

THE SOCIAL IMPACT OF GRAIN GRINDING MACHINES IN BIDA METROPOLIS OF NIGER STATE NIGERIA

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Abstract

Grain grinding or milling is a size reduction exercise in which the harvested crops are completely reduced to flour or powder (dry grinding) or paste (wet grinding). Different makes and models of grinding machines are found scattered all over Bida metropolis. These machines differ in many respects such as size, power rating, capacity, operating and maintenance requirements and milling performance. Due to their ever-increasing usage and patronage, grinding or milling has become a huge industry. A study was then carried out to find out which of these mills are more popular together with their positive and negative social impacts. The findings are outlined and conclusion drawn. It is strongly recommended that encouragement should be given to the grain grinding industry.

Introduction

The role played by grain grinding machines and the people who operate them cannot be over emphasized. Onwunali (1991), defines a grain grinding machines as a machine that performs the task of reducing grain sizes for human and animal consumption, without impairing the chemical properties of the grain. Asiedu (1989), observed that nutritionally the main advantage of milling and sifting of grains is the elimination of indigestible glucose materials, which can hinder the digestion of other constituents of the diet. These grain-grinding machines are capable of completely reducing the harvested crop to flour or powder (dry grinding) or paste (wet grinding). Even though the study is limited to grain grinding. It was discovered that several other materials are ground on these machines. These include melon seeds, bambara nuts, tomatoes, pepper, etc. regardless of whether the size reduction (grinding) process is carried out to the fullest (flour) or partially that is, reducing the harvested crops merely into grits, the most common types of size reduction machines used are:

1. burr or plate mill.
2. hammer mill
3. roller or crushing mill (Mohammed, 1997).

The most common types found in use in Bida regardless of makes or models are the burr or plate mills

The research work was therefore, conducted with the following specific objectives:

1. to conduct a survey on types of grain grinding machines in use in Bida metropolis of Niger state.
2. to identify performance relationship by grain type, grinding capacity and various operating conditions.
3. to be able to identify the grinding machines that give greater performance efficiency and hence advice on the appropriate ones for enhanced productivity.
4. to be able to make recommendations on how to enhance the grinding industry.

Methodology and Data Collection Approach to the Study

.Grinding machine operations and/or owners were visited and interviewed in most of the wards in Bida. To be able to determine the performance of the various machines grinding exercise was carried out on some of the machines. The wards visited are in Bida East, Bida central, Bida South and Bida West, Semi-structured questionnaires were issued to the operators or owners to fill in addition to verbal interviews. Customers who were at hand were also interviewed.

The grinding stations were observed for location of the machine, the caliber of the operators, his or her expertise and the performance of the machines. At the end, it was discovered that the grinding or milling machines were virtually the same in construction and in the operating principles. They can only be distinguished from one another by the make of the engine or electric motor.

The most popular ones identified based on their engines or electric motors are Viking Exclusive, Steel, man, Atlas, Higgs, Newmay, Brush etc with their power ratings and rated speeds ranging between 2-7 Hp and 1420-2260 rrev/mins respectively. Some of these milling machines are powered by electric motors or diesel engines, and some are powered by both. This is a clear development over what was obtained some years back when grinding machines like Premier 1A or 2A that uses diesel were still in use. These Lister engine-powered Premier 1A and 2A were according to Mohammed (1997), merely serving as standbys in case there was power outage. These machines are now almost extinct.

Description of the Grain Grinding Machine

The grain-grinding machine comprises basically of two parts namely: the grinding machine and the prime mover, which could be either electric motor or diesel.

The grain-grinding machine (Fig. 1A) is the main unit into which the grain is poured and with the help of the size-reduction mechanism, performs the function of grinding. The electric motor m(fig. 1B) only serves as a source of power to drive the grinding machine.

Data Collection

A total of 235 questionnaires were distributed in about ten different areas of Bida. The owners/operators of these machines who were to fill the questionnaires were also interviewed.

In some areas, samples of the grains were taken to the operators to grind. This was done so as to:

1. observe the performance of the machine,
2. observe the skill of the operator,
3. analyze the ground material, and

4. to ginger the operator for cooperation.

After grinding, the products were collected and analyzed sifting the samples from the individual machines. It was discovered that there was no significant difference in the ground materials, and where there were, it was either due to any of the following:

- ✓ expertise on the part of the operator.
- ✓ Sharpness of the burr plates
- ✓ Level of dryness of the grains (dry grinding).

To observe the fineness of the ground flour, a sample is taken between two fingers (thumb and any other finger) and felt.

The customers were also interviewed, seeking to know among other things their satisfaction with ground products, the costs they are charged and what impact the level of noise from those machines do have on them.

Results and Discussion Responses to Questionnaires

Table 1 below shows questionnaire distribution and response. Out of the 235 questionnaires distributed in about ten areas in Bida metropolis, 203 responses were received. The percentage responses to questionnaires was calculated by using:

$$\% \text{ Response} = \frac{\text{No. of responses received}}{\text{No. of questionnaires Distributed per area}} \times 100$$

source (Umogbai, 1997)

Table I: Questionnaire Distribution and Response

S/No.	Area	No. of Questionnaires	Response Received	Response (%)
1	Lonchita Central market	35	33	94.3
2	Umaru majigi small market	20	15	75
3.	Banwuya	20	17	85
4	Wadata	20	15	75
5	New market banma	25	20	80
6	Makwalla-kpebegi market	30	28	93.3
7	Masaga	15	14	93.3
8.	Bangaye	20	18	90
9	TafCOWASA	25	22	88
10	Banyagi	25	21	84
	Total	235	203	86.3%

The Status of Grinding Mills in Bida Metropolis

The use of grinding machines has in no small way alleviated the hardships involved in the grinding of grains and other agricultural productions into flour or paste before usage. Almost all the machines identified are powered by electric motors, except for a few that are powered by only diesel engines. For those who can afford, the engine is powered by electric motor with the diesel engine as a stand by in case of power failure, which is a common phenomenon. A diesel engine for small grinding machines now costs between N23,000 to N26,000.

Life has tremendously improved, especially, for the jobless and the rural women. Instead of sitting idle or getting involved in crimes and for the rural woman spending the whole day on the grinding stone or pounding at the grains with a mortar and pestle, a finely ground flour is produced under a few minutes. Daily output of the machines is between 100kg and 200kg.

According to Mohammed (1997), virtually in all the areas visited in Bida, at least every ten houses could each boast of a milling machine. This has greatly improved the social status of people in Bida in the following areas:

1. it has created job opportunities for most young people and women;
2. more people have gone into training to service and repair these milling machines;
3. more local foundries are opened to locally manufacture or re-sharpen the blunt burr plates (plates are the major parts that wear easily in the milling machines).
4. more shops have opened up dealing in sale of parts of these machines, especially belts, which

cut easily.

5. more people are trained as technicians to service and repair the electric motors. Only few of the operators can repair the electric motors, but for re-coiling and re-waxing. Services of qualified technicians are needed.
6. in addition to the motor vehicles services and repairs, the mechanics have more jobs on their hands to services and repair the grinding machine engines. As a result of this, more hands are needed.
7. while evaluating grain grinding machines in Bida, Mohammed (1997), reported that the operators charge between N3:00 to N5;00 for milling one mudu (1.367kg). Today, they charge between N7:50 to N10:00 with electricity, while they charge N15:00 per mudu with diesel engines: that means more money is made:

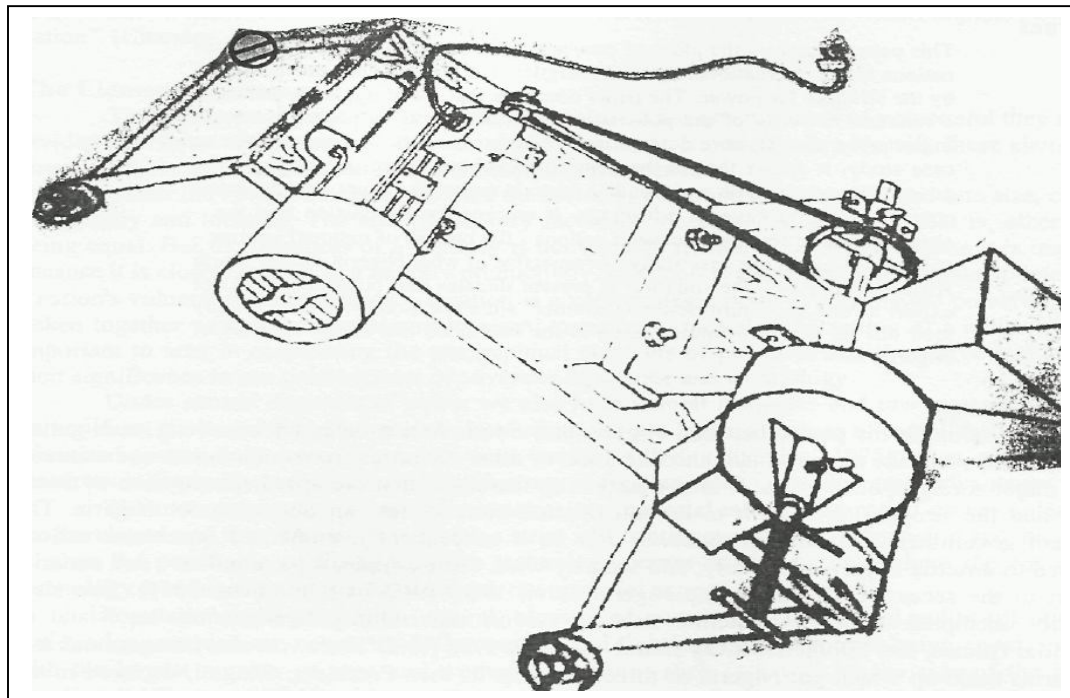
Recommendations

1. based on the positive impact on the social life, financial benefits and job opportunities involved with the use of grain grinding machines in Bida, it is strongly recommended that encouragement should be given to the grain grinding industry.
2. government and industrialists should view the possibility of providing modern foundries for casting parts of the machines (especially the burr plates) in Bida. The famous Bida Brass workers can even be involved by providing them with modern working facilities.
3. frequent disruption of electric power from PHCN is a common phenomenon in Bida, like most other towns in Nigeria. Except where there are diesel engine-powered machines, most houses would go without food. The purchase of more of the diesel engines to accompany the electric motors is recommended. Government can intervene at the importation levels so that the engines can be affordable. Small diesel engines of 5-8 Hp now cost between N23.000 to N26.000!
4. based on the disturbing and disturbing and distracting noise from the machines which are in most cases installed in high density residential areas, it is recommended that:
 - i. the possibility of relocating the machines to special areas (possibly one corner of the market) should be looked into, to reduce the noise impact in the residential areas. More electric power lines should be extended to such locations.
 - ii. Study of the audio impact on the residents and especially on the operators should be conducted
5. Workshops should be organized for the operators to educate them on the operation of the grinding machines and installation of electrical appliances.
6. Local Government should enact laws stipulating strict punishments on any operator who is found operating his/her machine without protective wear to cover his/her eyes, nose, ears etc.

Conclusion

The following conclusions were arrived at during and after the study:

1. The use of grinding machines is extremely on the increase. Ten areas were covered in Bida where 235 questionnaires were distributed. In addition to these, the deafening noise from grinding machines could still be heard from inside houses while the study was being conducted.
2. The Lister engine powered Premier 1A or 2A, which were used before in places where there is no electricity, have now become extinct. They are now replaced by machines, which are smaller, more compact and easier to operate.
3. The machine operators have a choice of either using electric motors or small diesel engines or both.
4. The grinding machines have enhanced the lives of the people.
5. Each of the grinding machines is able to produce a good quality flour or paste depending on the expertise of the operator.
6. Jobs have been provided for most people, e.g. operators, repairers and blacksmiths who fabricate the damaged parts and spare parts dealers.
7. Grinding capacity per machine per day is between 110 to 140kg, which greatly makes the job of grinding a lot easier. I. T. Publications (1994), reported that with grinding stones, the grinding rates are very limited usually less than 0.5kg per hour.
8. The deafening noise from these machines can constitute a public disturbance and a health hazard.
9. Most of the grinding machines are located in residential houses as a result of tradition, inadequate space and inadequate electric power cable connections in the market areas. For example, it could be observed that about 4 to 6 machines are connected to one electric meter. This scenario sometimes results in quarrels in payment of PHCN bills by the owners of the machines. In addition to this, direct connections are made instead of using wall plugs distribution sockets. The electric cables also are in most cases exposed.



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