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**World Food Programme**  
Centre of Excellence  
against Hunger

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LIVES

# **Cost-Benefit Analysis São Tomé and Príncipe**

National School Feeding and Health Programme – PNASE

April 2020

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# CONTEXT

In the context of the Government of São Tomé and Príncipe's efforts and the World Food Programme (WFP) mandate for a transition towards a nationally managed National School Feeding Programme, the "Zero Hunger" Strategic Review was conducted in 2018. The need for a cost-benefit estimate for the National School Feeding and Health Programme (PNASE) is among the document's conclusions and recommendations. This is the subject of the present document. In order to avoid overlaps and value the importance of recent efforts, such as the aforementioned Strategic Review (2018), SABER report (2016), and Agricultural Mapping (2017), our analysis shall be restricted to PNASE's cost components and its potential returns within the scope of the methodology adopted. Therefore, this is not an evaluation of PNASE itself, but of the potential benefits it may bring and the current, real costs of investing in school feeding in São Tomé and Príncipe within current models.

## Demographics

São Tomé and Príncipe's demography is characterized by a large portion – 42% – of its total population (around 215,000 people) in the school-age range, 0 to 14-year-olds, considering that the primary education cycle in the country covers ages 6 to 14. In this context, it is possible to directly associate school feeding as an important intervention towards SDGs 2 and 4, given that PNASE benefits a significant proportion of the population (25%).

## Education

Basic and universal education is a right guaranteed by the State to its citizens since 2011. School feeding is offered in all preschools and basic education schools in accordance with Law 04/2012, which created the PNASE and established its coverage. The public education system in São Tomé and Príncipe is divided into Preschool, Basic, Secondary, Technical-Professional and Higher Education. All analyses in this document will be restricted to public preschools and basic schools covered by PNASE. Preschool education, or kindergarten, is for children aged 3-5, while Basic Education is for students aged 6-11. Naturally, there are students enrolled at different ages than the educational system establishes, due to the occurrence of grade retention.

The school year usually dedicates 195 school days for Preschool and 190 days for Basic Education<sup>1</sup>. The Ministry of Education and Higher Education (MEES) has done important statistical work which shows that, in recent years, the net enrolment rate in preschool education (age group of 3 to 5-year-olds) has grown significantly, from 56% in 2015/16 to 74% in 2017/18<sup>2</sup>. In the first cycle of Basic Education (1st to 4th grade), A dropout rate of 0% was observed in the year of this analysis (2017/18), while in the second cycle (5th and 6th grade), a dropout rate of 5% was observed in the same period. Such positive indicators show that the education system has met its purposes regarding its student coverage and attainment. Considering that PNASE coverage goes up to 6th grade, one can consider the programme has a strategic position to positively affect a considerable portion of the country's population.

## Agriculture

The agricultural sector accounts for 20% of São Tomé and Príncipe's GDP (INE, IOF, 2014) and, historically, export agriculture has focused on cocoa and coffee production. In the post-independence period, however, the decline in the competitiveness of these commodities has been generating a great drop in production and their participation in the national economy.

There is an ongoing effort to assess the feasibility of buying local food destined for PNASE. The opportunity to benefit the local agricultural market, especially small farmers in vulnerable situations, and stimulate short consumption chains is a trend observed in several countries, including on the African continent. Although this analysis methodology cannot determine the potential benefits of PNASE for the national agricultural sector, the decentralized procurement modality in which schools use financial resources from parents' contributions ends up fulfilling the role of local purchase, as most of these resources are normally used to procure vegetables and fish on a weekly basis. However, the largest amounts invested in the purchase of food by PNASE are intended for the purchase of imported foodstuffs such as rice, beans, salt, and vegetable oil.

In a study prepared in 2017, within the trilateral project to support school feeding between Brazil, São Tomé and Príncipe, and FAO, a survey of food production in the country was carried out in relation to PNASE demand.

<sup>1</sup> MEES/DGPIE/DEP

<sup>2</sup> MEES/DGPIE/DEP

The analysis gathered information that shows there is sufficient production to serve the PNASE market in all districts of the country, with exception of Água Grande. However, there are a number of known challenges for farmers to access the institutional market, especially the

PNASE financial sustainability guarantee to buy from small producers, as well as a demand for strong coordination between different actors to solve problems of logistics, management, payments, price definition, and production.

## Administrative

Law 4/2012, in addition to establishing all PNASE guidelines, also created the National Coordination of PNASE. This body is responsible for managing the programme at a national level, with an intermediate level of independence from the MEES. Although it has autonomy to sign contracts with partners, prepare the annual budget, menus, food delivery, and dedicated technical staff, the management of financial resources is still carried out by the Educational Administration Board (DAE) of the MEES.

All financial resources used in the implementation of PNASE are therefore executed by the Ministry at the level of its responsible Board. The Coordination is responsible for requesting the food purchase and collecting parents' contribution, account and redistribute, but not for carrying out disbursements. The entire process of hiring companies to supply foodstuffs happens at ministerial level. The PNASE management model can be understood as mixed, with centralized management in coordination and part of the purchases made at school level, using parents' contributions.

This school feeding cost-benefit analysis seeks to show the expected benefits of the investment in PNASE, given its current design and volume of resources applied. In addition, we will execute an analysis of the institutional frameworks related to the programme, as well as its current implementation, without adopting an evaluation approach.

# PNASE

The National School Feeding and Health Programme (PNASE) of São Tomé and Príncipe is the result of a State effort to take over the execution of the School Feeding Programme, based on principles established by law and local characteristics. The WFP had been implementing a School Feeding Programme in the country since 1976 and, given the need to start an ownership transition, efforts were taken in this direction with support from several partners, such as the Government of Brazil, FAO, and WFP itself. The WFP and the government then established a transitional period from 2012 to 2015, when schools covered by the WFP programme would be gradually transferred to the government. During this period, all schools that received school feeding provided by the WFP began receiving meals under management of the Government of São Tomé and Príncipe.

To enable the programme's transition and ensure its sustainability, several legal and institutional mechanisms have been strengthened or created. Among the main milestones of this transition process is the publication of Law 4/2012, which creates the PNASE, defines its action, establishes principles of management, supervision, and financing, and defines the actors responsible for PNASE within the General School Administration Board (DGAE) of the MEES.

Furthermore, cooperation with Brazil and FAO was important to institutionalize PNASE, which helped create and disseminate a brand for the programme, map the availability of local products for school meals, offer training for PNASE dedicated staff, and strengthen the programme's nutritional principles in its implementation. Regarding the institutionalization of a programme of such dimension and its perception by the beneficiaries as a civic right, these are important milestones on the way to a perennial State program. However, the law still lacks regulation in several aspects and greater appropriation by other actors involved in PNASE other than the MEES.

Currently, in addition to the WFP, which fulfills the role of supporting PNASE and contributes with structural investments into programme execution, there are also other partners that

support the government through technical reinforcements and investments in equipment and infrastructure. For example, the PRIASA II project of the African Development Bank (AfDB) covered acquisitions of small equipment and restructured canteens; another example is JICA, which provided a cold room to store perishable products. Such initiatives contribute to the programme's implementation, as financial resources for structural investments are still scarce.

## PORTRAIT OF PNASE

### HOW DOES IT WORK?

**44649**  
BENEFICIARIES



children received meals in 89 daycare facilities and 176 basic schools in 2017-2018

**265**  
SCHOOL UNITS



**UNIVERSAL COVERAGE**

89 daycare facilities and 176 basic schools



**MIXED IMPLEMENTATION MODEL**

Schools receive food purchased at central level and complement the meal with locally-purchased food.

**FOOD BASKET**

Made up of tubers, rice, beans, oil, salt, sugar, flour, corn, juice, fish, vegetables, fruits, coconuts.

**COVERAGE FOR**  
6 years of Basic School

**180**  
DAYS

Figure 1 - PNASE in 2018

# Design

PNASE's current design is of a mixed implementation programme. Given the size of the territory and number of schools, there is distribution of dry products from the central level combined with a decentralization of financial resources, which come from parents' contributions to schools. Such financial resources should be implemented for the purchase of fresh foodstuffs – mostly fish and vegetables – and cover small expenses with firewood and utensils, for example.

The National PNASE Coordination, connected to the School Administration Board (DAE), is responsible for programme management. The Coordination's tasks include preparing PNASE's budget and including it into the yearly MEES budget prediction, elaborating norms and procedures for programme implementation, promoting its activities, its monitoring and evaluation, and rendering accounts. This Coordination is dedicated to the Programme and has a framework of nutrition, logistics, and administration experts, as well as its own facilities, independent from the MEES building. These characteristics give PNASE a very advanced level of institutionalization compared to other countries that have recently carried out a transition of their school feeding programmes. The Administrative and Financial Board (DAF) of the MEES is responsible for providing the Coordination with any financial and personal resources necessary for a proper programme implementation. The purchase of dry foodstuffs on a large scale is carried out by the DAF. The central warehouse, in turn, receives the foodstuffs to distribute to schools that participate in PNASE, in amounts previously calculated by the Coordination Team. Provision of accounts happens in reverse, from school to coordination, which submits it to the DAF.

Students' parents, in voluntary but encouraged manner, give to their children's school, at the beginning of the school year, an approximate amount of 150 dobras for preschool and 80 dobras for basic education. The school's amount is then deposited into a dedicated checking account managed by the MEES, which is then accounted for and deducted from a percentage of around 10%. The net amount is then returned proportionally to the schools, based on the number of students and their age group. Given its voluntary nature, the contribution of parents is not practiced by all families and still presents imbalances between the schools themselves. There are cases of schools that raise very small funds, and schools that raise a significant amount of funds. However, as the redistribution is proportional, parents' contribution plays a role of rebalancing the inequalities between schools. Therefore, schools with fundraising difficulties (where families are more vulnerable, for example) still receive financial resources to pay for school meals. One respondent, who is responsible for a large school in the capital, says he does not find it unfair that their school sends the MEES a large amount at the beginning of the year and receives only part of the money back. In his understanding, the contribution from parents in the capital, who have higher purchasing power, can help poorer families who receive school feeding in other areas of the country.

The PNASE Law also establishes District Supervisory Councils. Such councils, composed of local government members, civil society, the Ministry of Education and the association of parents and education officers, are responsible for monitoring the programme's implementation in schools at the district level.

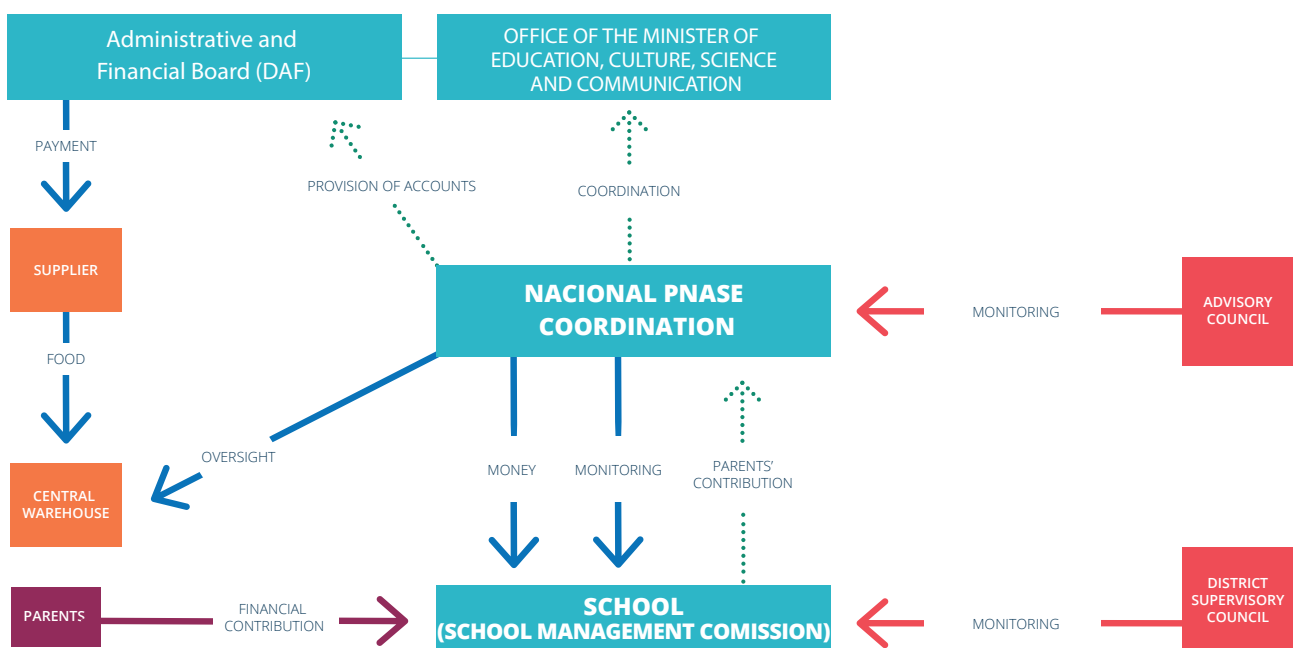


Figure 2 - PNASE operation structure

# Cost-Benefit Analysis

## METHODOLOGY

Given the availability of data necessary for the analysis in São Tomé and Príncipe, the WFP Centre of Excellence chose to adopt the methodology developed by WFP in partnership with Boston Consulting Group (BCG). This methodology is an economic model that analyzes the monetary costs of implementing the school feeding programme and its estimated economic returns.

This cost analysis tool allows a calculation of costs involved in implementing the programme in its different dimensions. Here, we use five cost categories:

### 1. Costs of food products (Commodities)

These costs relate to the purchase of foodstuffs exclusively. PNASE records regarding the amount paid for food in the reporting year were analyzed. The analysis includes the purchase of fish and vegetables, carried out directly by schools, using parents' contributions. These costs exclude those related to food transportation and storage, which are accounted for in the next category.

### 2. Logistics, storage, and service costs

This category lists all services involved with the transportation, storage, and distribution of food. The entire logistics structure must be included in this category, including transportation of food to warehouses, warehouse maintenance, and costs of handling and distribution to schools. Fuel costs for cooking (firewood, gas, or others) should also be considered.

### 3. Management and administration costs (includes staff costs)

Costs of programme implementation related to management at all levels. Travel costs for professionals, events, monitoring, and field activities. Does not include personnel costs. It also includes salary payments and maintenance training for the staff implementing the programme. It includes professionals who are fully or partially involved in PNASE at all levels. It includes coordination, drivers, cooks, administrators, and nutritionists, for example.

### 4. Capital costs

Includes tangible goods acquired during the analyzed period at all levels. Equipment with a long service life is accounted for proportionally, so as not to cause a distortion in the data of the analyzed year. Some examples of costs in this category are office supplies, kitchen utensils, construction of structures related to school feeding, and vehicles.

### 5. Community costs

PNASE depends on financial contributions not only from parents, but also from teachers, coordinators, and principals of schools that implement the Programme. This category includes the yearly cash contribution that parents pay, donations from companies, small routine purchases (especially kitchen utensils).

CATEGORY	DESCRIPTION
<b>Costs of food products (Commodities)</b>	Exclusively food costs within the Programme.
<b>Logistics, storage, and service costs</b>	Foodstuffs transportation, stock management, firewood etc.
<b>Management and administration costs (includes personnel costs)</b>	Costs related to running the programme at national, district, and school levels. Includes workshops and other events, media campaigns, monitoring and evaluation etc. It also includes all salaries and benefits related to job posts of all professionals involved with programme implementation at all levels. Any personnel training is also included.
<b>Capital costs</b>	These are acquired goods used at some point in programme management. May include office supplies, buildings, vehicles, utensils etc.
<b>Community costs</b>	Parents' financial contributions, donations from private companies, from school staff or any kind of goods and products schools receive to implement the programme.

Table 1 - Cost Categories

Benefits generated by school feeding are widely supported by scientific literature and reach different aspects of direct (students) or indirect (school community, farmers, beneficiaries' families) beneficiaries' lives. In this methodology, the following benefits will be considered and quantified:

#### **a. Value transfer**

The food the student consumes in school is a monetary transfer to households – a value equivalent to that meal. This value transfer is then considered an additional income for that family.

#### **b. Return on investment**

Value transfer to households, through food, may redirect the saved resources to investment in productive assets.

#### **c. Increased productivity**

School feeding promotes access to education, better learning, and may even contribute to fighting micronutrient deficiencies, which boosts health. A healthy child has increased learning potential, which enables a more

productive adult life. The increase in productivity, in this case, means better wages as a result of better education. In addition, as a result of better nutrition during school years, the student will have more productive years in the future, generating a higher total productivity throughout their life.

#### **d. Healthier life**

Greater gains due to a healthier life come from two sources: (i) private spending on medical care is avoided as an effect of a healthier life, a direct result of school feeding; (ii) public spending on medical care is avoided, as an effect of a healthier life for beneficiary children, a direct result of school feeding.

#### **e. Gender equality**

Decrease in gender inequality due to access to education and health interventions.

## Model limitations

This cost-benefit analysis model is used in different contexts. Therefore, we must highlight the adaptations and reservations regarding its use. PNASE is a programme of unique characteristics, which should be observed when looking at the available results and data.

### **1. Control group**

As PNASE has been a universal programme since the 2012 Law approval, this analysis does not have a control group reference. The data used as control group (schools with no school feeding) are indicators from before Law 4/2012.

### **2. Community costs**

Accounted school community values used in this analysis represent an average of values reported by respondents during visits in September 2018. Four schools were visited, each with different characteristics, but with a pattern of consumption of firewood, utensils, and other inputs from donations made by teachers, principals, parents, and institutions close to the schools. Monetary values, collected annually from parents, are duly recorded by the PNASE Coordination and were considered here.

### **3. Menus**

Although PNASE provides for balanced meals, with menus prepared by nutritionists, this model does not measure the positive effects of this varied diet for beneficiaries.

### **4. Local agriculture**

This model does not differentiate the origin of the food served in the analyzed programme. Although PNASE serves local food to students, the methodology used here cannot measure the impact on local agriculture. It is possible, however, to note that a large part of resources from parents' contributions is used to purchase vegetables and fish from local markets.



# Resultados

## Overall results

PNASE, as executed today, has a projection of **6.9 dollars returned for every 1 dollar invested**. This is a high return that shows the lifetime earnings of beneficiaries are substantive and should be valued. However, it is notable that the intermittence of school feeding prevents these gains from being even greater. On average, around 100 days

of school feeding served by PNASE were observed during the 2017-2018 school year. The PNASE law determines that school feeding must be available during the approximately 180 annual school days. If there had been no interruptions and the students had received food for all 180 school days in the analyzed period, the benefits could have increased to 8.6 dollars for every 1 dollar invested.

### Cost-Benefit Breakdown for Sao Tome and Principe

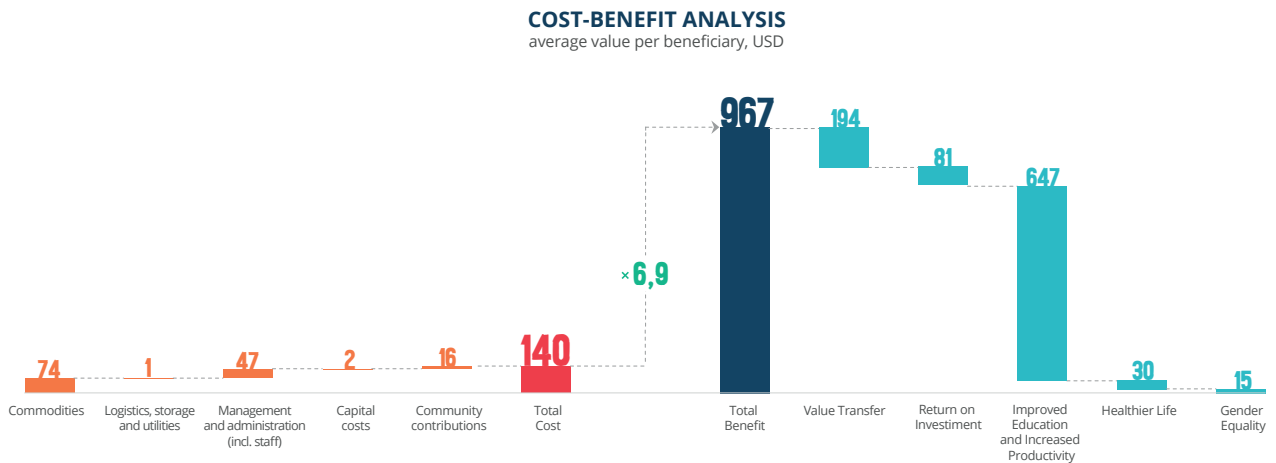


Figure 1 - Scenario for 100 days of feeding

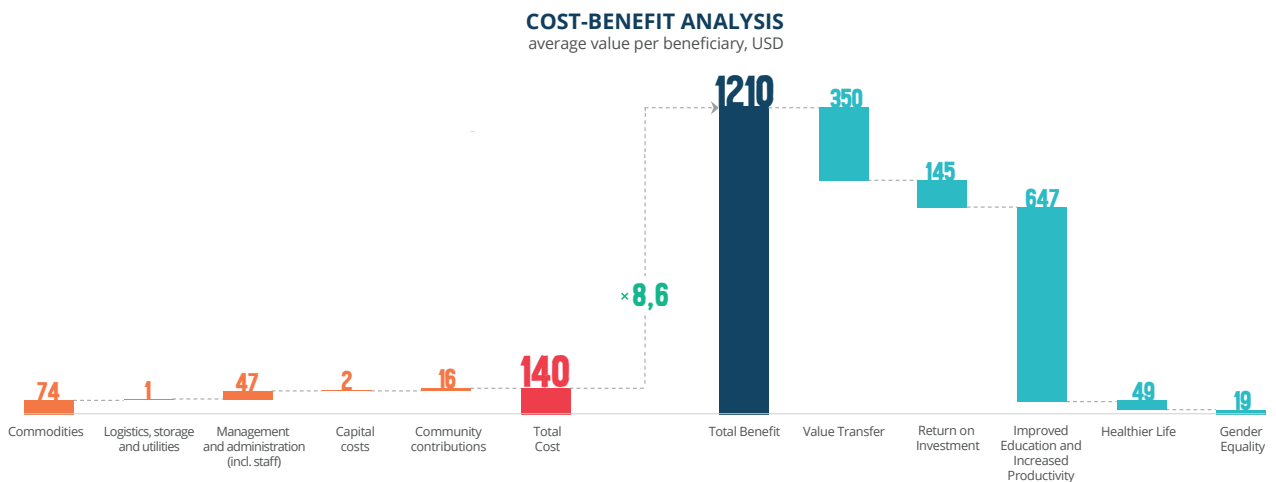


Figure 2 - Scenario for 180 days of feeding

# MAIN ASSUMPTIONS

The model used in this analysis is based on data from internationally available scientific literature and used for diverse econometric analyses.

Responsible institutions, including national statistical and economic entities, collect and publish macroeconomic data at different periodicities. Thus, the most recent data available were used for each indicator and may be prior to the period analyzed.

BRIEF SUMMARY OF USED DATA AND SCOPE OF ANALYSIS (PRIMARY + NURSERY)		
VARIABLE	METRICS	VALUE
MACROECONOMIC	GDP growth rate	4,18%
	GDP per capita (USD/year)	1411
	GNI lowest quintile per capita %	8.40%
	GNI lowest quintile per capita (USD)	592.62
	Average age at the beginning of working life	15
	Average age at end of working life	65
	Life expectancy at birth	65.88
	Exchange rate	20.92
EDUCATIONAL	Discount rate	10%
	Starting school age	6
	End of school age (basic)	11
	Primary school years	6

## DETAILED RESULTS

Given its universal character since Law 04/2012 was adopted, the entire target audience of PNASE was considered as a control group in the period immediately before the law was implemented. Therefore, the educational indicators used for the control group are pre-PNASE, when school feeding was not universal in São Tomé and Príncipe.

This analysis uses the total of 44649 benefited students, a number used by PNASE to calculate quantities for food distribution. The proportion of students is 51.10%

males and 48.90% females. There are no available data disaggregated by sex for education indicators - therefore, it is not possible to present benefit results separated by sex. According to information from the PNASE coordination, meals were served during 100 school days on the analyzed year. According to the PNASE law, food must be served for at least 180 school days. Therefore, we chose to demonstrate a simulation of the benefits for the 180-day feeding hypothesis in the previous section (General Results) of this report.

VARIABLE	METRICS	VALUE
SCHOOL FEEDING INDICATORS	Number of students reached	44649
	Percentage of male students	51.10%
	Percentage of female students	48.90%
	Energy intake - share of daily needs	33% da recomendação diária
	Feeding days / year	100 <sup>3</sup>
EDUCATIONAL INDICATORS	gross enrolment rate (GER) with PNASE	97.30%
	gross enrolment rate (GER) before PNASE	94.70%
	Attendance rate with PNASE	94%
	Attendance rate before PNASE	85.90%
	Dropout rate with PNASE	2%
	Dropout rate before PNASE	6.20%

## COSTS - OVERVIEW

The overall cost of PNASE for the analyzed year was accounted for at STD 26,078,390.84 (approximately USD1,246,577.00), or STD 584.07 (approximately USD27.92) per beneficiary per year. This includes all fixed costs listed in the methodology section as well as food costs. It is important to

understand the investment in PNASE in all its complexity in terms of management, logistics, and quality control so we can also observe all the returns that the programme can bring, as described in the next section.

### Costs - PNASE

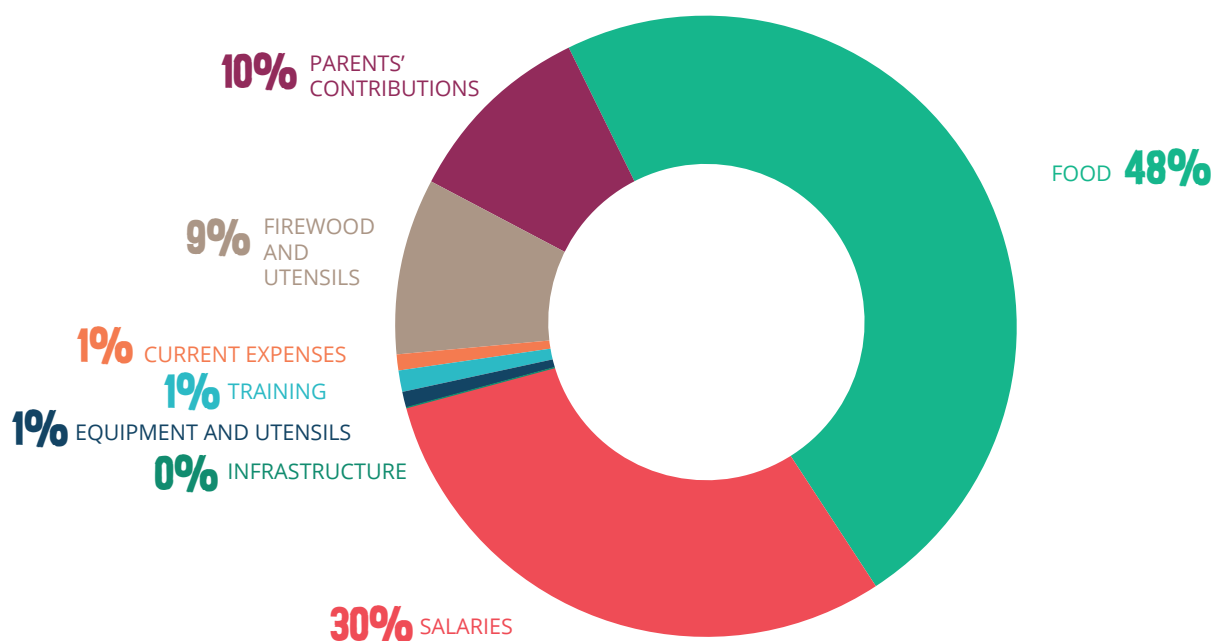


Figure 2 – Proportion of costs in PNASE: Food – Salaries – Infrastructure – Equipment and utensils – Training – Current expenses – Firewood and utensils – Parents' contributions

3 Number of school feeding days in the analyzed period (2017/2018)

As shown in the figure above, foods still constitute the most representative portion of the PNASE, even considering the analyzed scenario when only 100 of the planned 180 school feeding days were fulfilled. However, all other costs occur regardless of the amount of feeding days observed and can be considered fixed costs for the whole year.

Parents' contributions, for example, represent only 10% of the total cost – still, school managers described them as

essential for programme operation. The small resource that parents transferred to schools allowed managers to cover small emergency expenses with utensils and equipment that stopped working or, for the most part, the purchase of fresh food in the local market, such as vegetables and even fish. While PNASE purchased imported food, this small share of resources received from parents is invested in the local market, in products produced in the community.

VARIABLE	METRICS	VALUE*
YEARLY PER CAPITA	Annual value per beneficiary student (USD)	27.92
DEWORMING	Deworming available for schoolchildren	Sim
WASH (WATER, SANITATION AND HYGIENE)	Sanitary infrastructure in schools (water and soap)	Sim
PROGRAMME COST	Food	659656
	Salaries	407042
	Infrastructure (rehabilitation)	4131
	Equipment and utensils	14485
	Training	13249
	Current expenses (water, electricity, telephone, fuel, maintenance)	10880
COMMUNITY COSTS	Firewood and utensils**	115538
	Parents' contribution	141915

\*Sources can be found at the end of this report

\*\*Estimate based on interviews at school level and considering market value of reported items.

## BENEFITS – OVERVIEW

The total return per beneficiary in the year analyzed is USD967 over the life of each student who received school feeding. The largest share of the return observed with PNASE was in better education and higher productivity throughout life, generating a return of USD647 per

beneficiary throughout his/her life. Here we highlight the difference in returns for a year in which the 180 feeding days, provided for in the law, were carried out: the total benefit would be of USD1210, over 20% higher.

## Overview of PNASE benefits

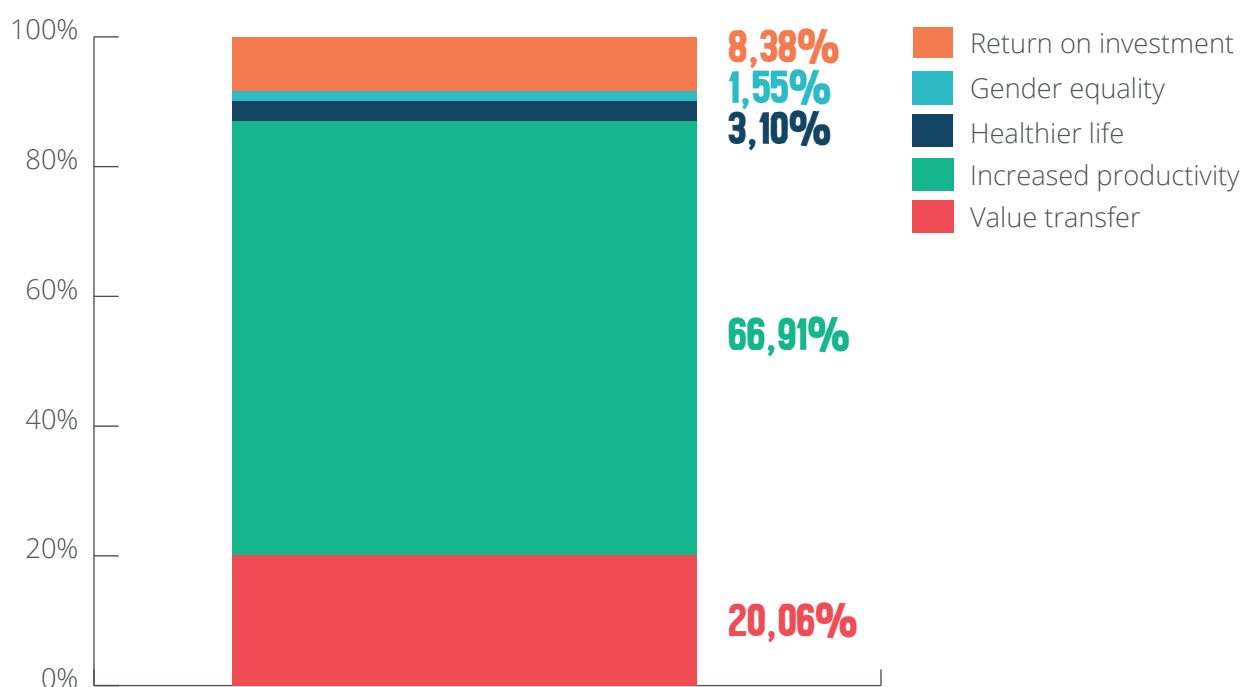


Figure 3 - Overview of PNASE benefits: Value transfer – Increased productivity – Healthier life – Gender equality – Return on investment

## BENEFITS - BREAKDOWN BY CATEGORY

### Value transfer

Responsible for 20% of the total return on investment in PNASE, the value transfer, in this case, represents the local monetary value of the food served to children in schools. This amount is equivalent to how much a family would have spent to offer that child an equivalent meal. PNASE generates a value transfer of USD194 to a family over five years.

The maximum benefit in this category can be achieved by observing the amount of nutrients and the menu determined by the PNASE law, as well as programme continuity throughout the school year.

This analysis considers:

- The menu and amount of nutrients established by law and used as reference in the year analyzed;
- 100 days of feeding per year (days actually observed during the analyzed year), five years per student;
- Equivalent value of a basket of products in the local market.

### Return on investment

One of the effects of school feeding is that it relieves family spending on food and reduces the cost of job opportunities for the family. Thus, a child who is attending school instead of working to bring income to their household receives food at school and the family does not need to cover the cost of the meal. Families in situations of economic vulnerability and food insecurity tend to spend most of their income on food. The observed returns within a year of PNASE was of USD82 per child.

The families reached by PNASE may then save a portion of these resources to make other small investments, such as buying small animals (chickens, pigs) that will offer more food for the family for some time, or simply buy more food and increase its available amount in the household.

This model considers:

- 15%<sup>4</sup> of the saved income used for those micro investments over 5 years; and
- A rate of return on investment of additional income of 54%<sup>5</sup>.

<sup>4</sup> Growth Theory through the lens of development economics, Massachusetts Institute of Technology Department of Economics Working Paper Series, December of 2004.

<sup>5</sup> Average data obtained through Banerjee and Duflo's studies in returns on investment (2004).

## Increased productivity

School feeding programmes have effects on both quantity and quality of education for their beneficiaries. The main indicator observed is the gross enrolment rate, obtained by the number of students enrolled at a given school level, regardless of age, divided by the population of the age group that officially belongs to that school level.

In PNASE's case, a positive effect is observed on the enrolment rate (97.3% vs. 94.7% pre-PNASE), on the attendance rate (94% vs. 85.9% pre-PNASE), and dropout rate (2% vs. 6.2% pre-PNASE). Since PNASE is a universal programme in São Tomé and Príncipe, the pre-2011 period (before the law was approved) was adopted as a parameter for no school feeding.

It should be noted that other socioeconomic factors also have a positive impact on the improvement of these educational indicators, especially over a decade. Therefore, this model considers empirical data from other countries where comparative studies were conducted and the same trend was observed. Where there is an added incentive for school feeding, parents are motivated to send their children to school and keep them attending classes throughout the year, especially in contexts of food insecurity. For this reason, students who benefit from school feeding programmes tend to accumulate more years of education than students under the same conditions, but who do not receive food at school.

## Educational indicators in São Tomé and Príncipe

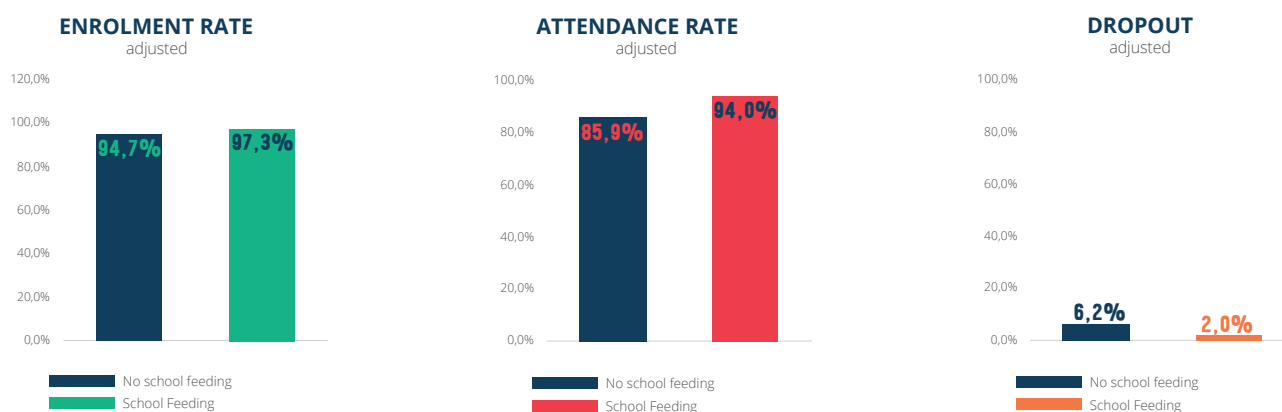


Figure 4 - Educational indicators in São Tomé and Príncipe: Enrolment rate (adjusted) – Attendance rate (adjusted) – Dropout (adjusted)

In addition to contributing to children's permanence in school, school feeding also promotes an improvement in the quality of education for these children during their stay in school. The food that students receive provides the energy they need to concentrate and absorb content from their teachers, allowing them to spend more time in the classroom and achieve a better school performance. This improvement in learning is what leads to higher future productivity for students who receive school feeding, thanks to two factors: a) more years of education create better employment opportunities and higher wages; and b) more productive years thanks to better health conditions achieved in childhood.

This methodology uses the national income per capita (or Gross National Income – GNI) of the population's lower quintile as basis to determine the increase in productivity. In the case of São Tomé, considering data from empirical studies that conclude that each additional year of education generates an increase of about 8% in future earnings; and improvements in learning tests yield up to 11% in the increase of these same future earnings. The projection of future income increase for a student receiving school feeding in the country is up to USD1000 per year.

## AVERAGE INCOME PROJECTION

average value per beneficiary, USD

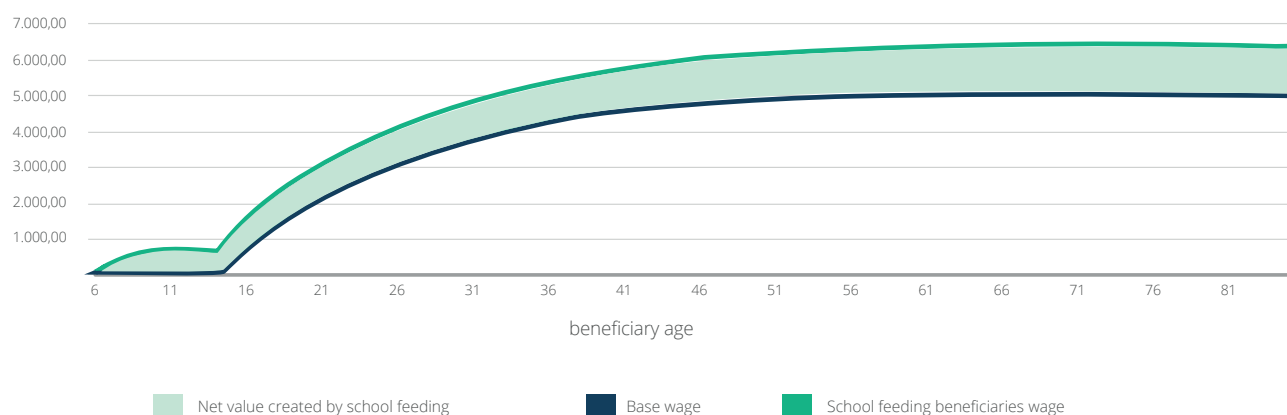


Figure 5 – Average income projection: average value per beneficiary, USD

This component of the benefits of the school feeding programme, which brings a large return to the educational impact on students who receive food at school, but also for their future income, which will also benefit their families and the country's economy, corresponds to a large share of the return on investment in PNASE: 66.7%.

### Healthier life

The daily intake of nutritious meals, in adequate amounts based on the child's age, dramatically reduces the chances of students developing malnutrition and lifelong health problems. Caloric intake and minimum requirements of macro and microcalories served to students are concerns embedded in the design of the PNASE. In addition, health entities promote deworming for schoolchildren. By promoting an overall improvement in a child's health, PNASE positively affects the costs of public and private health systems.

PNASE determines that the programme is responsible for meeting 33% of daily energy needs of children served by the programme. In addition, the menu suggested in the analyzed year covers 2% of daily needs of vitamin A, 42% of iron and 74% of iodine. These nutritional guidelines are extremely relevant to achieve maximum impact on

beneficiaries. Considering these nutritional parameters, the years of life lost due to disability (DALY) are reduced by 4.09% in São Tomé and Príncipe. This means that, by being served by PNASE for 5 years, a student has the expectation of living 4.09% more years in productive and healthy activity.

Moreover, there is a reduction in spending on health care for both the family and the State. It is estimated that each person spends, on average, USD41.94 on private health care; the State spends about USD16.30 per year with each inhabitant in São Tomé and Príncipe. The PNASE alone can reduce these total costs by USD16.33 per beneficiary, annually.

DESCRIPTION	BENEFIT	VALUE
Reduction in health spending	Number of years with school feeding	5
	Health spending avoided by Better Nutrition (annual)	USD2,38
	Daily caloric intake provided by school feeding	33%
Reduction in DALY due to nutritional and hygiene improvements	Standard monetary value of a DALY (GDP per capita)	USD1921,28
Reduction in DALY by deworming	Reduction of DALY by deworming (%)	0,0002

### Gender equality

Dropout, attendance, and enrollment rates are commonly worse for boys in places where school feeding is not offered. Where the programme exists, more similar indices are observed for boys and girls. The probable causes of this are early entry into work for boys – or early marriage where girls are the disadvantaged group.

PNASE is a great incentive for parents to send their children to schools, regardless of gender. In the case of São Tomé

and Príncipe, we did not obtain access to educational data disaggregated by gender. In any case, PNASE does not distinguish between its beneficiaries or between the schools served by the programme. Thus, this model considered only the health data, which showed a reduction in the gap of DALY between men and women attended by the programme in childhood, of USD19.45 per family benefited.



# RECOMMENDATIONS

The PNASE has a strong regulatory framework determined by Law No. 4/2012, a technical staff dedicated to the programme, operating infrastructure and a certain autonomy to execute the programme. Despite being a country with territorial dimensions, considered small, management, monitoring, and logistics challenges are still present. Centralized programme management in the capital is feasible, provided that some aspects of implementation can be decentralized to the districts. The sometimes-difficult access to Príncipe Island makes it even more difficult for supplies and technicians to arrive at the local schools.

In addition, the programme has been facing serious resource cuts. When the data from this analysis were collected, in August 2018, PNASE was already operating with reduced days. Of the 180 feeding days established by law, the programme was only able to serve schools for around 100 days. This supply gap generates a 20% lower impact, distrust of parents, and difficulties in schools. At school level, employees and the community made an effort to build and maintain spaces dedicated to preparation, storage and consumption of food.

Integration with local production is still at an elementary stage. There is local food production available and recent studies try to map it and integrate it into PNASE as far as possible, but the programme still relies on imported food.

Considering the major challenges that PNASE faces, the following recommendations are made to ensure maximum impact and sustainability for the programme.

**1. Enable feeding on all school days.** Despite Law 4/2012, there is difficulty in ensuring resources to purchase enough food for the whole year. As the simulations show, there is a loss of about 20% of PNASE's impact potential when there is a reduction of feeding days from 180 to 100. It is necessary to ensure perennial resources for the purchase of food, either via the public budget or with support from partners who can make food available for the whole year.

**2. Ensure higher investment for school infrastructure, such as construction of canteens, places for storage, and acquisition of utensils.** This basic infrastructure, despite representing significant initial investment, has a long- or medium-term durability, bringing immense return in terms of reducing waste, improving hygiene conditions for students and work conditions for cooks.

**3. Regulation of specific aspects in law – the operation of entities that implement and supervise the PNASE (Article 8), which can play an essential role in monitoring and strengthening the programme institutionally;**

**4. Seasonality – consider availability of local products when preparing menus and integration efforts with local agriculture.** It is an opportunity to increase the impact of PNASE which requires strong involvement of the nutrition team and coordination with the agriculture sector.

PNASE is a well-structured school feeding programme with a dedicated technical framework and specific legislation. Funding challenges have been the main barrier to its full implementation. This analysis shows that even with the difficulty in implementing the programme on all school days, there is a significant return of USD 6.9 for every dollar invested, making PNASE an important tool for promoting education in the country.



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