



Solving Sociological Problems with Qualitative Tools: Options from Perceived Environmental and Health Effects of Charcoal Production among Selected Agro-Ecological Zones of Nigeria

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Authors' contributions

This work was carried out in collaboration between both authors. Author POE designed the study, performed the methodology, wrote the protocol and wrote the first draft of the manuscript. Author SOO managed the analyses of the study and the literature searches. Both authors read and approved the final manuscript.

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ABSTRACT

Aims: The study discussed some basic participatory tools using a contemporary issue of the perceived environmental and health effects of charcoal production on the studied groups.

Study Design: The study made use of survey.

Methodology: The use of quantitative tools in analyzing social problems has been creating imbalance and arguments in some quarters of knowledge.

Results: The study find out that charcoal production was a major livelihood activity of respondents in the study area since high income were generated from the activities as a result of low level of education. Data on various issues of involvement, production, quantity, environmental and health effects, flow and distribution of charcoal in Nigeria are not sufficiently available and these have had adverse effects on the various development plans for the energy sector in particular and the country in general. Ranking can be undertaken with the key informants or groups of villages that represent a good mixture of interest. It can also be conducted based on gender to determine different preferences between men and women.

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1. INTRODUCTION

The use of quantitative tools in analyzing social problems has been creating imbalance and arguments in some quarters of knowledge. Therefore, the use of qualitative tools which does not work at any degree of freedom or level of significant before an inference could be drawn are better ways of solving social problems. This involves the collection of narrative data in a natural settings (a variable that cannot be manipulated) in order to gain insights into phenomena of interest [1]. This means that the researcher investigate on nature without imposing their assumption, limitation and delimitation of the research design upon emerging data. Researchers therefore, record what they observe from the subject in their natural environment. Qualitative tools are good in obtaining culturally specific information about the values, opinions, behaviours and social divergence of a population [2].

In the time past, rural dwellers only used the stumps and twigs collected from agricultural lands to produce little charcoal they could use in their households [3]. Within the last two decades, charcoal production has taken a new dimension, with increase in the number of producers and the quantity produced. In Nigeria, the need for rural energy development has been on the increase in the last two decades [4]. Rural energy systems have been affected by charcoal production as a result of several factors such as population, increased poverty, unemployment, urban-rural migration, high cost of petroleum products and inadequate data. Data on various issues of involvement, production, quantity, environmental and health effects, flow and distribution of charcoal in Nigeria are not sufficiently available and these have had adverse effects on the various development plans for the energy sector in particular and the country in general [5-8].

Despite the laws promulgated by the Federal Government prohibiting illicit felling of these trees, charcoal producers keep increasing with an increase in the quantity of charcoal produced. Charcoal production is very prominent in Oyo, Osun, Kwara, Benue, Kogi, Ogun and Niger States of Nigeria where the vegetations (forests, derived and guinea belts) support its production [9-11].

Forests are decimated, economic trees that ought to be preserved are felled for charcoal

production and farm lands are used excessively without considering its future implications on the environment and health of the producers. Many people suffer from one ailment or the other ranging from acute to chronic diseases as a result of their involvement in charcoal production [12]. This creates serious concern for health, agricultural production, environmental sustainability and food security in the near future.

It should be noted that to solve the problems highlighted by this study, hypotheses were formed and tested which gave the rule for the use quantitative data [9,10]. However, for the study to have a direction in the quarters of knowledge, more qualitative tools were used.

This write-up discussed some basic participatory tools using a contemporary issue of the perceived environmental and health effects of charcoal production on the studied groups.

1. In-depth Interview: They were used for collecting data on individual personal histories, experiences and perspectives particularly when sensitive topics are being explored. It allows a single individual the time and freedom to explore issues at length. In this study, key important personalities (such the emir, chief, leaders of charcoal producers, government agents) were met in order to get in-depth knowledge about various issues (indiscriminate felling of trees for charcoal production,) on charcoal production in Lapai community. The following were the questions asked from the key informant:

1. What year did charcoal production start in your community?
2. Mention the types of trees that were available before and after charcoal production started
3. Is there any presence of any law enforcement agents guiding charcoal production?
4. State your involvement in charcoal production activities_____

Responses were summarized and reported in the study. For instance, several species of trees have gone into extinction which they listed. The chief and the leaders of charcoal production involved in the collection of money from charcoal

producers for community development. This they reported had started more than two decades ago.

2. Focus Group Discussion: This was effective in producing data on the cultural norms of the group and in generating broad overviews of issues of concern to the cultural groups or subgroup represented. The groups were rarely more than fifteen in number. The participants were selected because they have homogenous characteristics in the topic of charcoal production. This provides the ground the ability to tap into human tendencies to yield qualitative data that provide insights into attitudes, perceptions, feelings, manner of thinking and opinion of participants on their perception on environmental and health effects of charcoal production. Open-ended questions were asked using this seven terms- what, why, who, when, where, how and much. An example of open-ended question is stated below.

- Why are you involved in charcoal production?

Response:

“.....Since we cannot wait till the harvest period before we spend money, we have to try charcoal production which will give us quick income to feed our homes.....”

3. Key Informant Interview: This involved the selection of knowledgeable persons or households in a community and formally and informally discussing the subject of charcoal production. The key informants were village heads, chairpersons of charcoal producers, women leader, youth leader, religion leader, chief priest, etc. The interview was guided by a schedule ensuring that nothing was left out and it was also cross checked through group discussions and interviews with other people. However, during the process, answers to a question led to new issues but the interviewer redirected the conversation at each point.

4. Problem Tree Analysis: This showed the analysis of the problems of the people as identified by them in their community. This was itemized in three phases namely: fruits/leaves (effect of the problem), trunk (the problem itself) and root (causes of the

problem). It should be noted that problem tree analysis could be derived from Focus Group Discussion (FGD). Thus, the outcome of FGD could be better explained using a problem tree.

Olawoye [13] describes problem-tree as a participatory tool that enables the participants to understand effects of a problem in terms of the causes and thereby proffer solutions or activities to overcome the problem by tackling the root of the problem.

For example, the people of Lapai community in Niger State were faced with the problem of high level of perceived environmental and health effects of charcoal production.

Fig. 1 illustrates the composite of the results from this exercise with several groups. The ‘Problem’ given to the participants of the analysis was “high level of perceived environmental and health effects of charcoal production”. Participants were asked to give causes of high level of perceived environmental and health effects of charcoal production as the ‘roots’ of the problem and consequences (effects) of these conditions as the ‘leaves’ of the ‘tree’. The participants viewed low rainfall, extinction of some trees and animal species, loss of nutrient, desert encroachment, high cost of building woods, reduced production, deforestation, unstable rainfall pattern, increased environmental temperature, loss of soil nutrients and human diseases as effects of conditions, while high rate of trees cutting, saw millers operations, fetching of woodfuel, corruption of officials, high rate of charcoal production, illiteracy, lack of law enforcement, unemployment and poverty as the root cause of the problem.

This implies that the more the root cause of this problem is not given serious consideration, the greater the manifestation of its effects on the environment as well as human existence.

The study find out that charcoal production was a major livelihood activity of respondents in the study area since high income were generated from the activities as a result of low level of education.. This activity had resulted into cutting of trees which consequently led to deforestation, environmental degradation and also posed health challenges to the rural dwellers. The perceived environmental effects of charcoal production were more pronounced in the guinea and derived savannah zones. Such effects include deforestation, erosion, flooding, land

degradation, reduction in the number of trees for future use and extinction of trees species. Health of charcoal producers may also be worsening if they continue to produce charcoal especially with the use of crude methods [14].

Recommendations emanated from the study were;

1. Provision of cottage industries that will reduce unemployment and total dependence on the forest.
2. Environmental extension and charcoal extension education should be promoted among rural dwellers so as to protect the environment.
3. Community policing should be promoted so as to check the menace of foresters. Other livelihood activities which are environmentally friendly such as bee-keeping, fishery and snailery, among others, should be promoted among rural dwellers.
4. Charcoal is a major product of means of livelihood. Hence there is need for natural resources management measures through enforcement of the laws that regulate the use of forest resources. Such as laws that will recommend selective/controlled felling of trees.
5. In view of the health and environmental hazards as well as huge benefit accrued from charcoal production by the rural dwellers, there is an urgent need to introduce and enforce the use of improved methods of charcoal production that are environmentally friendly. For example, the use of Adams retort method of charcoal production should be promoted among charcoal producers. Considering the importance of charcoal production to the economy of the nation as well as to the producers, tree plantation should be embarked upon by the three tiers of government.
6. An active commission should be set up which could be tagged "Tree Replacement Commission of Nigeria". Charcoal producers should be encouraged and forced to participate in the replacement of trees. There should be regular supply of tree seedlings to the rural dwellers.
7. There is need for the government to work on other available and affordable alternative household energy sources such as kerosene, solar energy, gas, and uninterrupted electricity.
8. Regular training programmes and workshop should be organised for rural dwellers on proper management of the forest and its future implications on the environment and human lives. This will enhance persons' participation in forest management.

5. Diagramming and Mapping

These include models or visual out prints made on cardboard sheets or bare ground which represent information in easily understandable form. Participatory mapping is one of the most versatile tools in generating pictures on any aspect of physical reality. These are;

- (i) **Community sketch map:** It is a spatial representation of the community understudied and it provides a reference point within which the data were collected on charcoal production, analysed and suggested remedies in form of future planning took place. It showed the micro-zones and natural resources in the village as well as disparities in wealth and access to natural resources. Map making was the first step used in participatory research of charcoal production as it arouses the interest and response of the community members.
- (ii) **Social map:** - This indicated spatial distribution of roads, forests, water resources, institutions. It identified households, their ethnic composition, caste areas, new and old settlement, etc.

Example of community mapping showing features in the study area: From Fig. 2, the features available in Lapai community were included in the map. Although charcoal production was an organised activity, the producers had meeting centres where they discuss various issues affecting them. One of the institutions which may still influence them is the banking industry where they can save money and gain access to loans. Very close to the community were charcoal production centres. As they produce charcoal, various substances are released into the atmosphere which affects both the environment and human health. The more such activity continues, the greater the effects. Felling of trees and proximity of charcoal production centres to the residential areas is a way of polluting the latter's air, land and water.

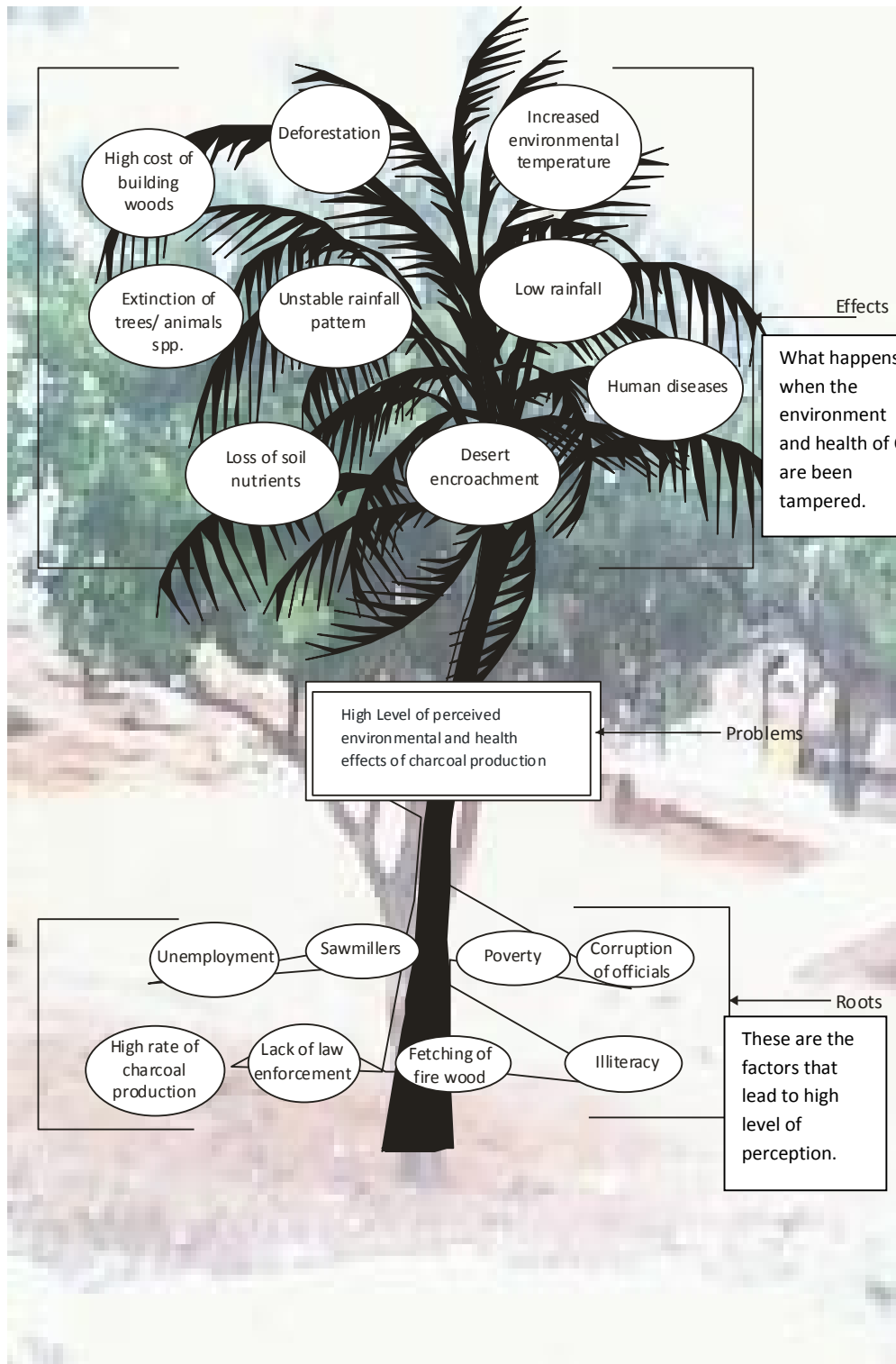


Fig. 1. Model showing problem tree analysis result from groups of charcoal producers in Lapai community of Niger State

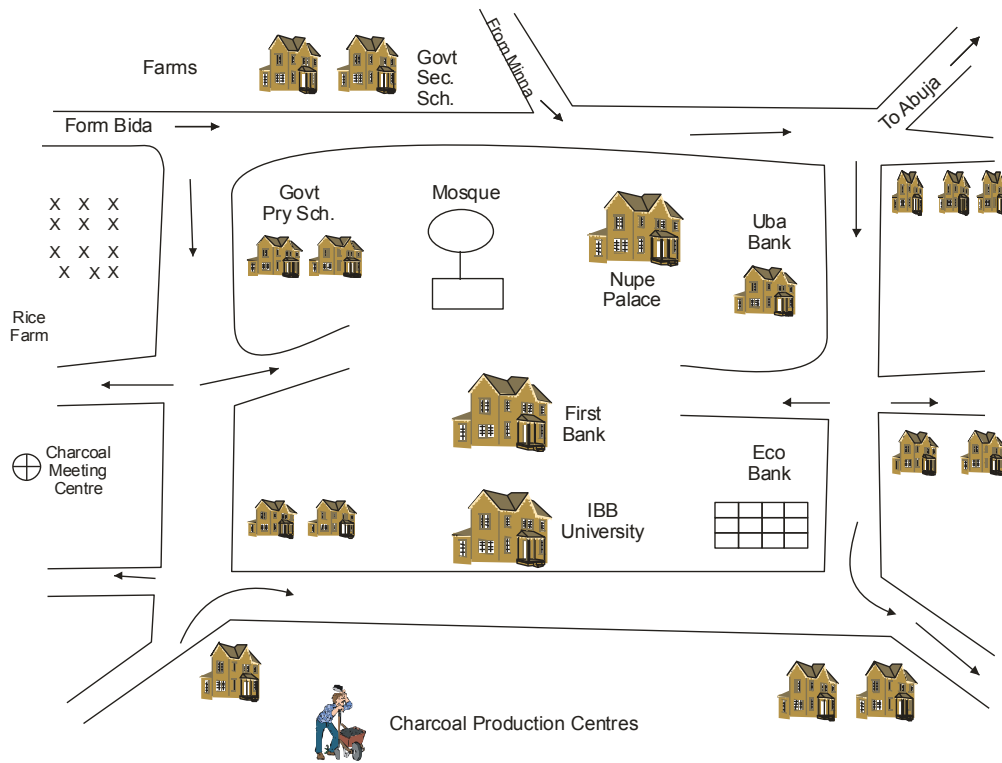


Fig. 2. Community mapping showing features in Lapai, Niger State (Guinea Savannah Zone)

6. Paired needs ranking with Charcoal producers

The next step taken after problem tree analysis is Pair needs (wise) ranking of the problem of the people as identified on the tree. It is used in identifying/prioritizing the people’s problems, needs or action. Ranking can be undertaken with the key informants or groups of villages that represent a good mixture of interest. It can also be conducted based on gender to determine different preferences between men and women. For example: Ago–are community (derived savannah) needs are prioritized as stated below:

List of needs	Electricity	Water	Road	Capital	Health centres	Farm input	Position	Ranking
Electricity	X	Electricity	Road	Electricity	Electricity	Electricity	4	2 nd
Water		X	Road	Water	Water	Water	3	3 rd
Road			X	Road	Road	Road	5	1 st
Capital				X	Capital	Farm input	1	5 th
Health centres					X	Farm input	0	-
Farm input						X	2	4 th

Fig. 3. Paired needs ranking with charcoal producers in Ago-Are (Derived savannah)
 Road=1st, Electricity=2nd, Water=3rd, Farm inputs=4th, Capital=5th, Health centres = 6th

From the group interviewed in the derived savannah zone, six needs were stated (Fig. 3). They are electricity, water, road, capital, health centres and farm inputs. Based on priority needs of the group, Road=5→1st, Electricity=4→2nd, Water=3→3rd, Farm inputs=2→4th, Capital=1→5th. This implies that the group (representing the community) needs good roads as a matter of urgency, followed by electricity, water, farm inputs and capital for the expansion

of their business. This shows that lack of adequate infrastructure that can enhance persons’ livelihood are factors that encouraged them to continue charcoal production. Therefore anything outside this list will not address the need of the community as desired.

NB: if two of the needs tallies, ask them to choose between the two and re-check.

When to use Qualitative Research Method:

Qualitative research is often applicable in the following situations;

- When finding out people's perceptions of issues, programme or product
- When identifying strengths and weaknesses of a programme or event
- When understanding people's decision dynamics
- When developing or evaluating programme.
- When investigating current or potential product/services or activities
- When new idea is to be developed
- When identifying new uses of current products
- When accessing the usability of website or interactive services
- When processing or analysing body of works or ideas which have developed over time

Advantages of Qualitative Research Method:

1. It enhances interaction and intimacy among respondents as they build on each other's comments and ideas.
2. It gives room for probing; permits participants to respond in their own words rather than forcing them to choose from fixed responses as found in quantitative method.
3. The dynamism of the group discussion or interview process which makes respondents to participate more actively than is made possible in more structured survey.
4. It provides the opportunity to observe record and interpret non-verbal communication (e.g. gestures, body language and voice intonation) as part of respondent's feedback which is of great importance during interview and data analysis.
5. It has the strength of understanding of the social world with its complexity, multidimensional nature i.e. context, diversity and processes [15,16].

NB: Each method (participatory tool) is particularly suitable for obtaining a specific type of data.

2. CONCLUSION

Data on various issues of involvement, production, quantity, environmental and health

effects, flow and distribution of charcoal in Nigeria are not sufficiently available and these have had adverse effects on the various development plans for the energy sector in particular and the country in general. Ranking can be undertaken with the key informants or groups of villages that represent a good mixture of interest. It can also be conducted based on gender to determine different preferences between men and women.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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