Competitive environment of the staple food distribution system in Namibia: An assessment of the pearl millet (Pennisetum glaucum) industry.

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ABSTRACT

The central goal of this study was to assess the factors that constrain or enhance domestic competitiveness of the Namibian pearl millet (Pennisetum glaucum) industry using the Porter Diamond model. The evidence is that the industry is domestically, relatively competitive. However, more public-private investment is needed to enhance productivity as the industry value chain experienced high cost and insufficient product differentiation that hampers the competitiveness of the industry. The main challenge for the pearl millet sector deciphered from this study hinges on the negative effect of climatic change. Other challenges determined include households’ access to production inputs, access to credit services, access to market, prevalent occurrence of pests, unavailability of clear product quality standards, price instability and inadequacy of appropriate infrastructure such as roads, storage and processing facilities. The study therefore, recommends that the government and private sector alike should continue to support the production and commercialization of pearl millet especially in the communal areas, taking into consideration its practical importance for poor households in terms of food security issues and its potential in creating wealth through income generation.

Key words: Staple food, Productivity, Small-scale farmers, Diamond model.

INTRODUCTION

The global production of pearl millet accounts for almost half of all types of millet production (FAO and ICRISAT 1996). This plant (Pennisetum glaucum) also known as mahangu in Namibia is a traditional cereal drought tolerant staple food crop in the semi-arid tropical zones of Africa and the Indian subcontinent since prehistoric times. It is resistant to moisture stress and adapt well to high temperatures, it has a low yield, and high nutritional value when compared to other cereals such as wheat (Triticum aestivum), maize (Zea mays), sorghum (Sorghum bicolor) and rice (Oryza sativa). In Namibia pearl millet is grown under rain-fed conditions by majority of small scale farmers in the northern communal areas (NCAs) mainly for household consumption. The question that needs to be addressed as the main purpose of this study is whether or not the Namibian pearl millet industry has any competitive advantage in domestic market although external markets are also important. The concept of competitiveness has been addressed from different perspectives in the literature though most definitions equate productivity with competitiveness (Thomas, 2007). Tweeten (1992) defines competitiveness as “a nation’s ability to maintain or gain market share by exploiting competitive advantage in the world
markets through increasing productivity from technological advances or other sources”. Thus, the competitiveness of the agro-food industry such as pearl millet depends on a number of wide-ranging factors dependent on social, economic, political, legal, technological and physical or biological environmental forces.

OBJECTIVES AND PROBLEM OF STATEMENT

The objective of this study was to assess the competitive environment of the Namibian pearl millet industry. Pearl millet is in high demand locally by the majority of the population in NCAs, amongst workers in the mining and fishery sectors as well as urban informal settlements. Currently, the domestic total production does not meet the national consumption demand of pearl millet hence no exports of the crop has been reported. However, tightly controlled imports are reported from India through the formal trade and from Angola through the informal trade channels.

METHODS

This research described aspects of pearl millet value chain in Namibia, an area that has been neglected by past researches. Porter (1990) argues that nations are most likely to succeed in industries or industry segments where the national ‘diamond’ is most favorable. His method evaluates both the competitive nature of the farmer and also that of all participants involved in the supply chain. He identifies six determinants, which shape the environment and creates the competitive advantage namely: factor conditions, demand conditions, related and supporting industries, firm strategy, structure and rivalry, role of chance occurrences and acknowledgement of the role of government. The problem with using the Porter (1990) diamond technique, however, lies with the critical interpretation of the results (Thomas, 2007). In this study such a model was considered significant keeping in consideration the lack of finance and inadequacy of pearl millet structured data to conduct the study. Information was collected using desktop study and through expert interviews with chain participants (producers, millers, consumers and technical or professional experts) as well as secondary sources. Consultations took place in the form of multiple office visits, with, in some cases, telephone interviews also being held.

DATA ANALYSIS

Collected data was analyzed qualitatively through repeated interrogation and reengagement with the key informants along the pearl millet value chain. This was from the farmers to the processors who happened to be the main marketers. Laterally, government departments and non-governmental development agencies were repeatedly and consistently interrogated throughout the study.

RESULTS AND DISCUSSION

The paper reports the results, starting with a brief review of the Namibian pearl millet industry as obtained from desktop study activities. This is followed by a discussion of the competitiveness of the industry in domestic and global terms using Porter diamond model as the information was condensed from the interviews. The paper ends with conclusions and some future implications for the industry.

This study showed that in Namibia, of the total cereal production in 2004 contributed 14 percent to gross agricultural production of which pearl millet accounted for 64 percent (Mendelsohn, 2006) of this share. The crop is the backbone of the economies of rural households in the NCAs and is a staple food for at least 60 percent of the Namibian population (Government of Namibia, 1995). There is also high demand for pearl millet in particular amongst workers in mining and fishery sectors (NEPRU, 2000) as well as urban informal settlements in the country. Pearl millet grains and its by-products (straws and chaff) can be used as food, beer, animal feeds, fuel, thatching, manure, fencing materials and building materials for many rural houses (Onwueme and Sinha, 1991). The desktop study revealed that worldwide statistical figures for the production of pearl millet are generally rough estimates, analyses derived from these data should, therefore, be treated with caution (FAO and ICRISAT, 1996). The crop average yields was estimated by NRC, (1997) to be around 0.6 tonnes per hectares (around 0.8 t/ha in India), but range between 0.3 t/ha in Southern Africa to over 0.8 t/ha in Nigeria and Uganda under wetter conditions. In the Namibian context the average households cultivates an average farm size of 4.2 hectares with an average millet yield estimated at around 0.35 t/ha which is amongst the lowest in the world (CAC, 2010). Most common size of production land units in NCAs is ranging between 1-5 hectares per household, but some operators have up to 15 hectares under cultivation (Akwenye and Low, 1998).

Households access to domestic market

Traditionally the production system of pearl millet was mainly based on family labour and the crop was not produced for the market (Vigne and Associates, 2004). The traditional valuation of pearl millet is the high value households place on storing surplus grains as reserve stock for or insurance against years of poor harvests. Henceforth, the selling of pearl millet surplus may
undermine traditional drought coping mechanism of poor rural households (Vigne and Associates, 2004). Moreover, traditional pearl millet producers tend to sell older grains which are of lower quality compared to new harvests. An important factor to note with respect to pearl millet market is the minor role of traded products in the industry supply chain. One of the consequences is that people are not directly sensitive to market prices, since most of them imagine they have pearl millet for free (Leporrier et al., 2002). Another consequence is that methods of producing and marketing are not appropriately developed (Lucas, 2010b). In addition rural producers are isolated from food markets because of high transport costs and low agricultural productivity (Fafchamps, 1992).

Pearl millet as control crop

Pearl millet had been gazetted as a controlled crop by the Namibian Government under the Namibia Agronomic Act 20 of 1992 No.4047 of 15 May 2008. This means that in principle the Namibia border is closed for millet imports. The rationale is to protect domestic produce from fierce competitive threat from cheaper imports. Domestically produced pearl millet, however, does not meet the food demands of northern Namibia where over half of the Namibian population lives. In total, cereal consumption in Namibia in most cases is met by imports, mainly from Republic of South Africa (RSA). Currently no imports of pearl millet are from RSA (Lucas, 2010a personal communication). However, white maize which is considered to be a closest substitute for pearl millet in Namibia is imported from RSA. The availability of imported white maize helps to keep the retail pearl millet prices low and stable irrespective of the supply situation (Matanyaire, 1998). Compared to maize and wheat, price support and formal marketing channels for pearl millet where almost none existent before Namibia independence in 1990. Recently, as a policy instrument the Namibian maize and pearl millet industry’s price setting is determined based on the import parity price of RSA’s white maize. The government through the Namibia Agronomic Board as the implementing agent has agreed on a direct linkage of the minimum price setting mechanism of pearl millet to be the same with that of the white maize industry. The basic rationale of this policy implementation was to alleviate inefficient production by protecting domestic pearl millet industry while encouraging surplus production and trade (Lucas, 2010a personal communication).

Producer prices

The average producer price of pearl millet in Namibia has been around N$/1.70 per kg to the grower, which is comparable to farm level prices of pearl millet in Sahelian West African countries and comparable to the world price of maize (Sattar et al., 2003). For 2009/2010 season the Namibian average producer price for pearl millet grain per kg was N$ 2.66 (NAB, 2010).

With regards to international trade Vigne and Associates, (2004) argue that even if the World Trade Organization (WTO), Southern African Development Community (SADC) and Southern African Customs Union (SACU) trade liberalization measures do come into effect, pearl millet will be the only dry-land crop in Namibia that is likely to survive the rigors of unprotected international trade, especially given the history and current practices of the exporting nations in protecting and subsidizing their own crop commodity sectors. The Ministry of Trade and Industry’s (MTI) was tasked to include pearl millet as a sensitive product (infant industry) in the SADC Free Trade Agreement (NAB, 2008). The Namibian custom officials are responsible for border controls and checking of import permits that are issued by Namibian Agronomic Board (NAB). Similarly, the law enforcement agents carry out any additional patrols to control any illegal trade through northern porous borders (NAB, 2008).

Discussion of competitiveness of the Namibian pearl millet industry

Factor conditions

Elements that affect factor conditions for the pearl millet industry in Namibia include yield, climate change, production inputs and infrastructures.

Yield (as production per hectare):

Pearl millet is grown primarily under subsistence, largely traditional, rain-fed cultivation systems on communal land in seven northern regions (Kunene north, Omusati, Oshana, Ohangwena, Oshikoto, Kavango and Caprivi). The Average annual total production of pearl millet in Namibia is estimated to be 210 000 tonnes (150 000 households × 4ha × 0.35 t/ha) depending on the rain season (CAC, 2010). Low and sporadic rains during early season significantly interfere with crop establishment while same events towards the end of the season will adversely affect grain formation (CAC, 2010). During years of drought farmers experience poor harvest and hence, reduced yields. Similarly, during years of flooding, due to water logging the harvests are low because of reduced yield levels. Thus, pearl millet production should be introduced in other suitable non-traditional areas in the country to increase yields. Its yield per hectare is also affected by diseases and pests. The main production pests are stem borer, birds, army worms, armored ground cricket, wireworms, leaf miners, American bollworm, mylabrisoculata, blister beetle and locust. The standing pearl millet is destroyed by livestock (cattle, goats) and large animals (donkeys, and elephants) if fields are not fenced or protected somehow.
The pearl millet production per farmer also depends on the size of field i.e. hectares of land available accessible to the farmer. Farmers with large fields are perceived to produce enough grains surpluses than farmers with small portion of land. Most rural farmers especially women do not know how to measure a hectare of land. In many cases the total farm area cultivated in NCAs is estimated by government extension officials by eye and not by actual measurement (CAC, 2010). Global Positioning System (GPS) and other traditional field measurement instruments such as field measuring tape and pacing should be encouraged to estimate farmers’ field area accurately and, hence, improve the accuracy of measuring the agricultural productivity per hectare. Naturally the production per hectare and hence productivity differs yearly depending on rainfall, pests and soil fertility. With regard to unpredictable rainfall the proposed strategy for farmers is to plant traditional seed (longer-maturing) during early rain fall and improved seed (early maturing Okashana 2 or Kangara) during late rain fall. Pearl millet is often grown in the same field with sorghum. This makes it difficult to segregate pearl millet and sorghum hectares. On average sorghum is however, estimated to be around not more than 10 percent of mahangu-sorghum production. Other crops such as cowpea, groundnuts, bambara nuts, maize and watermelons are also grown on the same field with pearl millet although in smaller quantities. Domestic and international markets niche for these crops and their products should also be assessed and supported as market access will improve farmer’s income. It is advisable for NCAs farmers to continue with crop rotation, mixed cropping or intercropping pearl millet with legumes in order to improve soil fertility in a natural.

Inputs for farming:

The size of the land area cultivated mainly depends on availability of capital and labour. Since work is done mainly manually, poor farmers are curtailed by the availability of labour especially family labour. Unemployed young people are limited as most migrate/go to urban areas to search for better opportunities. Whenever casual labourers are available such as through organized youth groups, farmers cannot afford to hire these groups. In this regards unavailability of skilled labour constrains the competitiveness of pearl millet production. In general, the recent study by CAC report, (2010) argues that to maximized yield or have a stable yield respectively in Omusati, Oshana, Ohangwena and Oshikoto regions, farmers’ priority should be based on land-saving technologies (i.e. use of manure and intensive weed control) because of their small land portion. Meanwhile in Kavango region the majority prioritise labour-saving technologies such as increasing production area and fallowing.

Traditionally, farmers prepare their field using ox and donkey drawn ploughs as well as supplementation by hand hoes. Tractors are also used for land preparation (ploughing services) to a limited extent. The use of traditional draught animal power or tractor disc plough and harrow significantly damages the soil structure in NCAs. Ripping instead of disc plough is being promoted by the Ministry of Agriculture, Water and Forestry’s (MAWF), Directorate of Extension and Engineering Services as a component of integrated conservation agriculture. The fact that pearl millet farmers are risk averse probably due to low return on investment should be considered when farmers are introduced to sustainable new technologies.

Soils of the NCAs have deficiencies of essential nutrients namely phosphorus (P), potassium (K) and nitrogen (N) as land is utilized over and over. Farmers use both organic and inorganic fertilizers to improve their fields’ soil fertility. The use of chemical fertilizers in the NCAs however, remains significantly low even with the implementation of the government’s agricultural inputs subsidy scheme. Traditionally, farmers in Omusati, Oshana, Ohangwena, Oshikoto and Kavango regions use kraal cattle manure to improved soil fertility. Today cattle manure is found far away from farmers in cattle posts. Livestock manure is also available from commercial farms countrywide. The main problem however, is transportation costs that have to be paid by poor rural farmers. Moreover, fallowing of crop lands is a common traditional soil fertility restoration practice in Kavango and Caprivi regions (CAC, 2010).

Pests are controlled by using different traditional practices (crop rotation, mixed cropping, intercropping), chemicals, mechanical (trapping, weeding) and biological methods depending on affordability and knowledge of the farmers. Due to high production costs experienced by producers,’ government is supporting farmers through dry land crop production programme (Government of Namibia, 2010).For example subsidising land preparation services, chemical fertilizers, 10 kilograms of pearl millet seeds per household, weeding services for a maximum of 3 hectares of cultivated land and to a lesser extent marketing. Delivery of inputs to agricultural extension offices is consistently late; hence, this has serious implications on the crop yields. With regards to subsidises ploughing and weeding services the problem is that not all farmers have an understanding of how the government voucher services system work. Henceforth, farmers need to be trained in the safe application of pesticides and chemical fertilizers. Another important activity is fencing off of farmers’ field to prevent animals destroying crops. Availability of affordable production inputs obviously will positively enhance productivity and create competitive advantage for local pear millet producers.
Infrastructure and Post-harvesting technologies:

In order to enhance competitiveness, infrastructure should be in place and post-harvesting losses should be reduced. The increase in distance between production sites and market outlets require products to be delivered regularly and reliably to the market. As a result there is need to improve rural roads and other communications networks for farmers to have easy access to towns, grain collecting centers and millers. Post-harvest of pearl millet embraces all operations from harvest to final utilization of the grain including harvesting, drying, threshing, cleaning, storing, marketing and processing. Farmers normally wait for pearl millet heads to partially dry while the crop is still on the field before harvesting take place. Depending on rainfall andearliness with which the pearl millet variety was planted, harvesting usually takes place around May – June in Namibia. The stem is cut beneath the head with a sharp knife, placed in the harvesting basket taken, away to a clay threshing floor for further drying before threshing and windowing. The former means to detach kernels from the heads and the latter means the removal of chaff from clean grains. Either when done manually, threshed by sticks or use of machines (threshers) threshing is perceived to be costly when evaluated from an economic point of view.

At household level the pearl millet grains are commonly stored in traditional granaries. Other storages facilities used include plastic granaries, corrugated iron bins, baskets, drums, bags and containers. The main problems experienced during storage are pests’ infestation. The main pests are moulds, rice moth, *triboliumconfusum* and rodents that deteriorate the quality of grains. Through the farmers’ indigenous knowledge, farmers use control methods such as application of ash, chilli pepper and or allow crop to dry well before storage to avoid the risk of losses due to storage pests. Moreover, selecting and storing pearl millet seeds (traditional varieties) for the following planting season is a crucial practice of post-harvest systems. The seeds are stored in empty bottles and man-made baskets where ash is applied. At national level government has constructed national grain storage facilities (silos) as food reserve in KatimaMulilo (Caprivi region), Rundu (Kavango region), Omuthiya-Gwipundi (Oshikoto region), Okongo (Ohangwenaregion) and one is earmarked for Tsandi (Omusati region). According to Lucas, (2010b) the *mahangu* price at silos will be the same as the price paid to farmers at collection centres provided that *mahangu* stored in silos is not more than 18 months old.

Traditionally, pearl millet grains are processed by women and girls into flour using a wooden mortar and pestle for household consumption. Pearl millet grains are de-hulled wet, fermented to improve flour quality, dried and milled. Today, commercial pearl millet millers are available in rural and urban areas of Namibia. Millers mill both using fermented and unfermented methods. The main advantage of unfermented flour is that it is cheaper compare to fermented flour and it is also good to prepare fermented drinks (*oshikundu*). Alternatively the main disadvantage of unfermented meal is the poor quality with a bitter taste when prepared into stiff porridge (*osithima*) which is often not preferred by consumers. Various other basic food products that are prepared include pancake (*oshikwilila*), uncooked flour mixed with sour milk (*olumbololo*), boiled grain most dehulled (*onona*), thin porridge (*okatete*). So to further enhance competitiveness product differentiation into pearl millet products such as bread, cakes and biscuits for commercial purpose should be considered.

**Demand conditions**

The second factor influencing the competitiveness of the pearl millet industry is the nature of home demand for processed products.

**Domestic market for pearl millet:**

Access to lucrative domestic market will provide rural farmers with economic incentives to increase production. The demand for pearl millet products is reported to exceed the supply over years in Namibia (Lucas, 2010b). As communities develop there is a movement of people from the rural areas into the urban areas. This means that the number of people needing to be fed by the farming communities continues to increase. Both the formal and informal markets are important for trading of pearl millet. Farmers currently sell their grains through NAB to government to fill up national reserve storage (silos) facilities using the nearest Agricultural Development Centres (ADC) as collecting centres. They also sell their products to local millers and open markets. Pearl millet products are also included in public institutional food supply contract to enhance domestic market growth. The main challenge however, remains on how to promote pearl millet milled products to non-traditional consumers in the country.

**b) Imports and exports of mahangu grain:**

No pearl millet products currently are being exported to other countries. However, some tightly controlled importation of pearl millet grains is done by the government from India following a formal market. NAB issues permit to millers to import pearl millet according to appropriate standards as per guidelines. The NAB also prescribes and collects permit fees and imposes such levies for pearl millet. *Mahangu* producers pay a levy of 0.70 percent per tonne grain marketed while the millers pay 0.6 per tonne milled (NAB, 2010). Relatively smaller quantities of pearl millet mainly for household consumption are also entering (brought mainly by relatives) the border from Angola. It is important to note...
that sometimes these grains from Angola also end up in the Namibian informal market (open markets). The open market in rural towns remains an important trading centre for many rural products including pearl millet products.

**Market information and Quality of products:**

Both small and large millers buy quite significant quantities of newly harvested pearl millet grains from farmers. The major problem however, lies in inconsistency of supply from local producers. This is probably because of lack of surplus production during floods or drought year. Moreover, most farmers prefer to sell poor quality older millet grains from their stores than new ones. One can deduce that maybe farmers perceive that the price per kilogram for new grains is not good enough compared to the cost of the final output (grains raw material). As earlier indicated the pearl millet grains formal market price for 2009/2010 season was N$2.66/kg (NAB, 2010). From observation, when grains traded informally, especially during the off season the price can be up to at least N$4/kg. Hence pearl millet price setting should be based on domestic price floor and not on the import parity price of RSA white maize. In addition the quality standards of pearl millet grains traded is specifically not well articulated and farmers are not well informed. For example grading, sorting and packaging standards as important marketing functions need to be improved. Taste of pearl millet flour found in the formal markets need also to be improved to meet traditional consumers’ preferences. Providing market information among producers, consumers and processors will enhance competitiveness of the pearl millet industry.

**Related and supporting industries**

Transport, processing, financing, distribution, selling and risk-taking are essential marketing functions performed by business to add value to finished products. The MAWF is responsible for pearl millet research. The main research stations are the Okashana research station and the Mahenene research station where different new varieties and seed multiplication activities are being carried out. In addition loans to farmers for agricultural activities (inputs, implements, training and services) are available from the Agricultural Bank of Namibia (Agribank). The main challenge for Agribank as the loaner remains on how to overcome the issue of collateral (security) with rural farmers. Recently, new innovative forms of collateral such as agricultural insurance policies have been proposed to government to help rural farmers to access credit (Government of Namibia, 2010).

The complex marketing chain linking pearl millet products supplies to consumers is illustrated in Figure 1. Domestic millers purchase pearl millet from rural surplus producers and supply retailers and final consumers. In most cases small millers buy from farmers while relatively few farmers delivered their grains to small millers. NAB manages the purchasing of new grains for national reserve storage (silos) from rural surplus producers with trading taking place at ADC. From silos Government sells pearl millet to millers and serves households with drought relief through Emergency Management Unit (EMU). Figure 1 shows the main, related and supporting industries for the Namibian pearl millet industry.

**Firm strategy, structure and rivalry**

Firm strategy, structure and rivalry relates to the national conditions governing how companies are formed, organized and managed, as well as to the nature of domestic rivalry (Porter, 1990)). In case of Namibia, pearl millet products have been concentrated on the domestic market. Strategies were thus focused on this market. As pearl millet is a controlled crop, its markets are well regulated by government. The main strategy is for producers to be food self-sufficient at household level.
so that they can sell their surplus to generate income. Firms in this industry are loosely explained as:

**The surplus mahangu producers:**

This group can be divided into small and large scale pearl millet producers. As a copying strategy the farmers grow multiple activities that are economic as precaution against risk to ensure that there is at least some food to eat for the family until the next harvest. The uncertainty about climatic conditions (floods and drought), the higher presence of pests, unavailability and un-affordability of fertilizers and market access challenges makes this group of farmers vulnerable to failure to consistently produce surplus.

**Implements and tools suppliers:**

As earlier indicated the land preparation and management of pearl millet involve the usage of various implements and tools such as draught animal power technologies (ploughs, cultivators, planters and harrows). Farmers also use tractors, and to a limited extent walking tractors. Pre-cleaners and milling machines perform important marketing and processing functions namely cleaning and milling respectively. The availability of affordable implements or tools and appropriate technologies will obviously enhance competitiveness of the millet industry. Most of these production and processing machines are specified from overseas suppliers usually through RSA dealers. For example small scale mills, the preferred country of machinery imports is China or India. Locally government owned Ongwediva Rural Development Centre (Komeho) manufactures and sells at subsidized price some of the cereal production and marketing facilities. Some rural farmers have been trained by the MAWF as blacksmith technicians, which is important for repairing and maintenance of depreciating capital goods. Yet most of the parts (components) and tools for repairs as well as new machines are sourced from overseas, hence constraining the competitiveness of the pearl millet industry.

**Cooperative arrangements:**

Challenges facing rural farmers include new technologies, new crop varieties, and procurement of production inputs, marketing agricultural output and new industries as well as poor infrastructure. All these and other constraints call for cooperation among small scale farmers. Generally cooperatives in the pearl millet industry are established mainly for acquiring inputs (seeds, fertilizers) and land preparation services than for marketing outputs.

**Small and large scale millers:**

Small-scale millers operate in rural areas (including towns) were electricity is available. They mill old and new grains mainly from rural households (informal markets) into flour for a service fee of N$12 per Olata (25kg bag). Some do also sell their high quality flour to retailers and catering companies though to a lesser extent. One of the problems experienced by smaller millers is the higher operation costs, henceforth, lower profit margins which are not price competitive with that of substitute maize meal. Some small millers also lack proper storage facilities, proper equipment for cleaning and grading their products. Namib mills which is the largest monopoly cereal company in the country continues to mill its two brands of pure mememahangu and mixed maize with mahangu flours. Possibly the company processing strategy is to reduce cost and makes mahangu flour price margins competitive with that of substitute maize meal. This strategy results into poor quality mememahangu flour, suggesting that their pearl millet processing method is not very efficient and effective. As a result, in the long term might this will constrain the choice of millet products.

**Threat of substitute and new entrants:**

Maize meal remains the main substitutes for mahangu flour in Namibia. In the future millet products such as bread, biscuits will obviously compete with wheat products. For pearl millet products (flour) to be competitive with that of maize meal, its price should be less than that of maize meal. Currently the average retail price per kilogram of pure mahangu meal is estimated to be 5 percent less than that of maize meal. As a result the main challenge for the formal market is to improve at lower cost of mahangu flour meeting consumer preferred quality standards (taste). The market power to improve the quality of the mahangu flour however, lies with the millers.

**Acknowledgement of Government support**

In general, government plays a significant role and can influence each of the Porter’s four determinants of competitiveness in the value chain, with the exception of chance events, either positively or negatively through government policies and operational capacity. The National Agricultural Policy (1995) acknowledges the role of government in the development of the pearl millet industry for both household food security and commercialization of surplus. Government has been supporting the industry through various programs such as the Mahangu Marketing Intelligent Unit (1995 – 2006), the Mahangu Marketing Plan (2010 – 2013) and Dry-land Crop Production Programme (2010 – 2013). If Government experiences a higher budget deficit coupled with high expenditure this would obviously constrain
growth of the millet sector. Government should also curb inflation since high inflation rate will influences negatively the competitiveness of the pearl millet industry. Moreover, tariff and non-tariff barriers constrain international competitiveness. As a result, on the international front, Namibia is a member country of various trade arrangements, such as the WTO, SADCSACU and African Union (AU). The main driving force behind Namibia joining the international community chiefly has been market access and trade policy reforms which are vital to the development of the agricultural sector.

**Chance factors**

The role of chance occurrences has little to do with national strategic planning, being largely outside the sphere of influence of specific firms. Namibia enjoys political and relatively economic stability. As earlier indicated the main uncertain factors that affect the surplus production of pearl millet include prevalent occurrences of floods, drought and pests as well as reduction in labour due to HIV-AIDS infection. In general, the Namibian dollar (N$) is strong when compared to major currencies, such as the US$ (Thomas, 2007). The strength of the N$ means that the Namibian pearl millet industry is less competitive in the global markets.

**IMPLICATION AND CONCLUSIONS**

The Namibian government to a large extent and private sector to a lesser extent are committed to the production and commercialization of pearl millet. Price support to northern communal farmers take the form of subsidized tractor hire schemes, improved seed, fertilizer and weeding that are supplied through the government extension services at below market prices. However, the delivery of production inputs to agricultural extension offices is consistently late; hence, this has serious implications on crop productivity. With regards to subsidised ploughing and weeding services the problem is that not all farmers have an understanding on how the government voucher services system work. Moreover, the absence of fertiliser and the incomplete draft seed policies make the implementation of agricultural inputs and services subsidy programme complex. Fertiliser and seed policies should be drafted and completed to serve as guiding principles to farmers. In addition high pre-harvesting grain losses from pests especially birds have been reported by *mahangu* producers. To enhance productivity more appropriate birds control techniques should be explored.

From observations it seems that there is a major concern with regards to cleanliness, age and to a lesser extent variety of pearl millet grain from buyers. From the consumers’ perspective the major concern is the bitter taste of unfermented pearl millet flour from millers. From producers’ perspective the main concern has been the price paid for the raw materials. With the assistance from both public and private sector there is a need to establish well organized research institutes and domestic marketing systems that incorporates appropriate products quality assurance and management practices. Since the domestic demand of *mahangu* is significant, the average producer price for its grain per kilogram should not be determined based on the import parity price of RSA white maize but should be based on well calculated domestic market floor price.

The major determinants of competitiveness of the pearl millet industry vary from region to region. Hence productivity should be improved through the implementation of appropriate product differentiation and low cost processes in the *mahangu* value chain. As a strategy to enhance surplus production, the pearl millet sector should be introduced to other suitable regions in the country. Another main production strategy emanating from this study is to encourage the planting of late maturing traditional seed varieties when the rainy season starts early and early maturing improved seed varieties when the rainy season begins late. The main promotion strategy is to reach out to non-traditional domestic *mahangu* consumers.

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