

From the performances acquired and the risks incurred towards the process of establishing a united, equitable and sustainable value chain

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INTRODUCTION

The introduction of artisanal brick manufacturing in Madagascar by Jean Laborde, then Consul of France, in 1837, brought new perspectives in terms of housing not only to compensate for the untimely destruction of forest resources then necessary for construction but also to improve the well-being of the ruling class and wealthy households but also of the population in general in terms of housing in the sense that if the first cities had, in principle, the prerogative of bricks obtained after firing, the majority of Residents were entitled to mud brick constructions which could better help them cope with climatic hazards.

This initiative, in terms of brick manufacturing, was favored by the existence in the country, especially in the Highlands, of clay deposits (Antananarivo and its outskirts, Ambatolampy, Ambositra and other regions). The framework conditions, including environmental and socio-economic, were met for Antananarivo given the existence of the Betsimitatatra plain which saw its rice fields abandoned following the difficulties linked to water control in certain parts of the locality. Over time, following the demographic explosion in Antananarivo and its surroundings, the needs created in terms of construction and by causality the increase in related craftsmen, the downside of the promotion of brickmaking was marked by colonization other clay deposits in various localities, often inappropriate as they had other uses such as rice cultivation, protection of river banks and lentic systems.

The rural communes of Ambohitrimanjaka and Ampangabe have not escaped this phenomenon in the sense that their quarries produce clay among the most highly rated in the Analamanga region in terms of quality necessary for the manufacture of rich red bricks. Made of iron oxide or so-called white bricks rich in kaolinite.

The question that then arises is to know to what extent the manufacture of bricks in these localities can generate tangible economic benefits for the direct producers and their associates as well as for the respective population of the municipalities concerned, within the framework of decentralization, while respecting the environment of the environments taken into consideration?

The hypotheses formulated here take existing facts into consideration while representing them in advance and providing adequate explanations in the sense that they may not be directly controllable. Indeed, these circumstances can be correlated with various variables relating, among other things, to the manner of behavior of the different actors relating to the community and institutional environment as well as to the socio-economic, environmental and socio-cultural realities in which they operate. This is how we set the following two basic hypotheses:

- Hypothesis 1: "The manufacture of artisanal bricks benefits direct producers as well as the actors directly involved and generates socio-economic benefits for the respective population of the CRs concerned";
- Hypothesis 2: "Consultation and voluntary adoption of Soil Defense and Restoration (DRS) and the introduction of improved brick production techniques within the framework of the community social system, contributes to the socio-economic valorization of the activity ".

Taking into consideration the problem and these two hypotheses, the specific objectives identified are formulated as follows:

- Guarantee the integration of the brickworks, as a promising speculation, into an efficient and sustainable integrated development system;

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- Ensure the implementation of an effective strategy for a reorientation of the value chain relating to the manufacture of artisanal bricks.

Two results are expected:

- The production of artisanal bricks will contribute to socio-economic development - taken in the broad sense - at the level of the municipalities concerned;
- The manufacture of artisanal bricks will generate a united, equitable and sustainable value chain by addressing the risks involved.

MATERIALS AND METHODS

1.1. Study areas

The municipalities concerned are those of Ambohitrimanjaka and Ampangabe which, on the decentralized level, are an integral part of the Analamanga region and, on the deconcentrated level, of the Ambohidratrimo district.

The commune of Ambohitrimanjaka is made up of 25 fokontany. It is located between latitude 18° 52' South and longitude 47° 26' East -, 12 km west of Antananarivo taking the RN 4, passing the RN 58A, and provincial road 29. It covers an area of 21,765 km².

The commune of Ampangabe, for its part, is made up of 15 fokontany. It is located between latitude 19° 07' South and longitude 47° 31' East -, 17 km west of Antananarivo using the RN 4 and provincial road 29 and 5 km northwest of the commune of Ambohitrimanjaka. It covers an area of 92 km².

The physical environment plays a determining role in that it is favorable in its various aspects to the artisanal production of bricks.

The commune of Ambohitrimanjaka is located at an altitude of 1249 m while that of Ampamanga is located at 1343 m.

Hydrologically, the commune of Ambohitrimanjaka is crossed by the Ikopa river to the east and its tributary Sisaony to the south while that of Ampangabe is crossed by the first two respectively on the northern and northeastern borders. The Andromba River, for its part, is in its western part. It should be noted that the Ikopa allows the irrigation of rice fields in the rainy season and the manufacture of bricks in the off-season following its drying up.

The two municipalities benefit from a humid tropical climate at altitude characterized by a relatively marked dry and cool season (southern winter: May to October) following a hot and humid season (southern summer: November to April). Average monthly temperatures vary between 16 and 25°C in January-February and between 10 and 20°C in June-July.

The average annual rainfall is around 1150 mm, but the rains are especially frequent and intense from December to February: 210 to 310 mm/month with 15 to 20 rainy days/month while the months of June to August are very dry: 4 mm/month with approximately 4 rainy days/month. It should be noted that the annual rainfall was close to 1,400 mm in the 1980s. In exposed areas, the period of soil water deficit generally extends from May to November (Marie d'Arifat et al. Oct. 2019).

On the pedological level,

On a human level, taking into consideration the results of the RGPH-3 of 2018 conducted by Instat, sociodemography holds a primordial place. The population at the level of the commune of Ambohitrimanjaka amounts to 41,601 inhabitants while that of Ampangabe amounts to 13,466 inhabitants. Women are the majority at the level of the CR of Ambohitrimanjaka with 51% while for the CR of Ampangabe, it only represents 49% of the inhabitants. This can be explained by the existence of a migratory flow towards this locality, new arrivals looking for work either in rice farming or in the brickmaking industry. Female heads of household are 18.8% for the CR of Ambohitrimanjaka and 13.6% for Ampangabe. The average household size is 4 for the first municipality and 4.2 for the second.

Collecte des données

Apart from the pre-survey which was based on bibliographic research and participant observation, the data collection was based on a dynamic of ensuring consistency in the conduct of the directive survey of a strictly quantitative nature for the needs of statistical analysis on the one hand as well as the Semi-Structured Interview

(ISS), the Accelerated Participatory Research Method (MARP) and focus groups often of a qualitative nature, although quantitative parameters can also be obtained and verified, on the other hand.

As part of the study, the sampling levels are as follows:

- Municipality: 100%, i.e. that of Ambohitrimanjaka and Ampangabe;
- Fokontany: 100% of municipalities concerned for socio-economic data in general and to obtain the opinion of households on the impacts of brick manufacturing;
- Fokontany close to operating areas.

In terms of sampling, we took into consideration the results of participatory social categorization in the choice of households to survey, taking into account their respective profiles. Thus, 30% of the households concerned, according to their category, were respectively selected in the 2 localities (standard sampling rate)

For the result entitled “The production of artisanal bricks will contribute to socio-economic development – taken in the broad sense – at the level of the municipalities concerned”, the variables taken into consideration are:

- The typology of brickmakers in correlation with the participatory social category: Well-off brickmakers who are owners for Ambohitrimanjaka but also for Ampangabe (80%), medium-sized ones working in rental or sharecropping (20%);
- The quality of the bricks produced: 50% red bricks and 50% white kaolinite-based bricks produced;
- Monthly brick production by type of brickmaker 1000 to 5000 for 13%, 5000/10000 for 60%, 20% 10000/20000, + 20000 for 7%. These figures are multiplied in our study to the production period lasting from May to October at the latest.
- Although it depends on demand, the unit cost in the two municipalities only varies at limited prices including the price for red 75 Ariary and 80 Ariary for “white”;
- Contributions of brickmakers in municipal development: Contributions of bricks for the construction of schools and other constructions of public interest depending on the type of brickmaker;
- Status of rebates for each municipality: There is no economic barrier which should make it possible to measure the contribution of transporters to municipal development;
- Impacts of brick manufacturing on the environment: on the structure of the soil, on the banks and watercourses, on aquatic fauna, on the irrigation of rice fields;
- Impacts of brick manufacturing on a socio-cultural level: in the two municipalities, around 25% of the population have problems in terms of respiratory disease (Acute Respiratory Infection -ARI-; however, this situation can also be due to climate change and related diseases. Those far from clay mining areas are the least affected by respiratory diseases.

These are the relative steps:

- The mode of production: from the production of clay, from its transformation to cooking;
- The marketing method: on site and in warehouse;
- The mode of transport : types and ownership of means of transport, cost of transport by truck, van, cart and canoe, taking into consideration the space-time during a day of full activity for the “origin- destination ”.

From these different points, the strengths and weaknesses of the value chain are highlighted through their causal relationships using the problem tree and the objective tree in accordance with MARP.

In terms of data processing, this involves the establishment of a processing framework and the processing of data taking into consideration the coding system already pre-established by section and by question for the directed survey intended for processing. computer science.

RESULTATS

For data entry, statistical processing identification (EXCEL) was carried out. This made it possible to complete data entry according to each section corresponding to a file.

For the data analysis, we proceeded to determine the possibilities of interaction between the variables included in each section as well as between the sections. This was carried out by a mode of crossing these variables and/or files represented on a respective data table.

This process made it possible to focus on favorable and negative opinions. It should be noted that the analysis of the comments received effectively leads to defining the links between the identified variables as well as their systemic relationships.

In the conduct of our research, we encountered restrictions relating to the administration of the survey tools with regard to certain misunderstandings regarding certain personalities of the fokontany.

Indeed, the widespread use of brick began in the 19th century, quickly becoming the distinctive element of Highland architecture. It was integrated into the construction of various elements of the dwelling such as walls, pillars, gables, lintels, window frames, porches, arches, and many others.

Although brick is omnipresent in the surrounding countryside, particularly in the Ambohitrimanjaka Ampangabe areas, its use is mainly dictated by urban demand. Thus, brick kilns are concentrated near towns and along communication routes, leading to growing problems of competition with areas devoted to rice fields.

It is a fact that the profession of brickmaker is essentially seasonal. Farmers rent their rice fields to brickmakers during the off-peak period. To avoid and prevent excessive soil depletion, all stakeholders involved are aware that clay should be extracted to a depth of approximately one meter. However, its extraction remains very rudimentary. The yield varies relatively little: we generally obtain 80% well-fired bricks, 15% over-fired or under-fired bricks and 5% losses.

The exploitation of river banks for the production of fired bricks constitutes one of the major factors in bank degradation. This activity is still booming today. It provides substantial income due to its economic profitability (the resources used are almost free) but also an environment favored by the very high price of cement and very strong demand.

Overfired bricks are used as filling material in walls, poorly fired bricks are refired.

It is in this context that a restoration idea proved crucial in appropriating assistance to support the community of manufacturers and rice farmers to arrive at consolidated project ideas relating to the Reconversion of brick manufacturers terracotta and riverbank restoration.

DISCUSSIONS

Importance is given in the context of this article to the evaluation of the relevance of activities linked to the manufacture of bricks with regard to the expected impacts and its own strategic orientations. Attention paid to the orientations and modalities required to establish a program or project based on restoration principles.

It must be recognized, however, that the implementation of project ideas and strategies still remains very limited due to the lack of expertise necessary for the development of "bankable" projects. Aspects relating to compromise conditions are expected from the main stakeholders to promote both the improvement of manufacturing and the process of implementing Land Defense and Restoration (DRS) within the operating areas considered.

3.1. L'idée de participation en vue d'un compromis vis-à-vis de certaines autorités décentralisées et déconcentrées

If we have always been well received at the level of the municipality of Ambohitrimanjaka despite the overloaded responsibilities of the executive team, on the other hand at the level of the municipality of Ampangabe, we came up against a strong reluctance from the mayor who we had to go back and forth several times to get his approval. In addition, this reluctance was followed by a certain distrust that even for the consultation of the Communal Development Plan (PCD), we encountered various questions which led us to not be able to collect all the necessary data. So, we had to look for other sources of information.

At the level of the decentralized fokontany units, we were generally well received. However, the availability of the authorities concerned was limited due to the various responsibilities incumbent upon them that we had to find time (meeting outside of their working hours among others) to administer the Semi-Structured Interviews (ISS).

Inspired by the lessons learned within the framework of the initiatives taken for this article, a certain orientation will be likely to approach the entire sector by placing more importance on the notion of training and monitoring

of artisans up to the measures allowing the emergence of large, diverse markets favorable to operating conditions and above all without forgetting awareness and promotion among users.

3.2. Une concertation favorisée par l'administration des outils d'enquête

For the management of the Accelerated Participatory Research Method (MARP), holding a meeting with the members of the fokonolona was postponed at least once following uncontrollable events (e.g. death of a member of the community). Furthermore, if the ideal is to carry out the PRA at the level of a mixed group, the observation is that often vulnerable groups, including women, do not fully participate in the debates before the notables that had to be organized. additional sessions for the latter in order to give them free expression.

For the administration of the questions relating to the directive survey, although these were written to collect the most relevant data and in simple language, the ability to concentrate of the heads of household surveyed was limited after hard work. It was sometimes necessary to return more than once in order to complete the investigation either at their workplace or in the evening;

- In relations with the Decentralized Technical Services (STD), in this case the Base Health Center level II (CSB II), the collection of data on the impact of brick manufacturing on health was hampered the refusal to transmit existing data without the approval of the supervisory ministry. We had to use our communication skills to access the essentials without being able to consult the related files.

Overall, we therefore had to reorganize our planning in order to achieve the expected results.

Conclusion

It is important to note the retraining of artisan manufacturers of fired bricks in the study areas considered by promoting environmentally friendly technology. Priority would be given to the restoration and cultivation of river banks degraded by the production of fired bricks. However, the identification of the parties involved at the local or even regional level turns out to be inevitable through entering into a relationship to make the authorities aware of the environmental problem and the advantages of renewing the methods of using bricks. The advent of the institutionalization of a regulatory framework and public policies would then be expected in order to promote good practice and the use of fired brick production.

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