

**DETERMINING FACTORS INFLUENCING LOW CEREALS PRODUCTION IN
CENTRAL REGION OF MOZAMBIQUE**

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ABSTRACT

Mozambique though it has good soils and good climate for agriculture, the country's population still experience hunger and starvation. The problem addressed in this article is that of low cereal production in Central Region of Mozambique. There is a persistent low level production of cereal causing starvation, despite favourable climatic conditions and good breeding ground for the production of cereals. The purpose of this article was to investigate the main factors that cause the low production of cereals in the central region of Mozambique so as to find solutions to the problem. The study was undertaken from 2010 to 2013 and used the paradigm of qualitative research. Data were generated using interviews, field observation, document analysis, questionnaires and focus group discussion Data were analyzed using content analysis. The study found out that cereal production in the central region of Mozambique is very low due to interrelated factors that include lack of new or modern cultivation techniques such as irrigation, use of high yielding varieties of seeds and use of mechanical power for planting cereals on a large scale. Therefore these are considered as determinants of cereal high production. Thus, it can be concluded that the production of cereals in central region of Mozambique is low due to lack of use of new technologies, lack of quality seeds, lack of funding for this sector by government and under-utilization of mechanical resources as most of the works are done manually.

KEYWORDS: Cereals, Food Security, Agricultural Technologies, Hybrid Seeds.

BACKGROUND TO THE STUDY

Debates on hunger and starvation have been in the global village for a long time. Mozambique has not been spared from this debate. The debate has been intensive in Mozambique mainly because the country has good soils and climate for cereals growth although it is experiencing hunger and starvation. This article focuses on the factors that contribute to low crop production in central region of Mozambique. It also focuses on the reasons why there is problem of acute shortage of food in this area, despite the presence of

abundant natural resources for cereal production. Therefore, it is not possible to talk about the agricultural process without focusing on the concept of production. This means that the concept of production and agriculture are inseparable terms. "Production is a process that involves the coordination of work, business and finance"(Santos, 2006, p.2) in various ways and in various forms, such as raw materials, products already processed, all equipment types, plants, technology, workforce, knowledge management, with the objective or purpose of producing agricultural products that are needed by many consumers. (Samuleson, 2010 p. 110) says "The factors of production are constituted by land, labour and capital" All these factors culminate in agricultural production of all types. Farmers can control and stimulate these processes in order to produce food and other goods for human consumption.

For this type of productive activity, farmers need land, and be provided with a series of productive resources such as agriculture technical expertise, seed, animal reproduction, labour, tools, and machinery. This will allow the maximization of agricultural production to ensure food security and reducing hunger. (Santos, 2006, pp. 2-3) says that the main task of the farmer is the production of food and other products that people need to survive. Agriculture has always had and played a key and important role in wealth creation worldwide. Being the staple food for an extensive group of companies, cereals are an important food group in terms of energy supply. In energy terms, the majority of the world population, mainly in Asian countries the grain contributes approximately 80% of the human diet (Gergoletti, 2008).

Despite advances in biotechnology and other related technologies, world grain production has grown slowly since 1984 (Capobiano, 2006). These nutritious grains are corn, wheat, rice, barley, sorghum, wheat, rye, and oats. (Scolari, 1997 p.4) indicates that the most important grains are mainly rice, wheat, corn, rye, maize and sorghum. They occupy a large area for cultivation, and they represent 66% of the amount of food produced around the world. Therefore, the concept of food security has been taken as the right to food and considered a human right. Angels & Hirai (2007) and Almeda (2008) reinforce that man has the right to have food and not suffer from malnutrition. However, the reality is that hunger remains a global calamity despite all the technological and scientific advancement that allows for abundant food production, "Even today there are 816 million people, distributed in all corners of the world suffering in terms of food insecurity" (Angels & Hirai, 2007 p.33).

Problem

There is availability of land for the practice of agriculture in Mozambique. There are about 36 million hectares (Hanlon, 2011), of which, over 10 million is arable land with good soils and climate. The central region of Mozambique has 5 million hectares (Siteo, 2005) being used for the practice of agriculture. From this, only 3.3 million hectares could be irrigated, but only 50,000 hectares is being irrigated. This irrigated land is equivalent to 0.13% of arable land (CEMO, 2011). With these data, we conclude that there are sufficient natural resources in Mozambique, in terms of agricultural land for the production of important cereals, such as maize, rice and sorghum.

In Mozambique, it is considered that the basic economic activity is predominantly subsistence agriculture. The central region of Mozambique remains the poorest region in the country, with shortages of basic foods due to low rates of production of cereals, or the implied lack of update capability of the region and the abundance of underutilized persistent resources available in this part of the country.

It is therefore a curious paradox that, despite abundant agricultural land ideal for cereals, there are high rates of hunger, poverty and food insecurity. It has been observed that since 1996, the production of cereals has been declining at an alarming rate, which is worrying for the people of Mozambique and certainly is the phenomenon which caused the study reported in this article.

The purpose for the study

The aim of this study was to examine the underlying factors for the low cereal production in central region of Mozambique in order to increase production and alleviate if not completely eradicate poverty in this region of the country.

Research questions

What are the main factors that affect cereal production in Central Region of Mozambique?

How do the government and other organizations fund the production of cereals in the districts of Central Region of Mozambique?

What are the types of technologies used in the production of cereals in the district of Central Region of Mozambique?

RESEARCH METHODOLOGY

A paradigm is essentially a worldview, a whole framework of beliefs, values and methods within which research takes place. According to (Cresswell, 1994. p. 15) “a qualitative study is defined as an inquiry process of understanding a social or human problem, based on building a complex, holistic picture, formed with words, reporting detailed views of informants, and conducted in a natural setting.” Qualitative research was used in this study because it comprises a set of different interpretive techniques aiming at describing and unfolding components of a complex system of meanings. It aims at translating and expressing the sense of the phenomena of the social world, thus reducing the distance between the indicator and the indicated, or between theory and data or between context and action.

According to (Hammersley, 1992) qualitative researchers share a set of preferences which are:

- A preference for naturally occurring data, that is, observation rather than experiment, unstructured versus structured interviews.

-“A preference for meanings rather than behaviour, that is, attempting to document the world from the point of view of the people studied. “(Hammersley, 1992, p. 165) a preference for inductive hypothesis that is, generating research rather than hypothesis testing.

Therefore qualitative method was used for this research since the research was based on the way people experience social phenomena of cereal production in the real world in which they live, with particular focus on how they produce cereals. Thus, qualitative research enabled the researcher to come up with a “deeper” understanding of social phenomena than would be obtained from quantitative data. Though qualitative research downplays or avoids the use of quantitative instruments, numbers and other phenomenon that arise in research need to be measured thus quantitative instruments had to be used in this research; for example, the number of farmers who produce wheat, or rice or maize and quantities and numerical values of significant data, that needed to be recorded quantitatively.

The method used in this study qualitatively resembles the interpretation of phenomena that are used every day, which have the same kind of data that the researcher employed in this research. (Godoy,1995) explains some key characteristics of a qualitative study. He assets that qualitative research "considers the environment as a direct source of data, and the researcher, as a key instrument having a descriptive character; the process is the main focus of approach and not the result or a product; where data analysis is performed intuitively and inductively by the researcher”(p. 58). Thus, according to Godoy (1995, p.58) qualitative research does not attempt to enumerate and/or measure the events studied, nor employ instrumental statistical data analysis; it involves obtaining descriptive data about people,

places and interactive processes by direct contact with the researcher who studies the situation, trying to understand the phenomena from the perspective of the subjects, that is, the situation of the participants in the study.

RESEARCH DESIGN

A research design is an architectural blueprint; a plan for assembling, organizing, and integrating information (data), and its results in a specific end product (research findings). The research design used in this research was the case study design. Gil (1994 cited by Revillion, 2000, p.7), says a case study is characterized by profound and exhaustive study of one or a few objects, in order to allow broad and detailed knowledge of the same. A case study allows for greater understanding of complex and systemic problems by studying the dynamics and interaction of multiple factors, from a few specific situations. However, in some case studies, generalization of the observations may not be possible especially where the case may not represent the mean of a population. A case study examines a phenomenon in its natural environment by applying various methods of data generation in order to obtain information from one or more entities. In addition, the study's results depend heavily on the integrative power of the researcher, of his skill in site selection and methods of data generation, as well as the researcher's ability to make changes in the design of research in a timely manner.

According to Yin (1994, p. 2) "the case study proposes to investigate a contemporary phenomenon, where the boundaries between the phenomenon and its context are not clearly perceived. Its utility is to assist in the development or improvement of theories. Empirical evidence should generate feedback to the unknown and enable analytical generalization where possible."

In this research therefore, individual farmers, and government officials were interviewed through the use of various instruments to draw out deep meanings of the current and future cereal production prospects in central region of Mozambique.

Robson (1993, p. 40) defines case study as the development of detailed, intensive knowledge about a single "case", or a small number of related "cases." The case study approach also has considerable ability to generate answers to the questions, 'Why?' 'What?' and 'How?' (Robson, 1993, p. 44) and these were common questions in this research on why certain production methods were preferred, what was produced and how the cereals were produced.

Low cereal production poses a social problem of hunger which culminates into poverty that plagues the central region of Mozambique. Hence some ways to increase cereal production in the central region would undoubtedly benefit the people of this area. This research's goal was to make a thorough investigation on the perception of the farmers or their associations for the reasons why there is low cereal production while biophysical conditions are suitable for more quantities of cereals to be produced in central region of Mozambique. The next section describes the process followed to generate the data for this study.

Population

The population for this study included the peasants or small, medium and large agricultural farmers of central region of Mozambique, officials from the Ministry of Agriculture, cereal traders and elders living in the research areas. In addition, the population included economic agents, district officers from the government departments, agricultural associations, non-governmental organizations, transporters and the general public who are the consumers of the cereals. These constitute the key stakeholders in the production of cereals. In this region, different cereals such as maize, sorghum, millet and rice are produced and distributed through various categories of grain merchants, while the consumers who benefit from this process are mainly the general public. It is critical to note that there is always food crisis in those regions which are very close to the central region of Mozambique. For this research, data were generated from a heterogeneous population that represents the country's population that is practising agriculture in this region.

Sample and Sampling Procedure

The central region of Mozambique has four major provinces namely, Zambezia, Sofala, Manica and Tete. One district experiencing low cereal production in each province with agricultural potential was purposively selected. Thus, for Zambezia province Namacura district was selected, Gorongosa district was selected in Sofala province, Gondola District for Manica province and from Tete province Angonia district was selected. Cereal producers and consumers were then selected using the simple random sampling method due to the fact that the participants reside in clustered homesteads and to save time, the researcher preferred this sampling method. The sample comprised groups of peasant farmers and agricultural associations to form designated focus groups for discussion. For the focus groups, guided unstructured interviews were carried out. This allowed the researcher to understand the profound reasons for the low production of cereals.

The population was divided into subpopulation (stratum). By stratification, the researcher grouped members of the population into homogeneous subgroups before sampling. The researcher then used a convenience sampling method within each stratum on the participants on the basis of their accessibility and convenience to the researcher. The main assumption for using convenience sampling method is that each stratum is homogeneous (Ross, 2006). The sample size of 32 was used for this research.

Sampling Procedure

Stratified random sampling was used for this research. For group discussion in each district, 6 people of the producer group were selected. Within this group there were producers of sorghum, maize and rice and other cereals. The 7 participants were the principal farmers in each district who are the presidents of the associations. For each district, the director or the district director of agriculture was interviewed, totalizing 8 participants per district. The following table 1 shows the sampling and stratification method used for this research.

Table 1: Sampling per Stratum

Target Participants	Strata	N°
Growers of sorghum	People with at least 1 ha and local leaders	1
Growers of maize	People with at least 1 ha and local leaders	1
Growers of rice	People with at least 1 ha and local leaders	1
Farmers of other cereal (specified)	People with at least 1 ha and local leaders	2
Mixed cereal growers	People with at least 1 ha and local leaders	2
Government Officials	Administrators in each district	1

Source: Author, 2013. Please note that this gave a sample of 8 persons per district and 32 persons total.

This was a representative sample since it covered as many people involved in cereal production as possible. Being a qualitative study, this research included interactive interviews in the form of one-on-one interviews, focus group discussions, document analysis and observations. Primary data on demographic characteristics, for example agricultural crop type, crop quantity, quality of seed, uses of incomes, markets, agricultural technologies, agricultural policies and soils used for agriculture were collected.

FINDINGS

These results indicated that the land belongs to the State and the representatives or community leaders make government allocation to interested parties. The data clearly show that the districts of Namacurra, Gorongosa, Gondola and Angónia, community leaders are a

key part in the allocation of land for cereal production. The data also show that there were conflicts in the allocation of land as noted in Gorongosa district, while in Angónia more people were involved in agriculture than in years prior to the exploitation of mineral resources in the province. In relation to the preparation of the land, which is the decisive factor in the production of cereals, data revealed that farmers in the study area are still using rudimentary tools, for example, the use of traditional hoes and machetes, which contribute to low cereal production in the region of central region of Mozambique. These produce are collected using rudimentary tools such as knives, sickles and hoes. Practically this is noticeable in all districts studied during the harvest, farmers lose a lot of produce especially when the harvest of rice and sorghum. So, the technological factor is critical in the production of cereals.

Regarding the quality of seed used it is shown that, in general, farmers used seed from the selection of part of the production of the previous year, due to lack of certified seed. This contributes to the low production and productivity of cereals in central region of Mozambique. Lack of certified seed is a crucial factor that leaves farmers in a state of total despair because they experience low seed germination. The government support and organizations have been very isolated or non-existent in the distribution of seeds, as many businesses closed. This research also established that training and technical assistance has been very weak and in some cases, irrelevant. These observations lead to an assertion that although central region of Mozambique has abundant land with good soils and farmers who were interested in producing cereals, the conditions in which they operated made it difficult for them to reach their capacity.

Another revelation for low production is the lack of tractors, cultivators, plows, animal traction, and pumps to irrigate fields, certified or hybrid seeds and pesticides. Clearly, the production of cereals in the central region of Mozambique still depends on rain and no irrigation system because agriculture follows normal growing seasons, so it continues to produce limited quantities, while the family or the population grows geometrically. The data indicate that financial support for the production of cereals is nonexistent and that reduced levels of cereal production. The data also indicate that the government does not act, nor have strategies that streamline the production sector of cereals, for example, the seed sector, where the existing policy does not promote the farmer. In addition, the study revealed that there are organizations that want to help farmers but are facing enormous difficulties due to lack of a clear policy on production and deteriorating security, especially in Gorongosa.

DISCUSSIONS

In the context of tenure and land preparation interviewees were unanimous that community leaders are a key part in the allocation of land for cereal production. This is in accordance with the law on the use and enjoyment of land approved in 1997 that says local communities should be treated as legal persons who have power over communal land (ORAM, 2010).

For larger production of cereals, good soil or fertile land is basic means determining factors that increase production in the central region of Mozambique. For the preparation of land for growing cereals data revealed that farmers still use rudimentary system, based on hoe cable short, contributing to very low production of cereals. This was confirmed by (Nakhuma et al, 1999), who state that the central region of Mozambique is facing a considerable limitation of the use of technologies to reduce hunger. Moreover (Mosca, 2011) says that the change of agricultural technology in Mozambique is particularly urgent for the central region of Mozambique, because it is a region that has potential, but remains weak in cereal production. Producers have expressed unanimous concern of low quality seed used by them resulting in the use of the previous year produce due to lack of certified seed, a fact that contributes to the low production and productivity of cereals in central region of Mozambique. This is a crucial production factor. According (Nakhuma, 1999), to increase the production of cereals, it is necessary to improve the seed used during the cultivation process. The seed saved a few more years may be spent (bad) and lose the good characteristics of good germination, strength and good production.

About technology and human resources participants reported that the production of cereals is complicated by the use of rudimentary tools during the production process of grain harvest and storage. The agricultural sector in Mozambique is mainly composed of families who practice subsistence agriculture, and mainly depends on rain season.

According to the documents interrogated in this study it was found that major river systems remain unexplored, such as the Zambezi river system and Save Rivers River. Due to the abundance of water in the central region of Mozambique, irrigation can become a comprehensive strategy for the development of the agricultural sector. According to information from the CPC and TIA, in rural areas of Mozambique, the family farm is composed mainly of small farms (those who cultivate less than 5 acres) and it is possible to use such limited hectare for irrigation. The lack of irrigation systems results in very low yields in a land with abundant natural resources conducive to the production of cereals and report rates of chronic malnutrition of 45%.

LIMITATIONS

The limitations of this study consisted of access roads from one district to another. There are regions where there is flooding due to rain and these areas become almost impossible to drive to. The researcher generated data during the period of less rain. Informants were sometimes reluctant feeling uneasy with strangers. This problem of unwillingness by farmers to give the vital information was carefully taken care of as the researcher approached the farmers through their community leaders.

CONCLUSIONS

The cereal production in the central region of Mozambique is by subsistence farmers who produce just enough to eat. This is caused mainly by the use of rudimentary production, harvesting and storage tools, as well as the lack of financial support for grain production. Lack of quality seed and lack of modern agricultural implements also contribute to low cereal production. No company ensures the distribution of good quality seeds in the central region of Mozambique. Based on this study, it is concluded that the poor quality of seed planted by farmers in central region of Mozambique have poor cereal germination that result in reduced volumes of cereals. The use of technology for the production of cereals in central region of Mozambique is minimal, especially in land preparation, crop management, and harvesting and storage. The lack of effect mechanical methods of cultivation and irrigation, in central region of Mozambique remains low. The central region of Mozambique has large tracts of land with fertile soils, which are capable of producing large volumes of grain for reducing hunger and poverty, not only for the central region, but for the country as a whole. Therefore, poor quality seed or other use of grain, using rudimentary tools and lack of financial support are factors causing low production of cereals.

Recommendations

The study recommends that farmers transform from substance farming to commercial farming in areas of land preparation, management of the crops, the volume of production and storing places. This would guarantee high quality seeds, advanced preparation and mechanization of the land, methods of plantation, weeding and control of plagues, provision of fertilizers, good harvest and mechanisms of storing in good places. It is recommended that the farmers of Namacurra, Angónia, Gondola e Gorongosa use quality seeds and new seeds in every planting season. The farmers should buy new seeds and avoid having second recycled

seeds. The farmers of the central region are recommended to preserve the soil through avoiding the forest burning which destroy not only the forest natural fauna but also the soil. To the farmers, it is also recommended the application of fertilizers which are better for the types of soil, because it increases the production as well. Research should be carried out to establish the preparedness of farmers to change from manual to mechanised production in order to avoid channelling resources to people who do not appreciate them due to the respondents' low literacy level. This research could set out strategies that the government could take to promote mechanized production in central region of Mozambique.

REFERENCES

1. Capobiango, M. (2006) Extraction of maize proteins and obtention of hidrolisadosproteicos with low content of femilalamina. Beautiful horizon
2. Centre for studies for Mozambicans (2010) The impact of Agrarian Politics in Mozambique, Maputo.
3. Creswell, J (1994) Research Design: Qualitative and Quantitative Approaches, Thousand Oaks, (Calif), Sage.
4. Cunguara, B. (2011) Agrarian sector and Mozambique: A situational analysis, Constraints and Opportunities for Agrarian growth, Maputo.
5. Cunha, R. (1974) Food Security- A Concept Structure. Rome.
6. Denzin, N. and Lincoln, Y. (1993) Handbook of Qualitative Research, SAGE Publications, USA.
7. FAO (2012). The State of Food and Agriculture. Italy
8. Godoy, A. (1955). Introdução á pesquisa qualitativa e suas possibilidades. São Paulo.
9. Hammersley, M (1992) The Dilemma of Qualitative Method, London, Routledge.
10. Gergoletti, I. (2008) Food Production - A cooperative analysis of scenarios in the environmental sustainability perspective, Sao Paulo.
11. Salam, A. (2012). Review of Input and Output policies for Cereals Production in Pakistan: Environment and Production Technology Division. Pakistan.
12. Samuelson, Paul A. (2010). Economia. Décima nona edição. New York.
13. Santos J. (2006) Production theory, New York
14. Scolari, D. (1997) World Agricultural Production, Brazil.
15. Siteo, T. (2005). Agricultura famílias em Moçambique. Que módulos e estratégias par o desenvolvimento sustentável. Maputo.
16. Godoy, A. (1955). Introdução á pesquisa qualitativa e suas possibilidades. São Paulo.
17. Hammersley, M (1992) The Dilemma of Qualitative Method, London, Routledge.
18. Robson, C. (1993), Real World Research: A Resource for Social Scientists and Practitioners- Researchers, Blackwell, Oxford.
19. Ross, J.(2006). Practical assessment, research and evaluation. Toronto.
20. Mosca, J.(2010). Economia Moçambicana 2001-2010. Um Mix de popularismo económico e mercado selvagem. Maputo.
21. Yin R K (1994) Case Study Research: Design and Methods (Applied Social Research Methods) Paperback– March 18.