

Sorghum as an Indigenous Drought Resistant Crop for Food Security in the North West Province of Cameroon

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ABSTRACT The paper uses a participatory and case study approach to discuss the importance of sorghum as an indigenous drought resistant crop for food security in the North-West province of Cameroon. It was found that sorghum was experiencing a decline in production due to: the colonial introduction of exotic cash crops, limited cultivation land and tenure insecurity, lack of farming equipment and government financial support to small-scale farmers. It is recommended that the government develop policy strategies to promote the cultivation of indigenous food crops; support the interface between indigenous and modern knowledge systems to improve production; promote indigenous knowledge awareness among government extension officers; support small-scale sorghum farmers, especially women, with modern inputs and equipment, finance and research for information on sorghum production, post-harvest and marketing channels. This will assist them to improve productivity and sustainability of sorghum production.

INTRODUCTION

Sorghum (*Sorghum bicolor* (L.) and the millets (*Pennisetum glaucum* (L.) R. Br.) are essential to diets among poor communities in the semi-arid tropical areas of West Africa including the North-West province of Cameroon (Kimber 2000; The International Crops Research Institute for the Semi-Arid Tropics and Food and Agriculture Organization 2006).

Osmanzai (1992) indicates that generally, the area of sorghum and millet cultivation in West Africa has steadily increased over the years but the average yield trends are downwards. However, sorghum remains an important food security crop in the region due to its uniquely drought resistance and ability to withstand periods of high temperature (The International Crops Research Institute for the Semi-Arid Tropics 1994).

Doggett (1998) adds that much of the African continent is characterized by semi-arid and sub-tropical climatic conditions. Africa is the only continent that straddles both tropics. Sorghum is adapted to Africa's drought conditions and able to withstand periods of water-logging. Sorghum in Africa is processed into a very wide variety of attractive and nutritious traditional foods, such as semi-leavened bread, couscous, dumplings and fermented and non-fermented porridges. It is the grain of choice for brewing traditional African beers (Murty and Kumar 1995).

National Research Council (1996), and Mmaptsi and Maleke (1996) show that in the competitive environment of multinational enterprises, sorghum has been proven to be the best alternative to barley for lager beer brewing. Continuing focused fundamental and applied research is essential to unleash sorghum's capacity to be the cornerstone of food security in Africa (Gomez 1993).

The National Research Council (1996) reveals that sorghum grows in areas where the annual rainfall is in the range 500-700 mm per year which is characteristic of most African countries. This is related to the fact that the rain in sub-tropical Africa is intermittent and characterized by brief periods of very high rainfall.

Jordan and Sullivan (1982) stipulated that while the precise reasons for sorghum's environmental tolerance are not fully understood, they reveal the adaptive traits of sorghum to drought conditions. These include: deep penetrating and extensive roots networks; ability to conserve moisture by reducing transpiration through leaf rolling and closing stomata and increased levels of epicuticular wax. Moreover, sorghum appears to have a high capacity for osmotic adjustment to stress to maintain turgor pressure in cells; possess 'stay green' genes that enable them to continue to photosynthesize, post-flowering during drought. Further research into the mechanisms of sorghum's envi-

ronmental tolerance will clearly be highly beneficial (Rosenow et al. 1996).

Babu et al. (1994) states that sorghum cultivation in Africa is still mainly characterised by traditional farming practices including indigenous knowledge systems; with low inputs (no inorganic fertiliser or pesticides) and traditional varieties or landraces. Such low yields mean that there is often no surplus sorghum, without which processing industries cannot be created. Over 90 percent of Africa's agricultural output is by small-scale (less than 5 ha) farmers who have for centuries, sustained their food supply through a considerable wealth of IK on how to harness both the natural and socio-economic factors of production (Rajaskeran 1993).

Arthur (2003) and Bell (2000) add that colonialism destroyed the essence of African food security by introducing exotic crops such as wheat, barley, maize, rice and mono-cultural agricultural systems geared for the external market rather than sustainable community livelihood. Commercial crops like cocoa were introduced in Ghana, peanuts in Senegal and Gambia, tobacco in Malawi and tea in Kenya, cotton in Angola and sisal in Tanzania. These export crops subjected Africa to total dependence on Europe on market demands at the expense of indigenous food crops such as sorghum which provided African communities with food security. Nieuwoudt et al. (2003) define food security as "access by all people at all times have physical and economic access to adequate amounts of nutritious, safe and culturally appropriate foods." Crops such as the various types of millet and sorghum have been staples for local communities in the North-West province of Cameroon. They ensured food security and nutrition.

Samper (2004) and Berlin (2005) indicate that, the climatic conditions of the North West province of Cameroon greatly favour the cultivation of drought resistant indigenous African crops like sorghum. Sorghum is grown in vast areas of clay soil, called Kara (plural kare) that is difficult to till during the rainy season (Wilson 2002). The crop is grown twice a year (during the rainy and dry seasons). Numerous local varieties of sorghum are adapted to the soil conditions.

At the time of the study, the community was experiencing problems of food shortages. Food supply came from neighbouring communities such as Babanki, Bambui and Wum. Nutritional deficiencies among children and HIV/AIDS

plagued the community. Sorghum was a staple food that was in a decline. Like in other parts of Africa, sorghum production for food security has been neglected in the North-West province of Cameroon over the years in favour of exotic crops which are not adaptable to the harsh climatic and soil conditions of the area.

An examination of past research studies (Rao 1997; Bell 2000; Berlin 2005) show that much has been published on food security in Africa, but little attention has been given to the role of African indigenous crops like sorghum for food security. The production of sorghum has served the food security and socio-cultural needs of the community over the years.

This paper examines the role of sorghum as an indigenous crop for food security in the Kom community in North-West province of Cameroon.

METHODOLOGY

Taking into consideration the community-based nature of indigenous knowledge systems (IKS) the study followed a participatory and case study approach to investigate the role of sorghum as an indigenous drought resistant crop for food security in the Kom community of the North-West province (Cameroon). The use of participatory techniques was motivated by the fact that it enables development practitioners, government officials, researchers in partnership with local people to work together to plan context appropriate research activities. This provides a shift of research thinking from doing research on people to doing research with the people. In this study community knowledge holders and IKS practitioners such as local sorghum farmers (men and women), traditional leaders and community elders were actively involved in the whole research process from research design to the interpretation of the research findings. Their views were sought in all stages of the research process. Moreover, in an effort to ensure maximum participation of the knowledge holders, the study was conducted in the local language known as Kom.

The Kom community was the unit of analysis. It lives in an arid environment with an average annual rainfall of 500 mm. A purposive sample of 80 respondent community members (50 women and 30 men) participated in the study. Participation of women in the sample was important because according to the community lead-

ers, they were considered to be the main knowledge holders in the community in matters of agricultural production as the economic main activity in the community. The people included were known to have been involved in specific experiences related to the research problem, that is, sorghum cultivation.

Conrad (2002) describes a case study research strategy in the following words:

Rather than using large samples and following a rigid protocol to examine a limited number of variables, case study methods involve an in-depth, examination of a single instance or event. They provide a systematic way of looking at events, collecting data, analysing information and reporting the results. As a result the researcher may gain a sharpened understanding of why the instance happened as it did, and what might become important to look at more extensively in future research.

The selection of study cases was purposive. Berelson (2000) defines a purposive sample as, a non-representative subset of some larger population, and is constructed to serve a very specific need or purpose. A researcher may have a specific group in mind, such as traditional healers. It may not be possible to specify the population. They would not all be known, and access will be difficult. The researcher will attempt to zero in on the target group, interviewing whoever is available.

Qualitative research methods such as key informant interviews, focus group discussions and participant observations formed the core of data collection methods; while a questionnaire was administered to the research sample in an effort to collect supportive quantitative data. Cooke and Kothari (2001) explain that qualitative research seeks out the 'why', not the 'how' of its topic through the analysis of unstructured information – things like interview transcripts, open ended survey responses, emails, notes, feedback forms, photos and videos. It does not just rely on statistics or numbers, which are the domain of quantitative researchers. Qualitative research is used to gain insight into people's attitudes, behaviours, value systems, concerns, motivations, aspirations, culture or lifestyles. Qualitative data in the form of audio taped interviews were transcribed and translated from Kom to English. Interview and participant observation notes were typed and a content analysis conducted.

Burns (2007) looks at content analysis as a systematic analysis of the content rather than the structure of a communication, such as a written work, speech, or film, including the study of thematic and symbolic elements to determine the objective or meaning of the communication. Quantitative data in the form of questionnaires were checked and coded. Data were analysed using SPSS/PC+ (Babbie 2004).

RESULTS AND DISCUSSION

The Socio-economic and Demographic Characteristics of Respondents in the Kom Community

The objective of investigating the socio-economic and demographic characteristics of the respondent community members was to describe the characteristics of the respondents in terms of their age groups, gender and marital status. The results are presented and discussed below:

The study found that the majority of the respondents, both male (85%) and female (78%) were in the age group of 50 years and above. Interviews and focus group discussions with this age group showed that they had a wide range of knowledge about the research problem. Like in other African communities marriage in the Kom community plays a significant role in community life because it is part of person's social and cultural status and rite of passage. It is on the basis of this that the study sought to establish the marital status of the respondents. The majority of the respondents, both male (88%) and female (61%) were married. Interviews and focus group discussions showed that these categories of respondents were the one who were directly involved in sorghum cultivation and were highly knowledgeable about the research problem.

The study probed into the educational background of the respondents both formal and informal. The study found that the majority of the respondents, both male (59%) and female (61%) did not attain the matric qualification level. However, interviews with them revealed that they had a wide knowledge of sorghum production acquired through many years of agricultural practice.

Taking into consideration the fact that most of the agricultural work in the study community was labour intensive and for food security, it was found that the amount of food available to households was affected by the household size

(number of household members), the study was interested in establishing the percentage distribution of respondent household sizes. The majority of the respondents, both male (66%) and female (68%) reported that they had six or more household members.

The following section discusses socio-economic and cultural significance of sorghum in the Kom community.

Socio-economic and Cultural Significance of Sorghum in the Kom Community

The respondents were asked through face to face interviews and focus groups discussions to explain the importance of sorghum in the Kom community:

The respondents indicated that, besides provision of food security and income, the Kom community valued sorghum because of its socio-cultural importance. For instance, spirituality and ritual performances constituted an important part of sorghum production system to ensure food security in the community. Firstly, during nursing, women put water into a calabash and the peace plant (*nkeng*) was used to sprinkle on the seedlings'. Rituals were also conducted using *sha* (home-made beer) before planting commenced. Quarter heads coordinated the ritual, whereby *sha* was poured on the doorpost of each producer. This was to appease the ancestors, to ensure crop protection, and request for a good harvest. During the planting period, the majority of respondents acknowledged that most farmers, both men and women visited the chief priest who gave them some medicine to ensure good crop yield. Rituals were also conducted on the boundaries of farms to prevent birds and rodents from destroying the crops. Diviners were said to communicate with the ancestors. This was vital and indispensable in ensuring food security.

Moreover, respondents argued that cultural beliefs determine people's attitudes towards the type of food eaten. For instance, the taste and colour of a foodstuff could overshadow values such as nutrients and vitamins which people cannot see or feel. This is supported by Rao (1997) who elaborates that cultural beliefs are very important in determining people's perceptions towards food. Usually, when people think about food, they seldom take into consideration its nutritive contents such as proteins, minerals

and vitamins. Rather, they consider food in terms of taste, smell and colour.

Focus group discussions with respondents indicated that there was a decline in sorghum production as an indigenous food crop over the years in the Kom community. The study wanted to establish from the community perspective the factors which contributed to this decline. These factors are discussed in the following section.

The Decline of Sorghum Production in Kom Community

The respondents were asked through a questionnaire and focus group discussions to explain the production status of sorghum in the Kom community. The majority of the respondents (over 60%), both male and female indicated that there was a decline in the production of sorghum and the staple food of the community.

This section looks at factors contributing towards the decline of sorghum production from the Kom community perspective. This is due to the fact that most often, arguments about the decline of sorghum production in Africa have been attributed to colonialism and other forms of imperialism as portrayed in the literature (Bell 2000; Arthur 2003). Other factors include limited land, land tenure insecurity and limited financial and material support to local sorghum farmers.

The study showed that one of the contributing factors to the decline of sorghum production in the Kom community was the impact of colonialism on indigenous crops. Through focus group discussions, respondents had the view that colonialism introduced and encouraged the production of exotic crops in local communities' especially commercial crops for colonial interests. This reduced the importance of food crops such as sorghum including the cultivation area. This was also aggravated by immigration as more people came into the community and land became scarce and expensive. Local communities around the Mbingo, Fundong and Belo areas were facing this problem.

According to respondent community members, the problem of land scarcity was also exacerbated by indigenous land management systems especially the practice of shifting cultivation. Land was left for some years to regain natural fertility after use. There was a belief among the people that during the years when land was allowed to fallow, ancestors meditated over the

land and cleansed it from malicious (evil spirits) forces. This was considered a form of renewal to land for future crop cultivation, but at the same time, it hindered continuity of cultivation of sorghum by limiting availability of agricultural land.

Furthermore, the respondents complained about the corrupt system of governance and greedy elites. The Fon (chief) and other traditional authorities were blamed for the sale of land to Fulani grazers and other outsiders. This created scarcity of land for locals to cultivate food crops such as sorghum.

Regarding land tenure insecurity, the respondents complained that land tenure insecurity impacted on sorghum production. In the focus group discussions and interviews with respondents and community knowledge holders, women were acknowledged as key players in sorghum production. It was the responsibility of the men to clear the land and prepare it for women to carry on with cultivation. Women did most of the agricultural labour such as tillage, weeding, harvesting and seasoning. In spite of this contribution women had limited rights to land ownership. The study revealed their concern on the lack of farming tools, limited financial support, lack of improved varieties of sorghum and land of government and development agencies measures to improve sorghum production for food security in the community. One female respondent stated that “if effective tools, inputs and initial investment capital were provided to women in particular, it would increase production on a large scale and thereby fighting against food scarcity”.

Indigenous Sorghum Production Management Systems in Kom Community

The study was interested in establishing indigenous sorghum production management systems in the community in terms of cultivation methods, harvesting and post-harvest processes of the sorghum crop.

It was revealed during focus group discussions and interviews that mixed cropping or intercropping of sorghum with other food crops was a strategic measure to ensure food security and prevent land erosion or degradation. One female farmer explained that they also planted sorghum along other crops like pumpkins, cassava, cocoyam and beans. Another female respondent reported that in mixed cropping, the

weeds removed from the maize plant were spread in bed rows to conserve soil moisture and when they decomposed, they provided natural manure for crop growth. The study found that the majority of the respondents both male and female (over 80%) cultivated sorghum as a mixed crop with other crops for food security.

Indigenous Sorghum Post Harvest Management Systems

Post-harvest sorghum management systems were very vital for food security. Respondent sorghum farmers reported that, after drying the grains in the sun, they were put in plastic bags or preserved in calabashes. A small hole is cut on top of the calabash, the seeds inside the calabash are removed and the grains of sorghum put inside and stored in a dry place in the bands for another planting season. Healthy cultivars are separated as seeds for the next planting season and grains for ritual purposes are also stored separately.

Furthermore, the majority of respondents and knowledge holders reported that, the mortar and the pestle were used in processing grains for food stuff; like ‘*guinea corn fou-fou*’, making home beer (*sha*), cooked with beans (*corn chaff*), *puff-puff* and was also roasted. Farmers exchanged seeds of sorghum with those of other crops such as beans. It was reported that custom and tradition never permitted the sale of sorghum. Nowadays community members sell it to buy seeds of other crops that were not locally produced.

Prospects and Challenges of Interfacing Indigenous and Modern Sorghum Production Systems in the Kom Community

This section looks at the attitudes and perceptions of respondent community members towards the transformation of indigenous production systems through interfacing with modern sorghum production systems. The study revealed that more than 80 percent of the respondents, both male and female, were in favour of applying fertilizers and pesticides to improve sorghum output and for crop protection, respectively. This was in spite of the fear that chemical fertilizers were toxic and could pollute the environment, especially water. Focus group discussions revealed that the agricultural research

agenda in Cameroon had neglected the needs of smallholders, especially women farmers. All the respondent sorghum farmers, both male and female, complained that they did not receive any form of government support and their local knowledge was not taken seriously by most development agencies including extension officers.

Interviews and focus group discussions with respondents including direct observation of the irrigation system in the community showed that the low sorghum production was also the result of poor soil and water management systems. Therefore, the introduction and the availability of modern and affordable irrigation systems could enhance productivity and increase output of sorghum. The study found that all the respondents, both male and female appreciated the introduction of modern irrigation systems in sorghum production. They were aware of the fact that modern irrigation systems were expensive to finance. It was on the basis of this that most small scale farmers relied on dry land farming.

It was also reported by respondents that low sorghum production and food insufficiency in the community was due to the reliance on purely local varieties and limited research on the socio-economic and cultural significance of sorghum in the area. The respondents also raised the concern during focus group discussions that the government and other development agencies in Cameroon have continued to pursue the colonial agrarian policies which worked against the promotion and development of indigenous food crops such as sorghum and millet. This was done in favour of exotic cash crops.

CONCLUSION

The paper discussed the role of sorghum as an indigenous drought resistant crop for food security in the North-West Province of Cameroon, with special reference to the Kom community. It was revealed that in spite of the decline in sorghum production, it was still an important indigenous crop for food security, socio-economic and cultural life of the people in the Kom community. The contributing factors for the decline in the production of sorghum and the staple food of the community included: limited land, land tenure insecurity and limited financial and material support to local sorghum farmers. The problem of land scarcity was also exacerbated by indigenous land management

systems especially the practice of shifting cultivation. While women were recognised as key players in sorghum production, they had limited rights to land ownership. Both male and female respondents highlighted the lack of support from agricultural development agencies including extension officers. Moreover, they indicated that their local knowledge was not taken seriously.

RECOMMENDATIONS

The following recommendations were made: Firstly, there is the need for the government to develop policy strategies to promote the cultivation and use of indigenous food crops such as sorghum. Secondly, government and other developing agencies should support small-scale farmers, especially women with modern inputs and equipment, finance and researched information on sorghum production, post-harvest and marketing channels. Thirdly, in order to promote sustainability of sorghum production among local producers, the interface between indigenous and modern production systems including technologies should be promoted and supported. Agricultural extension officers should learn about the efficacy of indigenous food production systems and integrate them in their work.

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