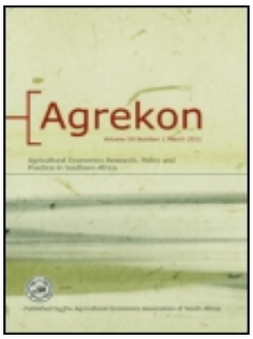

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M.L. Mabuza (Postgraduate student), G.F. Ortmann (Professor) & E. Wale (Senior Lecturer)

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SOCIO-ECONOMIC AND INSTITUTIONAL FACTORS CONSTRAINING PARTICIPATION OF SWAZILAND'S MUSHROOM PRODUCERS IN MAINSTREAM MARKETS: AN APPLICATION OF THE VALUE CHAIN APPROACH

M.L. Mabuza*, G.F. Ortmann* and E. Wale*

ABSTRACT

Mushrooms have been cultivated in Swaziland since 2001 as part of a long-term programme that seeks to improve rural livelihoods through commercial production of non-conventional high-value commodities. Despite the availability of niche markets, and various forms of support received by producers, Swaziland is still a net importer of locally consumed cultivated mushrooms. This study uses a value chain approach to identify the underlying factors constraining local production and producers' participation in mainstream markets. Understanding the nature of these constraints and how they can possibly be alleviated is very important from a policy perspective as this process will inform the formulation of improved market access strategies required to achieve the programme's overall objective. The results indicate that availability of marketable surplus is affected by production constraints emanating from lack of access to key inputs and services, which are centralised and fully controlled by the government. While producers currently attain higher gross margins (in absolute value and as a proportion of consumer price) compared with other actors in alternative marketing channels, their efforts to participate more profitably in mainstream markets are hampered by poor value chain governance and lack of vertical coordination, subjecting both producers and buyers to various forms of transaction costs. In attempting to address the identified constraints, this study calls for privatisation of key services, allowing the government to assume a monitoring role. Further recommendations are also made towards institutionalising and strengthening collective marketing under different options, which reflect producers' socio-economic status and the prevailing institutional environment in Swaziland.

Keywords: mushrooms, market participation, value chain, Swaziland

JEL Classification: Q13

* Respectively, Postgraduate student, Professor and Senior Lecturer in Agricultural Economics, School of Agricultural, Earth and Environmental Sciences, University of KwaZulu-Natal, Private Bag X01, Scottsville 3209, Pietermaritzburg, South Africa.
(E-mails: lmabuza@yahoo.co.uk, Ortmann@ukzn.ac.za and WaleE@ukzn.ac.za)

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1 INTRODUCTION

Prior to 2001 mushrooms were not cultivated in Swaziland and their introduction was part of a United Nations Development Programme (UNDP)-funded initiative meant to assist Swaziland towards diversifying its agricultural base and improving rural livelihoods. The adopted strategy was to promote the production of non-conventional high-value agricultural commodities (HVACs) that have not been explored by local farmers despite having a relatively high market demand in local and international markets. Currently, Swaziland's priority is placed on the oyster mushroom (*Pleurotus* spp) because it is the easiest and least expensive to grow (Chang and Miles, 2004). There is also a wide choice of oyster mushroom species available for cultivation under different climatic conditions using a range of substrate materials (growing media), most of which are generated from agricultural, forest and food processing waste (Oei, 1991). The production procedure qualifies the mushroom enterprise as an environmentally unique process for bioconversion of non-edible plant biomass to generate value-added products that are highly nutritious, tasty and relatively quick and easy to prepare. Compared with other high-value food commodities (e.g. vegetables), cultivated mushrooms have high levels of proteins, vitamins, dietary fibre and inorganic minerals (Guillamón *et al*., 2010). More importantly, they are effective in enhancing the human body's defence against various types of cancers, viral infections (including HIV), diabetes, constipation and cardiovascular diseases (Roupas *et al*., 2012).

Given the high local demand for cultivated mushrooms (Mamba, 2010), there is a growing interest in the mushroom enterprise, particularly from rural-based small-scale farmers who can generate additional income from growing mushrooms using residues from other agricultural products. Different from the conventional agronomic enterprises found on customary Swazi Nation Land (SNL), which are generally mono-seasonal and rainfall-dependent (Government of Swaziland (GoS), 2002), mushrooms can be grown year-round and do not require large areas of land as they are produced from enclosed structures, whose environment (temperature, light and humidity) is controlled by the producer. This form of diversification is capable of mitigating the effects of climate change on rain-fed agriculture. It also provides rural dwellers an opportunity to make returns within a short period of time as a single production cycle of maize, for instance, which takes about four to six months, is enough to produce approximately two cycles of oyster mushrooms. Given these attributes, a number of sub-Saharan African (SSA) countries have since the early 2000s included the mushroom enterprise in their agricultural systems (see Zero Emissions Research Initiative (ZERI), 2005). In support, the New Partnership for Africa's Development (Nepad) initiated a programme in 2009 that seeks to promote small-scale mushroom farming for poverty reduction and health benefits in southern Africa. Under the Nepad

programme, Swaziland participates as a host for a regional mushroom gene bank (Southern Africa Network for Biosciences (SANBio), 2012).

Typical of HVACs, which are known for having a relatively high income elasticity of demand (Kumar *et al*., 2011), cultivated mushrooms are largely consumed by the urban working class and people with special diet preferences. These consumers usually purchase mushrooms from supermarkets, whose involvement in food retailing provides an opportunity for farmers to participate in mainstream markets, enabling them to potentially generate substantial returns (Weatherspoon and Reardon, 2003; Emongor and Kirsten, 2009). With South Africa being the major trading partner for a number of southern African countries, most of the operating supermarkets in Swaziland are sub-branches of South African chain stores. The predominant ones include Pick n Pay, Shoprite and Spar (Emongor and Kirsten, 2009). With over 63% of Swazis living below the US$2/day poverty line, of whom 75% reside in the rural areas (GoS, 2011a), integration of rural-based small-scale producers into mainstream supply chains can enhance Swaziland's fight against poverty and food insecurity.

However, despite the available market for local producers, over 95% of cultivated mushrooms consumed in Swaziland are currently imported (Mamba, 2010). Since the mushroom development programme was started in 2001, no empirical research has been done to study the underlying factors constraining local production and producers' access to mainstream markets, an objective that this study seeks to accomplish. Understanding the nature and complexity of these constraints and how they can possibly be alleviated will inform the formulation of improved market access strategies required to achieve the programme's overall objective of improving rural livelihoods. While considerable studies have been done in southern Africa on this subject (see Ortmann and King, 2010, for a review), mushrooms have not featured in the debate and the findings and recommendations of previous studies cannot be generalised across commodities and countries because of different commodity characteristics and institutional environments (Delgado, 1999; Torero, 2011). This study also differs from previous attempts by using a value chain approach (VCA), which reflects on the various activities from production to the delivery of mushrooms to final consumers (Kaplinsky and Morris, 2001). The VCA enables the study to better identify unexploited opportunities and in response prioritise interventions that could improve operations at various stages of the entire chain (Chitundu *et al*., 2009).

2 DATA COLLECTION

A snowball method (Goodman, 1961) was used to collect data from different value chain actors. Initially, data were collected from mushroom producers who identified input sources and mushroom buyers. Interviews with input suppliers and market intermediaries also identified other actors and institutions influencing the value chain. Using information from the Mushroom Development Unit (MDU) under the Ministry of Agriculture, producers in Swaziland as at December 2011 comprised 11 farmer groups, whose respective members are located in more or less the same communities, and 74 individuals found in various locations. Farmer groups operate in predominantly two models. In model A, members produce mushrooms in one growing room and share all production and marketing activities. In model B, members share all preparatory activities, including substrate gathering and spawning of bags. However, instead of producing under one roof, each member manages his/her own production house. Groups that operate using model B allow members to make their own marketing arrangements independently. Given that this study was part of a broader survey with a component that required household variables to study mushroom producers' choices of marketing channels, it was found reasonable to use data generated from individual producers and members affiliated to groups that operate using model B. Among the 11 groups, only two (Mbangweni and Zombodze) were found using model B. From a total of 38 members from Mbangweni and 25 from Zombodze, interviews were conducted with 36 members from Mbangweni and 24 from Zombodze, respectively. From the list of 74 registered individual producers, 43 owned production structures but had not started producing at the time the interviews were conducted. Therefore, 31 producers from this category were interviewed, bringing the number of interviewed producers to 91. Data from producers were gathered between December 2011 and January 2012, whereas interviews with other value chain actors were conducted between June and July 2012. Questions for the latter survey were structured such that the data and information provided were in harmony with the period when producers were interviewed.

Given the very low number of identified input suppliers and other value chain actors (see Appendix A), it was not necessary to generate samples. Therefore, interviews were conducted with representatives from all stakeholders identified in Appendix A. Additional information came from site visits where activities related to mushroom production and marketing were directly observed. The next section presents the study results in a format that follows the mushroom value chain, highlighting the main activities and constraints encountered in every stage.

3 RESULTS

This section commences with a brief description of producers, followed by a discussion of activities and related constraints encountered in the production and marketing processes. Major institutional factors constraining mushroom production, marketing and value-addition are also discussed. The section concludes with an outline of proposed interventions meant to enhance market access and facilitate the movement of mushrooms within the value chain.

3.1 Description of producers

Farmer groups legally recognised in Swaziland consist of cooperatives, companies and associations. However, of late, some farmers have elected to associate and venture into agribusiness through "informal" commodity-based groups, which are fully autonomous and not regulated by any form of legislation. The latter category describes the nature of mushroom producing groups (A and B) discussed in the previous section. These groups are relatively easy to form, flexible and responsive to members' shifting needs. With no externally imposed rules of running their businesses, informal groups are founded on the strength of cognitive and structural social capital and have a relatively wider latitude for decision-making, enabling them to swiftly respond to available business opportunities (Mabuza *et al*., 2012).

The average age of interviewed producers was estimated at 50 years, and the majority (75%) are women. The producers have limited experience in agribusiness and a relatively low level of education as slightly over 65% did not go beyond secondary school. They also have limited access to market information as only 37% reported to have knowledge of mushroom prices in alternative markets. Such attributes tend to compromise the producers' ability to bargain for better deals with exchange partners (Pingali *et al*., 2005). Given the relatively high perishability of mushrooms, producers are at times compelled to store their produce in cool conditions before availing them for exchange. In relation to such expectations, only 58% of the respondents indicated to own refrigerators. With only 13% owning vehicles, most producers rely on public transport to convey their mushrooms to distant markets. The size of enterprises range between 400 to 1000 substrate bags (15cm diameter and 30cm long) and all respondents produce on customary Swazi Nation Land (SNL), implying that they cannot claim formal ownership of the land. Information on other value chain actors is contained in subsequent sections.

3.2 Production phase

3.2.1 Input supply (spawn and substrate)

The first activity in mushroom production relates to spawn (seed) development, which since 2001 has been done by the government through the MDU, located in Malkerns (central Swaziland). Government's justification for having one spawn supplier is that, as the industry is relatively new, consumers need to be protected from poisonous types of mushrooms, and producers from unscrupulous suppliers who may provide them with a low quality product. The spawn is sold in 350ml bottles at a cost of six Emalangeni[1] (E6) each. These bottles are collected by MDU field staff from bars and restaurants after being discarded as waste material, whereas substrate bags from which the mushrooms are grown, are donated by the government of Thailand and distributed by the MDU to producers for free.

Different combinations of growing substrates that have been tried and recommended for growing oyster mushrooms in Swaziland include: (i) 90% sugarcane bagasse and 10% wheat bran, (ii) 90% grass straw (*Panicum maximum*) and 10% wheat bran, and (iii) 45% grass straw, 45% maize cobs and 10% wheat bran (MDU, 2009). However, sugarcane bagasse is no longer available to local farmers as sugar mills use it to produce ethanol. As such, most (95%) producers have resorted to using grass straw and wheat bran, whereas the rest use a combination of grass straw, maize cobs and wheat bran. Although grass straw is abundantly available in most rural areas, producers prefer to buy than to spend time cutting grass from the wild. The major supplier of grass straw is Mabhuda farm in Siteki (north-eastern Swaziland) where a bale costs between E250 and E350 per 250kg, depending on the season. However, because of Mabhuda farm's location, the MDU buys the grass in bulk for onward sale to farmers at E200 per 90kg. Wheat bran is obtained from agricultural retail outlets, whereas maize cobs are generally collected for free after maize has been shelled. Before the spawn is inoculated (planted), the substrate material has to be cut into smaller pieces and pasteurised. Cutting grass or maize cobs into the required sizes and mixing with water and wheat bran are a labour-intensive activity. The technology used for this purpose, also donated by the government of Thailand, is available in only four areas countrywide and producers have to make arrangements to access the service at a cost of E20 per bale of 90kg. After inoculation, the bags are kept in an incubation room for about three to four weeks and will thereafter be ready to produce mushrooms. The incubation room is only available in Malkerns and can only accommodate 3 200 bags at a time. After this period, the bags are withdrawn and transported by the MDU to the producers' growing houses. Currently, producers are not charged for transportation of inoculated bags. While

some producers have managed to construct their own incubation houses, their plans to increase production capacities are constrained by the limited number of access points for spawn and substrate preparation technology. It was found that the relatively more active and progressive farmers produce at most two (instead of the possible three) cycles in one growing house per year, leading to low and inconsistent supplies to the market.

3.2.2 Management of mushroom growing house

Producers raise their own capital to erect production houses and purchase inputs, except for substrate bags as indicated earlier. They use different forms of low-cost growing houses constructed from locally available material. In line with the training offered, over 75% of producers have growing houses measuring 3m by 4m by 3m. Despite that these houses can take up to 2 000 substrate bags at a time (Food and Agriculture Organisation (FAO), 2001), respondents, however, were found producing below capacity as the houses carried between 400 and 1 000 substrate bags.

Standard practice also dictates that a growing house should have, among other items, a thermometer and hygrometer for regulating temperature and humidity, respectively. However, none of these items was used by the interviewed producers, who instead indicated that they regulate the conditions using their intuition, especially after spotting certain anomalies from the mushrooms. This kind of subjective practice, also favoured by some (e.g. Gwanama *et al*., 2011), often leads to erroneous decisions that are partly responsible for low production volumes. Even though the industry is currently dominated by small-scale producers, in attempting to commercialise mushroom production, producers should be trained on how to use these instruments and encouraged to use them as part of the daily growing house management practice. The following section discusses the mushroom marketing process. It presents the major mushroom marketing channels, showing the distribution of gross margins among the different market participants.

3.3 Marketing of oyster mushrooms

Mushrooms are highly perishable commodities, and as such their marketing is invariably associated with high transaction costs. As opposed to other food commodities that have a longer shelf life (e.g. grains), mushrooms require rapid and refrigerated transportation to consumption centres or immediate processing into less perishable forms. This limits the period of time during which mushrooms can be marketed as a fresh commodity or used as raw material in processing. Such conditions normally subject producers to limited marketing flexibility as they often find themselves in an unfavourable bargaining position, particularly against buyers who have alternative sources of supply (Jaffee, 1995). In contrast

to other countries, where similar mushroom programmes are implemented with a marketing component (see Zamil and Cadilhon, 2009), producers in Swaziland do not have this privilege as they have to make their own marketing arrangements. Currently, no cultivated mushrooms are exported from Swaziland and producers have not yet engaged in any form of mushroom processing (Mamba, 2010; NAMBoard, 2012). Instead, from what they harvest, it was found that about six to ten per cent is consumed at household level and the remainder sold through four channels identified as: (i) the farm gate; (ii) retail market (supermarkets); (iii) middlemen; and (iv) food services industry (restaurants/hotels). The marketing channels can be depicted as follows:

Channel I (Farm gate): Producers → Consumers;

Channel II (Retail market): Producers → Supermarket → Consumers;

Channel III (Middlemen): Producers → Middlemen → Supermarket →Consumers; and

Channel IV (Food services industry): Producers → Restaurant/hotel →Consumers.

About 528kg of fresh oyster mushrooms were traded by the respondents between November 2011 and January 2012 through the identified channels. Further analysis indicated that 42% was sold through the farm gate, 52% through the retail market, whereas 2% and 4%, respectively, were sold through middlemen and the food services industry. Buyers at the farm gate generally comprised locally based community members, whereas in the retail market and food services industry they include mainly the urban working class, tourists and customers with special diet preferences. Middlemen consist of a very few "entrepreneurial" mushroom producers who are able to negotiate with some retail outlets. These producers buy already packed mushrooms from their counterparts at the farm gate price for onward sale at a better price, hence benefitting from the margin. Although some producers who sell to such middlemen are aware of the price differences, in most cases they are compelled by lack of skills and confidence to negotiate with retailers. For others it is the lack of refrigerators that compels them not to rely on unpredictable buyer turnout from community members.

A summarised flow of mushrooms from production to consumption is presented in Figure 1. Due to the very low volume of locally produced mushrooms, supermarket chain stores, the major mushroom traders, often source a large proportion of their mushroom stock through their South African-based distribution centres. Compared with other southern African countries, South Africa has a much advanced and better coordinated mushroom industry, which is dominated by large-scale producers and processors; hence they are able to export fresh and processed cultivated mushrooms to different parts of the world, including several African countries (see National Agricultural Marketing Council (NAMC), 2011). As shown in Figure 1, together with restaurants and hotels, supermarkets also buy from local fruit and vegetable traders who import mushrooms from South African fresh produce markets. In the absence of stock from private traders, restaurants and hotels buy imported mushrooms from local supermarkets. Unfortunately, details on imports from supermarkets and fruit and vegetable traders could not be obtained due to the sensitivity of such proprietary information. However, information gathered from both market intermediaries indicates that the button mushroom (*Agaricus* spp), currently not produced in Swaziland, has a comparatively higher consumer demand than the oyster mushroom. In conformity with previous findings (e.g., Mayett *et al*., 2006), consumers' preference of the button is mainly attributed to its flavour and appearance. Even though mushroom buyers appreciate the initiative taken by local producers to venture into such an industry, they are particularly concerned about producers' lack of capacity to supply the required volumes of different types of mushrooms, maintaining supply consistency and, to some extent, the inability to meet the required standards. The next section discusses the distribution of gross margins among the identified participants in different mushroom marketing channels.

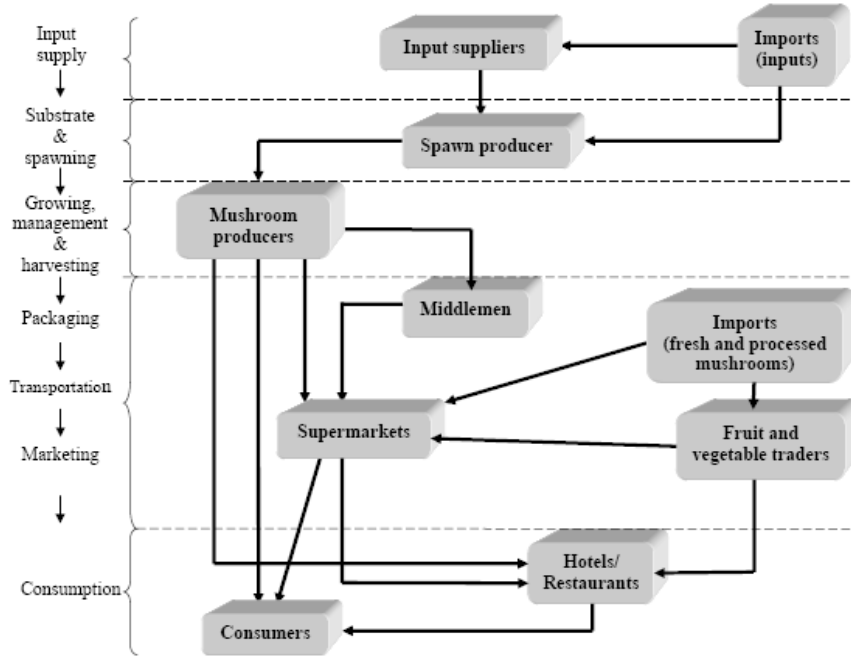

Figure 1: Product flow map for cultivated oyster mushrooms in Swaziland

Source: Authors' presentation (2011/12)

3.3.1 Distribution of gross margins along alternative mushroom marketing channels

Following Hardesty and Leff (2009), the variable costs and returns summarised in Table 1 were estimated using value chain actors' description of the chronology of activities performed from the period when mushrooms are cultivated to the point when they are finally sold to consumers. Computations were made on a per unit basis (kg of fresh mushrooms) for a producer who manages an enterprise of 400 substrate bags, the minimum enterprise size for interviewed producers, assuming he/she supplies an equal amount of mushrooms to the identified alternative marketing channels. One production cycle takes about three to four months, and within this period, mushrooms are harvested regularly, with the quantity produced declining gradually over time. A full production cycle will have about four peak harvests, also known as flushes (Gwanama *et al*., 2011).

Table 1: Estimated gross margins for market participants in different mushroom marketing channels, Swaziland, 2011/12

Marketing channels[†]	Market participants	Production and marketing costs	E/kg	Ratio of gross margin to consumer price[♣] (GM/CP)*100
I	Producer	Variable production cost (VPC)	8.99	64% (Producer)
		Variable marketing costs (VMC)	5.71	
		Consumer price (CP)	41.00	
		Gross margin (GM) = CP - (VPC+VMC)	26.30	
II	Producer	Variable production cost (VPC)	8.99	50% (Producer)
		Variable marketing costs (VMC)	10.34	
		Selling price to retailer (SP)	51.80	
		Gross margin (GM) = SP - (VPC+VMC)	32.47	
	Retailer	Purchase price (PP)	51.80	17% (Retailer)
		Variable marketing costs (VMC)	1.59	
		Consumer price (CP)	64.53	
		Marketing margin (MM) = CP - PP	12.73	
		Gross margin (GM) = MM - VMC	11.14	

III	Producer	Variable production cost (VPC)	8.99	42% (Producer)
		Variable marketing costs (VMC)	5.09	
		Selling price to middlemen (SP)	41.00	
		Gross margin (GM) = SP - (VPC+VMC)	26.92	
	Middleman	Purchase price (PP)	41.00	1% (Middleman)
		Variable marketing costs (VMC)	10.21	
		Selling price to retailer (SP)	51.80	
		Marketing margin (MM) = SP - PP	10.80	
		Gross margin (GM) = MM - VMC	0.59	
	Retailer	Purchase price (PP)	51.80	17% (Retailer)
		Variable marketing costs (VMC)	1.59	
		Consumer price (CP)	64.53	
		Marketing margin (MM) = CP - PP	12.73	
		Gross margin (GM) = MM - VMC	11.14	

Source: Survey data (2011/12)

Notes:
†Channel I: Producers → Consumers;
Channel II: Producers → Supermarkets → Consumers; and
Channel III: Producers → Middlemen → Supermarkets → Consumers.
Channel IV is not included in Table 1 for reasons explained in the text.

♣The ratio of gross margin to consumer price measures how much out of every E1 of sales to consumers a market participant earns in the respective channels.

Even though producers do not use hired labour, their labour costs were estimated based on the average time taken to perform each activity and the official minimum wage rate for agricultural general labourers (GoS, 2007). In channel I for instance, after the production stage labour is required for harvesting, weighing and packaging, and selling mushrooms to community members. Selling at the farm gate has no transportation cost as consumers buy the mushrooms from where they are produced at an average price of E41/kg. Considering the cost of packaging material and opportunity cost of labour, the farm gate's variable marketing cost was estimated at E5.71/kg. In channel II the average producer price for the retail market is E51.80/kg. Upon receiving the already packed mushrooms, supermarkets screen them for quality using their own procedures, which are mainly based on

visual inspection for browning, weight loss and microbial spoilage. Producers who sell to the retail market travel distances of at least 10km, with about 64% required to travel over 30km. Most (84%) of these farmers rely on public transport, which exposes the mushrooms to unfavourable conditions. Given that mushrooms emerge in flushes, as indicated earlier, the number of trips to the market is dictated by the quantity harvested. On average, producers make ten return trips per cycle, each covering about 70km using public transport. Transport cost was estimated at E4.63/kg, labour cost at E3.79/kg, and the remainder (E1.92/kg) being the cost of packaging material. The average consumer price from supermarkets is E64.53/kg with variable marketing costs averaging E1.59/kg. Variable marketing costs for retailers consist mainly of labour costs for receiving, screening, weighing, pricing and packaging. The cost of labour was estimated using the average time taken to perform the aforelisted activities and the official minimum wage rate for the retail and distribution sector (GoS, 2011b). In supermarkets, mushrooms are displayed in refrigerators and generally sold out within a day. Even though data on the price of electricity was gathered (E0.99/KWh), the analysis did not incorporate storage costs as the refrigerators are used to display other types of food items at the same time. In channel III, middlemen buy the already packed mushrooms from producers at E41/kg and transport them using their own vehicles to retailers where they are sold at an average price of E51.80/kg. Estimations indicate that middlemen spend an average of E9.26/kg on transport and E0.95/kg on labour.

Another category of buyers identified in Section 3.3 is the food services industry (restaurants and hotels), which adds value by cooking the mushrooms as part of different recipes. Given that mushrooms are rarely cooked alone, but in combination with various food products and ingredients, costing the value added by the food services industry proved to be an insurmountable challenge. Hence, the value chain analysis does not include channel IV. Under the current programme, where farmers are supported with free substrate bags and transportation of inoculated bags, the variable cost of producing oyster mushrooms is about E8.99/kg. Without this kind of support, the enterprise would still be profitable even though variable production costs would increase by approximately E3.57/kg. Table 1 indicates that producers currently enjoy higher gross margins (in absolute value (E/kg) and as a proportion of the consumer price) compared with other participants in alternative marketing channels. The proportion, however, reduces with an increase in the marketing channel's number of participants. The estimations indicate that producers currently earn relative gross margins of about 64% from selling at the farm gate, 42% from selling through middlemen, and 50% from selling directly to retailers. Although the gross margins are lower from selling directly to the retail market, mainly as a result of transportation costs, a large quantity (52%) of the mushrooms was traded through this channel as supermarkets offer

a comparatively higher producer price and a relatively more dependable market. Besides the absence of written marketing contracts and having less bargaining power in setting exchange prices, producers who sell through the retail channel do not have to rely on unpredictable buyer turnout as is the case with the farm gate option. While the middlemen provide an important link between some producers and retailers, a very small quantity of mushrooms was traded through channel III. Worth noting as well is that the benefits attained by middlemen are far less attractive compared with those of other market participants in the value chain. This is largely attributed to the fact that middlemen hardly add any value from what they buy from their counterparts. Hence, retailers have no incentive to buy their supplies at prices different from those offered to other producers.

Producing at full capacity (2 000 spawn-impregnated bags) from the small growing houses (3m x 4m x 3m) can generate returns over variable costs of about E11 498.00 in a period of three to four months. This amount is not negligible for rural dwellers in Swaziland, most of whom are unemployed and have limited livelihood options. The mushroom enterprise provides an alternative economic activity particularly for households located in drought-stricken areas where rain-fed agriculture has been almost impossible since the early 2000s. Producers, though, can still increase income and improve consistency in market supply by establishing their own incubation rooms, improving management practices and staggering production schedules. The major institutional factors constraining mushroom production and value-addition are discussed in the following section.

3.3.2 Institutional environment

Certain organisations, because of their internal policies or regulations, make decisions and undertake various programmes that have important implications for value chain activities. Although not directly involved in the production and distribution of products and services in the industry, these organisations are more likely to influence the institutional environment, and consequently, the performance of certain activities by other value chain actors (Webber and Labaste, 2010; Trienekens, 2011). Four such organisations were identified in the study as the MDU, Food Science and Technology Unit (FSTU), National Agricultural Marketing Board (NAMBoard) and the supermarket chain stores. Besides producing and selling spawn, the MDU is responsible for training farmers in mushroom production, importation of substrate bags, and act as a link between the government and stakeholders in the mushroom industry. Since 2009, the MDU has trained over 970 people in basic oyster mushroom production and only about a third of this number are currently engaged in mushroom production. However, as one of the industry's lead actors, the MDU has not convened a single stakeholders' consultative forum since 2001. Such forums could enable value chain actors to

establish networks and allow the MDU to receive feedback on areas that require improvement. The FSTU, also under the Ministry of Agriculture, is mandated to offer training services in food processing and value addition. However, this unit does not have the capacity to impart the skills required by producers to venture into mushroom processing and value-addition. Despite the various forms of mushroom processing opportunities (see Rai and Arumuganathan, 2008), not a single local farmer has received training in this field since 2001. Worth highlighting though is that substantial investment in commercial processing and value-addition is also constrained by Swaziland's unfavourable regulatory framework. For instance, Swaziland's Canning Control Act (GoS, 1961) gives the power for controlling the development of food processing to the Minister of Agriculture through issuing of licences. This Act, which also gives the Minister the prerogative to issue an exclusive licence to "any person for such period as he may deem fit", hinders the participation of prospective investors. Attempts to improve the general food processing environment in Swaziland would require a comprehensive revision of such counterproductive legislation.

NAMBoard is a government parastatal responsible for the overall coordination of agricultural marketing and trade, and issuance of permits to traders willing to import agricultural products. It was gathered that when the mushroom programme was started in 2001, a formal market was established with NAMBoard, which collected mushrooms from producers using refrigerated transport. However, because of the limited production capacity and inconsistent supply, NAMBoard withdrew its support, leaving producers to establish their own marketing arrangements. Worth highlighting is that mushrooms are listed under NAMBoard's scheduled products, implying that for every import of mushrooms, the parastatal receives an import levy equivalent to 7.5% of the total value. While the collected levies are meant to protect the local industry, government's regulations dictate that NAMBoard should use the generated revenue to develop local capacity to produce the same commodity (GoS, 2011c). Despite Swaziland importing over 240 tons of locally consumed cultivated mushrooms valued at about E2.4 million annually (NAMBoard, 2012), no tangible investment has been made by NAMBoard in the mushroom industry thus far.

By virtue of being the most preferred selling point for local mushroom producers, and the convenient source of supply for consumers, supermarkets' procurement policies may not only have consequences on the inclusion and exclusion of certain actors in the value chain, but also long-term prospects for the entire mushroom industry in Swaziland. Given their leverage, some supermarkets have gone to the extent of negotiating with local producers to supply them with button mushrooms instead of the oyster, as the latter has a comparatively less consumer demand. By so doing, supermarkets have sent a signal that even though the oyster mushrooms

could be comparatively easier and less costly to produce, in order for producers (and other actors) to participate competitively and sustainably in the value chain, they should consider diversifying towards other types of mushrooms in response to consumer demand.

In view of the possible increase in market supply (as a result of diversification, improved production capacity and staggered production schedules), parallel plans are required to establish an integrated value chain governance system to coordinate the movement of mushrooms from initial producers to ultimate consumers. Drawing from the identified constraints, the next section presents possible options that could be considered in fulfilling the above expectations.

3.3.3 Possible interventions for upgrading the mushroom value chain governance and coordination system

Even though the current programme prioritises the oyster mushroom, this study highlights the existence of a broad market for other types of mushrooms, especially the button. This is an opportunity for producers to diversify within the industry, a decision that may not be difficult to make, given the knowledge and experience gained thus far. However, the same cannot be said about aspiring farmers who have not been trained as they cannot seize the available opportunity. The major constraint in this case is that the MDU is the only organisation with the capacity to provide such expertise. Considering their low staff complement, it would take a while to train a substantial number of aspiring producers. This calls for the government to either increase its staff complement and facilities or alternatively establish strong alliances with NGOs to complement their training and extension programmes. Another option would be to train and identify lead farmers in strategic locations and, thereafter, facilitate farmer-farmer interactions to impart similar skills to other aspiring producers. Otherwise, opportunities to engage the private sector could also be explored. However, caution should be exercised to ensure that farmers are offered quality training and are not charged exorbitant fees.

As farmers diversify to incorporate other types of mushrooms, a demand for more production inputs will be created. Substrate availability should not be a major challenge given the abundance of agricultural and industrial waste in Swaziland. However, considering that spawn production and the technology used for substrate preparation are currently centralised and only offered by the MDU, it would benefit the entire industry if the government could privatise some of the services and allow the MDU to assume a monitoring role. As one of the lead actors in the industry, the MDU could also take the initiative to launch consultative forums with stakeholders in an attempt to establish networks and synergies among value chain actors, and possibly forge strategic public-private partnerships (PPPs). It is through such networks that prospective investors could be identified to take

up opportunities, particularly in areas where Swaziland currently relies on imports (and donations) even for simple technologies (e.g. substrate cutting and mixing machinery) that could be manufactured and supplied by local entrepreneurs. Through the establishment of collaboration structures, stakeholders could also devise strategies for influencing the removal of counterproductive legislation currently stifling value-addition.

The lack of a prescribed quality management and tracing system for traded mushrooms is another area worth looking into. While buyers did not identify quality as their major concern, the absence of easily measurable quality standards subjects producers to having their mushrooms bought at lower prices or even rejected without informed justifications. Furthermore, as the industry expands, a parallel trade in wild mushrooms is likely to emerge. In the absence of mushroom food safety regulations, this kind of trade could compromise the lives of consumers and the industry's reputation as desperation for income could lead to opportunists selling even the poisonous type of mushrooms to unsuspecting consumers. These issues could also be addressed through the proposed stakeholder forums.

With the current lack of coordination in mushroom marketing, major buyers are not spared from encountering transaction costs, given the small-scale exchanges they engage in with individual producers. However, changes that could allow the same volume of business to be concentrated in a smaller number of relatively larger and more secure transactions would benefit buyers and producers alike. This can be made possible by promoting collective marketing through the existing farmer groups. Collective marketing would also enable producers to strengthen their bargaining position, share marketing and transaction costs related to the search for buyers, monitoring transactions and transportation of mushrooms to distant markets. In view of the sparse distribution of producers, marketing and transaction costs could also be reduced by establishing collection centres (fitted with temperature-controlled storage facilities) in strategic areas, and using refrigerated transport to convey mushrooms from these centres to mainstream markets. These assets would be important in preserving product quality and freshness. While mushroom producing groups could raise the capital required to fund such investments from their own resources, it would take them a while to do so considering their economic status. Alternative funding could be sourced from state-owned Development Finance Institutions (DFIs) such as Swazibank, Swaziland Industrial Development Company (SIDC), and Swaziland Development Finance Corporation (Fincorp), which were established with a mandate to finance small and large-scale local enterprises, including agribusiness (Msibi, 2009). Building on a successful model used since the early 1990s to finance sugarcane production by previously inexperienced farmers on customary SNL, these DFIs have recently expanded their portfolios to finance even commercial horticultural

and livestock enterprises on both Individual Tenure Farms (ITFs) and communal SNL. In contrast to commercial banks, which require collateral and are generally not keen to finance small-scale agribusinesses, local DFIs have adopted a pro-poor financial innovation that uses contracts between producers and buyers as a collateral substitute. A tripartite agreement is then entered into by the producers, financier and buyer to facilitate repayment, which the financier reclaims directly from the buyer (Msibi, 2009).

However, given that current mushroom producers generally have limited agribusiness exposure, some form of outside assistance would be required to improve their competitiveness in the value chain. Engaging a facilitator who would, among other expectations, provide information and technical assistance could enhance producers' prospects to even venture into export markets. While a number of agencies, such as NGOs (Fischer and Qaim, 2012), could be considered, NAMBoard would be better suited for this role. Despite its subdued performance since its establishment in 1985, some positive lessons could be drawn from NAMBoard's recent experience in linking local vegetable producers with export markets and the attainment of Global Good Agricultural Practice (GLOBALG.A.P) certification. Hence, an option that could be viable under the current environment, would be to use the revenue generated from mushroom import levies to fund the establishment of collection centres and purchase of refrigerated means of transport, which would initially operate under the joint management of NAMBoard and mushroom producing groups. NAMBoard, working jointly with farmer groups, would assume the responsibility to find remunerative markets. As conditions improve and producers graduate to a position where they can manage the processes on their own, government may then consider withdrawing its support gradually. In order to sustain the groups' activities and cover collection centres' operational expenses, a small fee per kg of mushrooms sold could be deducted from individual sales and deposited into a working capital fund. Group members can also be responsible for providing security to avoid misuse and theft of the investment. Similar strategies have been successfully implemented towards assisting Kenyan small-scale milk and banana producers (see Staal *et al*., 1997; Fischer and Qaim, 2012). However, coordination in the milk sub-sector was later affected by politically related factors (Staal *et al*., 1997), an unfortunate incident that other developing countries could probably learn from.

4 CONCLUSIONS AND POLICY RECOMMENDATIONS

This study sought to identify the potential and underlying factors constraining mushroom production and producers' participation in mainstream markets in Swaziland. Using a value chain approach, the results indicate that producers' plans to expand production capacities are hampered by the difficulty to access key

inputs such as spawn, substrate preparation technology, and incubation services. These constraints are partly responsible for the extremely low locally produced volumes and inconsistent market supply, prompting major mushroom traders (e.g. supermarket chain stores) to rely on imports. Other constraints relate to the lack of diversification as farmers currently produce only the oyster mushroom, yet buyers are mostly interested in the button mushroom, which has a relatively high consumer demand. Although producers currently attain higher gross margins in absolute value and as a proportion of consumer price compared with other participants in alternative marketing channels, more benefits could be realised if certain services currently offered by the government (training, spawn production and distribution) could either be decentralised or privatised.

In view of the possible increase in market supply (as a result of diversification, improved production capacity and staggered production schedules), it would be beneficial to establish an integrated value chain governance system to improve market access and facilitate the movement of mushrooms from producers to ultimate consumers. In particular, the study recommends the establishment of collection centres that may enhance collective marketing in different locations. This can be made possible through financial and expert assistance from NAMBoard. In addition, efforts should be made to engage the public and private sectors to establish harmonised measurable quality standards for tradable mushrooms. These standards should be in line with existing international ones in order to facilitate mushroom trade with other countries. As a basic prerequisite for quality, the government, in close consultation with stakeholders, should introduce mushroom food safety regulations, and their promulgation will also curb possible trade in wild poisonous mushrooms. Such interventions will not only work towards guaranteeing the protection of consumers' lives, but also improve their attitudes towards the mushroom value chain. Given the diversity of the mushroom industry, a recommended starting point towards effecting the proposed improvements would be a stakeholders' consultative forum, which could also be used as an avenue to formulate control structures to oversee the implementation, monitoring and evaluation of future strategic interventions meant to instil growth and efficiency within the industry.

NOTE

1 'E' denotes Emalangeni, the Swaziland currency. E1 = US$ 0.1021 on 23rd July 2013 (Central Bank of Swaziland, 2013).

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APPENDIX A: LIST OF INTERVIEWED MUSHROOM VALUE CHAIN ACTORS, SWAZILAND, 2011/12

Activity	Value chain actor	Location(s) in Swaziland
1. Production inputs	Arrow Feeds	Matsapha
	Mabhuda farm	Siteki
2. Substrate and spawning	Mushroom Development Unit (MDU)	Malkerns
3. Growing and management	Producers	91 producers located countrywide
4. Marketing inputs	Matata	Bigbend
	Newden	Matsapha
	Foodlines	Matsapha
	Cold room	Mbabane
	Hyper packaging	Mbabane
	Builders Hardware	Nhlangano
5. Product marketing outlets	Spar supermarket	Moneni, Nhlangano, Matata (Big Bend)
	Shoprite supermarket	Mbabane, Manzini, Siteki
	Pick'n Pay supermarket	Mbabane, Manzini, Ezulwini, Matsapha
	Wozani supermarket	Nhlangano
	Tum's George Hotel	Manzini
	Calabash restaurant	Ezulwini
	Lituba Lodge	Ngcina
	Siteki Hotel	Siteki
	Café Lingo restaurant	Mbabane
	Mountain Inn	Mbabane
	Happy Valley Hotel	Ezulwini
	Debonairs Pizza	Manzini

6. Fruit and Vegetable traders	Tetsembiso Investment	Malkerns
	Vegworth	Manzini
7. Training	MDU	Malkerns
	Food Science and Technology Unit (FSTU)	Malkerns
8. Coordination	National Agricultural Marketing Board (NAMBoard)	Manzini/Nokwane
	MDU	Malkerns
	FSTU	Malkerns