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Twigg Exploration and Mining,
Limitada.

**UPDATE OF THE SOCIO-
ECONOMIC IMPACT STUDY OF
BALAMA GRAPHITE
OPERATIONS**

Summary

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LIST OF ABBREVIATIONS AND ACRONYMS

ARTEBA – Balama Artisans Association

BGO – Balama Graphite Operations

CDL – *Comité de Desenvolvimento Local* (Local Development Committee)

FBS – Family Budget Survey

ha – hectares

HIV – Human Immunodeficiency Virus

IAB – *Instituto Agrário de Balama* (Balama Agrarian Institute)

LDP – Local Development Program

MIREME – *Ministério dos Recursos Minerais e Energia* (Ministry of Mineral Resources and Energy)

RAP – Resettlement Action Plan

SDAE – *Serviço Distrital de Actividades Económicas* (Economic Activities District Service)

UNDP – United Nations Development Program

USD – United States of America Dollars

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1. Introduction

1.1. General overview

This document constitutes the **Summary Report** for the consultancy "**Update of the Socio-Economic Impact Study of Balama Graphite Operations**" for Twigg Exploration and Mining, *Limitada*. This report includes the following:

- The methodology used for the development of the work (section 2);
- Impact assessment in section 5, indicating the main results of the installation and operation of Balama Graphite Operations in surrounding communities, including the RAP and LDP;
- Identification of corrective measures and opportunities for improvement in section 4;
- Conclusion of the evaluation in section 5.

1.2. Objectives

The **overall objective** of the "*Update of the Socio-Economic Impact Study of Balama Graphite Operations*" is to assess the socio-economic impact of BGO on the surrounding communities resulting from the implementation of both the Resettlement Action Plan (RAP) and the Local Development Programme (LDP) implemented by the Twigg Exploration and Mining, *Limitada*.

Based on the above-mentioned general objective, the specific **objectives are**:

- (i) Assess the socio-economic impact of Balama Graphite Operations on surrounding communities (also known as host communities) of the implementation of its Resettlement Action Plan (and all its components) and Local Development Programme (LDP), both implemented by the Twigg Exploration and Mining, *Limitada*.
- (ii) Measure the impacts of these actions included in the RAP and the LDP, bring corrective measures, and identify opportunities for improvement.
- (iii) Identify and characterize the communities affected by the project's operations (host or host communities) with the latest study developed in the communities as a parameter.

1.3. Scope of work

1.3.1. Balama Graphite Operations

The BGO project is located in the Balama district of Cabo Delgado (northern Mozambique), approximately 265 km west of Pemba (provincial capital) and about 9 km from the nearest village to the west of the mine, Balama (check Figure 1).

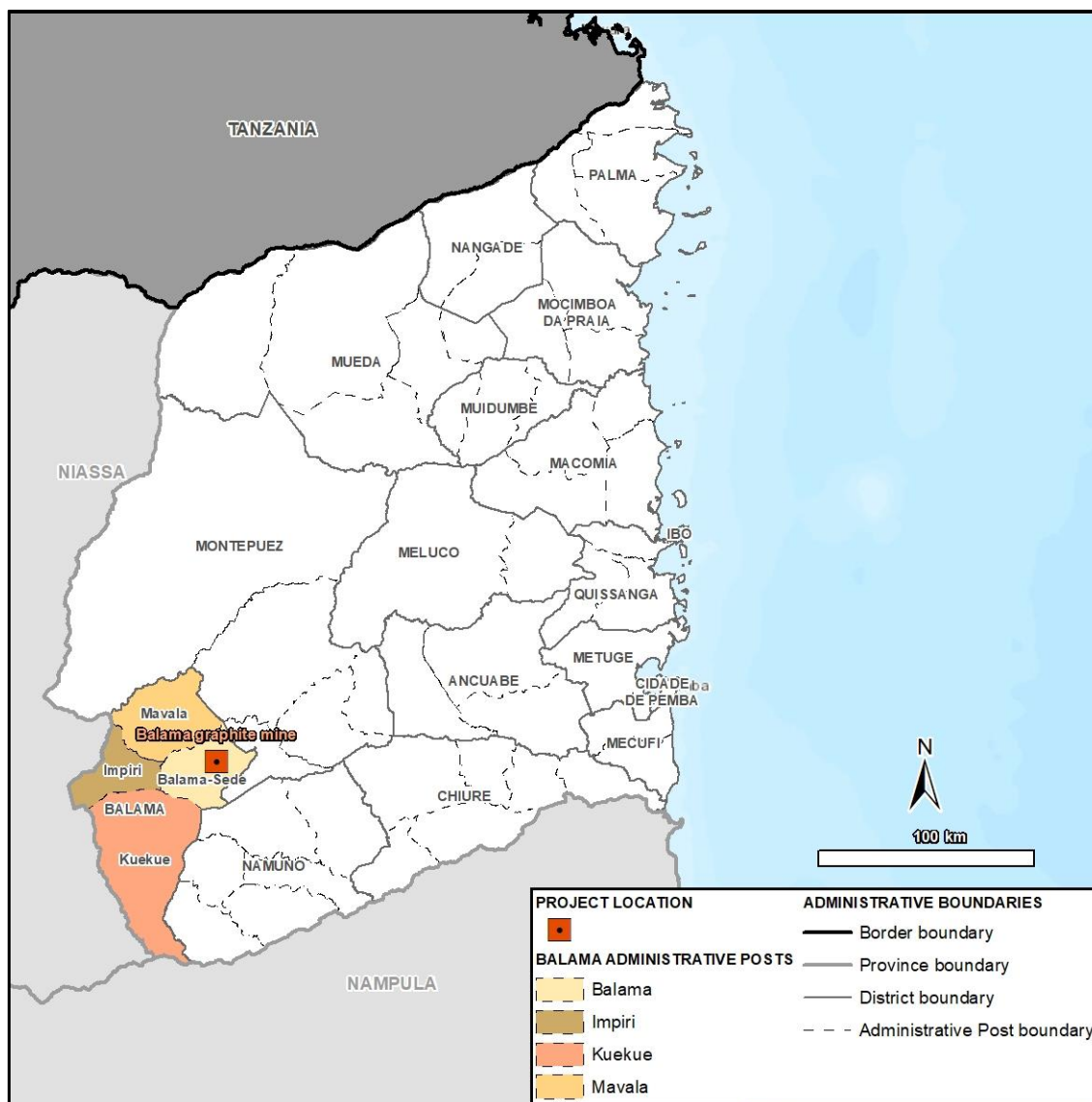


Figure 1 – Administrative framework of GBO.

On 6 December 2013, the Ministry of Mineral Resources and Energy (MIREME) awarded Twigg Exploration and Mining *Limitada* ("Twigg"), a subsidiary of Syrah Resources, a mining concession (No. 6432 C) for the extraction and treatment of Graphite and Vanadium emerging from prospecting and research operations. The concession had an

initial period of 25 years and a possible extension for 25 additional years (Syrah Resources, 2014; MIREME & Twigg, 2018; MIREME & Trimble, 2022).

The first production of flaked graphite was obtained in November 2017, and the first production lines in December of the same year. The implementation of the Balama Graphite Mine project was completed at the end of 2017, and operations began in early 2018 (Syrah Resources, 2018).

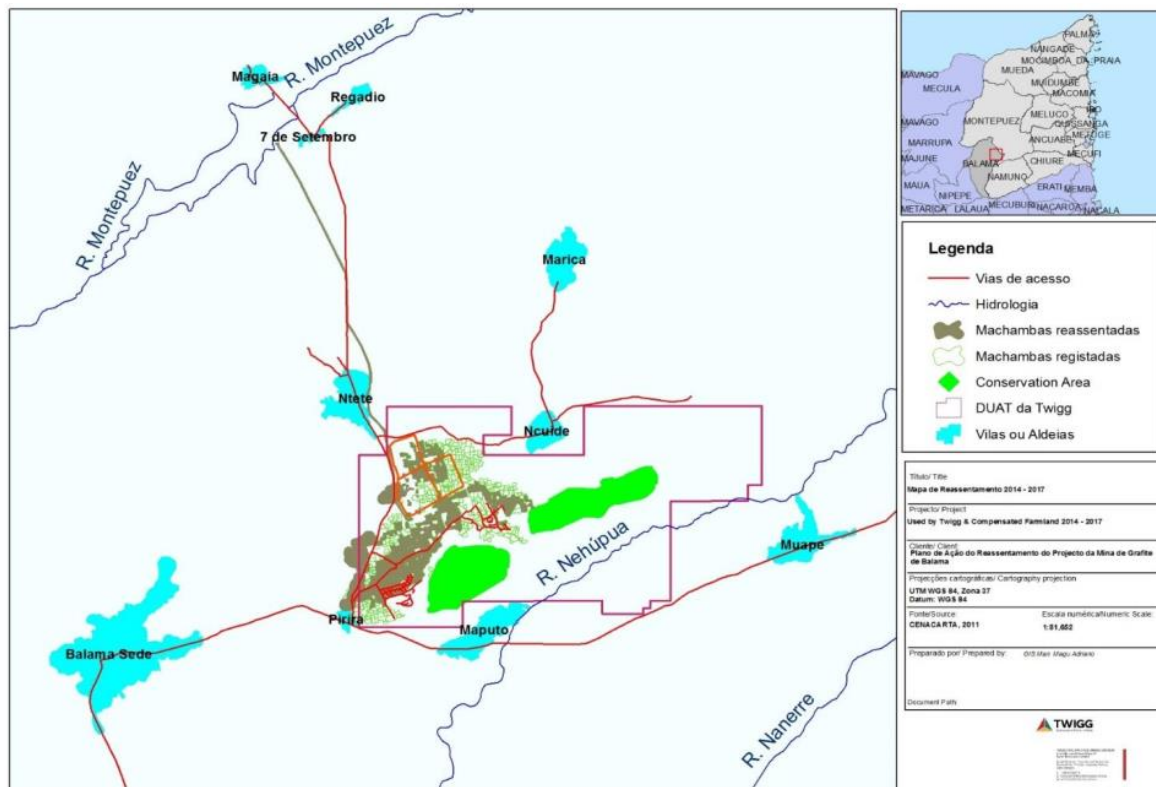
In 2018, Twigg Exploration and Mining *Limitada* ("Twigg") signed a mining contract with the Government of Mozambique (Ministry of Mineral Resources and Energy) in March (MIREME & Twigg, 2018).

1.3.2. Resettlement Action Plan

Between 2013 and 2014, an Environmental, Social and Health Impact Assessment was carried out for the project, according to the Environmental Impact Assessment process. Because local communities used part of the land for agricultural purposes (within the concession area), a Resettlement Action Plan (RAP) was required. The RAP was prepared and submitted to government authorities for its approval in 2014 and was subsequently approved, and its implementation initiated and carried out in a phased manner.

The BGO project is surrounded by four main villages, which were initially considered in the RAP (2014) as being the communities directly affected (Nquide, Ntete, Mualia – formally called Maputo – and Pirira). Based on data collected in March 2013, the total population estimated in these four surrounding villages was about 11,000.

After the start of the implementation of the RAP, four more communities were included in the group of PACs (Project-Affected Communities). These communities were directly affected for the following reasons: the village of Balama, although distant 9km, for being the place of residence of many of the farmers resettled; the community 7 de Setembro for accommodating the Chipembe dam, a reservoir built by the government for agricultural purposes and providing water for the mine; Nacole (formally called Muapé) and Marica because they are host areas for substitute agricultural land (as presented in Figure 2).



Source: (GABE & CES, 2018).

Figure 2 – Communities affected by the BGO Project.

According to the Post-Economic Displacement Socio-Economic Impact Assessment Report, between 2014 and 2017, 594 farmers affiliated with 727 agricultural plots, corresponding to 215 ha of land, received their compensation for economic displacement. In addition, precisely 2,788 economically significant trees (fruit trees) were compensated: 1,409 mango trees, 1,021 cashew trees, 67 papayas, 285 banana trees and six coconut trees. Finally, 122 secondary structures in such agricultural plots (mostly barns and temporary shelters) were also compensated (GABE & CES, 2018).

1.3.3. Community Development Agreement

Following clause 18 of the mining contract between Twigg Exploration and Mining *Limitada* and the Government of Mozambique (MIREME & Twigg, 2018), the company (Twigg) should support the development of its mining community to promote the general well-being and improve the quality of life of the host and neighbouring inhabitants.

In addition, the mining contract itself presents examples of obligations to be considered, namely:

- School education, learning, technical training, and employment for the community;
- Financial or other contributions to education, health, communication, energy, or water infrastructures;
- Assistance in the creation and development of small-scale societies and micro-enterprises;
- Marketing of agricultural products;
- HIV prevention and awareness;
- Methods and procedures for environmental and socio-economic management and local government capacity.

Finally, it was also considered in the mining contract that Twigg should contribute financially to the following works:

- Repair of the Chipembe Dam floodgate (already completed);
- Improvement of the road from Ntete to the dam;
- Expansion of the electricity grid to Ntete (electricity network expanded to Ntete Health Center completed);
- Development of the water network to Ntete (changed afterwards to installation of boreholes in the community, according to Twigg).

In 2017, the company (Twigg) established a Local Development Agreement with the Government of Mozambique to define how the Company will contribute to the sustainable development of the local community during the duration of the mining contract in the following three areas: physical projects; employment and training; health promotion.

The signing of the Community Development Agreement required the formation of a Local Development Committee to represent the best interests of the eight BGO host communities and oversee the implementation of all community development projects sponsored by the company. To ensure fair and transparent management of community projects and associated expenditures in the eight host communities, the members of the Committee include representatives from each of the communities, representatives of the company and representatives of the government (of the District and the Province).

Several projects have already been carried out under the Community Development Agreement with local communities, namely: Muapé Primary School, Pirira Primary School, Balama Professional Training Center, Maputo Road Rehabilitation and Ntete Community Building (check Figure 3).



Ntete Community Building

Rehabilitation of Maputo Road (inauguration)

Muapé Elementary School construction (left) and inauguration in March 2021.

Sources: (Syrah Resources, 2021d, e, 2022b).

Figure 3 – Works carried out under the Local Development Agreement (2021).

2. Methodology

2.1. Introduction

The methodology for the services was based on the experience of the NEMUS Africa/ NEMUS Consortium in similar services and takes into account the methodological guidelines of best practices at the international level on assessing the socio-economic impacts of projects on local communities (Kvam, 2018; Vanclay, Esteves, Aucamp, & Franks, 2015; Arce-Gomez, Donovan, & Bedggood, 2015).

In this way, the Consortium implemented the study in four different phases:

- Phase I – Preparation: the first phase consisted of the development of the technical approach to be implemented during the consulting time and involved;
- Phase II – Consultation: in the second phase, interviews out with key actors, focus groups, and family inquiries were carried.
- Phase III – Evaluation: at this stage, the consulting team measured the impact of the BGO project by comparing the measured values of the evaluation indicators with baseline data (previously surveyed).
- Phase IV – Completion: the fourth and final phase consisted of identifying corrective measures and opportunities for improvement concerning the impacts of the BGO project on local communities. The end of this phase is materialized in the present report, which includes all the work carried out during the consultancy.

2.2. Fieldwork

2.2.1. Introduction

This chapter details the fieldwork conducted in the District of Balama in the context of the work of the Update of the Study of Socio-Economic Impact of Balama Graphite Operations. This chapter is organized as follows:

- Community inquiry (*focus groups*) (section 2.2.2);
- Family surveys (section 2.2.3);
- Interviews with *stakeholders* (section 2.2.4).

2.2.2. Focus groups

Eight focus groups were held in the host communities in the Balama district (Balama-Sede, Maputo; Marica; Nacole; Nquide; Ntete; Pirira; and 7 de Setembro). Figure 14 shows photos of some of these meetings with local communities.



Figure 4 – Focus group photos in the communities of Marica, Nquide, Ntete and Maputo (March 2022).

2.2.3. Family surveys

Family surveys were conducted in the eight host communities in the Balama district (Balama Sede, Maputo; Marica; Nacole; Nquide; Ntete; Pirira; e 7 de Setembro). Figure 5 shows the geographical location of family surveys carried out under this project (between 8 and 16 March).

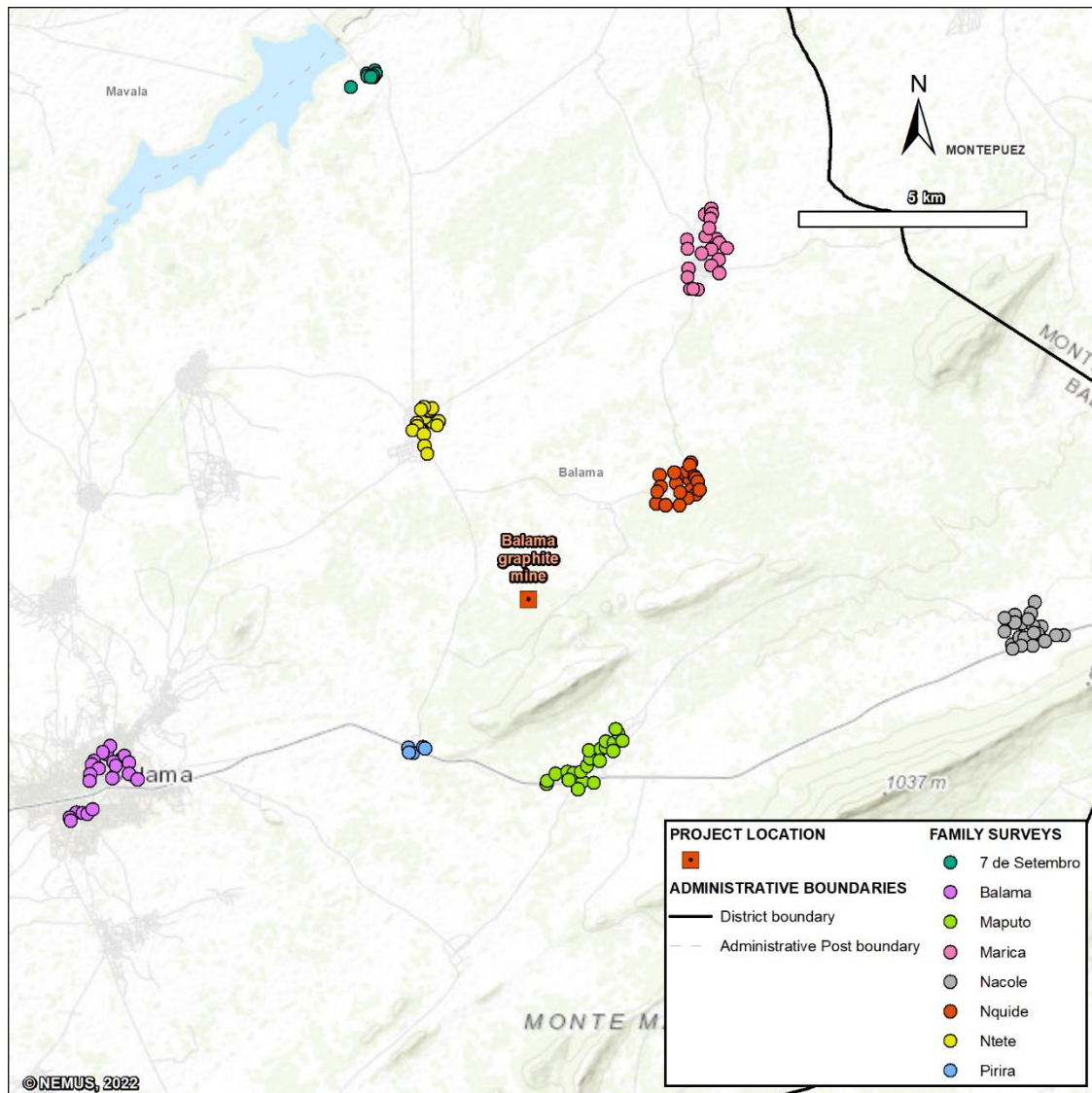


Figure 5 – Family surveys conducted and their location.

2.2.4. Interviews with stakeholders

Interviews were conducted with local leaders in the host communities in the Balama district (Balama Sede, Marica; Nacole; Nquide; Ntete; Pirira; and 7 de Setembro), district government institutions (district services), and other various institutions. A total of 17 interviews were conducted during the two weeks of fieldwork, as presented in Table 1.

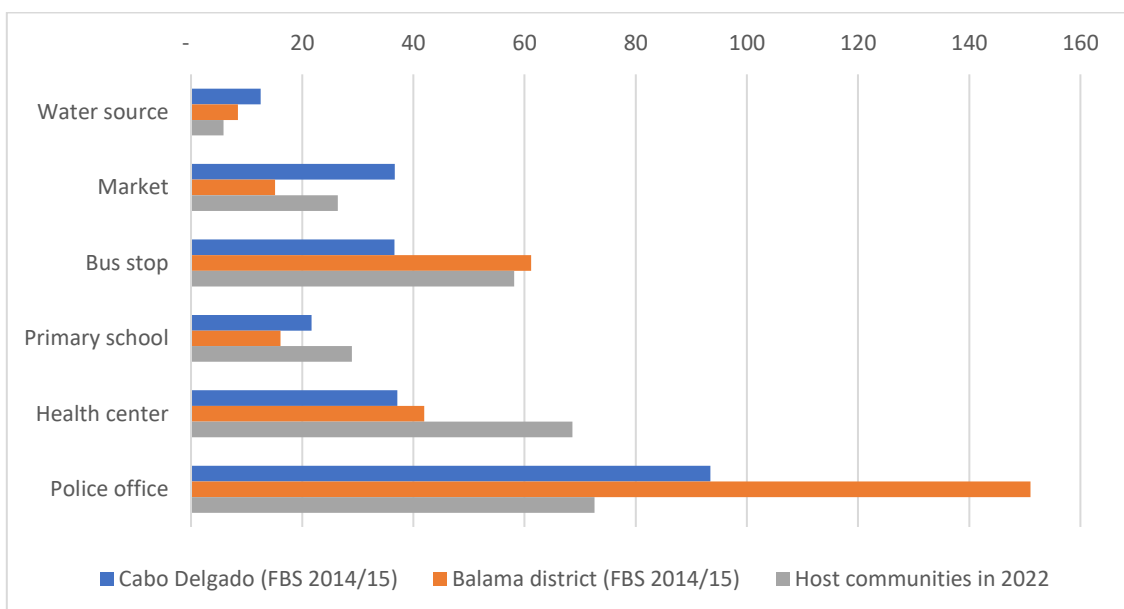
Table 1 – Institutions and entities interviewed.

Type	Entities	Interviewee(s)	Date
Government institutions (Balama District)	• Education, Youth and Technology District Service	Adelina Siteo (Director)	03/8
	• Health, Women and Social Action District Service	Odete Monjane (Director)	03/11
	• Economic Activities District Service	Chabane Tábito (Head of Agriculture and Fishing Dep.)	03/17
	• Planning and Infrastructure District Service	Júlio Mabote (Director)	03/11
Research/ education institutions	• Balama Agrarian Institute	Wilson Charles Madunga (Director)	03/10
	• Alberto Cassimo Institute of Vocational Training and Labor Studies	Amade Carlos Bacar (Director)	03/15
Industry/Promoters	• Twigg Exploration and Mining <i>Limitada</i> (heads of community outreach)	Magú Adriano	03/10
		Rosy Magaia	03/16
Community Organizations and other	• Balama Artisans Association (ARTEBA)/ Ntete	Paulo Francisco Olade (President)	03/10
	• Wiwanana Foundation	Ana David (Director)	03/18
	• Pirira community	Mário António Amaro (secretary)	03/08
	• 7 de Setembro community	Francisco Fernando (secretary)	03/9
	• Nacole community (Muapé)	Vicente Mário (secretary)	03/12
	• Nacole community / CDL Member	Jaime Pedro (Member CDL)	03/12
	• Nquide community	Joaquim Saide (secretary)/ Geraldo Zacarias (Technical group member)	03/14
	• Marica community	Carlos Rodrigues (secretary)	03/15
	• Balama Sede community (Ingonane neighborhood)	Raimundo Tahare (neighborhood secretary)	03/16

3. Impact assessment

3.1. Access to basic services

As can be seen in Figure 6, the distance to a water source for consumption is shorter in the communities under evaluation in 2022 than in Balama district and than in Cabo Delgado province in 2014/15, but this difference is not significant (less two minutes compared to Balama district in 2014/15). It is verified that the construction of water fountains in the host communities has reduced the time of access to drinking water for consumption. However, the use of unprotected wells remains more common, mainly due to the lack of maintenance of many of these fountains in several of the communities.



Sources: NEMUS (2022) and INE (2015).

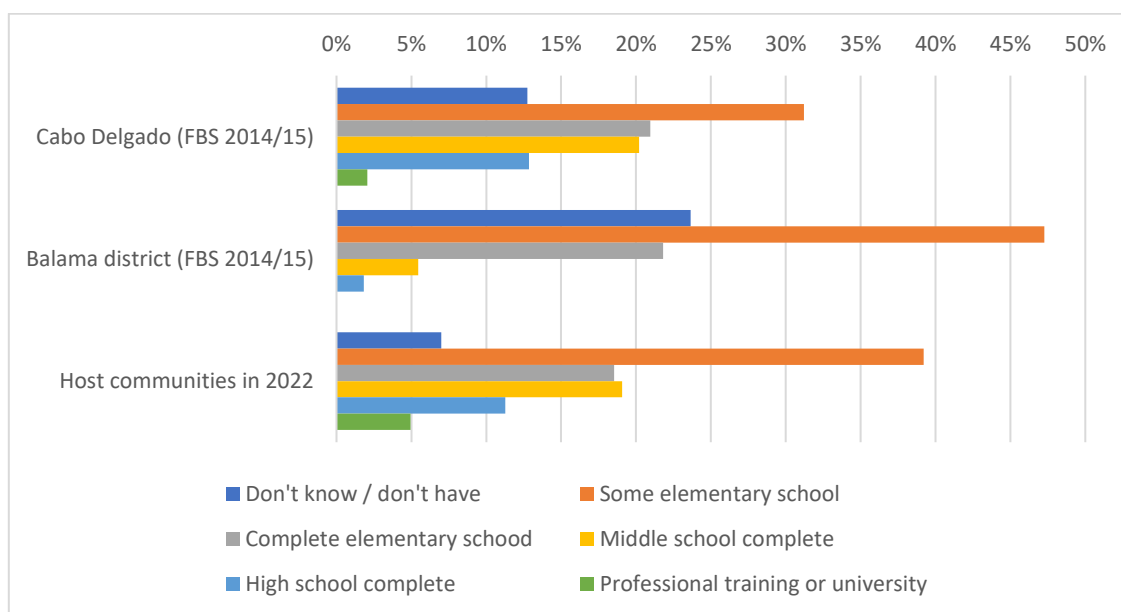
Figure 6 – Access to basic services - the average distance in minutes of walking (FBS 2014/15 results for Cabo Delgado and Balama and BGO host communities in March 2022).

However, one of the difficulties not yet addressed in recent years stands out: the distance to health centers (a common reality in rural Mozambican communities). For the communities under analysis this reality is the result of two independent variables: the inadequate quality of access to several of the communities, namely 7 de Setembro, Nquide and Marica; and the existence of health centers only in Balama Sede, Ntete and Nacole.

The Figure 7 compares the reality of Cabo Delgado and the District of Balama in 2014/15 and the host communities of Balama Graphite Operations in 2022 within the context of

the maximum level of education. The comparison allows us to conclude a positive evolution of the level of education in the communities under evaluation. However, limitations remain that are listed below:

- The existence of only one high school places a practical cost and too high opportunity cost in formal high education for most families residing outside the urban center of Balama Sede (great distance between the communities under evaluation, for example, 7 de Setembro, Nquide and Marica and high school, enhanced by inferior quality access);
- The presence of the Balama Agrarian Institute is an asset of excellence for the district and local communities, but access to it (in terms of training and examinations) hinders the potential it can have in the local economy mostly rural and agricultural.



Sources: NEMUS (2022) and INE (2015).

Figure 7 – Maximum family education level (FBS 2014/15 results for Cabo Delgado and Balama, and total weighted average in host communities).

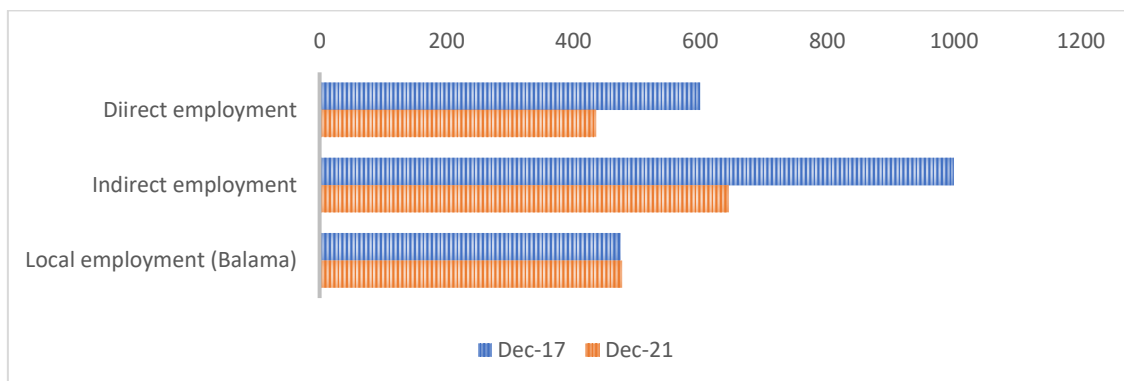
3.2. Income and work

According to the Post-Economic Displacement Socio-Economic Impact Assessment Report (GABE & CES, 2018), about 1.5% of people aged 15 to 65 had permanent employment in 2017. This indicator represented a decrease compared to the proportion recorded in 2014 at the time of the Resettlement Action Plan (1.8%). According to the survey conducted by NEMUS in March 2022 it is estimated that about 2.7% of the population of the eight communities under evaluation have permanent employment.

Although the evolution from 2014 to 2022 is significant, this indicator is still quite low (people with permanent work). The indicator reflects the rurality of the host communities, the fact that agriculture is the main source of revenue for local families, and that the manufacturing and service economy is underdeveloped. For a more positive development of the local economy, strategies for boosting the surplus of agricultural production need to be developed. These strategies should focus on the mechanization of agriculture, the creation of local producer structures such as cooperatives or associations, and more substantial support for farmers in the communities under evaluation.

It is estimated that less than 1% of families in host communities where any of their members work directly or indirectly in Balama Graphite Operations. Thus, this proportion is only 0.5% of the number of people over 15 years and up to 65 years in the communities under evaluation.

The Post-Economic Displacement Socio-Economic Impact Assessment Report estimated that about 500 to 600 people from local communities would be employed in the mine in the operation phase. According to the data published by the company (Figure 8), total employment at the mine is now (end of 2021, operation) about one third less than in 2017 (December 2017, end of the installation period). Given the greater need for workforce in the construction phase, this difference is expected.



Source: (Syrah Resources, 2022a; Syrah Resources, 2018).

Figure 8 – Direct, indirect, and local employment at Twigg (2017 e 2021).

The lack of skilled local labor and companies of adequate size and capacity at the district level able to supply the company is seen as a critical constraint, significantly reducing the economic impact that the Balama Graphite Operations have on the district.

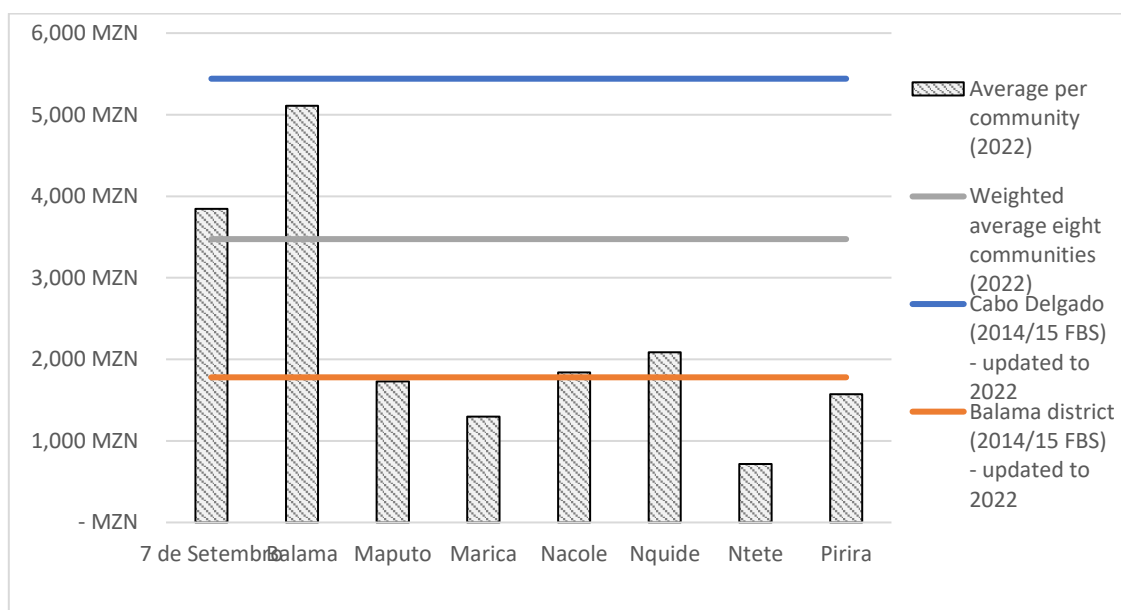
In addition to the need to mention direct and indirect employment, in the case of income, it is expected that the installation and operation of the Balama mine have contributed to the increase in revenues of local producers and traders by increasing demand. The results of the survey conducted in March 2022 by NEMUS make it possible to conclude this: more than a tenth of respondents reported starting a new business after the start of work for Balama Graphite Operations; almost a fifth of respondents also considered that the arrival of Balama Graphite Operations benefited their agricultural and/or commercial sales.

The focus group discussions and key interviews (e.g., SDAE) also led to the conclusion that these impacts could be much more significant. The potentiation of local effects and the creation of more local linkages between the mine and the district (whether backward linkages, consumption linkages or fiscal linkages – forward links are expected to be few in the mining industry with a particular focus on external markets) are measures that must be developed not only for the local benefit but also for better development of the company, cost reduction with international and suppliers outside Cabo Delgado, and, therefore, for better long-term sustainability.

3.3. Monthly expenses

The comparison of monthly expenditure registered in 2022 (through the socio-economic survey conducted in March) in the communities under evaluation and those recorded in 2014/15 (updated for 2022 with the inflation figures indicated by INE for Mozambique) is presented in Figure 9. The weighted average monthly consumption in 2022 in the host communities is higher than the updated amount of expenditures in the Balama district (based on 2014/15 FBS results). This difference is particularly significant and dependent almost exclusively on two communities: Balama Sede and 7 de Setembro. The remaining communities are at the consumption threshold registered by the FBS in 2014/15 for the district of Balama (Maputo, Nacole and Nquide) or have values lower than this (Marica and Ntete).

The comparison with the consumption pattern of Cabo Delgado is clearly unfavourable for the communities under evaluation. However, this comparison is little adjusted given the importance of the capital Pemba and its evidently higher level of income and consumption, which influences the results of the rest of the province.



Source: NEMUS (2022) and INE (2015).

Figure 9 – Estimated monthly expenses per family in the month prior to the survey (2014/15 FBS results for Cabo Delgado and Balama – updated by the inflation figure recorded in Mozambique and total weighted average in the host communities).

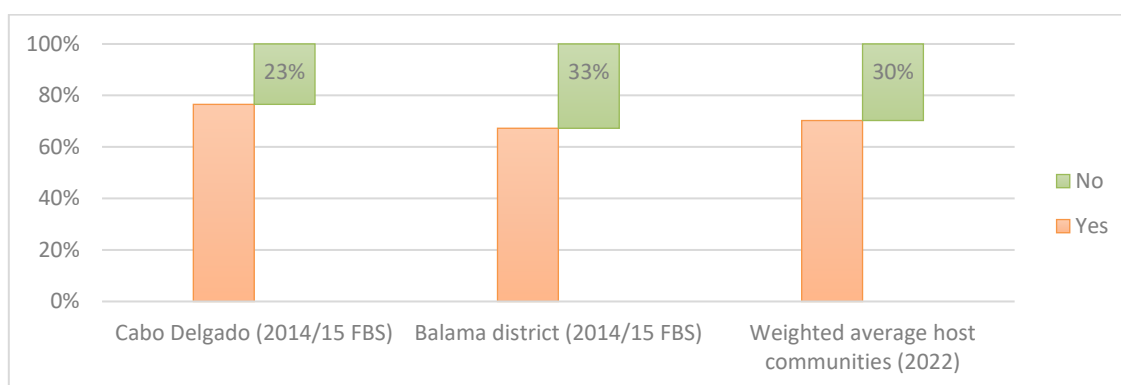
The following conclusions are important to be highlighted: there is a disparity in consumption patterns (and as a result of estimated revenues) in the communities under

evaluation; the consumption levels of Balama Sede and 7 de Setembro are higher than the average of the eight host communities and have evolved positively in the last five years; in contrast, Marica and Ntete have relatively lower consumption levels (than the values of the district and other communities); Maputo, Nacole, Nquide and also Pirira have consumption values within the expected, with a relatively positive evolution, but little significant in relation to the district result (considering the updated FBS results of 2014/15).

It is therefore considered that there is a relatively asymmetric impact of the BGO on the consumption conditions of the families of the eight communities under evaluation. The overall result is, however, considered positive and significant.

3.4. Poverty and ownership of assets and housing

Figure 10 compares families who claimed to have had food shortages in 2022 in the communities under evaluation and that registered in the FBS of 2014/15 (1st quarter) for the province of Cabo Delgado and the entire district of Balama. There is an almost zero evolution between the result for Balama district in 2014/15 and that recorded in 2022 for the weighted average of host communities (a slight increase in households that claimed to have had food shortages in the communities, but not significant).

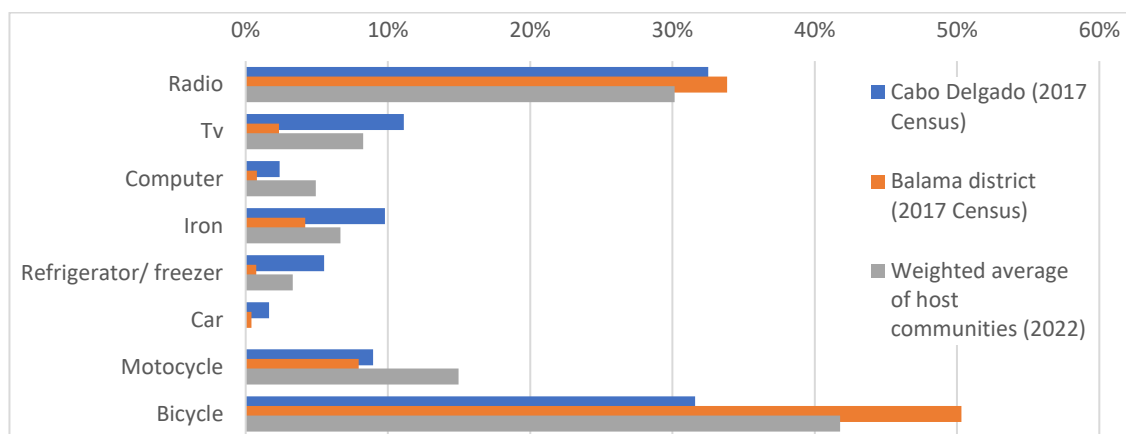


Sources: NEMUS (2022) and INE (2015).

Figure 10 – Families that have had food shortages in the last 12 months (Cabo Delgado and Balama in 2014/15 and total weighted average of host communities in 2022).

When comparing the indicators of possession of durable goods (and then the housing indicators), there is a significant evolution in the territory under evaluation, which indicates a positive impact of the installation of the BGO. For example, it is possible to

identify in Figure 11 a significant increase in families with a television, computer, freezer, or motorcycle in the host communities in relation to the situation in the Balama district in 2014/15.



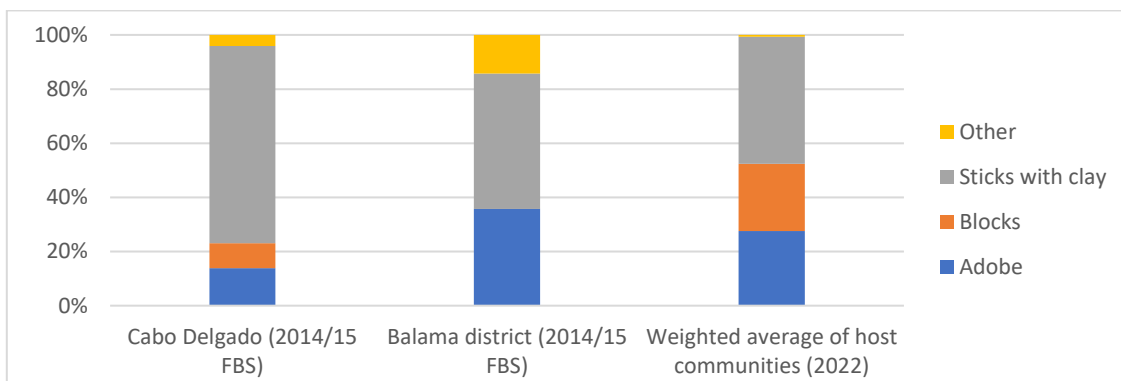
Source: NEMUS (2022) and INE (2022).

Figure 11 – Possession of durable goods (Cabo Delgado and Balama in 2017 and total weighted average of communities in 2022).

Another picture of the economic developments that have occurred in the territory over the last decade can be seen in Figure 12. From a territory with almost no dwellings with blocks in 2014/15, there is an evolution to a situation in 2022 in the communities under evaluation where about one-fifth of the houses are built with blocks.

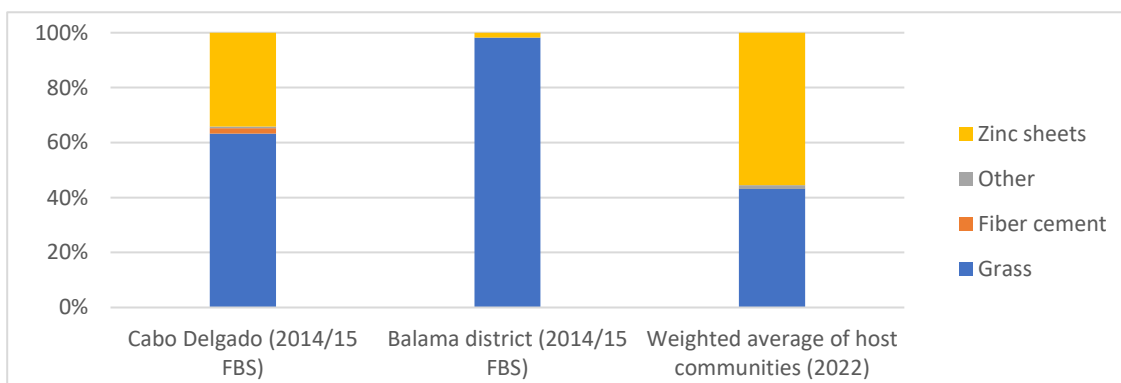
The housing cover material is perhaps the variable with the highest evolution from 2014/15 to 2022, as shown in Figure 13. From an almost universal use of grass as a cover material in the Balama district in 2014/15 to a situation in 2022 where more than half of the families have zinc plates as cover. This indicator for the communities under evaluation in 2022 is even higher than that observed for all communities in Cabo Delgado (FBS data for 2014/15).

One of the direct consequences of the Community Development Agreement established between the affected communities, the Balama District and Twigg, was the installation of water fountains in all communities. As shown in Figure 14, this measure had the direct consequence that about one-third of the families of the affected communities started to use fountains to supply water for consumption (in 2014/15, no community in Balama used fountains as seen in the FBS statistics for the district). In this way, it is estimated that this third of households would used mostly wells (without pumps) to supply themselves previously. This development has improved the quality and safety of the water supply of several affected communities.



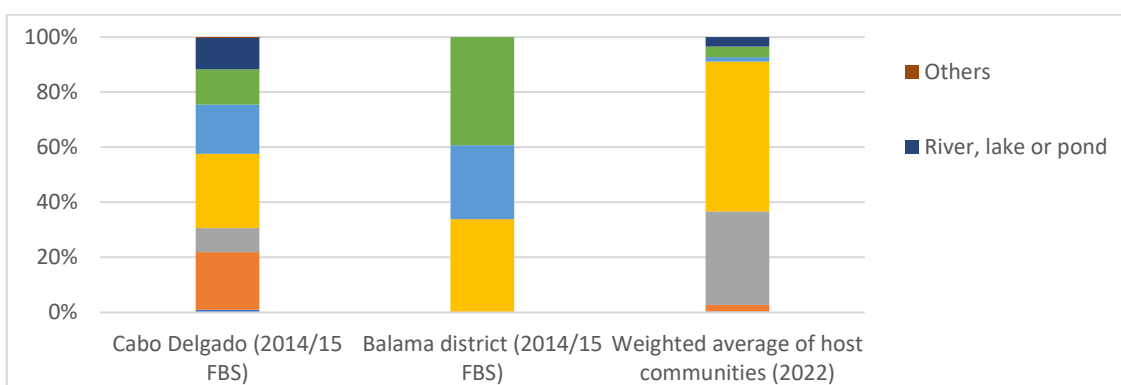
Source: NEMUS (2022) and INE (2015).

Figure 12 – The building material of the dwellings (Cabo Delgado and Balama in 2014/15 and total weighted average of communities in 2022).



Sources: NEMUS (2022) and INE (2015).

Figure 13 – Housing coverage material (Cabo Delgado and Balama in 2014/15 and total weighted average of communities in 2022).



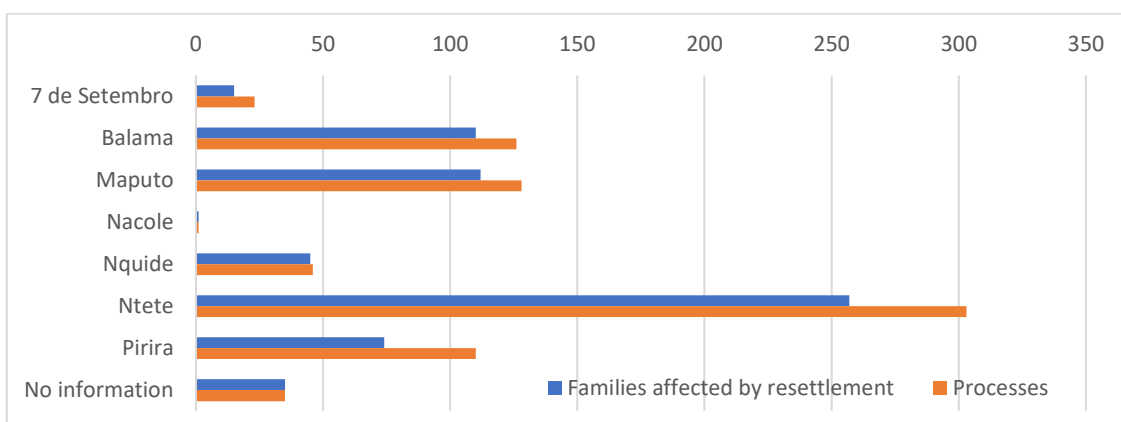
Source: NEMUS (2022) and INE (2015).

Figure 14 – Water source for consumption (Cabo Delgado and Balama in 2014/15 and total weighted average of communities in 2022).

3.5. Resettlement

A total of 10% of respondents in March 2022 said they had been resettled as part of Balama Graphite Operations. This represents a population-weighted average value of 7% (i.e., taking into account the composition and population distribution in target communities), which is in line with the total number of families resettled in Balama (772 different processes from about 650 households according to the database provided by Twigg – by the end of 2021, 7% of the families of the eight communities hosting Balama Graphite Operations).

As is seen in Figure 15 and Table 2, it was in the community of Ntete that more families were affected by the resettlement process (more than two and a half hundred families), about 40% of the total. The second community was Maputo (112 families, 17% of the total) and Balama (110 families, 17% of the total). In Pirira and Nquide, 74 and 45 families were affected by resettlement, respectively. Only a few families in 7 de Setembro and Nacole were resettled (mainly due to the works of the Chipembe dam and water supply to the mine).



Source: NEMUS (2022) based on data provided by Twigg (2022).

Figure 15 – Families affected by resettlement under Balama Graphite Operations by community and number of cases.

According to the survey results, about half of the families surveyed and resettled because of Balama Graphite Operations generally considered that the process ran positively. However, the remaining half believe that the process did not go positively. The justifications for the negative classification of the resettlement process are as follows: relatively low compensation value – perception of some of the respondents because the average value per hectare was somewhat lower in the first years; new site specified for agricultural production without ideal conditions (easily flooded or low-quality land).

Table 2 – Resettlement processes per year/community.

Community	Year						
	2014	2015	2016	2017	2018	2019	Total
7 de Setembro				23			23
Balama-Sede	7	85	26	7	1		126
Maputo	5	34	68	16	5		128
Nacole (Muapé)				1			1
Nquide	19	4	18	1	4		46
Ntete	5	39	100	159			303
Pirira		61	21	28			110
Without information						35	35
Total per year	36	223	233	235	10	35	772

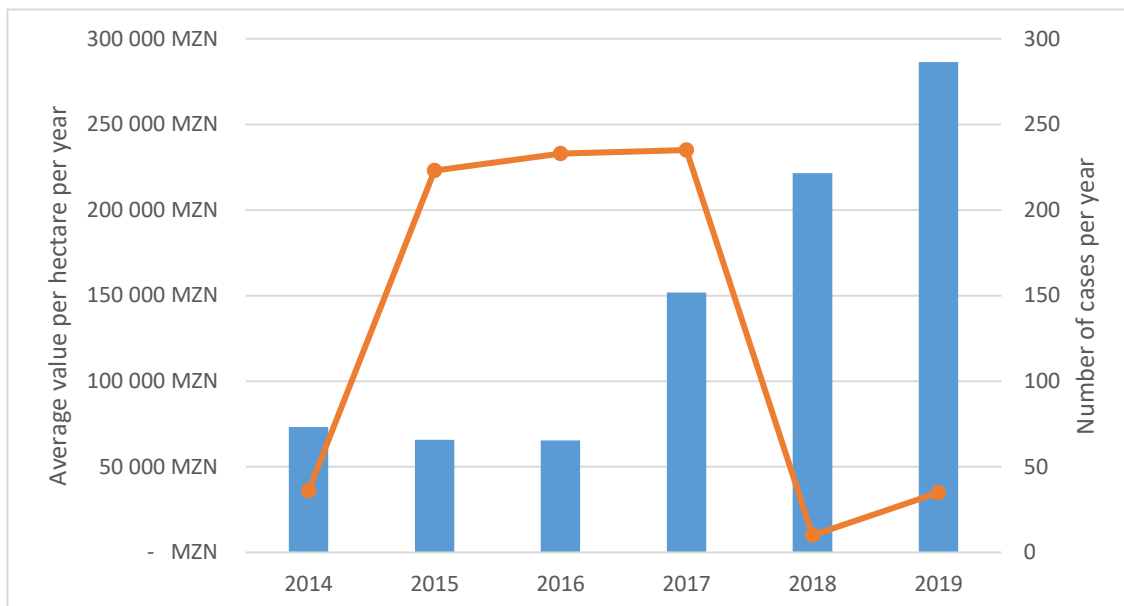
Source: NEMUS (2022) based on data provided by Twigg (2022).

One of the issues raised by several stakeholders in focus group discussions and surveys was the unequal treatment between the first resettled farmers (between 2014 and 2016) and those resettled later (between 2017 and 2019). This issue is confirmed by the Post-Economic Displacement Socio-Economic Impact Assessment Report (GABE & CES, 2018) and by the database provided by Twigg (2022), as it is possible to check in Figure 16. Thus, a methodological change between 2016 and 2017 (in 2017, sesame was no longer considered a basis for compensation and cassava was used instead; and the compensation value also started to include a value for clearing the new provided agriculture plots [before Twigg was responsible for this task]; this raised the stipulated base compensation value from 63,000 MZN per hectare to 150,000 MZN per hectare). Additionally, these methodological changes were instigated by the Government, represented in the District Resettlement Commission.

These methodological changes in the middle of the resettlement process are considered positive (resulting in an increase in the average amount received by a resettled family) but introduce into the communities a feeling of injustice given the different treatment for identical processes.

Finally, when the theme was the complaints in the context of the resettlement process, the leaders in several of the communities said that they were still waiting for the resolution of issues related to the allocation of new land for cultivation in neighboring communities (preventing their use due to conflicts between communities). In Ntete, it was also

specified that several families still wait for a new area to be able to cultivate (after they have been compensated).



Source: NEMUS (2022) based on data provided by the Twigg (2022).

Figure 16 – Average compensation value per hectare and number of processes per year (resettlement because of Balama Graphite Operations).

In fact, by consulting the database of complaints and grievances, it turns out that several of the complaints made by community members in 2018, 2019 and 2020 refer to the poor quality of the land delivered to compensate for resettlement (precisely the ease of flooding of these, making it impossible to produce traditional crops) and/ or the impossibility of accessing them (e.g., complaints 12/2018, 16/2018, 17/2018, 21/2019, 23/2019, 24/2019, 3/2020 e 4/2020). Some of these complaints have been resolved (23/2019, 24/2019, 4/2020). Others, though, appear to have not had a conclusion (they are not considered to be monitored or have no solution implemented).

It is also noted that measures have been taken by Twigg and the district authorities to monitor and resolve a complaint by several local farmers resettled (inadequate quality of land allocated in Marica). An Action Plan for resolving this complaint has been set up, involving the following: the allocation of new areas considered more appropriate and their preparation (situation still in resolution); the allocation of an additional financial compensation and financial management training; the allocation of improved seeds; the conduction of specific training for agricultural production and crop diversification; the certification of local producers.

3.6. Local development and economic development plan

Regarding whether the local community has benefited from Balama Graphite Operations, the families of the communities under evaluation have given quite different answers.. 7 de Setembro e Pirira have the highest proportions of positive values, above 80%. On the contrary, Balama, Marica, but also Ntete demonstrate a more pessimistic assessment of the contribution of the mine to local development. The most important reasons given for the positive contribution are as follows: construction and rehabilitation of the school (7 de Setembro, Nacole and Pirira); construction of fountains (7 de Setembro, Maputo, Marica, Nquide, Ntete); construction of police station and support to the health center (Ntete); support for farmers (inputs delivered in Ntete and 7 de Setembro); employment for young people in local communities.

On the contrary, the reasons given to substantiate the fact that the community has not benefited significantly from the opening of Balama Graphite Operations are as follows: lack of road rehabilitation (7 de Setembro e Ntete); lack of health center (Maputo); relatively low direct employment in the company (Ntete and Maputo); lack of direct support for local communities and the most disadvantaged (general).

The responses of focus group discussions underpin some of these statements. Local leaders say that employment at the mine is low, and more local labor should be used. Additionally, although the communities highlight the works conducted (e.g., schools), they consider that there are still promises to be executed, such as the rehabilitation of roads, the operationalization of fountains (some, however, have been vandalized or ceased to function), or more significant support for local agricultural production.

When the question was related to the direct benefit that the family received, in socio-economic surveys (i.e., whether the family benefited directly from the installation of the Balama Graphite Operations), the answer was only positive in 7% of cases. In this, the families who responded affirmatively pointed out the following facts: a family member had worked in the construction of the mine, and the family had received agricultural inputs.

Finally, it should be noted that of the 150 respondents, 17 (11%) reported having started a new business after the start of the Balama Graphite Operations. In addition, almost one-fifth of respondents believe that the arrival of Balama Graphite Operations has benefited its agricultural and/or commercial sales.

The Community Development Agreement anticipated various physical works. Additionally, there are other promises inscribed in the mining contract. Of the agreed infrastructures, several have already been implemented or are under construction. Other projects not stated in these agreements are under development: operating block in Balama and central wholesale market in Balama.

The second point of the Community Development Agreement concerns employment and training, focusing on the following: local employment (check analysis in section 3.2); English and multimedia classes; technical Internships - mechanic, electrician, boilermaker/welder; on-the-job training; farmer Development Program; creation of nurseries and agricultural farms to train local community members.

Most of these points have been met or are in compliance by Twigg. The Balama Training Center has also been training young people in mechanical and electricity courses, and a small part of them are integrated into the company or as subcontractors.

Finally, regarding the employment and training point, Twigg has developed support programs for local farmers (supply of provisions, seeds and plants supply, training) and has supported local families in poultry farming, for example.

Finally, the Community Development Agreement also incorporates health measures. NEMUS has information that several of these items have already been complied with, including: Health and Socio-Economic Survey (2017); Rehabilitation of the Laboratory of the Balama Health Center; Malaria screening and mitigation program; Occupational health monitoring at work; Local sporting events (football tournaments, athletics, among others); Training in Readiness for Work and Health Promotion; Malaria awareness campaigns; Parasitic disease awareness campaign; Support to the District of Balama in the context of the prevention of COVID-19 (donations of material); COVID-19 prevention, training, and awareness campaign; Several other awareness-raising campaigns (breast cancer, prostate cancer, HIV); Community interventions to promote health awareness campaigns (Wiwanana Foundation) (2021).

4. Identification of corrective measures and opportunities for improvement

4.1. Corrective measures

Considering what is described in the previous chapter, it is presented in Table 3, the corrective measures suggested for the identified issues to be rectified.

Table 3 – Suggested corrective measures.

Scope	The issue to be rectified	Suggested action(s)
Resettlement	<ul style="list-style-type: none"> Quality of land distributed as part of resettlement compensation (complaint in resolution) 	<ul style="list-style-type: none"> Implementation of the Action Plan by the end of 2022; Continue engagement with Government and affected farmers to improve current outcomes of the complaint resolution, ensuring land availability and technical support On agricultural inputs: distribution of agricultural inputs and specific training in the field of agricultural production adapted to the site (as stated in the Action Plan, see section 3.5); Holding semi-annual focus groups with affected farmers for monitoring and addressing any additional issues (one in 2022, two in 2023) up to overall satisfaction of more than 75%;
	<ul style="list-style-type: none"> Conflicts between communities due to the delivery of areas for agricultural production in neighboring communities (Nacole – Muapé and Marica) 	<ul style="list-style-type: none"> Action Plan to resolve this issue adopted by the end of 2022; Implementation of the Action Plan by the end of 2023; Implementation of joint community meetings between community leaders to resolve conflicts;

Scope	The issue to be rectified	Suggested action(s)
	<ul style="list-style-type: none"> Families with an assigned codeword and no compensation 	<ul style="list-style-type: none"> Review resettlement database and assigned codewords; Check cases of families with assigned code words that have not been included in the Resettlement Plan and report that they can cultivate their land (in community meetings in all communities with identified cases);
	<ul style="list-style-type: none"> Dissimilar compensation values leading to the perception of different treatment in communities 	<ul style="list-style-type: none"> Creation of a specific plan for the delivery of agricultural inputs for all families resettled between 2014 and 2016; Additional distribution of one machete and a hoe by each family resettled between 2014 and 2016; Distribution to each farmer in 2022, 2023, 2024 and 2025 of: <ul style="list-style-type: none"> Fertilizer (sufficient quantity for 1.5 ha per farmer/year); Insecticide (adequate amount to 1.5 ha per farmer/year);
Local Development Program	<ul style="list-style-type: none"> Rehabilitation of roads (desire raised by the local communities for periodic maintenance) 	<ul style="list-style-type: none"> Periodic maintenance of road to Marica by the end of 2024; Periodic maintenance of the road to 7 de Setembro by the end of 2025; Study bridge rehabilitation in Maputo.

Scope	The issue to be rectified	Suggested action(s)
	<ul style="list-style-type: none"> Maintenance of water fountains 	<ul style="list-style-type: none"> Consolidate Villages Water Committees established during the process of handover of the water boreholes to the government/community in 2018/19 by creating capacity for continued maintenance of the water boreholes; Rehabilitation of all fountains by the end of the first half of 2023.
	<ul style="list-style-type: none"> Expansion of the water network to Ntete 	<ul style="list-style-type: none"> Study for possible expansion of the water network to Ntete (completed by 2023) with supply sites in the community center and health center, according to the intended of the Mining contract; Study expansion of the water network to Nquide.
	<ul style="list-style-type: none"> Lower local employment than desired and expected 	<ul style="list-style-type: none"> Communication of employment opportunities in local communities (biannual employment fair); Training Centre with recruitment actions in local communities (annual event); Training Centre with integrated and paid professional internships (six months); Publicizing local employment in the quarterly and annual sustainability reports per community (not only the total); Raising the total local employment target (in host communities) to 60% by 2025.

4.2. Opportunities for improvement

Taking into account what is described in the socio-economic impact assessment chapter, it is presented in Table 4, the suggested measures for the identified improvement opportunities.

Table 4 – Opportunities for improvement.

Scope	Identified opportunities	Suggested measure(s)
Economic Development and Local Development Plan	<ul style="list-style-type: none"> Expansion of the irrigation network to increase agricultural production 	<ul style="list-style-type: none"> Creation of an irrigation network expansion plan (from the Chipembe Dam) for the communities of Ntete, Nquide and Balama-Sede.
	<ul style="list-style-type: none"> Increase of local suppliers (Balama district) 	<ul style="list-style-type: none"> List all supplies received by Balama Graphite Operations in the Balama district; Identify cases of supplies made by companies located outside Balama that can be easily performed locally (food, low complexity services such as cleaning, security, among others); Invite companies located in Maputo and Pemba with higher supply volumes to settle in Balama (based on previous identification); Set a local supply target of 1% in 2023 and 5% in 2025 (total value at the national level).

Scope	Identified opportunities	Suggested measure(s)
Economic Development and Local Development Plan	<ul style="list-style-type: none"> Improving local linkages and household income 	<ul style="list-style-type: none"> Legally and operationally support the creation of agricultural production cooperatives in local communities to supply food products to the company; Creation of long-term contracts for the supply of BGO with local cooperatives created for this purpose; Study establishing in the same agreement the supply of agricultural inputs (fertilizers, insecticides, and seeds); Setting a target for the supply of local agricultural products in the total food products purchased by the company (in value): <ul style="list-style-type: none"> 15% in 2025; 33% in 2030.
	<ul style="list-style-type: none"> A more significant contribution of the Training Centre 	<ul style="list-style-type: none"> Establishment of new training courses suitable for local reality such as construction, carpentry, and horticulture; Creation of paid professional internships in identified local companies; Increased integration in BGO and local companies (in current courses of electricity and mechanics), setting an employability target of more than 50% in 2025 and 100% in 2030; Establishment of quota for female members (25%);

Scope	Identified opportunities	Suggested measure(s)
Economic Development and Local Development Plan	<ul style="list-style-type: none"> Better inform communities 	<ul style="list-style-type: none"> Creation of structures for communication and information in communities for local development plan initiatives Biannual community meetings to showcase initiatives and their results Dissemination of initiatives and their results through pamphlets and boards located in primary schools
Access to essential services	<ul style="list-style-type: none"> Improved access to education 	<ul style="list-style-type: none"> Creation of scholarships for students of excellence in host communities (with monetary and in-kind support – school supplies, school clothes and food support); Scholarships for access to secondary education, IAB and Training Center; Establish a quota for female students (50%). Support in creating district public transport services between host communities and secondary schools (for all host communities).
	<ul style="list-style-type: none"> Improved access to health 	<ul style="list-style-type: none"> Support in creating district public transport services between host communities and health centers (for the communities of Nquide, Marica, Maputo and 7 de Setembro).
Most deprived families	<ul style="list-style-type: none"> Asymmetric impacts of BGO on local communities with less impact on the most deprived families 	<ul style="list-style-type: none"> Identification of food and other shortages in host communities (holding community meetings with local leaders); Creation of specific programs for low-income families (supply of agricultural supplies and food products such as corn, oil, and soap – supplied locally).

5. Conclusion

This document constitutes the **Summary** in the context of the consultancy "**Update of the Socio-Economic Impact Study of Balama Graphite Operations**" for Twigg Exploration and Mining, *Limitada*.

The territories under evaluation have undergone significant developments in the last five years. The result of the installation of the BGO, compensation received in the context of resettlement, the implementation of the LDP, the direct, indirect, and induced employment of the construction works and the operation phase of the mine and the fiscal linkages that also allowed state investments in the district, transformed the local economy, also benefiting local communities. These benefits are visible in the improvement of housing, increased ownership of durable goods (e.g., motorcycles) or the average income growth, as presented in this report.

It is considered that the resettlement process, in general, went satisfactorily. In addition, the issue of support for first resettled farmers needs to be taken into account with greater centrality in the future; finally, some issues still need to be checked in more detail, and some corrective measures are suggested in 4.1.

Much of the infrastructure promised under the LDP has been carried out or is being carried out (schools, improvement of the health centre, wholesale market, water fountains in the communities). There are, however, some pressing needs (which have been agreed with Twigg) that have not yet been carried out – e.g., the improvement of the road from Ntete to dam, which is suggested to be implemented in the short term. On the other hand, there is the issue that many of the constructed fountains have ceased to operate for various reasons, so measures are suggested to promote the maintenance of these equipment.

The focus on local employment is considered to have to be strengthened. In this context, the Training Centre could play a more comprehensive, central, and proactive role.

The opportunities for improvement identified focus on supporting the development of agriculture in the district, increased local economic linkages, support for access to essential services and specific measures for the most deprived families.

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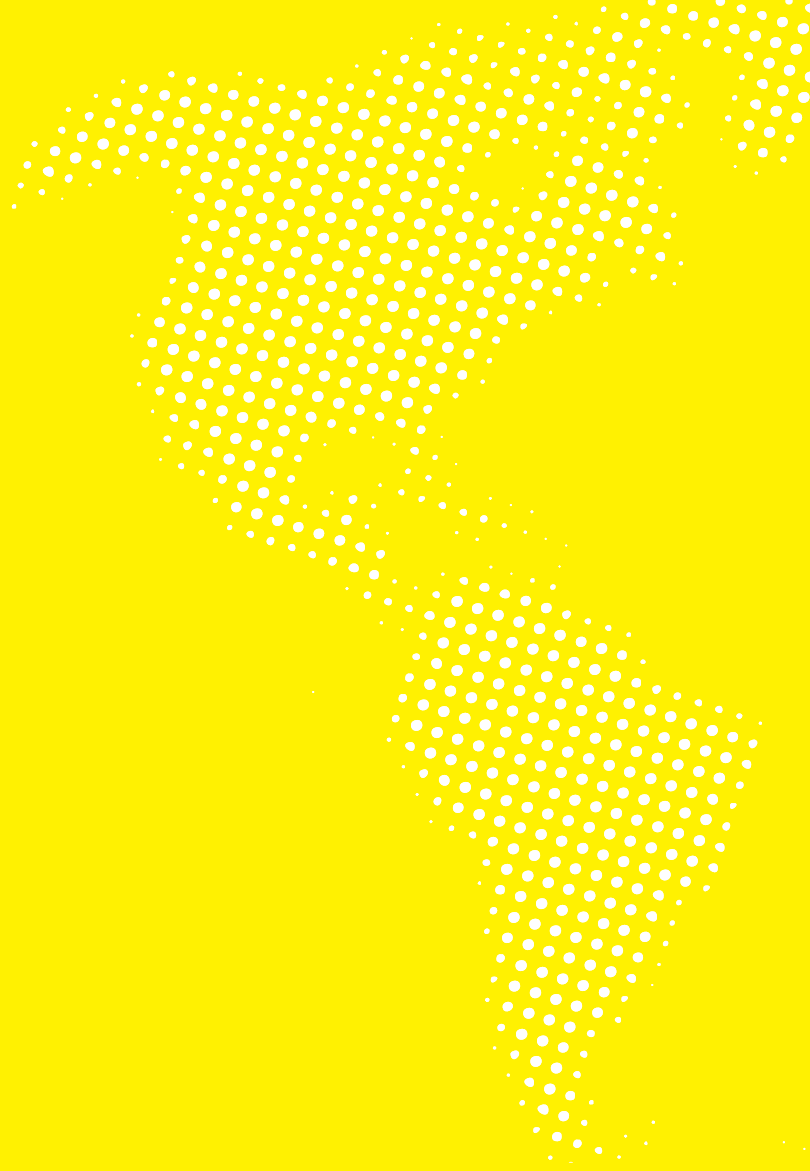
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