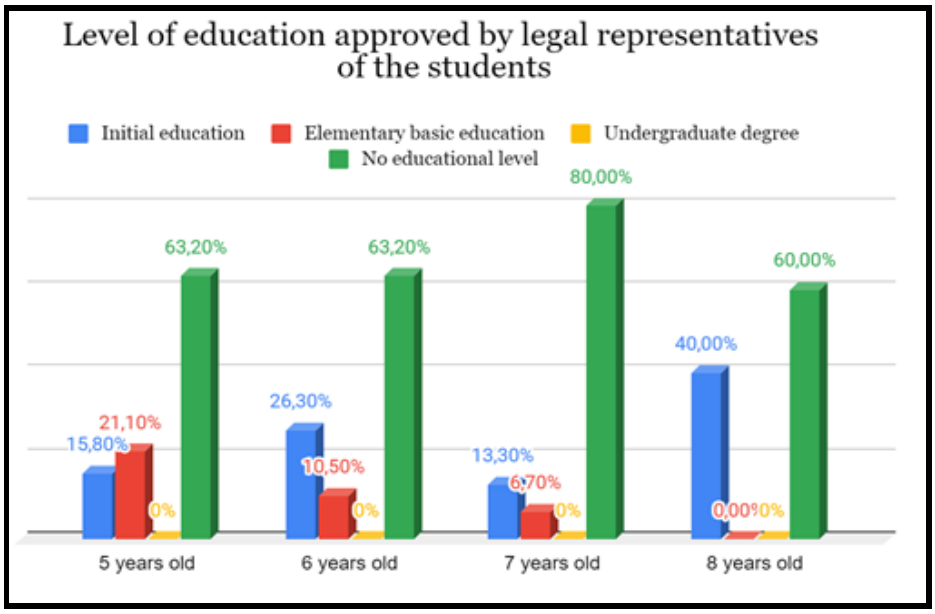
Monthly economic income of the legal representatives of the students



Question 5, addressed to the legal representatives of the students from 5 to 8 years old of the Sisid school, establishes that the monthly economic income of the parents be selected. It was observed that 43.1% of the 68 respondents have incomes of less than $50 dollars, 55.6% have incomes of $50 to $200 dollars, this is due to working in restaurants in the community of Ingapirca. and finally, 1.30% of those surveyed have a basic salary.

Figure 11

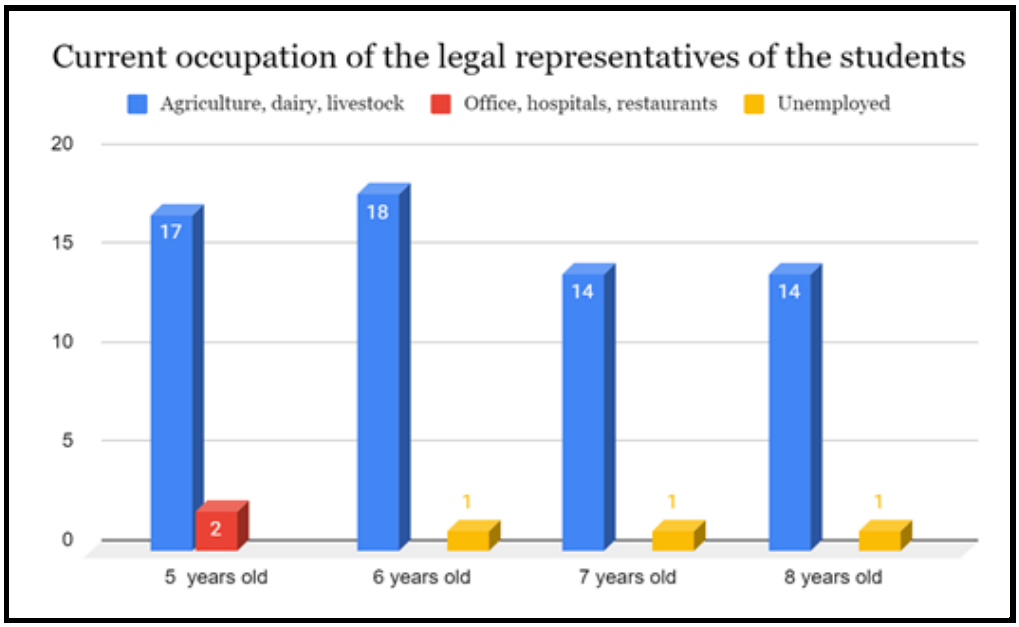
Level of education completed by the legal representative of the child



Question 6, addressed to the legal representatives of students from 5 to 8 years old, establishes that the level of education that the parents have completed must be selected. It was observed that 23.85% of the 68 respondents have completed initial education, 9.57% elementary basic education and finally 66.6% have not completed any educational level.

Figure 12

Current occupation of the legal representatives of the students

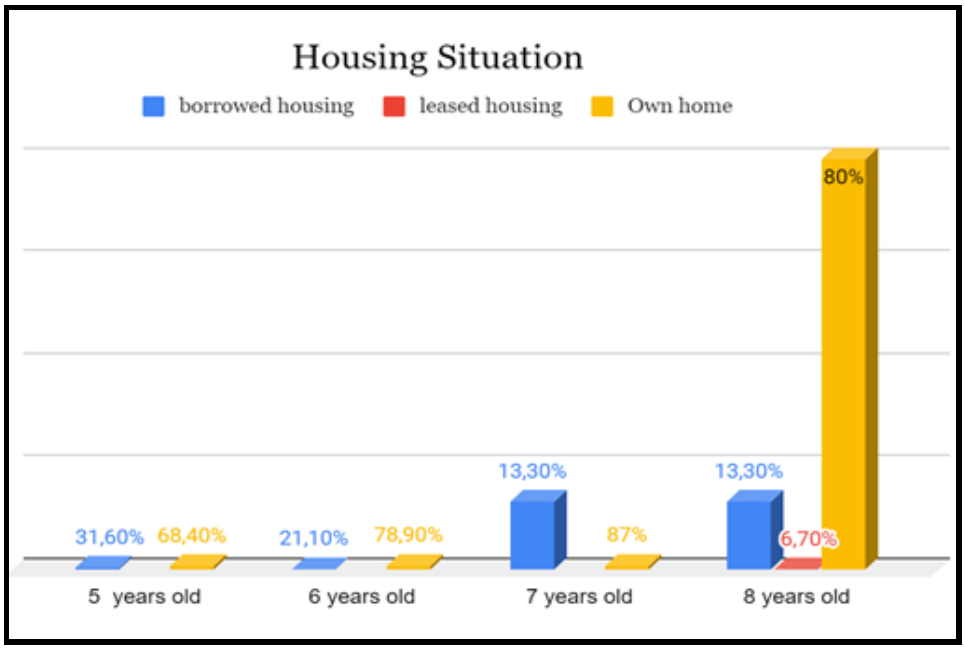


Question 7, addressed to the legal representatives of students from 5 to 8 years old, establishes that the current occupation be selected. It was examined that 63 of 68 respondents are engaged in agriculture, dairy and livestock, 2 work in offices, hospitals or restaurants and finally 3 respondents are unemployed.

Section 3: Home- Addressed to the student's legal representative

Figure 13

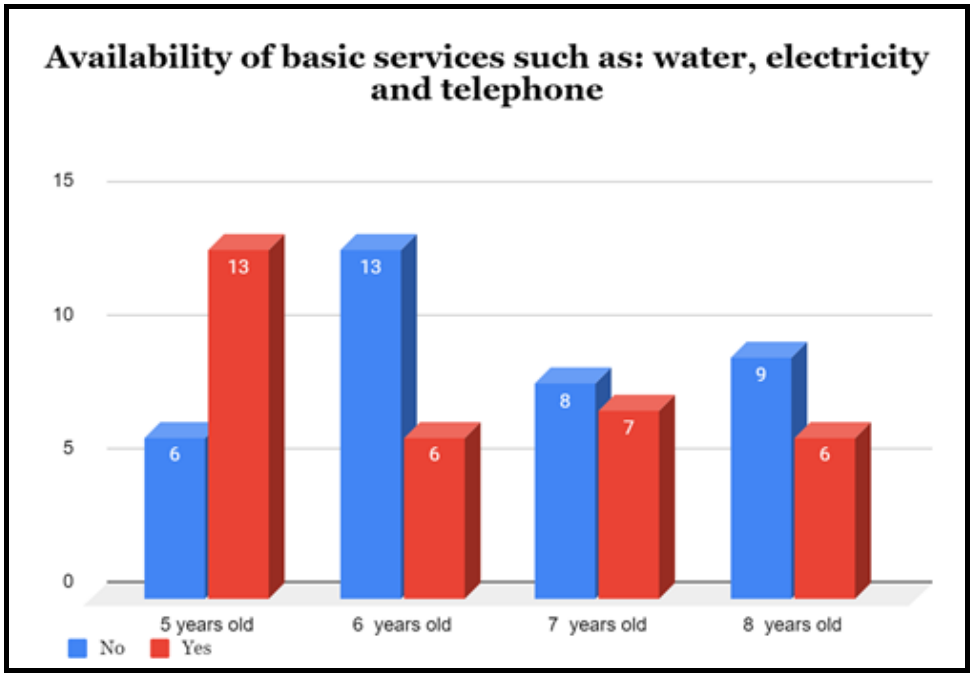
Situation of the house in which the students of the Sisid Educational Unit reside



Question 8, addressed to the legal representatives of students from 5 to 8 years old, establishes that the situation in which they live is selected, it was examined that 19.75% of the 68 respondents, reside in borrowed homes in the which there is no monetary payment, since the majority have migrated and have left the house to their friends or relatives so that they can take care of their children, 78.5% have their own home, this is because the majority of the people are elderly, they own their houses and land and finally 1.67% rent their home.

Figure 14

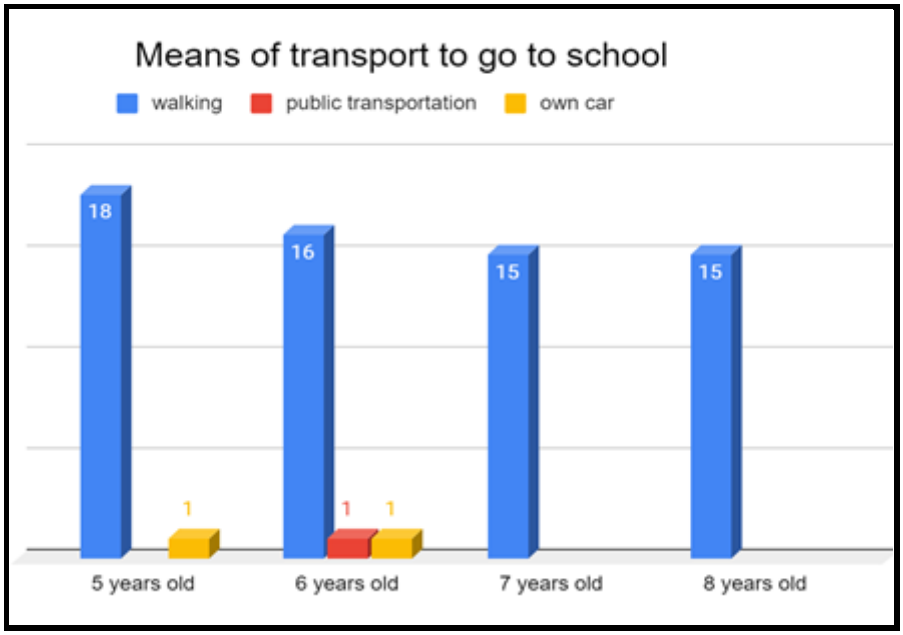
Availability of basic infant services



Question 9, addressed to the legal representatives of the students from 5 to 8 years old, establishes that it is selected whether or not the parents have basic services such as: water, electricity and telephone, it was analyzed that 32 of the 68 respondents do not have all the basic services, because the majority have low economic resources, while 36 do have all the basic services.

Figure 15

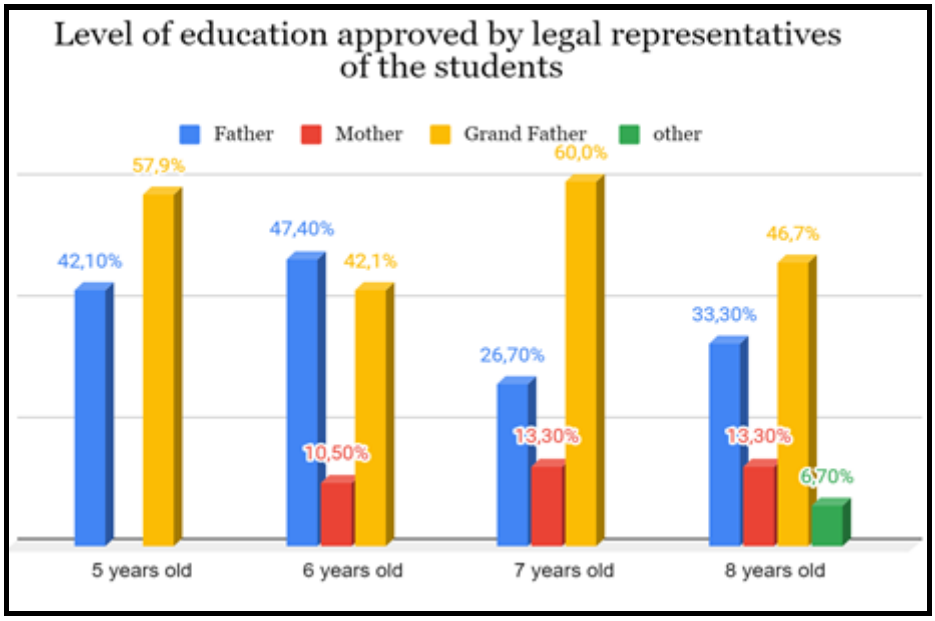
Means of transport of the respondents to get to the Sisid school



Question 10, addressed to students from 5 to 8 years old, establishes that the means of transport they use to go to school be selected, it was examined that 64 of 68 respondents go to school on foot, this due to the majority reside near the educational unit, it was also observed that 30 of them go to school accompanied by siblings, grandparents or parents, while 4 respondents use public transport or their own car to get to school.

Figure 16

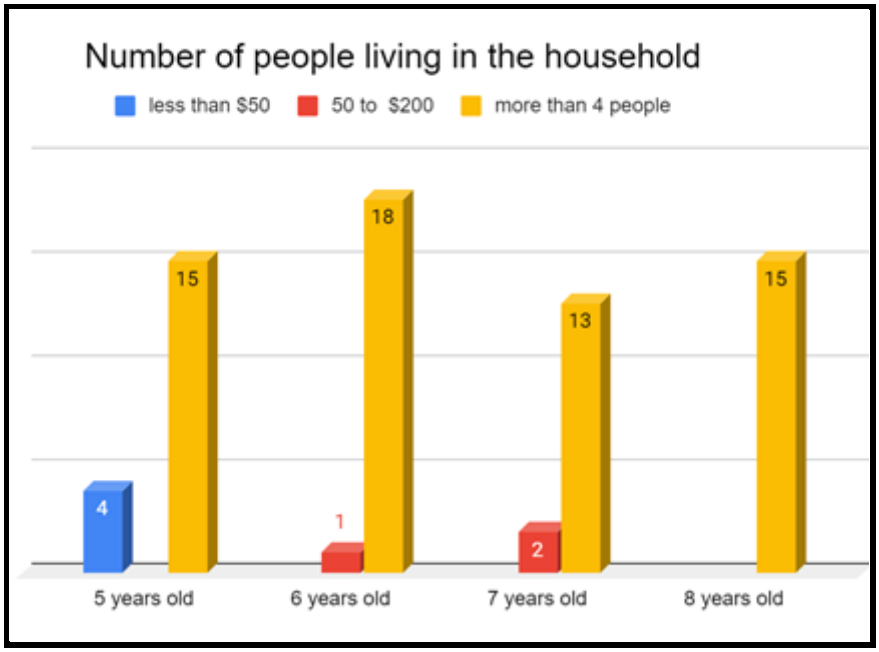
Home support manager



Question 11, addressed to students from 5 to 8 years old, establishes that the person in charge of the household's support be selected, it was observed that of the 68 respondents, 37.5% is the father who is in charge of maintaining the household, 51.67% is the grandfather, the person in charge, 9.27% is the mother and finally 1.67% are other people who maintain the household, it may be a relative abroad.

Figure 17

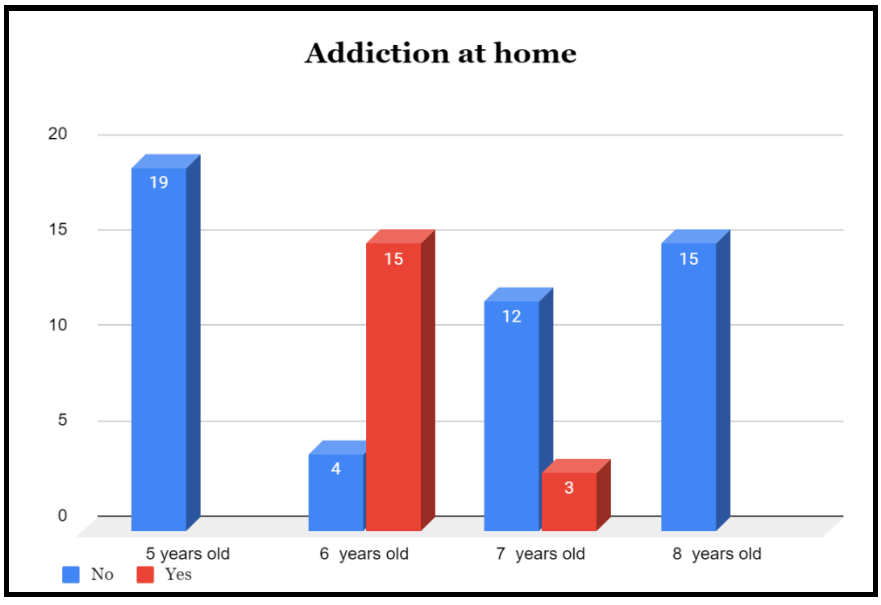
Number of people in the household



Question 12, addressed to students from 5 to 8 years old, establishes that the number of people who live with the student will be selected. It was analyzed that of the 68 respondents, 61 live with more than 4 people, 4 live with less than 3 members and finally 3 children live with 3 members.

Figure 18

Home addictions

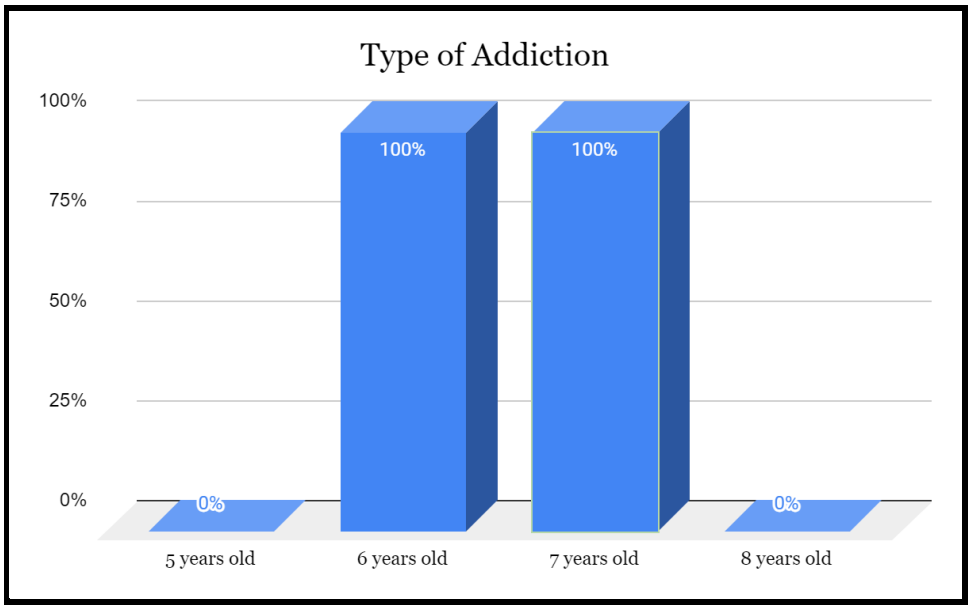


Question 13, addressed to students from 5 to 8 years old of Sisid school, establishes that it be selected if there is some type of addiction in the home, of the 68 respondents only 18 established

that in their home if there is any type of addiction by their relatives while 50 determined that there are no addiction problems in their homes.

Figure 19

Types of addictions that exist at home

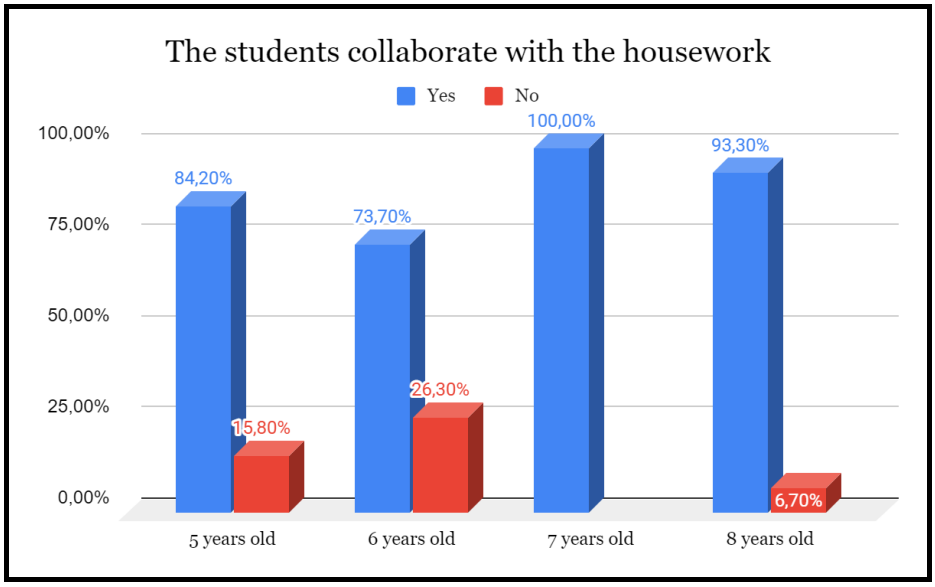


Question 14, addressed to children between 5 and 8 years old, establishes the type of addiction that exists in the home. It was observed that in most of the homes in which there is some type of addiction, the one with the highest percentage is alcohol.

Section 4: Everyday Life - Student Personal Information

Figure 20

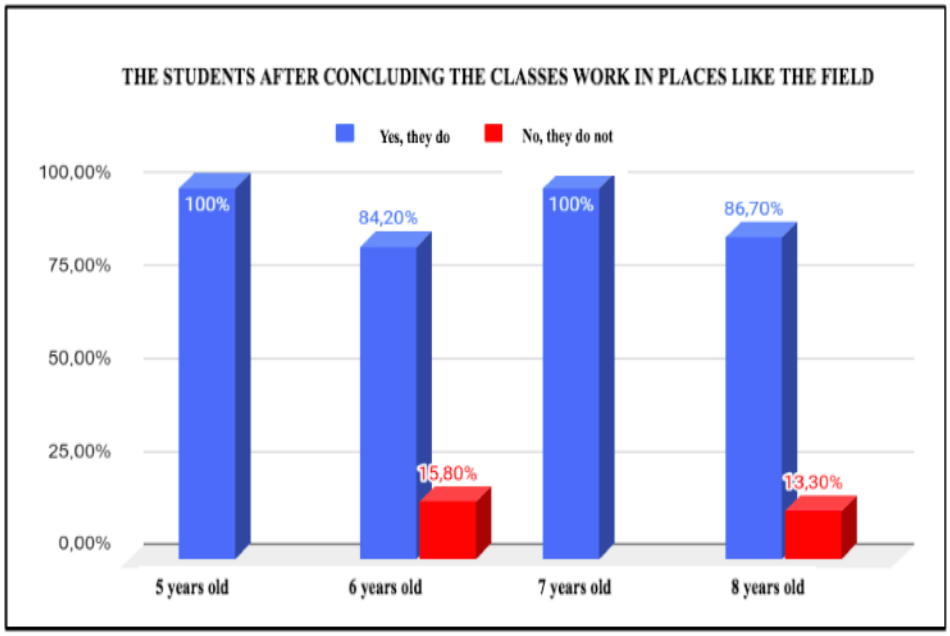
Collaboration on the part of the students for chores at home



Question 15, addressed to students from 5 to 8 years old, determines if the respondents contribute to household chores, it was observed that 87.8% of the 68 respondents do help their relatives with household chores. how: clean the rooms, wash the dishes, among others, while 12.2% do not.

Figure 21

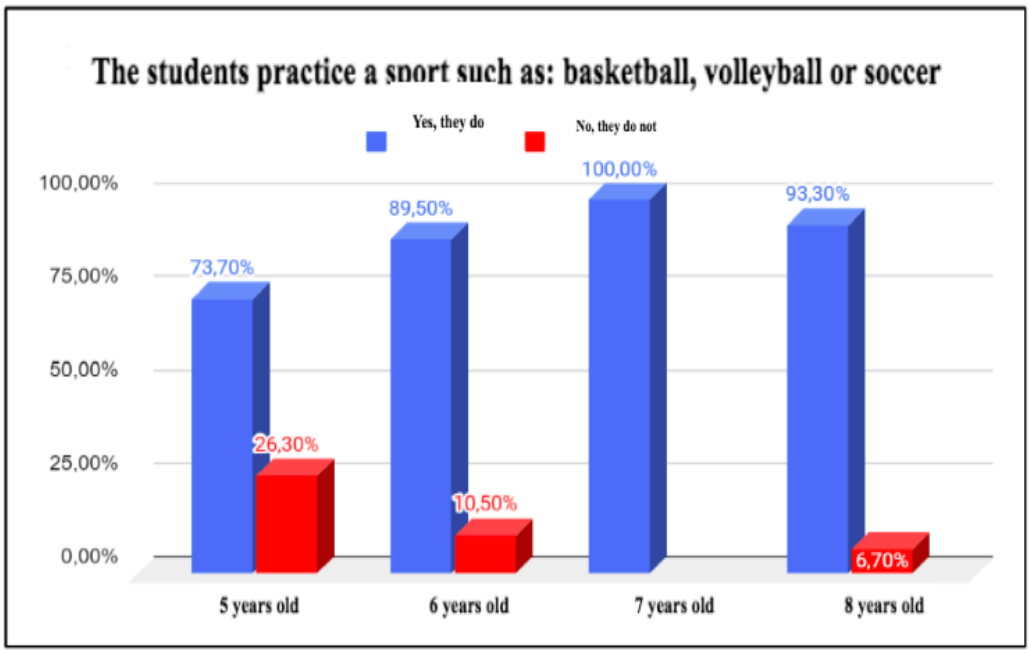
Child labor statistics at the Sisid School



Question 16, addressed to children from 5 to 8 years old, determines if the students, after concluding their classes, work in places such as the field, stores or on the street. It was possible to analyze that 92.72% of the 68 respondents after concluding their classes help their parents in tasks such as: feeding the animals, milking the cows, selling in the market, among others, while 7.27% they don't because they come home and do their homework.

Figure 22

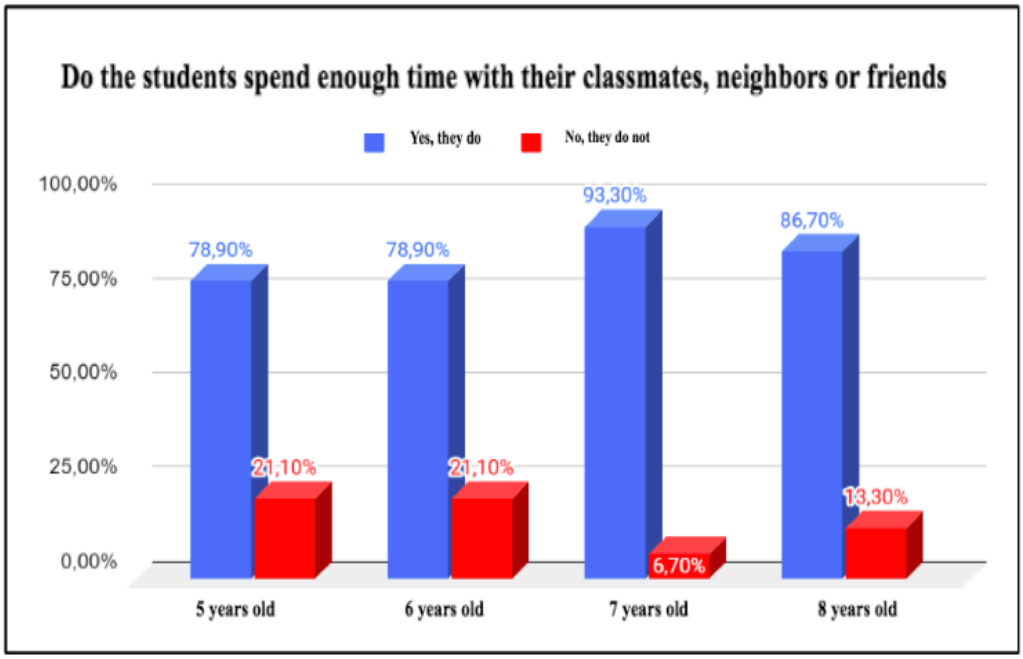
Students who play sports



Question 17, directed at children between the ages of 5 and 8, determines if the students play any sports. It was possible to analyze that 89.1% of the 68 respondents do, since they indicated that after school or in their free time they practice sports such as: soccer, volleyball, basketball, among others, while 10.87% of children do not do it since they do not like to do any sport.

Figure 23

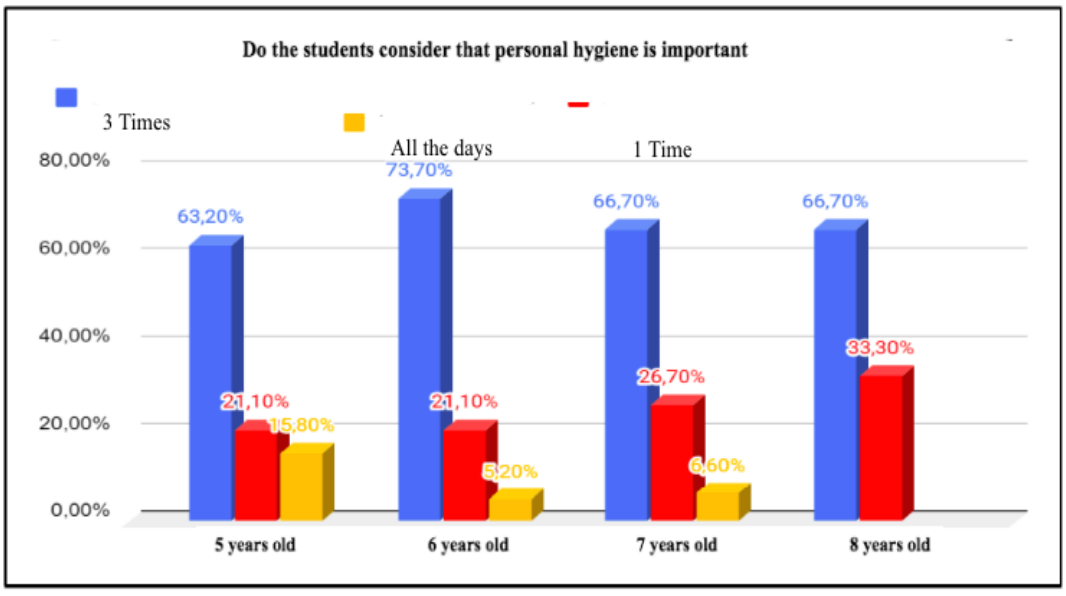
Student coexistence



Question 18, addressed to children from 5 to 8 years of age in the educational unit, determines if the students spend enough time with their classmates, neighbors or friends. It analyzed that 84.45% of the 68 respondents do, because in their free time or during breaks they enjoy with their peers, they like to participate in different activities, while 15.55% do not, this is due to those who are helping their parents.

Figure 24

Importance of personal hygiene in students

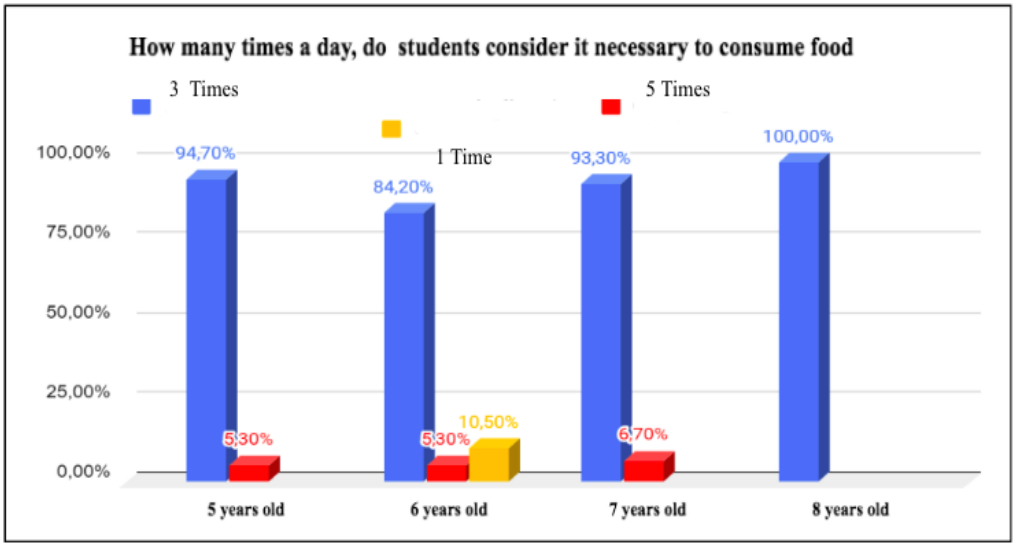


Question 19, addressed to children from 5 to 8 years old, determines if the students consider that personal cleanliness is important, it was possible to analyze that 67.5% of the 68

respondents do, because they believe that it is normal. that three times a week they carry proper personal hygiene, 25.55% think that it is normal to carry personal hygiene once a week and finally 6.9% state that it is necessary that they carry personal hygiene every day. personal cleanliness.

Figure 25

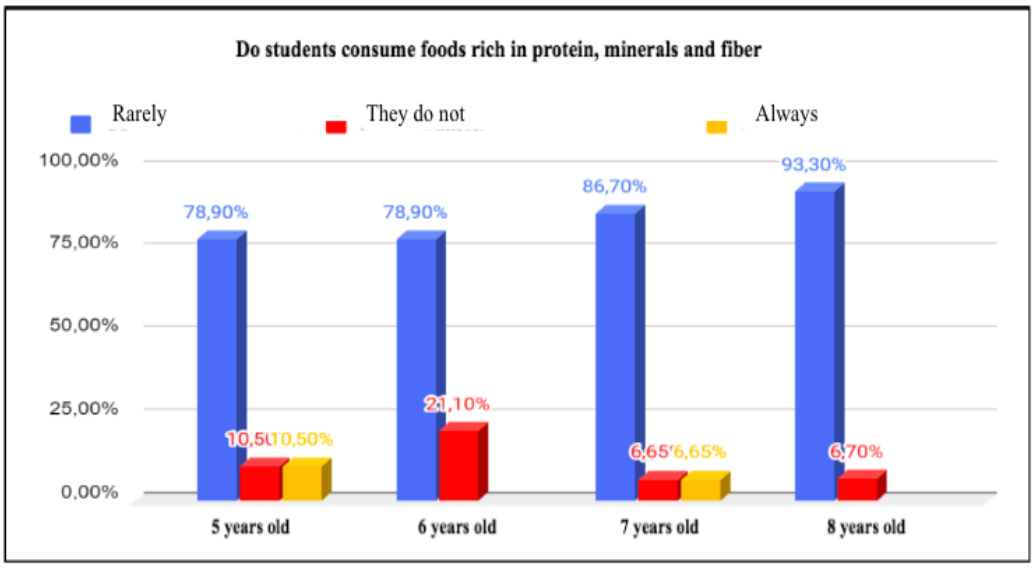
Amounts of food that students consider necessary to consume each day



Question 20, addressed to children from 5 to 8 years old, determines the times that students consider that it is necessary to consume food, it was possible to analyze that 93.05% of the 68 respondents consider that it is normal to consume food three times a day, such as breakfast, lunch and dinner since for breakfast they receive milk, coffee, boiled egg, for lunch they eat noodle soups and rice with egg or noodles and finally for dinner they consume something quite light such as bread with coffee, 4.32% of those surveyed eat food five times a day and finally 2.62% eat food once a day. This is why they do not have the necessary financial resources and do not know how to have proper nutrition.

Figure 26

Consumption of foods rich in protein, minerals and fiber of the respondents

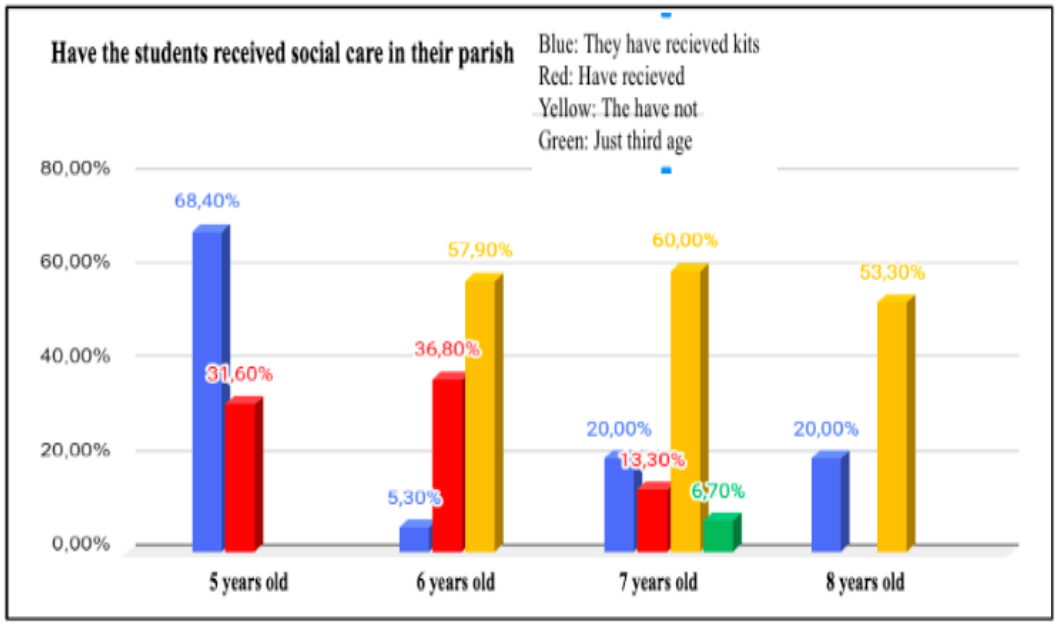


Question 21, addressed to children from 5 to 8 years of age, determines if students consume foods rich in protein, minerals and fiber, it analyzed that 84.45% of the 68 respondents rarely consume foods rich in protein, while 11.23% of students stated that they do not consume this type of food and finally 4.28% consume it every day.

Section 5: Social responsibility of the Municipal GAD of Cañar towards the inhabitants - Addressed to the legal representative of the student.

Figure 27

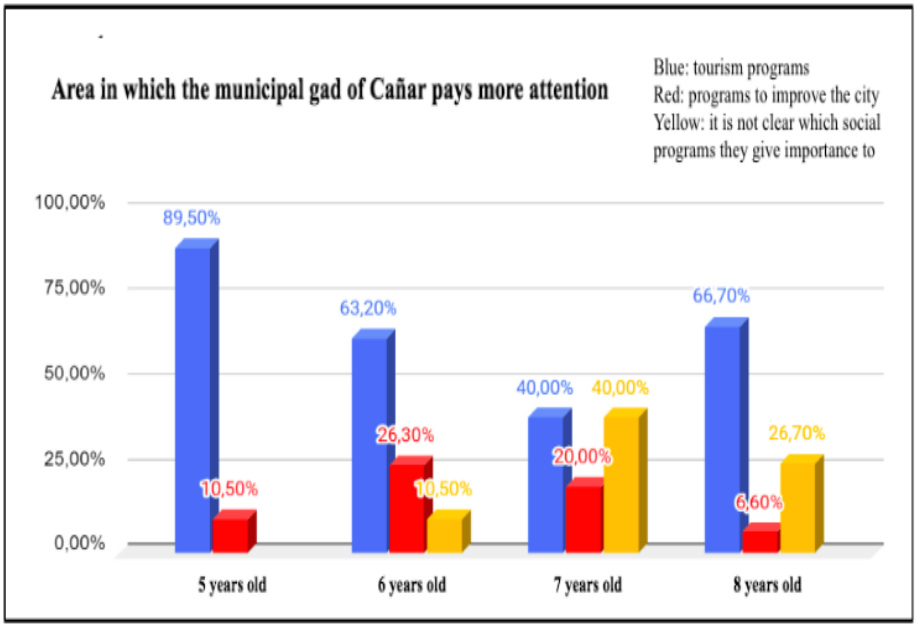
Social care received by students



Question 22, addressed to children from 5 to 8 years old, determines if the students have received social care in Ingapirca, it analyzed that 28.42% of the 68 respondents have received the delivery of kits, 27.1% have received bonuses, 42.8% have not received support from the GAD del Cañar, in addition, they stated that the situation has been even worse in times of pandemic, because the administrative staff in charge to manage this type of projects have been absent and finally 1.67% have received help only for elderly relatives.

Figure 28

Priority area of the municipal GAD of Cañar



Question 23, addressed to children from 5 to 8 years old, determines the area to which the municipal GAD of Cañar pays more attention, it was observed that 64.85% of the 68 respondents consider that pays more attention to tourism programs than to other social projects related to feeding children or community health.

The 15.85% state that more attention is paid to programs to improve the city and finally 19.3% of those surveyed do not clearly know which programs the GAD gives priority to.

Number of students with chronic malnutrition according to the surveys carried out in the Sisid Educational Unit:

From the surveys carried out on students and parents of the Sisid Intercultural Bilingual Community Educational Unit, it was observed that of the 68 respondents in the range of 5 to 8 years of age, 62 students have poor nutrition and 6 respondents they present chronic

malnutrition regarding height. Chronic malnutrition is the lack of calories and protein in the body that slows the growth of infants.

The factors that influence the chronic malnutrition of the students are due to the low economic income of the families, since the majority earn between $50 to $200 dollars, which does not allow them to supply enough food. Another factor is that most students help their relatives in the field work, so they do not consume foods rich in protein, minerals and fiber on a set schedule.

This problem has repercussions on the country's productivity, malnutrition is not only due to the lack of food intake and food security, but it goes much further than that, as observed in the results of the survey; the lack of safe water, hygiene, housing conditions, adequate medical controls, are factors that must be taken into account in order to reduce chronic child malnutrition.

1.3.3.2 Emotional, physical and intellectual effects of children from 5 to 8 years of Sisid Intercultural Bilingual School in the Ingapirca parish

The emotional, physical and intellectual effects are an aspect that stands out in children suffering from malnutrition. For this reason, a structured survey was conducted for teachers, with the aim of knowing what are the most relevant skills and behaviors in infants who present the disease in the Sisid Intercultural Bilingual Community Educational Unit.

Inclusion criteria:

- Teachers of the Sisid Intercultural Bilingual school
- Teachers of children from 5 to 8 years old.
- Teachers who reside in the Ingapirca parish.

To carry out this research, the following instruments were used:

- Voluntarily structured interviews addressed to the Institution's teachers.
- Physical surveys were carried out with teachers.
- In the month of September, only one visit was made to the school, since the teachers work normally, therefore, there was no inconvenience on the date the information was collected.

The tabulation of the collected data was carried out using the google forms and excel program to generate the graphics for the database.

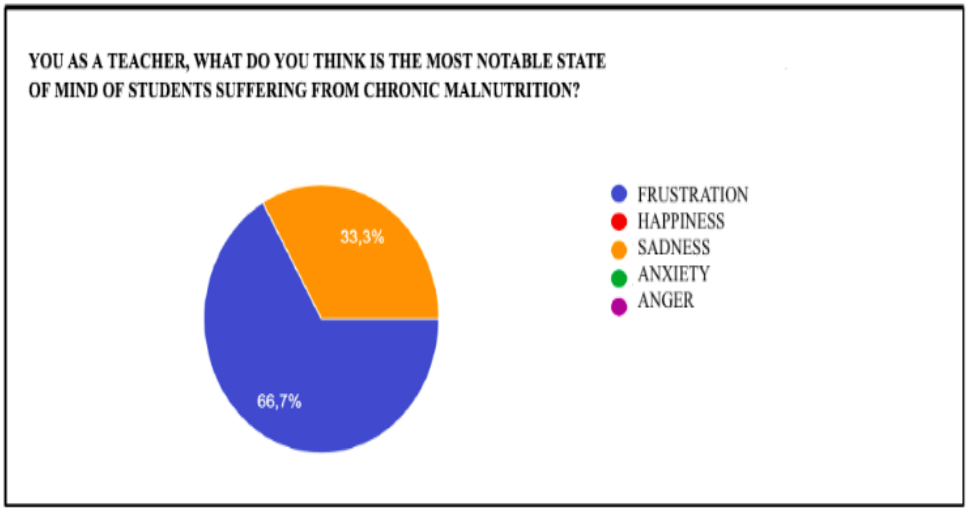
Results:

Below are the results of the surveys, in which 6 teachers who teach children from 5 to 8 years of age from the Sisid Educational Unit participated, the age of the respondents is 40 to 50 years. The survey consists of 5 questions.

Question 1:

Figure 29

State of mind of students suffering from chronic malnutrition



The teachers of the Sisid Educational Unit pointed out that the state of mind that stands out in children suffering from malnutrition is frustration, since 66.7% have it, while 33.3% are sad, they could observe this in their face-to-face classes.

Question 2:

2. As a teacher, what do you think is a cause in relation to the emotional effect suffered by students with chronic malnutrition?

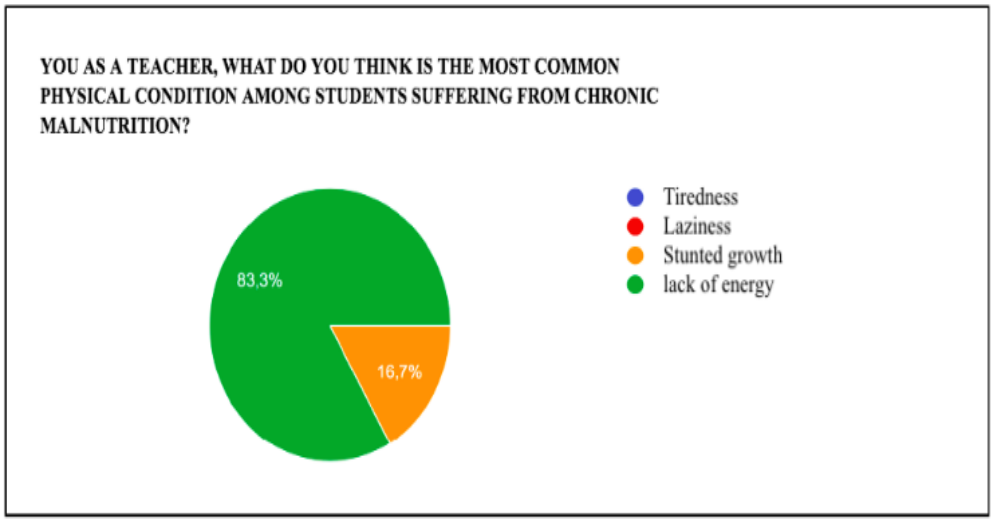
The teachers examined several emotional causes that children suffering from malnutrition have, such as:

- Abandonment by parents, due to migration.
- The family environment is not the best, because some parents do not care about the health of their children, therefore, they do not have a set time to eat.
- The people in charge of caring for the children do not take adequate measures, since the majority of the community leaves home early to carry out their work in the fields and the children are left in the care of other children.
- Another factor is that the GAD of Cañar or the community of Ingapirca do not carry out social projects that favor infant feeding, there are no agreements to counteract this problem.

Question 3:

Figure 30

Common physical state among students suffering from chronic malnutrition



The 83.3% of the teachers of the Educational Unit indicated that the common physical state of children with malnutrition is lack of energy, while 16.7% indicated that the delay in growth is notorious, since they do not ingest the daily nutrients necessary for their proper physical functioning.

Question 4:

As a teacher, what do you think is a cause of the physical condition of students suffering from chronic malnutrition?

Teachers examined several common causes, such as:

● Most families are low-income and do not have the money to buy nutritious food for a proper diet.

● Parents do not supervise the food that children consume.

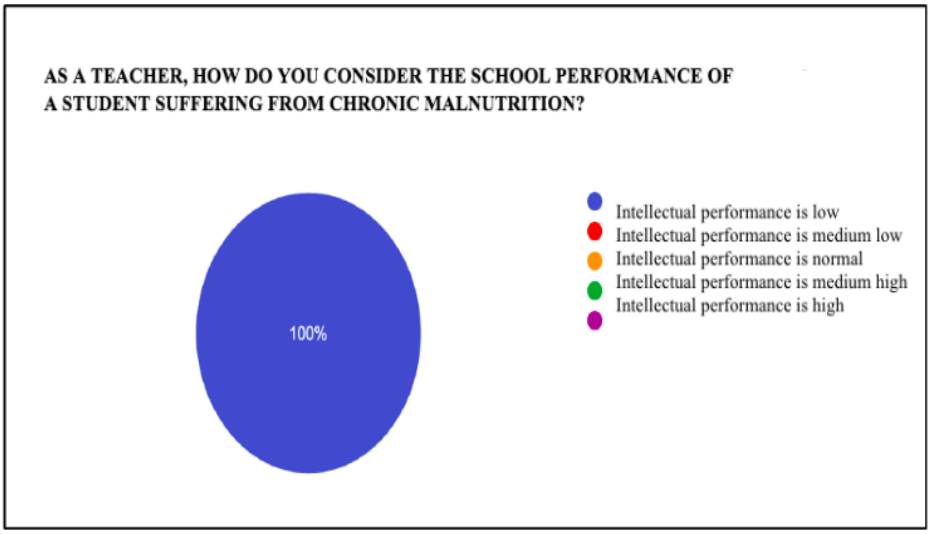
● Some children go to school without breakfast, and also have inadequate cleanliness. It is for this reason that teachers try to instill good habits in students during their class hours.

● Children do not have the appropriate weight or size, they have dry skin, weak muscles in the legs and arms, among others.

Question 5:

Figure 31

Intellectual performance of students with chronic malnutrition



100% of the teachers established that school performance is low in students with chronic malnutrition, due to the fact that there is a lack of concentration, difficulty in retaining information and disinterest of the legal representatives of the students, since the majority of children are in the care of grandparents.

1.3.3.3 Testimonies of administrators, teachers and parents about chronic malnutrition in the educational district of zone 6 of the Ingapirca parish

This discussion was addressed to the rector, teachers and legal representatives of the " SISID INTERCULTURAL BILINGUAL SCHOOL", and those in charge of the Municipal GAD of Cañar to collect testimonies of chronic malnutrition of children from 5 to 8 years of age. Participation was voluntary, likewise, the integrity of the opinions and the right of the actors to the privacy of their expressions. There are testimonials in this document that do not carry a specific reference, this depends on the consent given by the individuals. On the other hand, the information collected is only for the completion of the thesis project. At the beginning, the objective of the study was announced and permission was requested to present their opinions.

Table 6

Organization of the focus group

Conclusive Phase:	Report of the interview with the focus group.

Area:	Health of indigenous children from 5 to 8 years of age.
Trouble:	Testimony of chronic child malnutrition of the indigenous people of the parish of Ingapirca.
Moderator:	Estefanía Saldaña Observer: Mgt. Diana García Orellana

Analysis of the testimonials:

In the discussion addressed to the rector, teachers and legal representatives of the Educational Unit and those in charge of the Municipal GAD of Cañar, some emphasized that the Covid-19 pandemic has had a great impact on their lives, since it has affected both an economic, social and cultural. In addition, there is a lack of management by the Cañar GAD on social projects, those affected by this event have been the indigenous community, since most are low-income. It was concluded that the absence of parents due to migration has been a factor that has increased chronic malnutrition in infants, since children are left in the care of grandparents where there is no adequate control of the food they must consume.

CHAPTER 2

2. YACA OR JACKFRUIT AS A SUSTAINABLE ALTERNATIVE TO COUNTER CHRONIC CHILD MALNUTRITION

2.1 Description and potential qualities of Jackfruit

Figure 32

Yaca or Ecuadorian Jackfruit

Note. Taken from The Producer, 2018.

Around the world, the fruit is known by various names, for example:

- Jackfruit in English
- Bo loup mi in China
- Jaca in Spanish and Portuguese
- Jacquier in France
- Kapiac (New Guinea)
-Panka in Indonesian

(Kishore, 2018)

In this study, we will use the term jackfruit (Artocarpus Heterophyllus Lam.) It is important to know the description and potential qualities of this fruit, because being unknown in some areas of the world is wasted, this due to there is a lack of information in relation to the cultivation of the fruit. In Ecuador it is confused with Dorian or the breadfruit tree, however, there is a big difference between these, the jackfruit tree is always green, it is considered one of the largest producers in the fruit sector and has a wide edible use. The fruit can be eaten cooked, tanned and raw, in a ripe or unripe state.

Next, the parts of the jackfruit plant will be described:

Table 7

Jackfruit Description

Seed	The jackfruit seed is yellowish white in color, these are edible, since they contain the highest content of vitamin C, they also contain proteins, lipids and carbohydrates.
Tree	The tree is reddish brown, its circumference is 4 meters and it reaches 20 to 25 meters in height.
Leaves	Its leaves in the adult stage of the tree are oval and long. Its color is dark green, its surface is shiny, showy and leathery. On the entire part of the leaf there is white latex with a sticky texture.
Flowers	Jackfruit flowers sprout from thick branches that emerge from the trunk. The female flowers are thick and large compared to the male ones.
Fruit	The fruit in the mature stage has a thick shell that is yellowish green, this tree bears about 500 fruits in its life cycle, the fruit measures 90 cm and weighs from 5kg to 50kg. The inner pulp of the fruit is dark yellow in color and has a sweet, slightly acidic, aromatic and mild flavor.

Note. Table 5 describes the parts of the jackfruit. Taken from Piña-Dumoulín, et al., 2010.

On the other hand, jackfruit has potential qualities for health, since all its components are used from this fruit, its nutritional capacity is surprising and it is a good nutritional supplement. This is why jackfruit is beneficial for human consumption due to its large amount

of vitamins, minerals, proteins, among other supplements that help prevent and improve immunity to diseases. In addition, it promotes good digestion, increases muscle strength, helps the nervous system and helps produce energy.

Table 8

Jackfruit Nutritional Information

Nutrients	- The nutrients of the jackfruit are very extensive and beneficial for health. - 100 g of jackfruit pulp contains 3 g of protein, 3 g of fiber and 0.64 g of fat, it also has 0 mg of cholesterol, 95 g of calories. - There are minerals present in jackfruit, such as calcium, potassium and magnesium. Jackfruit contains 73% water.	- Vitamins are necessary for the development of the human body, therefore, consuming them helps the body function. Jackfruit, having a high degree of water, helps keep the body hydrated.
Vitamins	- The vitamins that are present in jackfruit are Vitamin B-9 (24 mg), Vitamin C (13.7 mg) and Vitamin A (110 IU).	Vitamins are obtained through food, they participate in vital functions for our existence, they are essential for growth, regulation of cell function and metabolism, as they help repair tissues, form defenses against infectious diseases, maintain healthy skin, strengthen night vision, prevent bleeding and contain antioxidant power. Jackfruit, having a great potential for

		vitamins, helps prevent anemia and malnutrition.
Minerals	Jackfruit has minerals such as Potassium (448 mg), Magnesium (29 mg) and Calcium (24 mg).	The minerals contained in jackfruit help build strong bones and proper body growth.
Calories	For every 100 grams of pulp there are 95 calories.	The human body needs calories for energy throughout the day.
Fats	Jackfruit contains 0.64% total fat.	Jackfruit fats help maintain healthy skin and absorb vitamins A, D, E and K.

Note. Taken from Nutrition Guide, 2020.

For all the nutritional value that the fruit contributes to the health of the body, the WHO recommends its consumption.

2.2 In which areas is Jackfruit grown?

The Ecuadorian land has fertile, productive and appropriate soils for cultivation, since it has great adaptability due to the fact that it is a country rich in warm climates such as: the east, coast and some sectors of the mountains. The jackfruit is cultivated in climates that are not lower than 21 degrees centigrade, since the tree has little tolerance to cold climates, the jackfruit is moderately resistant to drought, however, in these times, it is optimal to irrigate water to obtain a good growth, it can tolerate the winds, as it recovers and survives these events; it is important to know where the orchards will be made, otherwise bad weather can cause their loss (Muñoz, 2017).

In addition, jackfruit is cultivated in tropical and subtropical zones, this climate allows the plant to grow properly, since the fruit trees adapt to humid zones and at the time of planting there should be no unevenness in the ground (Macias & Esquivel, 2020, page 9). The crop adapts very well in the country and has a high export potential, for these reasons it is necessary

for producers to have a good design of a strategic plan that allows the fruit to be produced in a wide variety, because if there is no dissemination of it, there is no how to market it and leads to the disappearance and waste of the jackfruit.

In Ecuador, the area with the highest production of the fruit is Santo Domingo de los Tsáchilas, since it has a large number of jackfruit tree farms (Zamora, 2016), there are also farms in Arenillas, Valle de los chillos, among others. However, in some areas of the country they do not promote its cultivation for productive purposes, due to the little knowledge that the local city has about the different processing techniques that can be applied to this fruit.

2.3 What is the Jackfruit cultivation process?

The jackfruit cultivation process is not complicated, although it should be considered that the size of the tree is large, for which it needs to have a wide space and a considerable distance between each crop to be able to plant it.

There are some steps that must be followed:

1. First, a moist and fertile soil is needed, it should not be a cold temperature, since the tree does not support it. The finer the soil, the higher the quality of the plant. Manual pollination is recommended, since in this way the fruit develops with a larger size and the flavor is more intense.
2. Second, the germinated seed is sown in a fixed place where it can grow, there is the option of planting it in a pot and then changing to the place where it will develop. The grafts must be in a narrow and shallow opening, the plants must have a distance of 8 x 8 meters to ensure the quality of the tree and its fruits.

Finally, the jackfruit tree is fast growing, its production begins from 3 to 8 months and will continue to bear fruit up to 100 years. For its harvest the fruit must be slightly soft and the thorns developed. The fruit needs to be yellowish green. Each jackfruit tree bears approximately 30 to 50 fruits per year (Güemes & Resina, 2020).

<u>Recommendations for cultivation:</u>

- It must be verified that the soil is adequate and that it does not have excess water.
- The distance between each plantation must be considerable, because if they are not located properly, the largest tree will cause shade and death to the other.

● Sustainable and organic pesticides will be required, focused only on the pest that they present.
● It is necessary to make good plantations and maintain healthy soils for the well-being of human consumption.

2.4 Jackfruit as a sustainable option for the design of nutritional bars:

Agriculture was thought of as an activity for profit without taking into account how it affects the environment and only focused on economic ends, on the other hand, sustainable agriculture has the ability to make use of resources without causing greater damage to nature, productivity and profitability, causing long-term development in their communities, with good management of quality food supply at adequate prices for the population, at the same time promoting healthy ecosystems, supporting the management of land, water and natural resources. natural, so sustainable agriculture involves the social, economic and environmental without thinking in an individualistic way.

Jackfruit as a sustainable option?

There are several reasons why jackfruit is considered sustainable for the design of nutrition bars:
- Since jackfruit is a fruit that comes from a tree, it contributes to improving air quality by generating oxygen.
- The jackfruit originates from a habitat in which different species such as pigs, vapir, guanta, parrots, monkeys, among others, cohabit.
- When planting jackfruit trees, they absorb carbon dioxide (CO2) which is a gas that causes the greenhouse effect, thus helping to improve the ecosystem.
- Trees regulate temperature and are of great importance in relation to the water cycle, since the roots, by absorbing rain with pollutants, help prevent flooding and cushion soil erosion.
- In the jackfruit plantations there is a control of the use of water, since a high-efficiency micro-sprinkler irrigation system is used, which reduces water consumption by 50% and minimizes tillage due to the lower growth of weeds This contributes to conserving the nutrients of the soil where the crops are made.
- The fertilizers, phytosanitary products and pesticides used for the cultivation of jackfruit are organic and are not harmful to the air or to people's health.

- Everything is used from the fruit, from the seeds to the shell, which is why it is also considered a good substitute for meat without the need to go through any chemical process (González, 2021).

2.4.1 Raw material extraction

According to a study presented by the National Institute of Agricultural Researchers of Ecuador about the agronomic qualities of existing fruit trees, they determine the jackfruit as a tree 20 to 25 m tall, with a dense and wide crown, its leaves are rounded, they have a thick trunk and branches, their fruits have a rough yellowish green shell, they measure between 30 to 60 cm and when they mature they reach up to 90 cm. The jackfruit in the lower part has bulbs that cover the seeds, and they have a yellow color tone. Each of the bulbs has a smooth surface, it is ovoid in shape and its color is light brown surrounded by a very thin membrane. The seed can measure between 2 to 4 cm, of which 80% is edible and the other 20% is the shell that covers it. This fruit has a fairly strong odor, its flavor is sweet, it has a low incidence, therefore it is susceptible to diseases (Caizaluisa, 2016).

Jackfruit is a fruit that has a high nutritional value. Its consumption can be given through jellies, juices, ice creams, among others, however, the fruit is not being fully used since many people in Ecuador do not know of its existence, therefore they do not know of the large amount of nutrients that it has. It is for this reason that for the development of this project, a design will be made for the provision of nutritional jackfruit bars as an alternative to counteract chronic malnutrition in children from 5 to 8 years old in the Ingapirca parish, focused on the Sisid Intercultural Bilingual School

For the design of nutritional jackfruit bars, the production areas of the fruit must first be analyzed.

In Ecuador, jackfruit can be produced throughout the year in places such as: Quevedo, Quito, Santo Domingo de los Tsáchilas and Guayaquil because it is coupled to humid, subtropical and tropical areas. For its production, it must have a clean soil without unevenness, each crop must have a distance of 8x8, the best time for the jackfruit crop is winter since a large amount of water is needed to grow. The production of jackfruit is a feasible option for the preparation of agro-industrial products and to diversify agriculture, this is due to the biodiversity that Ecuador has. Crops aged 1 to 3 months are tender. It is not easy to determine when the product is ripe,

however, in some cases, the peel of the fruit varies in color from green to light green or yellow and the strong odor of the fruit shows the degree of ripeness.

For the production of jackfruit, the factors that influence the process must be taken into account, among which the following stand out:

Climate: This fruit only adapts to tropical, humid and subtropical climates, this is because they do not tolerate drought. Jackfruit crops must have a humid climate or adequate irrigation, which is why it has begun to be cultivated in places like Santo Domingo and the East.

Soil: For the fruit to be produced, the soil must be rich in nutrients, it can also be produced in territories with limestone, only more slowly.

Propagation: Jackfruit seeds must be preserved for a minimum time of one month before sowing. Germination lasts between 3 to 8 weeks, however, the process can be accelerated by soaking the seeds in water for 24 hours.

Season: The fruit ripens between the months of March to June, from April to September, or June and August, depending on the region and the climate in which they are grown, it also varies from the climatic places that exist in Ecuador.

Harvest: The fruits are ready for harvest from 3 to 8 months.

Productivity: In Ecuador, the jackfruit is not a well-known fruit, so its exploitation is not as high, however it has been analyzed that the fruits have a good yield per tree.

Storage: Jackfruit is brown in color, it deteriorates rapidly as it begins to ripen. It is for this reason that it should be stored cold for 3 to 6 weeks between 51°F to 56°F and roughly 82% to 94% relative humidity.

For the development of nutritional jackfruit bars, the raw material will be extracted from the plantation called "Plantas Ecuador" which is located in Armenia 1. Calle P Alfonso Villalba and 18 de mayo in Valle de los Chillos Quito. This company distributes retail and wholesale products. It focuses on the production of plants and fruits for the national and international market. This is done through the implementation of both productive and commercial techniques, which allows them to create a radical change in the experience of buying plants and fruits.

Plantas Ecuador, has approximately 1,000 square meters of jackfruit crops. This space contains around 100 fruit trees. The tree has flowers practically all year round, each tree takes 6 months to mature and produces between 30 to 50 jackfruit fruits per tree, the weight of each fruit is 5

to 10 kilos, of which 4 kilos are only pulp. This plantation, by producing fruits wholesale, will be able to provide the raw material for the management of nutritional bars.

When we contacted "Plantas Ecuador", they established that they can provide more than 300 jackfruits to start the process of developing nutritional bars with a wholesale cost of three fruits for 20 dollars, later depending on how the production of the fruits is. bars annually will be able to supply the raw material, without any inconvenience .

Figure 33

Jackfruit Extraction

Note. Taken from Plants Ecuador, 2021.

For the harvest of the fruit, an instrument must be used to cut the branches, later the latex will be expelled from them, when cutting it, it will have to take care that the jackfruit does not fall to the ground since it could be ruined. They have to be kept in the shade until they are transported for industrial processing. For the extraction of the pulp, it is necessary to separate what is consumable and what is not, also, it is necessary to use vegetable oil on the hands and in the utensils that are used. This will serve to protect you from the remaining latex of the jackfruit.

The jackfruit is used in its maturation stage, since in this phase it has defined its characteristic flavor and smell. It is essential that in the raw material extraction process a quality control is carried out in which the fruit is examined to be free of bruises or rot to ensure care and continuous improvement in the quality of the product.

Figure 34

Jackfruit Plantation

To extract the pulp of the jackfruit, the following steps must be carried out:

1. First the fruit must be cut in half.
2. Second, with a pulper, the seed is separated from the pulp and it is boiled in order to undo the amount of latex it may contain.
3. Third, the pulp is cooked until it is soft, at this time it can be stored and frozen in containers to later be used for the development of nutritional bars.

Figure 35

Jackfruit pulp

2.4.2 Methods for processing nutrition bars

After having determined the raw material extraction process, the methods that will be used to start the production line of jackfruit nutritional bars should be detailed later. In the first

place, the machinery for the development of the bars must be evaluated and determined. At this stage, it is necessary to have the appropriate machinery for the operations. It is important to select those that offer an adequate capacity for the volume of production, in addition, they must have requirements such as (space, water, electricity), availability of spare parts, maintenance and labor.

Subsequently, a sensory analysis will have to be carried out, which allows measuring on a scale of 1 to 5 the level of acceptability (being 5 I quite like it and 1 I totally dislike it) that the product will have, in the same way. It will evaluate aspects such as: taste, color, texture, appearance and smell. In addition, a bromatological analysis will be carried out that refers to the chemical evaluation of the matter that makes up the nutrients, this will allow evaluating the characteristics such as the nutritional value, total sugars, saturated fats, sodium and adulterations that the jackfruit bars will have. This analysis will determine the proteins that the bars will contain. The Microbiological characteristics will also be specified based on the Sanitary Standard that establishes the Microbiological Criteria for Sanitary Quality and Safety for Food and Beverages for Human Consumption in Ecuador.

On the other hand, the organoleptic characteristics that the bars will have must be analyzed. At this stage, it is specified that the bar must have a pleasant taste and smell, the product will also have an adequate color, without foreign matter and be crunchy. Finally, the presentation and packaging will be ecological for first use and hermetically sealed, that is, sealed in such a way that the entry or exit of air is prevented.

2.4.3 Extra ingredients that the jackfruit bars will contain

After knowing the process of obtaining raw material and the methods for the processing of nutritional jackfruit bars, we proceed to analyze the correct composition of ingredients that they should have. For the development of the nutritional bar, the Food Engineer Ismael Cordero who works in the Municipality of Azogues and the nutritionist Geovanny Carrera, president of the clinical nutrition and nutritional support service of the San Juan de Dios Hospital in the City of Cuenca (M. Lamb, personal communication, October 26, 2021).

The methodology used and proposed by the Food Engineer and nutritionist was to develop three different formulas for the composition of the product, since the project, being focused on chronic malnutrition, the bars must contain a high protein base, in this case protein

from animal origin, because they have macronutrients that facilitate the functioning of the body, as they contain vitamins, minerals and substantial amino acids, which help the growth of tissues and organs to improve development in infants, also allows the formation of antibodies that repair the cells of the immune system.

According to Geovanny, each bar should contain between 10 to 15 grams of protein, so you will have to use supplements such as: milk, egg whites, among others, since these have a high protein level. These three formulas will be made in order to analyze the variations of the bars and to know which is the result that most closely resembles the desired product. The formulations share the same composition of grains, cereals and fruits, being their liquid composition what differentiates them, with this it is sought to obtain bars that have a good image, consistency and flavor.

For the development of the formulations, a table must first be established with the ingredients that the jackfruit nutritional bars will contain and the equipment that will be needed for their development.

Table 9

Ingredients and equipment for the development of jackfruit bars

Ingredients	**Equipment**
Jackfruit pulp	Electric balance
Brown sugar	Containers
Honey	Mixers
Milk, egg whites	Industrial kitchens
Whole grain corn flakes, oatmeal, coconut, raisins	Industrial Furnaces

Note. Taken from Carrera, 2021.

Secondly, the table of formulations for the design of the bars will be defined.
in order to analyze which result is better suited.

Liquid base

The percentage of ingredients that the liquid base will have for the preparation of 20 nutritional jackfruit bars will be determined:

Table 10

Jackfruit Nutrition Bars Liquid Base

Ingredients	Formula 1	Formula 2	Formula 3
Brown sugar	6,31%	1,4%	0,80%
Honey	7,12%	-	1,61%
Milk	-	82%	40,45%
Egg whites	32,38%	8,7%	8,57%

Solid base

The percentage of ingredients that will have the solid base for the elaboration of 20 nutritional jackfruit bars will be determined:

Table 11

Solid Foundation of Jackfruit Nutrition Bars

Ingredients	Formula 1	Formula 2	Formula 3
Whole grain corn flakes	20,36%	1,4%	4,04%
Oatmeal, coconut, raisins	14,25%	2,8%	8,09%
Jackfruit pulp	6,51%	2%	24,27%

Banana pulp	13,03%	1,7%	12,13%

The formulations listed below are established for the manufacture of 20 Jackfruit Nutrition Bars:

Formula 1: It was made with the following ingredients: Oatmeal (70 g), corn flakes (100 g), honey (35 g), eggs (3 units), panela (31 g), banana pulp (64 g), jackfruit pulp (32 g), milk (-). It was placed in a preheated oven at 200oC for 15 minutes. Then, they were removed from the oven, the sheet was allowed to cool to room temperature.

Formula 2: It was made with the following ingredients: Oatmeal (80 g), corn flakes (60 g), honey (-), eggs (6 units), panela (50 g), banana pulp (70 g), pulp of jackfruit (80 g), milk (3 liters). It was placed in a preheated oven at 170oC for 20 minutes. Then, they were removed from the oven, the sheet was allowed to cool to room temperature.

Formula 3: It was made with the following ingredients: Oatmeal (200 g), corn flakes (100 g), honey (40 g), eggs (4 units), panela (20 g), banana pulp (300 g), jackfruit pulp (600 g), milk (1 liter) Baked in a preheated oven at 180oC for 10 to 15 minutes. Then, they were removed from the oven, the sheet was allowed to cool to room temperature.

The previously established formulations allowed us to examine that formula 3 is the one that achieves the best results because it shows a nutritional profile that provides health benefits.

Table 12

Formula that most closely resembles the results achieved

Grams (g)	**Percentage (%)**
Oatmeal (200 g)	8,09%
Corn flakes (100 g)	4,04%
Eggs (212 g)	8,57%
Brown sugar (20 g)	0,80%

Banana pulp (300 g)	12,13%
Jackfruit pulp (600 g)	24,27%
Honey (40 g)	1,61%
milk (1000 g)	40,45%
Total: 2472	**100%**

Once the composition of the product was defined, the Food Engineer developed the process for the preparation of nutritional bars, in which you must first:

1. Determine the weight of the ingredients: each ingredient will have to be weighed on a precision scale and placed in its respective container to be mixed later.
2. Union of grains, cereals, the pulp of the jackfruit and the banana: once weighed, all the grains, cereals and fruits are taken to the same container for homogenization.
3. Elaboration of the liquid base: in the same pot, heat the honey with the whites of egg and milk. Mix well and let heat until they reach the point of caramelization.
4. Mix of cereals, grains and fruits with the liquid mixture: the cereals, grains and fruits are finally joined together with the liquid base in order to give the bar its consistency.
5. Shape the bars: the dough is taken and the rectangular shape is manually given to the bar.
6. Bake the bars: after having shaped the bars, they will be placed in the oven at a temperature of 180 degrees Celsius to achieve a solid consistency. The same temperature must be maintained throughout the cooking. The control of the cooking time is carried out, which is from 10 to 15 minutes, likewise the temperature control will be carried out.
7. Cooling: The bars are removed from the oven and cooled to room temperature.
8. Unmolding: Once the bars are cut, they are manually unmolded, a visual check to avoid pieces of paper sticking to it. (Career, 2021).

For the bars to provide the necessary and sufficient protein value, it will require a fruit that has 4 kg of jackfruit pulp for the preparation of approximately 133 nutritional bars, since each bar will contain 30 grams of pulp only. According to the nutritionist, each bar should

contain only 10 to 15 grams of protein to see the changes in children suffering from malnutrition. It is for this reason that each bar will weigh around 123 grams.

Below is the table of nutritional information that each jackfruit nutrition bar will contain.

Table 13

Nutritional content of nutrition bars

Ratio (1 bar)	Content
Calories	602 calories
Protein	15 g
Fat	20 g
Saturated Fat	10 g
Carbohydrates	40 g
Sugars	10 g
Dietary fiber	28 g

Note. Taken from Carrera, 2021.

Figure 36

Nutrition bar design.

2.4.4 Necessary regulations for the development of the bar

For the design of nutritional bars, it is essential to know the permissions, legal regulations and trademark registration that are needed so that the product meets the requirements requested by Ecuadorian law to be produced. In this case, the production will be carried out in the Ingapirca parish, this project seeks that the farmers of the area become involved in the production of the nutritional bars and that they provide the components that these contain as: milk, eggs, corn flakes among others. It is important that farmers are trained, so that in the future it becomes a stable source of work, which allows the development of this community.

The certifications required are listed below:

INEN standards:

- NTE INEN 1751-96: 2012: “Fresh fruits, definitions and classification”. In this INEN standard, the qualities of jackfruit and bananas are specified, such as their color, flavor, and smell, so that it is a quality product.
- NTE INEN 1334-2: 2011: "Labeling of food products for human consumption part 2". This standard establishes the nutritional labeling, requirements and healthy declarations that nutritional bars must have.
- NTE INEN 2570: 2011: “Snacks of grains, cereals and seeds”. This standard establishes the requirements that nutritional bars made from grains and cereals must meet for consumption.

Health Register:

Figure 37

Access to the health registry

Note. Taken from the National Agency for Health Regulation, Control and Surveillance, 2020.

The Sanitary Registry are all the requirements requested by the Ministry of Public Health of Ecuador, the same ones that must be related to all those specifications to determine the quality of the product. This document will declare all the ingredients that will be used to make the jackfruit nutritional bars. To obtain the inscription of the sanitary registration by product for national processed foods, you must enter the application form (129-AL-002-REQ-01) through the Ecuadorian Single Window (VUE).

- First, the application form must be completed.
- Second, the declaration must be made in which it is determined that the product complies with the respective national technical standard, for which a document must be attached that declares compliance with the Ecuadorian technical standard NTE INEN, which It must have the name and signature of the technical person in charge, as well as the name of the product to be registered exactly as it is on the application form. If there is no specific national or international technical regulation for a processed food, the manufacturer will have to establish product quality and safety specifications, which must be valid by the manufacturer, this validation will be analyzed by ARCS (The National Agency Health Regulation, Control and Surveillance).
- Third, a file must be submitted containing the entire process of making the product, so a document must be attached containing the name of the product and a brief description of all the stages of the manufacturing process. Therefore, this document must be signed with the name and signature of the technical manager. In the event that a conservation process is applied such as: refrigeration, sterilization, freezing, it must also be declared.

- Fourth, the product label will have to be made, which must be adjusted to the requirements demanded by the Ecuadorian technical regulation RTE INEN 022 and the Ecuadorian technical regulations NTE INEN 1334-1, NTE INEN 1334-2, NTE INEN 1334 -3 on the labeling of food products for human consumption. When there are several presentations of the same product, a single label is accepted, so a document must be presented that specifies that the same technical information will be kept and the information will only change according to what contains. The information that will be declared on the label will be established in the chemical and physical-chemical specifications of the product, which will be accredited by the SAE (Ecuadorian Accreditation Service).
- Fifth, a document must be delivered in which the useful life of the product is declared, in which the conditions of storage and conservation of the same must be indicated, it must also be with the name and signed by the technical manager.
- Sixth, a document must be issued by the distributor of the packaging to the manufacturer of the product, in this document the material with which the packaging was made must be verified and whether or not it is suitable for contact with food for human consumption.
- Lastly, a document must be submitted containing the name of the product with the description of the batch code that the manufacturer uses to identify its production. This document must be with the name and signed by the technical manager. This lot identification is the code that allows to identify the date of manufacture and the production lot.

Trade mark:

To register a trademark, first you must enter the site www.propiedadintellectual.gob.ec, second you must fill out a "virtual mailbox request" form with your information, third you have to perform a search to see if the trademark is not registered, fourth, if the brand is available, a process will have to be started on the SENADI page (National Intellectual Rights Service) where the brand information is entered, that is, the logo or trade name and its description , fifth, the payment of the $208 fee is made and finally the process begins in the system, which can last approximately 6 to 7 months (Gob.ec, 2021).

Patent Registration:

For the patent registration, a summary must be made in which there is:

a) The name of the product (the invention).

b) It must have a maximum length of 150 words.

c) It must contain the object and the description of the invention of the jackfruit bars.

d) This summary must be on the first page that is delivered together with the application.

ISO standards:

For the preparation of nutritional jackfruit bars, the following ISO standards must be met:

- ISO 22000: Food safety management: This standard specifies the requirements that a management system will have to ensure food safety throughout the entire food chain until reaching the final product to be consumed (ISO, 2018).
- ISO 9001: Quality management system: This standard focuses on all the quality management elements that a company or entity will have to have in order to have a system that allows improving and managing the quality of its services or products. an effective way (Standardization, 2015).

The jackfruit bars must have on the back of their packaging the nutritional report detailing the energy value, nutrients, amount of calories, sugars and proteins that they will contain.

2.5 Strategic alliance for the distribution of jackfruit bars

The purely indigenous microenterprise "Kuri Muru" is a strategic alliance option that will facilitate the manufacture and distribution of nutritional jackfruit bars, because it has a nutritional focus, which is dedicated to the healthy future of children based on the added value of Andean grains that are grown organically, they also focus on providing quality products. For this project Kuri Muru will be feasible, since it is located within the province of Cañar, which allows reducing transportation costs in terms of the distribution of the bars to the school, with this company each jackfruit-based nutritional bar will cost 0.27 cents and its production will be between 300 to 500 bars per day, in addition these will be delivered on time due to the production logistics that the company has.

After determining in chapter 2, the ingredients, formulations, regulations and permits necessary for the production of jackfruit nutritional bars. This information will be provided to the Kuri Muru company to facilitate their production.

2.6 How would Jackfruit bars help counteract malnutrition in children between 5 and 8 years of age?

According to the FAO and the WHO (2021), children between 5 and 8 years old need between 900 and 1,300 calories a day to keep energized. Surveys analyze that there is chronic malnutrition based on the size of the students. It is for this reason that the nutritional bars will have a high protein level since the components with which they will be made have high levels of protein such as milk, egg whites, oats, bananas, jackfruit, among others. All these nutrients will benefit children who suffer from this problem, since by consuming them frequently in a certain period of time, the results will be positive.

The nutritionist at the San Juan de Dios hospital recommends providing 2 nutritional jackfruit bars per child each day, one for breakfast and one for recess. For this reason, approximately 3,000 jackfruit bars will be distributed to 68 students each month. in the range of 5 to 8 years of age, for a period of 4 years. This project will be progressive, since first the bars will be provided to the 68 children and later the provision of bars will be expanded to the students of the entire educational unit. The results will be beneficial for the consumer, however they will be in the long term, by providing this supplement to children from 5 to 8 years old, their physical, emotional and intellectual development will improve.

On the other hand, most of the respondents from 5 to 8 years old of the Sisid Intercultural Bilingual school are low-income, most of the time they are alone or with their siblings. Students with chronic malnutrition have an inadequate diet due to their irregular meal times. Being present in nutritional bars, jackfruit will help counteract this problem, since it provides carbohydrates, proteins, calories, vitamins and minerals in infants so that their weight increases, their health improves and they stay hydrated.

Jackfruit nutritional bars have enough properties so that students have the ability to pay attention and concentrate during the school day, and thus improve their performance in classes, this due to there is a direct relationship between nutrition and mental development of the students, in most cases it is a proportional relationship with the academic performance of the child in his school stage. It is important that in this phase of development, students consume a large amount of protein and nutrients.

Most of the parents of the respondents do not have the resources or sufficient support to provide a balanced diet for their children. It is for this reason that the consumption of

jackfruit bars will help reduce malnutrition in infants, since new behaviors in their diet will be promoted, through the adequate consumption of carbohydrates, fats, water, vitamins, minerals and proteins, causing an impact positive that contributes not only to health problems, but also to economic, social and cultural problems.

CHAPTER 3

3. DESIGN OF AN INTERNATIONAL COOPERATION PROJECT FOR THE FEASIBILITY OF PROVIDING NUTRITIONAL BARS OF YACA FOCUSED ON CHILDREN FROM 5 TO 8 YEARS OLD IN THE INGAPIRCA PARISH

3.1 Diagnosis

Next, it is presents the diagnosis of the Ingapirca parish:

Table 14

Project Diagnosis

Population	The approximate population is 14,000 inhabitants, of which 2,000 are in the urban center of Ingapirca and the rest are distributed in indigenous communities or rural areas.
Natural resources	Ingapirca occupies around 2,428.86 ha. in livestock and agricultural sectors, representing 8.80% of the territory.
Agricultural	The agricultural production in Ingapirca is mainly for self-consumption purposes. However, grains, seeds and flour are sold at the fair located in the parish. There is no higher productivity due to the lack of labor caused by migration. Also, the roads of the community are deteriorated, which influences the commercialization of agricultural products, so the capital invested in the businesses is not recovered.
Cattle Raising	The livestock sector is of quality, because there is a milk collection and cooling center.

	However, there is a production of milk on a smaller scale, what they earn is used to support their families.
Educational	There are only three schools, which are in poor condition, due to the glass at the classrooms is broken, the courts have cracks, therefore they do not have the adequate structure for the children to receive their classes.
Accommodation	In Ingapirca there is a smaller number of households compared to the number of dwellings. - 21.76% of homes built are unoccupied. - The predominant group are: 84.38% of dwellings are house or villa type, 8.99% are mediaguas and 3.53 are covachas - Most of the houses are made of concrete and have two floors, these are concentrated in the center of the parish.
Alcohol	There is moderate alcohol consumption

Note. Taken by GAD Ingapirca, 2021.

3.2 SWOT Analysis

Table 15

Project SWOT Analysis

Strengths: - Appropriate use of natural resources and existing agricultural products in the community of Ingapirca for the development of the project.	Opportunities: - Mitigate malnutrition in children from 5 to 8 years old, through non-profit social participation. -Contribute jointly with the municipal GAD

- UNICEF's management capacity to carry out social projects, which allows them to directly exercise International Cooperation within the scope of their powers. - The diversity of regulations that allow to regulate the action of UNICEF in the cooperation. - Officials from UNICEF and the Municipal GAD of Cañar recognize and value the contributions of cooperation at the time of manage the operational and strategic objectives of the project. - This project aims to benefit and promote the development of innovative actions and processes in the Ingapirca Community with a bottom-up model.	and UNICEF for the development of the project. - Have financial support, based on international cooperation between the municipal GAD and NGOs. - The involvement of NGOs in this project will increase the interest of other organizations in improving the health and well-being of the children of the Ingapirca community. It will also encourage the development of more programs that reduce chronic child malnutrition.
Weaknesses: - Lack of evaluation methods in the implementation of the project. - Deficient administration in the economic resources for the management of the project. - Lack of interest in the needs of the Community, by the municipal GAD. - The lack of information on food security by the community makes it difficult to reduce malnutrition.	Threats: - Not having the records in time for the approval of the project management. - Other social projects with lower costs. - It does not respond well to the expectations and needs of Ingapirca. - Prioritize other social needs of the Ingapirca parish - Unexpected cuts in the project budget.

3.3 Background of the Ingapirca parish, province of Cañar, Azogues - Ecuador

The Province of Cañar is located in the southern part of Ecuador, its limits are: to the north with the provinces of Chimborazo and Guayas, to the east with the provinces of Morona Santiago and Azuay, to the west with the province of Guayas and to the south with the province of Azuay. Cañar has approximately 281,396 inhabitants and is divided into seven cantons: Azogues, Biblián, Cañar, El Tambo, Deleg, Suscal and La Troncal. Cañar stands out for being an agricultural province since they are the main producers of sugarcane in the coastal area, while in the Andean region the crops of barley, corn, wheat and a wide variety of fruits and vegetables stand out (Government of the Meeting, 2018).

On May 1, 1919, Ingapirca was born as a new parish, from an extensive administration by its inhabitants under the command of the Presbyter Don Luis Sarmiento. Ingapirca means walls of the Inca, it is located in the Cañar canton, 90 km from Cuenca and 3160 m above sea level. Throughout the year its temperature varies from 8 to 12ºC. Two great pre-Hispanic cultures, better known as the Cañarís and Incas, developed in Ingapirca (Ingapirca Parroquial Government, 2018).

It can be seen that Ingapirca is a place full of culture and ancestral knowledge, which is considered a sacred site of the Incas in Ecuador, since it was a political, religious, scientific, military and administrative center during the Inca conquest. In addition, it is the best preserved Inca architectural site in the country and the most important pre-Columbian archeological site. Ingapirca is an amazing construction that shows tourists what the Cañarí-Inca culture was like. It has an area of approximately four hectares.

The ruins of Ingapirca is the most visited tourist place in the parish, since it is made up of solar observatories, cemeteries, roads, priests quarters, indigenous plazas and warehouses. The structures of its buildings are made of perfectly carved stones that are joined with natural mortar. What stands out most in the complex is the Temple of the Sun or Castle, since it is considered the main nucleus of the place (Ingapirca Parroquial Government, 2018).

The economy of the Ingapirca parish is fundamentally based on: agriculture, livestock, masonry, transportation and retail. Its inhabitants are dedicated to agricultural activities that allow them to take advantage of the soil for planting, caring for and collecting fruits, grains, among others, for consumption and sale to other communities.

Important aspects of the Ingapirca parish will be detailed below:

Creation date: May 1, 1919

Total population: Approximately 14,000 inhabitants

Extension: 277,106 km2. It limits to the north with the Juncal (Cañar) and Achupallas (Alausí) parishes; to the east with the Rivera and Pindilig parishes of the Azogues Canton; to the south with the Honorato Vásquez parish; and to the west with the Tambo Canton.

Altitudinal range: 2,880 to 4,440 m.a.s.l.

Hydrographic network: It is in the upper basin of the Cañar River, on the Pacific slope. The main courses are the Huayrapungo, Silante and Vende Leche rivers.
Economic aspects Employed population: 2,461 Economically active population (PEA): 3,049 (PEA) by branch of activity (Ingapirca Parroquial Government, 2019).

3.3.1 Why improve health in the parish of Ingapirca?

In Ingapirca there is a wide variety of families that do not have sufficient economic resources to be able to access medical or dental services. This community always needs medical attention. It is for this reason that it is important to improve the health system of the parish, because it is essential that there is a quality health system that promotes health in the community and allows protection from epidemics, reduces poverty, and also helps boost economic growth within it.

Promoting health care for the citizens of Ingapirca is important, since in this sector the population does not normally go to primary care services as they normally should. It is for this reason that all these efforts open a way to create awareness spaces about the importance of accessing a good health system.
At present, it has been observed that the social realities in indigenous communities such as Ingapirca are quite critical, since there are problems of malnutrition, anemia, intestinal diseases, diarrhea, respiratory infections, tuberculosis, among others, since the conditions in those who live make it difficult for them to have a good diet or timely access to health services, since the heavy workloads generate a particular picture of illnesses and diseases in both

children and adults. These aspects have been important for triggering a series of innovative initiatives to improve access to quality health.

3.4 Project objectives

- Develop an international cooperation alliance between UNICEF and the municipal GAD of Cañar.
- Promote jackfruit as a sustainable option for consumption. From the provision of nutritional bars.
- Counteract chronic indigenous child malnutrition existing in Ingapirca in children from 5 to 8 years old in basic elementary education.

3.4.1 Characteristics of the project

- International Cooperation Project between UNICEF and the GAD del Cañar that, in addition to financial assistance, includes the provision of equipment, supplies, technical support and training for its development.
- Production of nutritional jackfruit bars to reduce chronic malnutrition in children between 5 and 8 years old in the Ingapirca.
- It contemplates the development of a bottom-up model that benefits families in the sector with the aim of generating sources of employment for women in the community, helping to strengthen economic development based on sustainable management of the natural resources that exist in the area in order to improve gender integration.
- Promotion of the participation and empowerment of the indigenous community of Ingapirca.
- Ability to improve the quality of life of children in basic education in Ingapirca in order to develop high physical and academic performance in students.
- Encourages the development of future nutrition, child health and education projects in order to prioritize the comprehensive protection of children.

3.5 Financing and dissemination

For the management of the project it is essential to have technical and economic resources, of which the GAD del Cañar does not have in its entirety. Therefore, the intervention of UNICEF through international cooperation for the development of the project is important. It is for this reason that the project will have two sources of financing to carry it out.

1. Municipal GAD of Cañar:

The income of the Decentralized Autonomous Government of Cañar is classified into three groups:

- Own income: 2,442,006.77 dollars.
- Transfer from the central government: 2,280,996.30 dollars.
- Donations from the private sector and international organizations: approximately 8,311,912.54 dollars (Cañar canton Intercultural, 2020).

The Municipal GAD of Cañar has a budget of USD 9.2 million dollars destined to the development of projects such as: tourism, drinking water, health, sewage, roads and urban equipment of the province with the objective of benefiting approximately 123 thousand inhabitants (Development Bank of Ecuador, 2020).

When we interviewed the administrators in charge of the management of social projects of the municipal GAD of Cañar. They established that the support they give to this type of project begins with providing training on how to start them, they also support with technical support, financing logistics, and the preparation of cost tables. They also help carry out all the permits, declarations and even process the necessary health records. They are in charge of hiring the personnel required to carry out the project, in the event that the project is based on the development of products, the GAD pays food engineers to carry out the analysis and approval process of the same.

Likewise, the GAD provides equipment to save costs and thus production is efficient. They explained that they do not grant specific amounts of money for the development of projects, because their legal regulations do not allow them, but rather that the support they provide is based on technical resources. It is for this reason that, in order to carry out this project, the provision of jackfruit nutritional bars will be proposed to the municipal GAD of Cañar to counteract chronic infant malnutrition in children between 5 and 8 years of age, so that they consider if it is viable and what support they can provide to it.

2. UNICEF:

UNICEF Ecuador established a new cooperation program for the period 2019-2022. This program is aligned with the 2030 Agenda and the Sustainable Development Goals, its purpose is that every boy and girl throughout the country have the same opportunities, have adequate food, healthy, have access to clean water and quality education to achieve a full and happy life. It is for this reason that UNICEF always collaborates with a wide variety of individuals, agencies and organizations. These partnerships are paramount as the challenges facing UNICEF are big enough to tackle alone (UNICEF, 2014).

Worldwide, UNICEF is an NGO that works from cooperation programs that last approximately five years. These programs are discussed with States, governments and their institutions, so they must be approved by the UNICEF Executive Board, which is made up of 36 member States, divided into five regional groups. Ecuador has its Cooperation Program hosted in the period 2010 - 2014.

UNICEF funds its programs with:

- Contributions from donor governments
- Funds that come from Pro-UNICEF Committees in Spain and the United States, through the collection of donations made by individuals and corporate alliances.
- Voluntary contributions from companies, corporate alliances, individuals and foundations
- Intergovernmental Organizations such as Development Banks, among others (UNICEF for each child, 2020).

In Ecuador, the UNICEF office finances its programs with funds from governments such as: Spain, Italy, Japan, Germany, the Netherlands and Finland. When the Cooperation Programs in Ecuador are approved, these have a duration of 5 years and the resources are received from two financial sources:

1. Regular resources, which refers to funds from the Headquarters budget and which allows financing part of the structure of programs and human resources. This fund represents 25% of the total country program budget.
2. Supplementary funds or other resources (UNICEF for every child, 2020).

The agreements established in the Cooperation Programs are executed through Agreements and Work Plans. The Work Plan is a planning mechanism that contains an intervention strategy, to establish the expected results and therefore the key activities, it also allows knowing the execution time and establishing the budget for its implementation. Once the documents authorized by both parties are signed, the execution of the Work Plan is carried out based on 4 modalities of resource transfers, such as:

1. Transfer of funds
2. Reimbursement of funds
3. Payment on behalf of Third Parties
4. Direct implementation by the UN body

The funds provided by UNICEF to carry out social projects are between $50,000 and $90,000 dollars of initial financing without social capital. It is for this reason that for the financing of this project it is intended to participate with UNICEF Ecuador establishing the proposal for the provision of nutritional bars of jackfruit to counteract chronic child malnutrition so that this organization in turn provides a feasibility, technical, operational study and economic to see if the project applies with the established requirements and if it can be implemented (UNICEF, 2021).

3.5.1 Actors of the project: Municipal GAD and UNICEF:

Table 16

Main actors of the project

1. The municipal GAD of Cañar: - The decentralized autonomous government of Cañar is an institution that makes up the territorial organization of the country and is regulated by the Constitution of the Republic of Ecuador and the Organic Code of territorial organization, autonomy and decentralization. - Its function is to comply with policies, programs, projects and plans that benefit the province of Cañar. In addition, it carries out the execution of the institutional budget, fulfillment of the objectives and strategic plan of the entity and public contracting. It is supported by local and international cooperation to provide an intercultural, equitable, fair and quality society.	**LOCAL ACTOR**
2. UNICEF: - The United Nations Children's Fund is a non-governmental organization that aims to promote the defense of children's rights, meet	

their basic needs and guarantee their full development, ensuring their well-being throughout the world. UNICEF has been present in Ecuador since 1973, since it has been of great support to the national government, state institutions and civil society organizations. Because its mission is that the children and adolescents of the country have the same opportunities as an inclusive education, environments without violence, easy access to health services and adequate food.	**EXTERNAL ACTOR**

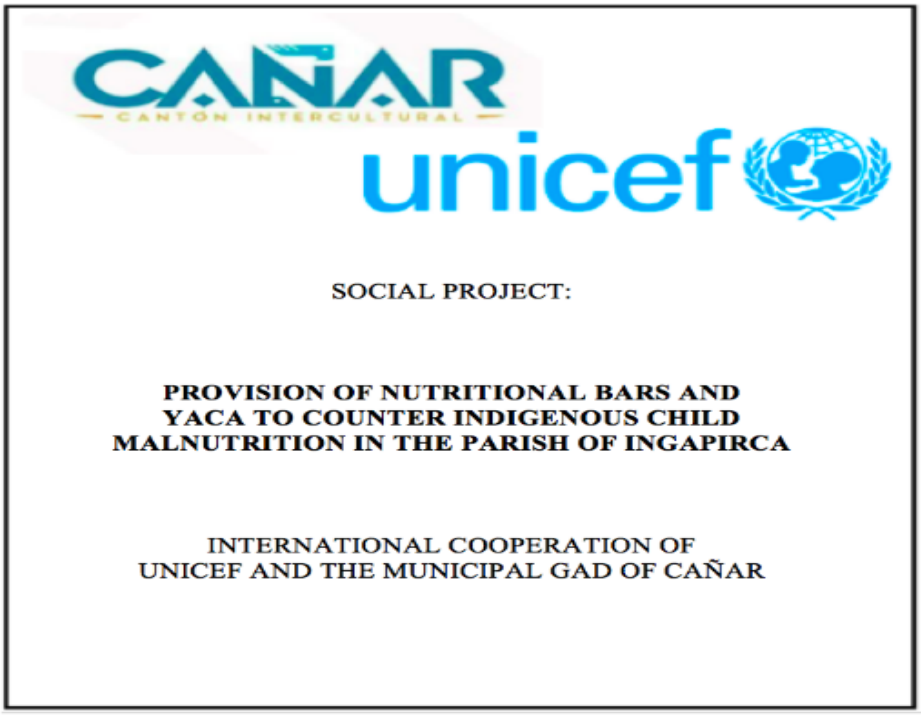
Note. Taken from UNICEF AND GAD DEL CAÑAR, (2021).

3.6 Formulation of the cooperation project with UNICEF for the provision of nutritional jackfruit bars in the Ingapirca parish

International cooperation project of UNICEF and Municipal GAD of Cañar: Provision of nutritional jackfruit bars to counteract indigenous child malnutrition in Ingapirca.

Figure 38

Project Design Model



1. Presentation of the organization carrying the project:

Table 17

Presentation of the Project

Organization name's	Municipal GAD of Cañar & UNICEF
Legal representatives	Estefanía Saldaña and Melina Cordero
Town	Azogues
Direction	Ingapirca
Email	projectyaca@gmail.com
Telephone	0984925193
Web page	www.projectyacaunicefygadmunicipalcañar.com

2. Describe the main activities of your organization:

To carry out this project, it is essential to know what activities will be made:

- First, it will be established a link between UNICEF and the Municipal GAD of Cañar, based on the socialization of both leaders and parish authorities.
- Second, the areas of intervention on which the project will focus will be decreed.
- Third, establish specific technical groups for each area, such as: the financing area, the control area and the management area for the viability of the project.
- Fourth, establish the infrastructure, space, and materials necessary for the production of nutritional jackfruit bars.
- Fifth, provide workshops and training for teachers and parents on methods and techniques to promote adequate nutrition in children.
- Sixth, prepare a budget table on the expenses and income of the project.

To carry out these activities, there must be a group of people in charge of managing the project, the same ones who have the function of organizing and preparing all the resources to make it viable, later there must be a technical staff that manages the financial area. allowing for budget planning. In addition, it is important to have a team of people who are in charge of making semi-annual reports to carry out an adequate control of the activities. Also, it is essential to carry out evaluations to know if the activities have been carried out correctly, what justifies the established expenses and if the resources granted for the development of the projects have been used appropriately.

3. Project Summary:

Context:

In Ingapirca there is a high rate of indigenous population, its main economic activities are livestock and dairy. However, their economic income does not meet the value of the basic basket ($716.14).

According to the survey carried out at the Sisid Intercultural Bilingual Community School, the monthly salary of the student representatives is between $50 and $200 dollars. The lack of financial resources, the little knowledge about nutritious foods and the lack of community organization generate chronic malnutrition in children between 5 and 8 years old.

Project description:

This project seeks to mitigate chronic malnutrition, based on the provision of jackfruit nutritional bars, for this it consists of two stages:

1. First stage: they will be socialized with the main actors of the project and the authorities of Ingapirca, later the areas of intervention in which the project will focus will be decreed, therefore the infrastructure, space and materials necessary for the production of nutritional bars, in this case they are: "Ecuador Plants" (place of extraction of the raw material), the "Kuri Muru" cereal factory (place of production of the jackfruit bars), "Zonas Producers" (place of production of milk and eggs, since they are the essential ingredients for the manufacture of nutritional bars). These production areas provide quality and eco-friendly products that allow maintaining sustainable agriculture.
2. Second Stage: it will be based on the provision of nutritional bars, workshops will also be provided, training for teachers and parents on methods and techniques to promote adequate nutrition in children.

Through these two stages, the feasibility of the cooperation project with an international organization will be known, and if this can be an alternative to mitigate this problem in order to generate a positive and sustainable social act. This project, being based on a bottom-up model, gives an important role to the indigenous female gender of the Ingapirca parish, since it will generate sources of employment for the women of the community.

General objective:

Carry out international cooperation between UNICEF and the Municipal GAD of Cañar, through the provision of nutritional bars based on jackfruit to counteract child malnutrition in children between 5 and 8 years old, focused on the Sisid Intercultural Bilingual School, applying a bottom up model that highlights the role of indigenous women in the productive sector of the parish.

Specific objectives:

- Promote the consumption of nutritional jackfruit bars as a sustainable option to reduce chronic child malnutrition.
- Generate sources of employment for the community, helping to strengthen the economic development of the parish, with nutritional bars from a bottom up model.
- Promote the local empowerment of indigenous women, in terms of the production of the components that the nutritional bars will have.
- Develop and implement a surveillance system by teachers to verify if the long-term consumption of the bars has a positive result in the life of the students.

- Encourage social community participation in Ingapirca to carry out campaigns for the prevention and control of chronic malnutrition in infants.

Expected results:

Once the project to provide nutritional jackfruit bars has been completed; the following results will be achieved:

- Promote an incursion of international cooperation in Ingapirca to carry out social projects that benefit the community.
- Promote the production of jackfruit for its commercialization both in the internal and external markets.
- Reduce the rates of chronic child malnutrition in the parish of Ingapirca.
- Improve school performance, health, and well-being of students in the long term from the consumption of nutritional jackfruit bars.
- Create eating habits in students from proper nutrition.
- In the long term, expand the supply of nutritional jackfruit bars so that they are distributed to more students from indigenous schools in other parishes who suffer from chronic malnutrition.

Figure 39

Project location

Note. Taken from a survey, by Google maps, 2021.

The location of the project is in the Sisid Intercultural Bilingual School, it limits to the north by the Jesús el Buen Sembrador church, to the south by the Silante River and to the east by the tourist sector called “Cara de Inca”.

This project will be developed in the province of Cañar:

- The jackfruit bars may be manufactured at the Kuri MURU company in Iza Vieja sector of the San Rafael Community.
- The ingredients that the bars will contain will be extracted from producers in the Ingapirca community through the application of the bottom-up model.
- The jackfruit bars will be distributed at the Sisid Intercultural Bilingual School.

Justification:

It is essential that children in the development stage have a healthy and balanced diet, since it is important that they consume adequate food to have a good functioning in the organism, in this way the children will have energy, concentration, physical health, mental health and good school performance. Therefore, it was detected that students from 5 to 8 years old at the Sisid Intercultural Bilingual School do not consume foods that benefit their health, since they are unaware of the nutritional value of the food they eat, and they also do not have the sufficient economic resources to acquire products rich in protein, fiber, minerals, among others.

It is for this reason that this project aims to improve the nutrition of children in the indigenous community of Ingapirca in order to reduce chronic child malnutrition.

Health and learning play a very important role in the lives of students, that is why it has been considered convenient to create an alliance between UNICEF and the Municipal GAD of Cañar, for the provision of nutritional bars of jackfruit, since this fruit contains a wide variety of nutrients, minerals, water, protein, among others, the consumption of the bars aims to improve growth, weight, school and daily performance of infants.

Other organizations involved (local):

- Plantas Ecuador, is located in the Valle de los Chillos in Quito. This company will be in charge of providing the raw material for the elaboration of the bars.

- “Kuri Muru” nutritional bars factory, located in San Rafael community in the province of Cañar. This company will be in charge of the manufacture of nutritional jackfruit bars.
- Ministry of Agriculture and Livestock (MAG), this organization will provide a space for indigenous women to dedicate themselves to planting oats, corn and the production of milk, eggs and honey to development the jackfruit bars.

Total project cost:

Below is a model of the budget breakdown for the project:

Table 18

Projection of the total cost of the project

PROJECT TOTAL COST OF THE PROJECT		
No.	ITEMS	TOTAL COSTS
	DIRECT COSTS	
	SUPPLY OF THE RAW MATERIAL (YACA, EGGS AND MILK)	$10.000,00
	MANUFACTURING OF NUTRITIONAL BARS AT THE KURI MURU COMPANY	$33.000,00
	HIRING OF STAFF	$11.000,00
	SEMESTER EVALUATION OF THE PROJECT	$3.000,00
	INDIRECT COSTS	
	ADVERTISING	$4.000,00
	TRAINING	$4.000,00
	STORAGE CELLAR	$5.000,00
	TOTAL PROJECT COST	$70.000,00
	% PARTICIPATION OF UNICEF	60%
		$42.000,00
	% PARTICIPATION OF THE CAÑAR GAD	40%
		$28.000,00

For financing, UNICEF will contribute 60% and the Municipal GAD of Cañar with 40% of the total cost of the project.

Project duration:

This is intended to last approximately 48 months.

4. Coherence of the project with public policies and with the actions of civil society: ALIGNMENT OF THE PROJECT WITH THE SUSTAINABLE DEVELOPMENT GOALS (SDG):

It is aligned with 5 SDGs:

Objective 2: Zero Hunger

The project contributes to the fulfillment of this objective through the provision of nutritional jackfruit bars, because it allows to reduce chronic child malnutrition in the children of the Sisid Intercultural Bilingual School, in this way the infants have the same opportunities to consume nutritious food. that provide health benefits. In addition, proper management of natural resources will be exercised, such as: water and soil; agricultural production of oats, honey, corn, among others; and finally renewable resources such as: eggs and milk.

Objective 3: Health and wellness

The project contributes to the fulfillment of this objective, due to the fact that the jackfruit bars will contain a high nutritional value, since they will be composed of fiber, protein, minerals, water, among others; which improves the health of students over a long-term period.

Objective 4: Quality education

The project contributes to the fulfillment of this objective, since, through the constant consumption of nutritional bars, the nutrition of each of the children will improve, which will benefit them in their school performance, since they will be energized and concentrated at the time to receive classes, in order that they have an inclusive, equitable and quality education.

Objective 12: Responsible production and consumption

The project contributes to the fulfillment of this objective, since there is a sustainable agriculture in terms of the cultivation of jackfruit in order to improve the environment without

harming the ecosystem. There is also a quality control in the production of milk and eggs by the indigenous women of the Ingapirca community for the preparation of nutritional bars. This encourages local production and conscious consumption.

Goal 17: Partnerships to achieve the goals

The project contributes to the fulfillment of this objective by fostering an alliance between UNICEF and the municipal GAD of Cañar to meet the social needs that have arisen in the Ingapirca parish.

ALIGNMENT OF THE PROJECT WITH THE OBJECTIVES OF THE NATIONAL DEVELOPMENT PLAN (2017-2021):

According to the National Development Plan (2017), in charge of former President Lenin Moreno, this project consists of an alignment of 4 objectives which are:

Axis 1: Rights for all throughout life

Objective 1: Guarantee a decent life with equal opportunities for all people

Objective 2: Affirm interculturality and plurinationality, revaluing diverse identities

The project contributes to the fulfillment of these objectives, since it aims to reduce chronic child malnutrition, as it promotes the consumption of jackfruit-based nutritional bars in infants; The project also generates co-responsibility mechanisms between the levels of government and citizens through the GAD and the Ingapirca parish in socialization activities on the importance of having adequate food, regarding the framework of food sovereignty and security. In addition, it guarantees interculturality and plurinationality in its efforts, since it facilitates the enjoyment of the collective rights of indigenous peoples and nationalities. In this case, emphasis is placed on the role of indigenous women for the agricultural production of the components that the bars will have. On the other hand, it promotes good practices that contribute to the well-being of the environment such as sustainable agriculture, reduction of pollution with good use of water in jackfruit crops.

Axis 2: Economy at the service of society

Objective 5: Promote productivity and competitiveness for sustainable economic growth in a redistributive and supportive manner

The project contributes to the fulfillment of this objective, since it promotes the agricultural and dairy productivity of the Ingapirca parish, in addition, the elaboration of nutritional bars will give added value to the jackfruit, which increases productive activity and increases local employment., in this way jackfruit bars boost the production of healthy food.

Axis 3: More society, better State

Objective 7: Encourage a participatory society, with a State close to the service of citizens

The project contributes to the fulfillment of this objective, because it strengthens the management capacities to carry out social projects by the Decentralized Autonomous Governments, it also meets the scope of the national objectives, through the administration of its competences, financial sustainability and the commitment to the participation of the Ingapirca community, which increases the involvement of social organizations such as: UNICEF, GAD Del Cañar, indigenous organizations and the Sisid Intercultural Bilingual School.

5. What needs does your project respond to? What are the main problems that the project aims to solve?

The needs that this project aims to respond to are:

Social needs: are those needs that are linked to community life.

In this case, living in inappropriate conditions, the high level of malnutrition in children, the lack of integration in society, and insufficient monthly income affect the quality of life of the population of Ingapirca. It is for this reason that from this project, it is intended to improve the living conditions of the community through sources of employment and healthy

Socio cultural needs: they are self-realization processes that are developed from activities that encourage knowledge of a specific topic.

The main problem that this project aims to solve is the existing malnutrition in children from 5 to 8 years old in Ingapirca, since the lack of knowledge about chronic malnutrition that the inhabitants have affects their health. For this reason, this project intends to carry out workshops and campaigns on the awareness of having adequate health.

6. Who will your project benefit? For each category of people identified, please estimate the approximate number of direct and indirect beneficiaries.

Table 19

Direct and indirect beneficiaries of the project

children from 5 to 8 years old of the Sisid Intercultural Bilingual School	68 infants	**Direct**
Students of the Sisid Intercultural Bilingual School	250 infants (Project replica)	**Direct**
Student family	Approximately 1,000 people or 250 families	**Indirect**
Population of Ingapirca	14,000 inhabitants	**Indirect**

Note. Taken by INEC, 2021.

7. Integration of the gender approach in the project:

This project is focused on children who suffer from chronic malnutrition in Ingapirca, and will also benefit integration due to the participation of indigenous women in the community through a bottom-up model, which aims to provide them with sources of employment.

- Comprehensive care for children focuses on their rights: This project seeks to create future opportunities in terms of improving the health, school performance and comprehensive protection of children in the Ingapirca community.
- Comprehensive gender care through a bottom-up model: This model will allow the development of sources of employment for indigenous women in terms of the production of milk and eggs for the manufacture of nutritional jackfruit bars.

8. How is your project innovative?

This project is innovative due to:

- The use of jackfruit as an essential ingredient for nutritional bars, since its qualities such as protein, fiber, water, minerals and water benefit health.
- The bottom-up model, since it will generate employment for the indigenous women of the area in the agricultural productive sector, as they will be in charge of planting corn, oats, among others, in addition to the production of milk and eggs.
- Jackfruit nutritional bars contain the necessary calories and nutritional values that infants require for energy and good health.

9. How will your project be monitored and evaluated?

For the monitoring and evaluation of the project, a six-monthly diagnosis must be made to identify whether the activities are being carried out correctly. In addition, this diagnosis will analyze the progress and impact of the project, so its operation is important, since it will allow problems to be identified and anticipated in order to avoid them and resolve them on time.
The diagnosis will be through activities, evaluations and monitoring, such as:
- Control in the fulfillment of objectives and strategies of the project.
- Control of income and expenses.
- Anthropometric monitoring by the health center to determine the effects of nutritional bars on students.
- Reports of the infants to see their progress in terms of their cognitive and emotional development.
- Quality control and project management.

Project Strategies:

- Promote the health of the children of the Ingapirca parish through the provision of nutritional jackfruit bars.
- Exercise a commitment by the Municipal GAD of Cañar to improve the health, housing, and agriculture of the community of Ingapirca.
- Promote the participation and empowerment of indigenous women through their inclusion in the productive agricultural sector.
- Promote a cooperation alliance between UNICEF and the Municipal GAD of Cañar to carry out the social project.

10. What will be your communication strategy

Table 20

Communication strategy

Social networks	Social networks are platforms that have several market niches, due to the dissemination of quality content and interest that they have, it is for this reason that this strategy will reach an objective audience that is interested in chronic child malnutrition. A large part of the people are in constant use of social networks, in this way this communication strategy allows the project to reach more users through publications, lives, among others. The speeches, advances, calls for the project will be visible on digital platforms.
Local media	The radio "La Voz de Ingapirca" and the newspaper "Noticias de la Provincia del Cañar" are intended to disseminate the project so that the community has knowledge about its operation.
Traditional media	Use billboards and banners in the Educational Unit to communicate to parents the dates on which the evaluations, monitoring and follow-up will be carried out on students from 5 to 8 years old.

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11. Project sustainability and long-term strategy:

The sustainability of this project is:

- Provide nutritional jackfruit bars with vitamins, proteins and fibers for the physical and mental development of children from 5 to 8 years of age in the parish of Ingapirca.
- Promote organic farming such as: corn, oats (ingredients that will contain the bars) in the Ingapirca parish.
- Generate sources of employment for the women of the Ingapirca community through a bottom-up model.
- Promote the comprehensive and sustainable development of the municipal GAD of Cañar based on strategic plans to reduce chronic child malnutrition, this will be developed through the participation of the inhabitants of Ingapirca.
- Conduct awareness campaigns on the problem of malnutrition to help promote food security in future generations.

The long-term strategy of this project is that the supply of nutritional jackfruit bars be extended to more schools in other parishes in the province of Cañar that have rates of chronic child malnutrition.

Logical framework

Table 21

Logical framework model

Project No. 00-01			
Logical Framework			
Association:	UNICEF & GAD MUNICIPAL DEL CAÑAR		
Project:	International Cooperation Project between UNICEF and Municipal GAD of Cañar Provision of nutritional jackfruit bars to counteract indigenous child malnutrition in the Parish of Ingapirca.		
General Objective	**Logic of Intervention**	**Objectively verifiable achievement indicators in 48 months; Sources and means of verification**	**Sources and means of verification**

	The objective is to counteract chronic child malnutrition in children between 5 and 8 years old of Sisid Intercultural Bilingual School through the management of international cooperation between UNICEF and the GAD.	4 MONTHS	Agreements
Specific Objectives (SO)	Develop a cooperation between an NGO and a municipal GAD	4 MONTHS	Alliance
	Promote the Ecuadorian jackfruit as a sustainable and healthy option.	10 MONTHS	Talks
	Propose the feasibility of providing jackfruit nutritional bars.	5 MONTHS	Talks

	To work with the educational component, implementing a surveillance system with the teachers to analyze if students are adequacy consuming the nutritional bars.	10 MONTHS	Human Resources
	To control the chronic indigenous child malnutrition of Ingapirca in children from 5 to 8 years old the Sisid Intercultural school.	7 MONTHS	Evaluations
Expected Results (R)	The Ingapirca parish will begin a foray into international cooperation	2 MONTHS	Agreements
	Jackfruit production be normalized and become an important product for commercialization	2 MONTHS	Contracts

	In a long-term period, jackfruit nutrition bars will improve school performance, health, and student well-being.	2 MONTHS	Evaluations
	The teachers will be an important component because with their vigilance will help to control if the students are adequately ingesting the nutritional jackfruit bars.	2 MONTHS	Evaluations
Activities (A)	**Result 1**		
	Promote an incursion in the international cooperation of the Ingapirca parish for the realization of social projects that benefit the community.		
	Result 2		
	Promote the production of jackfruit for its		

	commercialization both in the internal and external markets.	
	Result 3	
	Reduce the rates of chronic child malnutrition in the parish of Ingapirca.	
	Result 4	
	Improve school performance, health, and long-term well-being of students from the consumption of jackfruit nutrition bars.	
	Result 5	
	Create eating habits in students from proper nutrition**.**	

13. Schedule of Activities

This project aims to reduce existing malnutrition in children from 5 to 8 years of age in Ingapirca

Table 22

Project Activity Schedule

	ACTIVITIES	DURATION						RESOURCES
		BIANNUAL						
		Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	
1	Establish a link between UNICEF and the Municipal GAD of Cañar, based on the socialization of both leaders and parish authorities.	X	x	X				Direct

2	Decree the areas of intervention on which the project will focus.	X	x	x	x			Indirect
3	Establish specific technical groups for each area, such as: the financing area, the control area and the management area for the viability of the project.	x	x	x	x	x		Indirect
4	Establish the infrastructure, space and materials necessary for the production of	X	x	x	x			Indirect

	nutritional jackfruit bars.							
5	Provide workshops and training to teachers and parents on methods and techniques to promote adequate nutrition in children.	x	x	x	x	x	x	Direct
6	Make a budget table on the expenses and income of the project.	X	x	x	x			Direct

Table 23

Logical framework matrix

Logical framework matrix				
NAME OF THE EXECUTOR	UNICEF & GAD MUNICIPAL DEL CAÑAR			
PROJECT'S NAME:	International cooperation project of UNICEF and Municipal GAD of Cañar: Provision of nutritional jackfruit bars to counteract indigenous child malnutrition in the Parish of Ingapirca.			
HIERARCHY OF OBJECTIVES	OBJECTIVELY VERIFIABLE INDICATORS			ASSUMPTIONS

GENERAL OBJECTIVE OF THE PROJECT	BASE INDICATOR GENERAL OBJECTIVE	INDICATOR GOAL GENERAL OBJECTIVE	MEANS OF VERIFICATION	ASSUMPTIONS GENERAL OBJECTIVE
The objective is to counteract chronic child malnutrition in children between 5 and 8 years of age in the Sisid Intercultural Community Educational Unit through the management of international cooperation between UNICEF and the GAD.	Improve the weight, height and nutrition of the 68 students of the Sisid Educational Unit	Staff contract to carry out the project.	Keep a semi-annual report with the medical record of each student.	Parents do not authorize students to participate in the project
SPECIFIC OBJECTIVE 1	BASE INDICATOR SPECIFIC	INDICATOR GOAL SPECIFIC	MEANS OF VERIFICATION	ASSUMPTIONS SPECIFI

	OBJECTIVE 1	OBJECTIVE 1		C OBJECTIVE 1
Promote the consumption of nutritional jackfruit bars as a sustainable option to reduce chronic child malnutrition.	Encourage daily the consumption of nutritional jackfruit bars to the 68 students from 5 to 8 years old of the Sisid Intercultural Bilingual Community Educational Unit.	Expand the supply of nutritional jackfruit bars to the 250 students of the Sisid educational unit.	Semester evaluations of the students' reports on the daily provision of the bars, and also socialization with the parents of the infants.	Rejection of nutrition bars by students.

RESULT 1.1	ACTIVITIES	INDICATOR RESULT 1.1 GOAL	INDICATOR RESULT 1.1 ASSUMED	MEANS OF VERIFICATION	ASSUMPTIONS RESULT 1.1
Promote an incursion of international cooperation in the Ingapirca parish to carry out social projects that benefit the community.	Establish a link between UNICEF and the Municipal GAD of Cañar, based on the socialization of both leaders	Manage an international cooperation project to provide the bars.	Promote alliances for future projects with social purposes.	Through Agreements	Poor management and poor communication for the development of the project.

	and parish authorities.				
RESULT 1.2	ACTIVITIES	INDICATOR RESULT 1.2 GOAL	INDICATOR RESULT 1.2 ASSUMED	MEANS OF VERIFICATION	ASSUMPTIONS RESULT 1.2
Promote the production of jackfruit for its commercialization both in the internal and external markets	Declare the areas of intervention on which the project will focus	Produce jackfruit on a smaller scale for the development of the project	Produce jackfruit on a larger scale in order to be marketed.	Through Contracts	Suppliers do not deliver the raw material on time.

SPECIFIC OBJECTIVE 2	BASE INDICATOR SPECIFIC OBJECTIVE 2	INDICATOR GOAL SPECIFIC OBJECTIVE 2	MEANS OF VERIFICATION	ASSUMPTIONS SPECIFIC OBJECTIVE 2
Generate sources of employment for the community, helping to strengthen the economic development of the parish, based on a bottom-up model.	Indigenous women in terms of labor.	Participation of indigenous women for the elaboration of nutritional jackfruit bars.	Recruitment of labor from indigenous women of the community.	They do not want to participate in the project.

RESULTS 2.1	ACTIVITIES	BASE INDICATOR RESULT 2.1	INDICATOR GOAL RESULT 2.1	MEANS OF VERIFICATION	ASSUMPTIONS RESULT 2.1
Reduce the rates of chronic child malnutrition in the Ingapirca parish	Establish the infrastructure, space and materials necessary for the production of nutritional jackfruit bars.	Reduce chronic child malnutrition by 60% in a long-term period.	Reduce existing chronic malnutrition by 80% over a period of 4 years.	Through semester evaluations.	Not reduce enough for not consuming the bars in a correct way.

RESUL 2.2	ACTIVITIES	BASE INDICATOR RESULT 2.2	INDICATOR GOAL RESULT 2.2	MEANS OF VERIFICATION	ASSUMPTIONS RESULT 2.2
x	x	X	x	X	x
SPECIFIC OBJECTIVE 3		BASE INDICATOR SPECIFIC OBJECTIVE 3	INDICATOR GOAL SPECIFIC OBJECTIVE 3	MEANS OF VERIFICATION	ASSUMPTIONS SPECIFIC OBJECTIVE 3

Promote the local empowerment of indigenous women so that there is labor equality, in terms of the production of the components that the nutritional bars will have.		Local indigenous women contract.	Generate revitalization of the economy by contracting local people.	Through Payment roles.	Budget cuts for carrying out the project.
RESULT 3.1	ACTIVITIES	BASE INDICATOR RESULT 3.1	INDICATOR GOAL RESULT 3.	MEANS OF VERIFICATION	ASSUMPTIONS RESULT 3.1
Create eating habits in students from proper nutrition.	Realize a budget table on	Establish schedules for students to	Training for infants on how to	Through videos and talks.	The students do not

	the expenses and income of the project.	consume nutritional jackfruit bars.	maintain adequate nutrition.		want to consume the bars and do not attend the establishe d talks.
RESULT 3.2	ACTIVITIES	BASE INDICATOR RESULT 3.2	INDICATOR GOAL RESULT 3.2	MEANS OF VERIFICATION	ASSUMPTIONS RESULT 3.2
x	x	x	X	x	x

SPECIFIC OBJECTIVE 4		BASE INDICATOR SPECIFIC OBJECTIVE 4	INDICATOR GOAL SPECIFIC OBJECTIVE 4	MEANS OF VERIFICATION	ASSUMPTIONS SPECIFIC OBJECTIVE 4
Develop and implement a surveillance system by teachers to verify if the long-term consumption of the bars has a positive result in the school life of the students.		Keep a weekly control of the consumption of the bars.	Make semester evaluations on each student and their progress.	Evaluations	Not doing the evaluations correctly.
RESULT 4.1	ACTIVITIES	BASE INDICATOR RESULT 4.1	INDICATOR GOAL	MEANS OF VERIFICATION	ASSUMPTIONS

			RESULT 4.1		RESULT 4.1
Expand in the long term the provision of nutritional jackfruit bars so that they are distributed to more students from indigenous schools in other parishes who suffer from chronic malnutrition.	Provide workshops for teachers and parents on methods and techniques to promote adequate nutrition in children	Local endowment.	Local and external provision.	Through agreements and alliances.	Not being welcomed by the community.

RESULT 4.2	ACTIVITIES	BASE INDICATOR RESULT 4.2	INDICATOR GOAL RESULT 4.2	MEANS OF VERIFICATION	ASSUMPTIONS RESULT 4.2
x	x	x	x	X	x
SPECIFIC OBJECTIVE 5		BASE INDICATOR SPECIFIC OBJECTIVE 5	INDICATOR GOAL SPECIFIC OBJECTIVE 5	MEANS OF VERIFICATION	ASSUMPTIONS SPECIFIC OBJECTIVE 5

Encourage community social participation in Ingapirca to carry out campaigns for the prevention and control of chronic malnutrition in infants		Student participation.	Community involvement.	Acceptance signatures.	Not attend.
RESULT 5.1	ACTIVITIES	BASE INDICATOR RESULT 5.1	INDICATOR GOAL RESULT 5.1	MEANS OF VERIFICATION	ASSUMPTIONS SPECIFIC OBJECTIVE 5

Improve school performance, health and well-being of students in the long term from the consumption of nutritional jackfruit bars.	Establish specific technical groups for each area, such as: the financing area, the control area and the management area for the viability of the project.	Efficient management for the welfare of students.	A management of the direct and indirect participants for the realization of the project.	Attendance Record	Do not participate.

RESULT 5.2	ACTIVITIES	BASE INDICATOR RESULT 5.2	INDICATOR GOAL RESULT 5.2	MEANS OF VERIFICATION	ASSUMPTIONS RESULT 5.2
x	x	x	x	x	x

CONCLUSION

In this research, the factors that cause child malnutrition in Latin America, Ecuador and Cañar were explored. Also, it was analyzed how jackfruit can be a sustainable alternative with a bottom up model for the design of nutritional bars. In addition, the international cooperation project between UNICEF and municipal GAD was formulated to reduce chronic malnutrition in indigenous children between 5 and 8 years old.

To begin, the first chapter, it was analyzed that Ecuador is the second country in Latin America and the Caribbean that has a high rate of chronic child malnutrition, in which the sierra is the region that has the highest percentage of CD, such as the case of Cañar, since 72% of its inhabitants suffer from it. In addition, it was examined that malnutrition has a greater impact on indigenous people since 48% of the population presents it. Chronic malnutrition affects the development of children and have terrible consequences in their lives. It is for this reason that in this thesis it was proposed to carry out a social project proposal through international cooperation between UNICEF and the municipal GAD of Cañar for the provision of nutritional jackfruit bars in order to reduce chronic infant malnutrition in children of 5 to 8 years old.

This study focuses on the Ingapirca parish in the Sisid Bilingual Intercultural school, which have 98% indigenous students. In this institution, surveys were conducted to parents, teachers and students to determine the factors that cause malnutrition and how it affects infants. It was observed that the respondents who present this problem do not have the economic resources to maintain adequate nutrition and at the moment of receiving classes they present frustration, lack of energy and poor school performance.

In the second chapter, it was examined how jackfruit can be an alternative to reduce chronic child malnutrition in children from 5 to 8 years old, due to the qualities that the fruit has, since it contains proteins, vitamins, calcium, magnesium, calories and carbohydrates that benefit health. Also in this chapter, the areas in which the fruit is grown are detailed, from where it will be extracted, the process for the elaboration of the nutritional bars and the extra ingredients that they will contain are specified, since milk and eggs have a high protein value that children with chronic malnutrition need to improve their physical, emotional and cognitive development. The formulations that the bars will have and the regulations necessary for their production were also described in this chapter.

On the other hand, in the third chapter, the design of the international cooperation project was carried out for the viability of the provision of jackfruit nutritional bars. It is essential to mention that international cooperation plays an important role in the development and growth of countries, since it allows providing financial and technical support for the inequalities that exist in them, due to the fact that they have not been able to function due to lack of their own resources. This is why each country must have the organizational capacities and the necessary knowledge to use international cooperation in its favor. International cooperation allows us to solve needs from the management of programs and projects that have the purpose of promoting social or economic development. Therefore, it is necessary to strengthen the most latent needs that the territories have, in this case the decentralized autonomous governments. It is for this reason that, for the management of this project, it is established to create an alliance between UNICEF and the municipal GAD of Cañar to reduce chronic child malnutrition in the Ingapirca parish.

Both UNICEF and the GAD have the power to generate regulations and plan programs that benefit the community. UNICEF Ecuador executes and supports projects that guarantee the rights of boys and girls to promote their well-being and development, so that they can achieve their full potential. In this project, a bottom-up model is applied, which allows the use of local products and the participation of indigenous women for the preparation of nutritional jackfruit bars. In this way, chronic child malnutrition is reduced in the parish and Ingapirca in turn will have the opportunity for its economy to develop, the environment to be preserved and responsible consumption to be promoted.

Finally, the project will benefit approximately 35% of the Ingapirca community, due to the replication that it will have in a future. The responsible entity will be the Municipal GAD of Cañar. This project will be the basis for Ingapirca to begin its foray into international cooperation and develop more social programs to solve problems of malnutrition in children. By executing this type of projects, a positive change is achieved in infants, improving their intellectual development and physical growth, providing them with new opportunities in their lives. This proposal is ambitious but not impossible, through this study other areas that are excluded be taken into account, such as: in the Ingapirca parish, priority is given to tourism programs that leave aside the areas of education and health.

BIBLIOGRAPHY

- Accelerated reduction of malnutrition in Ecuador, 2015).
- Accelerated reduction of malnutrition in Ecuador. (2015). 57.
- CAF. (March 12, 2020). Retrieved from https://www.caf.com/es/ciencia/visiones/2020/03/el-flagelo-de-la-desnutricion-infantil-en-america-latina/
- Caguana, A. (2019, January 1). Socioeconomic vulnerabilities of the cantons Cañar-Tambo-Occal. University of Cuenca. https://www.ucuenca.edu.ec/images/vinculacion/Convocatoria2019/CANAR-TAMBO-SUSCAL.pdf
- Carrera, G. (October 30, 2021). Table 11. Nutritional scheme of nutritional bars. (M. Cordero, Interviewer)
- Carrera, G. (October 30, 2021). Table 8. Ingredients and equipment for the development of jackfruit bars. (M. Cordero, Interviewer)
- Childhood. (November 29, 2020). Retrieved from https://www.unicef.org/ecuador/estimaci%C3%B3n-de-la-brecha-de-finaci%C3%B3n-de-la-estrategia-para-prevenir-y-reduce-la- malnutrition%C3%B3n
- Constitution of the Republic of Ecuador. (2008, October 20). Constitution of the Republic of Ecuador 2008. Retrieved October 1, 2021, from https://www.oas.org/juridico/pdfs/mesicic4_ecu_const.pdf
- Development Bank of Ecuador. (2020). Retrieved from https://bde.fin.ec/canar-recibe-usd-92-millones-para-el-financiamiento-de-varios-proyectos-de-desarrollo-social/
- Early Childhood Development. (2016). Retrieved from https://www.oas.org/udse/dit2/por-que/nutricion.aspx
- ECLAC. (2018). In Policies and health programs in Latin America (p. 67). Santiago de Chile.
- ECLAC. (2018). In Policies and health programs in Latin America (p. 67). Santiago de Chile.
- Economic Commission for Latin America and the Caribbean. (April 2, 2018). Retrieved from https://www.cepal.org/es/approaches/malnutricion-ninos-ninas-america-latina-caribe

- G, K. (2010). Epidemiology of malnutrition in Latin America: current situation. Scyelo, 56.
- Gallego-Galan, I. (2020). Research design: questionnaire and sample. Market Research I.
- Gob.ec. (08/17/2021). Retrieved from https://www.gob.ec/senadi/tramites/registro-marcas-productos-servicios-unico-personas-naturales-juridicas-sean-nacionales-extranjeras
- Gonzales Medina, M.V. (2021). jackfruit sustainability. articles Mexico, 46, 63–70.
- Google maps, (2021). Figure 39. Project location
- Government of the Meeting. (2018). Obtained from nclusion.gob.ec/en-el-ecuador-la-rate-of-desnutricion-infantil-low-18-points-in-the-last-20-years/. Güemes, C., & Resina, J. (2020). Jackfruit cultivation strategy. Agriculture, Society and Development, 9(1), 50. https://doi.org/10.33115/udg_bib/pts.v9i1.22395
- Ingapirca parish government. (2019, June 2). Territorial Planning and Development Plan for the Ingapirca parish. Update 2015-2019. http://app.sni.gob.ec/sni-link/sni/PORTAL_SNI/data_sigad_plus/sigadplusdocumentofinal/0360017390001_PDYOT%20Ingapirca,%20Oct%2027-2015%20Sin%20Mapas_28-10-2015_23-37-43.pdf
- Ingapirca Parish Government. (2019). Retrieved from http://www.ingapirca.gob.ec/index.php/ct-menu-item-31/ct-menu-item-33
- MACÍAS, M., & ESQUIVEL, H. (2020, July 1). ANALYSIS OF THE YACA OR JACKFRUIT SEED. BINGQ. Retrieved November 4, 2021, from http://repositorio.ug.edu.ec/bitstream/redug/49544/1/BINGQ-GS-20P34.pdf
- Ministry of Public Health. (2011, January 1).
- Ministry of Public Health. (2011, January 1). Standards of comprehensive care for children. Republic of Ecuador MSP. https://aplicaciones.msp.gob.ec/salud/archivosdigitales/documentosDirecciones/dnn/archivos/NORMAS%20DE%20ATENCI%C3%93N%20INTEGRAL%20A%20LA%20NI%C3%91EZ%202011.pdf.
- Ministry of Social Development Coordination. (2015, May 1). Project for the Accelerated Reduction of Malnutrition 1. https://www.todaunavida.gob.ec
- National Agency for Health Regulation, Control and Surveillance, (2020). Figure 37. Sanitary Registry

- Nutrition Guide. (2020, February 1). Jackfruit, raw. Jackfruit nutritional information. Retrieved October 16, 2021, from http://www.guia-nutricion.com/yaca/
- Pazmino, J. L. (2015). INNOVATIVE PRODUCTS WITH JACKFRUIT IN THE
- Piña-Dumoulín, Grigna, Quiroz, Josbelk, Ochoa, Alfonsina, Magaña-Lemus, Sacramento. (2010). Physico-chemical characterization of fresh fruits from non-traditional crops in Venezuela I jackfruit. Tropical Agronomy, 60(1), 35-42. Retrieved on October 16, 2021, from http://ve.scielo.org/scielo.php?script=sci_arttext&pid=S0002-192X2010000300003&lng=es&tlng=es.
- Remigio, I. (2019, January 2). Chronic malnutrition in children, Ingapirca 2018. Postgraduate departments dspace uazuay. http://dspace.uazuay.edu.ec/bitstream/datos/8727/1/14386.pdf
- Research design (September 29, 2021). Figure 3. Image (Formula of cross-sectional studies with known population). Taken from Research Design, 2020. https://books.google.es/books?hl=es&lr=&id=Xkb78OSRMI8C&oi=fnd&pg=PA11&dq=dise%C3%B1o+de+la+investigaci%C3%B3n+2020&ots=zsGy7VOMqQ&sig=K_rYiXLvAe5cUq3tDh0GgIrVj-0#v=onepage&q=dise%C3%B1o%20de%20la%20investigaci%C3%B3n%202020&f=false.
- Standardization, S. E. (2015). Retrieved from https://inen.isolutions.iso.org/es_EC/sites/inen-nws/home.html
- The producer (March 27, 2018). Figures 32. Image (The Ecuadorian yaca or Jackfruit). Taken from El Productor, 2018. https://elproductor.com/2018/03/internacional-frutas-exoticas-listas-para-comer/#
- UNICEF (July 2020). Obtained from UNICEF: https://www.unicef.es/noticia/que-es-la-desnutricion
- UNICEF. (2021). Retrieved from https://www.unicef.org/ecuador/desnutrici%C3%B3n-cr%C3%B3nica-infantilWorld Health Organization. (June 9, 2021). Retrieved from https://www.who.int/es/news-room/fact-sheets/detail/malnutrition