

## **Improving the Viability of Small holder Market- Gardening Farmers in Zimbabwe: The Case of Mutoko Small holder Farmers.**

Beauty Dondo:

<http://orcid.org/0000-0002-4922-4801>

Collen Shoko: MercyCorps Zimbabwe

### **Abstract**

This study was carried out to establish ways of improving the viability of small holder farmers in Mutoko District in Mashonaland Central province of Zimbabwe. Questionnaires were distributed among the sampled farmers and interviews were held with all other stakeholders who work with the farmers. Results showed that the farmers were producing far less in quantity of vegetables than the average expected yields from the district. The marketing strategies used by the farmers were found to be flawed as they were not determining the prices for their commodities. Further to that the farmers were not keeping records to show whether they had made a profit or not. The study recommends that the farmers should add value to their produce before selling. The farmers could embark on contract farming to assure the farmers of a ready market for their produce. Universities and banks are encouraged to help the farmers through research as well as loan facilities so as to expand their activities. This would ensure that farmers produce their crops economically and market them prudently.

**Key words: small-holder farmers, market gardening, sustainable farming, vegetable marketing,**

### **Introduction**

Market gardening is the commercial production of vegetables, fruits, flowers and other plants on a scale larger than a home garden, yet small enough that many of the principles of gardening are applicable. Market gardening is distinguishable from other types of farming by the diversity of crops that are grown on a small area of land. Typical sizes of such a garden in the small holder sector of Zimbabwe range between 0.5-1 ha (Svotwa, 2007).

Market gardening is often oriented toward local markets, although production for shipping to more distant markets is also possible (Bachman, 2009).

The goal, as with all farm enterprises, is to run the operation as a business and to make a profit. Market gardening is based on providing a wide range and steady supply of fresh produce throughout the growing season which requires an investment of time and money. It also requires a business plan which helps the small scale gardeners define their business, create a road map for operations, set goals, judge progress, make adjustments and qualifies them to borrow.

Diversity in marketing, as well as diversity in planting, is a cornerstone of stability. Generally, many market gardeners try to maximize their income by selling directly to consumers and bypassing wholesalers and other middlemen (Xuereb 2010). Bachmann further states that tailgate markets, farmers' markets, roadside and on-farm stands, pick-your-own operations and subscription marketing are common direct-marketing strategies. Sales to restaurants, institutions and schools and grocery stores are common wholesale marketing strategies. Most market gardeners use several outlets.

This study examined the viability of smallholder market gardening farmers in Zimbabwe. The study was carried out in Mutoko district (Mashonaland East Province).

The district is characterized by low and erratic annual rainfall ranging between 450 mm and 650. Rains are received between November and April but are low and erratic with dry spells, which results in unreliable dry-land crop production.. Generally, the temperatures in the district are warm(temperatures range between a maximum average of 21 °C for the coldest month and a maximum average of 29°C for the hottest month) and this makes it suitable for the production of irrigated vegetables throughout the year (Climatedata.eu 20-10-2011).

The Mutoko communal lands are characterized by rough terrain that includes mountains, streams and rivers. Most of these rivers have small dams constructed by the local authorities to enable villagers to access water through-out the year. The farmers use the water from these streams and rivers to irk a living from market gardening.

Prior to the study it was observed that tomatoes were the major horticultural crop grown by almost every household while other crops like butternut, carrot, onion, leafy vegetables, cucumber, okra, gem squash and garlic were grown to a lesser extend.

The market gardeners of Mutoko are well known in the capital city, Harare, as providers of vegetables at the city market, but the intensity of their gardening had not been determined. What was evident was that their production was not consistent as at times they failed to supply the market with enough vegetables and then the next moment they brought in so much that there was an oversupply of the vegetables.

The smallholder market gardening farmers in Mutoko district relied on the people's market in Harare, commonly known as Mbare Musika, for the marketing of their produce. In most

cases these farmers harvested their produce without any knowledge of who would provide transport for their produce to the market, and they often got stranded on the roadside with boxes of tomatoes and piles of other vegetables. This scenario where smallholder farmers use any means of transport available, exposes them to losses, harm and death as they usually get involved in road accidents either going to or coming from the market after selling their produce. Very often when these trucks breakdown on the way to the market the farmer becomes the ultimate loser when they watch helplessly as their produce deteriorate by the roadside.

Marketing of produce at Mbare Musika was identified as a challenge threatening the viability of smallholder market gardening. Trading at this market was not well regulated and farmers fell prey to some unscrupulous traders. Prices at this market were not easy to predict. Farmers lost revenue through intermediaries at the market commonly known as “makoronyera” literally meaning “crooks”. These intermediaries determined the price and bought the produce from the farmers at low prices. These middlemen then sold the same product at a mark up to consumers at the same market.

After the marketing of their garden produce these farmers did not even pause to check whether they had made a profit or loss because there was no proper record keeping and accounting records. The smallholder farmer would then get back into the truck that brought him/her to the market on the return journey to Mutoko after buying a few household needs that included some agricultural inputs.

The observations above led the researchers to ask the question “How can production and marketing be improved to ensure viability for smallholder market gardening farmers in Mutoko district?”

The findings of this study would significantly benefit all stakeholders in the smallholder farming sector. The benefits could be through lobbying and advocacy by representative groups for the improvement of smallholder production and marketing strategies. This research would contribute towards improvement of communication and marketing infrastructure that would support smallholder farmers with marketing of their products within and outside the district.

The research sought to empower smallholder market gardening farmers through the addition of information. Improved marketing strategies would benefit farmers through reduced exposure to risk by doing business through well defined markets thus reducing the information gaps and uncertainties on the availability of demand for their produce and inputs to support the production systems.

## **LITERATURE REVIEW**

It is important to understand what production and marketing strategies are intended to achieve for smallholder farmers in the agricultural sector .(Tracey-White 2005). If smallholder farmers are to increase production, more attention needs to be paid to the fact that their output must be marketed at rewarding prices (FAO 2001). Tracey-White (2005) argues that marketing strategies are meant to facilitate the flow of produce between different levels of the marketing system. Tacoli (2004) noted that rural–urban linkages include flows of agricultural and other commodities from rural based producers to urban markets, both for local consumers and for forwarding to regional, national and international markets; and, in the opposite direction, flows of manufactured and imported goods from urban centres to rural areas.

Market access is crucial in smallholder development because it creates the necessary demand, offers competitive prices, thereby increasing smallholder viability (Al-Hassan *et al*, 2006). Smallholder market gardening farmers in most cases have limited access to the main stream markets like the supermarkets, retail, regional and international markets which have a constant demand for horticultural produce (Tschirle, 2007). Linking smallholder farmers to high value urban and export markets could be an important strategy for raising rural incomes, reducing poverty and ensuring viability of smallholder market gardening (Minot *et al* 2003). Shepherd (2005) observed that in general, linkages between associations in the fruit and vegetable sector were relatively poor. In a study in India, it was noted that while there were many fruit and vegetable trader associations, there were no formal or even informal linkages between them.

The rural-urban linkage model emphasizes that farmers and other rural producers be connected with both domestic and external markets (Tacoli 2004). This is critical for the smallholder sub-sector if it is to grow and contribute meaningfully to the national economic development.

## METHODOLOGY

The survey and observation techniques were used to collect data for the study. The techniques were used in order to collect data from all stakeholders in the market gardening sector in the district, as well as those involved in the market activities at the main market of Mbare. These techniques have been successfully used elsewhere in similar studies (DFID 2005).

### **Population and Sample:**

The population for the study was a group of smallholder market gardening farmers in Mutoko district of Mashonaland East Province, agricultural extension staff at district and ward levels, NGO staff at district level and council staff managing or working at the two farmers' markets. The population included traders that used the Mutoko Varimi market and Mbare Musika markets.

All smallholder gardens in the target six communal wards of Mutoko district formed the sampling frame for the study. The six wards have a combined total of 150 communal gardens, thus giving an average of 25 gardens per ward, but each household conducting its business independent of other garden members. A random sample of 25 gardens was selected for the study. Out of each of the 150 gardens only 2 farmers were further selected using a simplified random method where papers written "yes" or "no" were used and only those who picked "yes" participated in the study which was done to reduce bias in the selection process. A total sample size of 300 farmers was used.

Questionnaires were used to collect primary data from the farmers that participated in the study. Interview guides were used for interaction with extension staff at district and ward levels, NGO staff in the district and rural district council personnel.

Before the distribution of questionnaires was done, a pilot test of the instrument was done in Ward 3, (Chindenga) and this worked with a sample of 10 farmers to assess the user friendliness of the instrument. The feedback from the pilot test was then used to improve the questionnaire. The questionnaire combined both open-ended and closed-ended questions and was distributed together with an introductory letter which explained the purpose of the study and appealing for respondents' support during the survey.

Observations were used to get some insights into how the Mutoko and Mbare markets worked.

## **Nature and Scope of Smallholder Market Gardening Activities in Mutoko District**

### **Horticultural Crop Production Systems**

The data collected show that 97.6% of the farmers that participated in the study grew horticultural crops for marketing purposes. Table 1 gives a summary of market gardening crops grown for marketing by smallholder farmers in Mutoko district.

**Table 1: Distribution of farmers by market gardening crop**

<b>Horticultural crops</b>	<b>%</b>
B	40
Tomatoes	
Onion	24
Butternuts	17
Green mealies	14
Cucumbers	4
Egg plant	1

The study established that the four main horticultural crops grown by smallholder market gardening farmers in Mutoko district are tomatoes (40%), onions (24%), butternuts (17%) and green mealies (26.8%). The least grown horticultural crops from the sample being cucumbers and the egg plant representing 7.3% and 2.4% respectively. This low production of the egg plant could be attributed to the difficulties in marketing the crop, since it has a limited market and is favoured by the most affluent members of the society who do not normally buy from the public markets used by these smallholder farmers.

**Table 2: Yields levels attained by smallholder market gardening farmers in Mutoko district as compared to expected district targets**

<b>Crop</b>	<b>Expected District Yield</b>	<b>Average yields Attained</b>	<b>Percentage shortfall</b>

	levels (ton/ha)	(ton/ha)	
Cabbages	30	2.81	90.6
Tomatoes	35	10.05	66,5
Onions	30	4.59	84,7
Carrots	15	1.46	90.2
Butternuts	15	8.77	41.5
Cucumbers	15	13.25	11.7

Table 2 gives a comparison of yields that were obtained by smallholder farmers in their market gardening activities in Mutoko district as compared to the expected yields for each of the crop in the district. Although the majority of the farmers grew tomatoes, their actual yields were averaging 10 tonnes per hectare, 66.5% lower than the district expected target. However it must be noted that for cucumbers the farmers were close to the target producing 13.25 tonnes per hectare 11,7% lower than the expected yield and for butternuts they were 41.5% below the target which was quite encouraging.

From these results it is apparent that if farmers are to improve viability, more attention needs to be paid to their production capacity. There could be need to make the farmers aware of their production levels, as compared to expected yields, with a view to encouraging them to improve production

### **Smallholder Farmer Investment Practices**

The study also sought to understand how the smallholder farmers were spending their income after marketing. This was done so as to have an insight into the investment practices by the farmers. The major areas of investment by smallholder farmers were provision of shelter, education of their children, improvements of the business and acquisition of assets. Table 3 below gives a summary of the major investment areas by smallholder farmers in Mutoko district.

**Table 3: Distribution of income earned from market gardening activities by area of Investment**

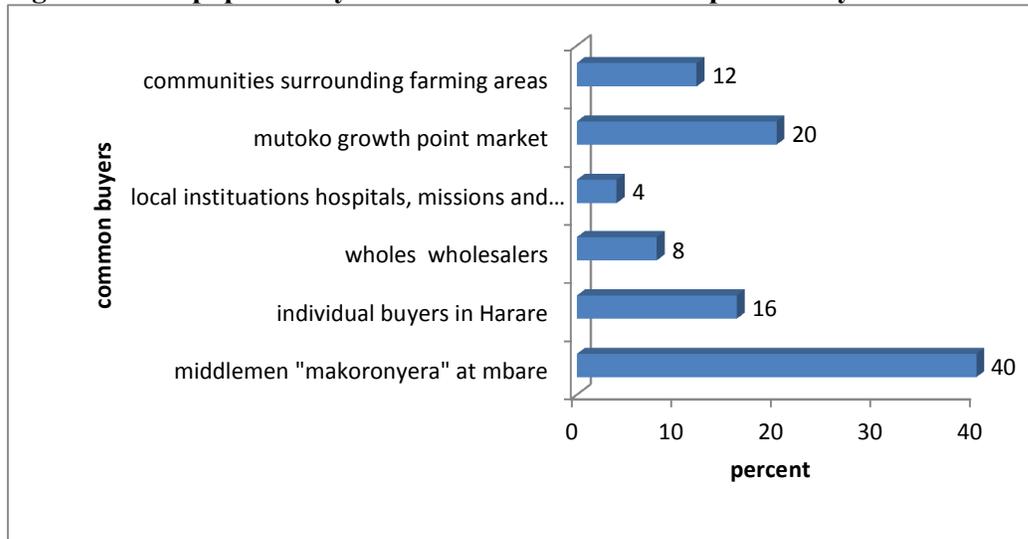
<b>Area of investment</b>	<b>%</b>
Managed to send my children to school	29
Managed to build an asbestos roofed house (shelter)	22
bought irrigation pipes	19
Bought cattle	17
Bought scotch carts and wheel barrows	11
Bought a Car	2

The results show that 29% of the farmers who participated in the study spend their income in the education of their children, while 22% spend their income in the improvement of family shelter. About 19% of the farmers ploughed back their income into their enterprises through the purchase of irrigation pipes, while 17% bought cattle and 11% invested in transport for their produce, by way of buying scotch carts, wheelbarrows and 2% bought small pick-up trucks

#### **Common Buyers for the smallholder farmers**

The study also sought to establish the type of buyers in the markets that were identified, by the respondents. Figure 1 below summarized the findings of the study on the subject.

**Figure 1 Most popular buyers for smallholder farmers produce by distribution**

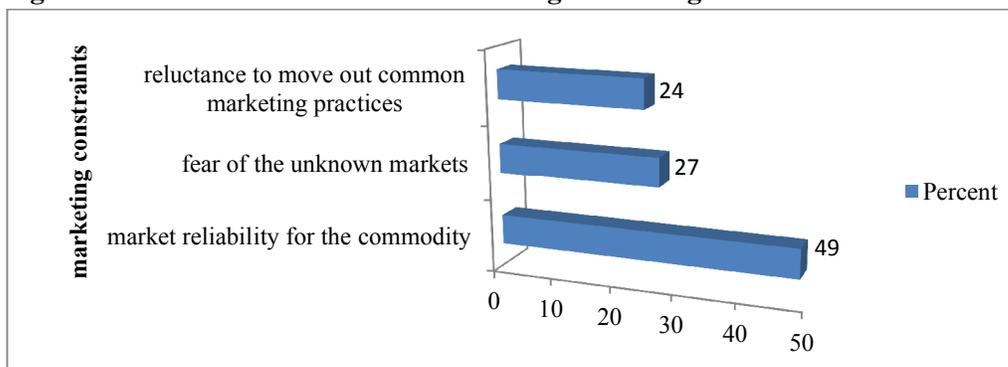


The middlemen (intermediaries) at the Mbare Musika wholesale market were regarded as the common and most popular buyers by 40% of the smallholder farmers. These were followed by the local market at Mutoko growth point which accounted for 20%. Wholesalers, local institutions and communities surrounding the farming areas were also identified as markets benefiting from the smallholder market gardening initiatives. Observations made at the Mbare market over three days of trading revealed that the middlemen would literally take over as soon as farmers came in with trucks of their produce. They would declare to have bought the whole truck load without paying any cash. Farmers would have little to say to the middlemen who determined the prices to pay for the various commodities on each day. At times farmers would be asked to wait whilst the middlemen sold the merchandize at a higher price to individuals and vendors, after which, they would pay the farmer and pocket the difference.

### **Farmers' marketing constraints**

Figure 2 summarizes the marketing constraints that were identified by the smallholder market gardening farmers as hindering the development and expansion of their marketing efforts in the district.

**Figure 1: Distribution of farmers indicating marketing constraints**



Findings from the study show that about 49% of the farmers felt that market reliability for commodities was the major marketing constraint as the markets were very volatile and farmers were not adequately rewarded for their efforts. About 27% of the farmers expressed fears that venturing into new markets was very risky as outcomes from such moves were not assured. About 24% of the farmers were just reluctant to change from their traditional marketing practices and markets and preferred to deal on the market they were familiar with.

**Perceived Constraints from the Extension Staff Point of View**

During the study extension staff from the department of agricultural extension services, three NGOs that work in district were also consulted on the subject. Their views on the challenges threatening smallholder farmer marketing gardening business activities in Mutoko are summarized in Table 4 below.

**Table 4: Distribution of challenges to the viability of smallholder farmer’s market gardening business**

<b>Challenges faced by farmers in marketing produce</b>	<b>%</b>
Excess supply on the market & low product price	44
Distance to nearest markets & high transport costs	28
Poor farmer organization	16
Lack of marketing skills by farmers & poor record keeping	12

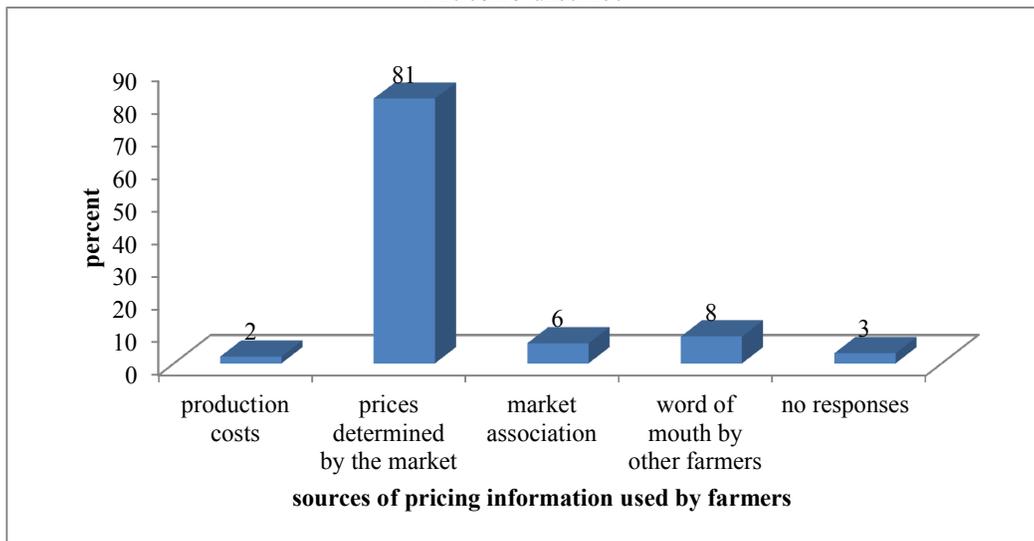
About 44% of the respondents believed that oversupply of product on the market coupled with low product prices were the major constraint to the marketing of vegetables by smallholder farmers. Distance to the market and high transport costs (28%) was cited as the second major challenge by the participants in the study. About 16% of the respondents

believed that poor farmer organization was contributing to the challenges as they worked as individuals and not in groups. From these results it is evident that smallholder farmers would need to look for alternative markets for their produce to address the issue of flooding and poor product prices on the current market. Although the subject of poor farmer organization was ranked low by this group of respondents it is one of the major challenges why farmers were faced with excess supplies on the market, low prices and high transport costs. These constraints could be better managed with good organization and planning by farmers. Poor farmer organization meant that they were not able to negotiate for better prices for their goods and other services which disadvantage them in the process.

### Pricing Determinants Used by the Smallholder Farmers

Figure 6 below summarizes how farmers were pricing their products on the market.

**Figure 2: Sources of price determination for smallholder market gardening farmers in Mutoko district**



Only 2% of the farmers that participated in the study indicated that they were using the costs of production to arrive at the selling price, while 81% of the farmers indicated that the prices of their commodities were determined by the market and had no influence on the prices being offered. About 8% of the farmers were getting prices by word of mouth as told by other farmers coming from the market place at different times of the marketing season. About 6% of the respondents were getting market information through the farmers' association. The results show that smallholder farmers' position on the market was weak and compromised as

they could not influence the price they needed for their crops. They were merely takers of prices on offer without any bargaining power, thus creating a gap in the whole marketing system.

The other gap observed from the results was that farmers were not using production costs to arrive at the selling price. Extension staff could focus on this area to assist farmers so that at the end of the marketing season they could sit down to reflect on their activities and do some viability analysis.

#### **Transport Arrangements to the Market:**

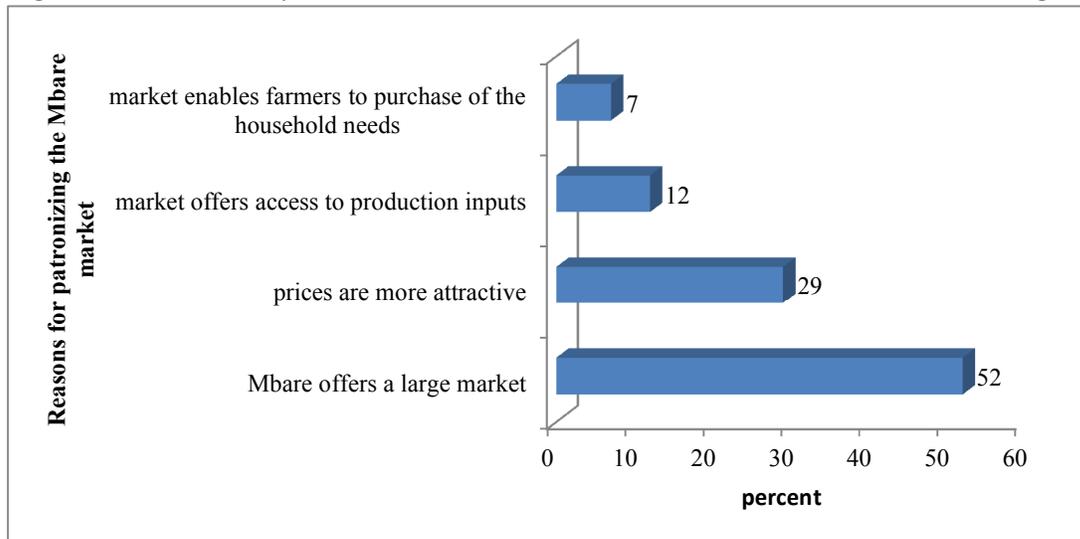
Findings of the study were that the smallholder market gardening farmers had poor transport arrangements to ferry their produce to the market

It was observed that 68% of the farmers used own transport arrangements to deliver produce to the markets, while 28% indicated that private transporters came and collected their produce from their farms or from the road side. The results revealed a weak transport arrangement making the farmers vulnerable to exploitation by middlemen and other unscrupulous transporters scouting for business opportunities in the district.

#### **Reasons why smallholder farmers preferred to use Mbare-Musika as their main market**

The smallholder farmers in Mutoko district cited a number of reasons for using the Mbare-Musika Market. Figure 8 below summarizes the reasons given by farmers.

**Figure 3: Reasons why farmers favour to use the Mbare-Musika market more regularly**



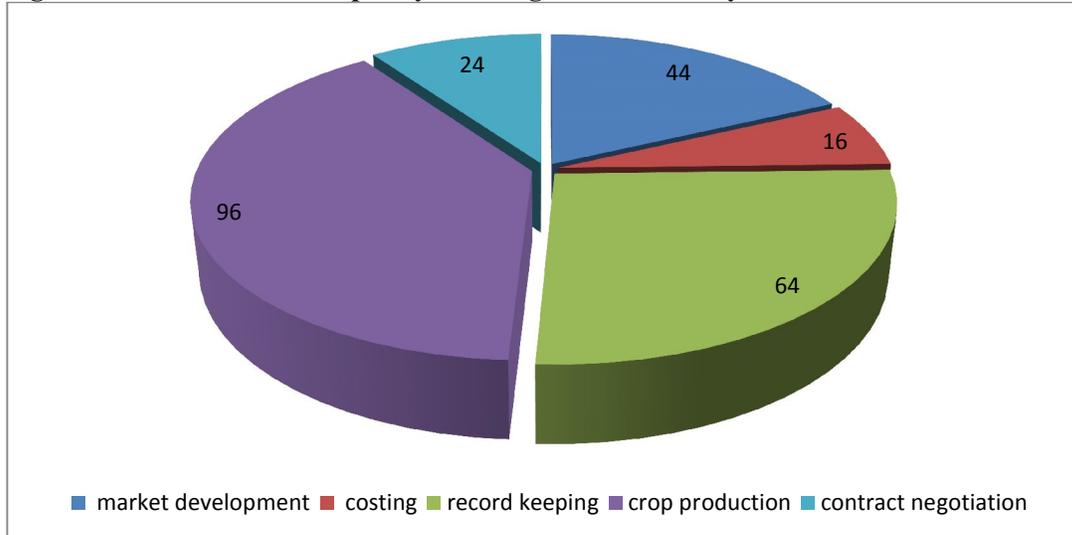
A total of 52% of the farmers believed that the Mbare-Musika market was large enough to absorb all their produce and 29% of the farmers believed that although they did not get the best prices at this market, it had more attractive prices when compared with their local markets in Mtoko. About 12% of the farmers used the market because it facilitated access to production inputs. After sales, farmers could buy inputs and load them onto the trucks and return home. The last category of farmers represented by 7% used the market because it facilitated easy access for them to purchase some of their basic household needs from the shops around the market.

### **Strategies for Improving Viability of Smallholder Market Gardening Activities**

#### **Capacity Building efforts for Smallholder Farmers**

Consultation with extension staff indicated that there were some efforts that were being made in order to improve the viability of the smallholder farmer market gardening business activities in Mutoko. Figure 9 below gives a pictorial view of the analysis of the responses from the extension staff and their efforts.

**Figure 4 Distribution of Capacity building efforts done by extension staff**

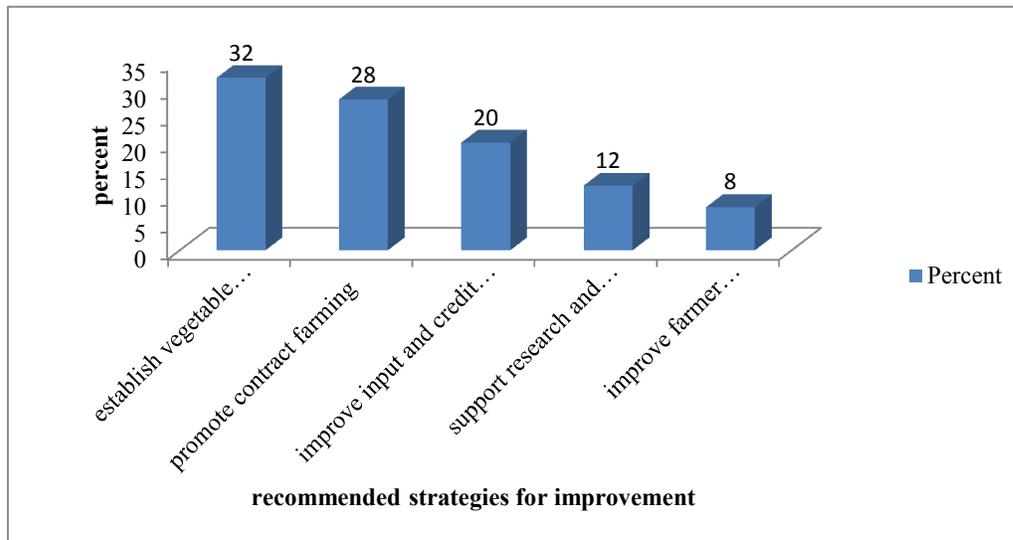


The most popular training undertaken by extension staff was on crop production with 96%, followed by record keeping and market development. Given the gap in the training, stakeholders in the sector like NGOs and other development agencies could take over and facilitate training in market development, costing and contract negotiation to complement the efforts.

**Strategies for improving smallholder market gardening farmers’ viability**

The study also sought establish from NGOs and government extension staff what they thought could be done to improve the viability of smallholder market garden farming activities. Figure 12 below summarizes some of the strategies that were put forward by respondents in the study.

**Figure 5: Distribution of strategies for improvement made by respondents**



Three major strategies came out of these consultations; the first two with similar weighting were the idea of establishing a vegetable processing plant in the district and promotion of contract farming as a way of guaranteeing markets for farmers, instead of the current practice where farmers start looking for market when the produce is ready. The other recommendation looked at improving input support and credit lines for smallholder farmers.

### Discussion

Market gardening is a popular economic activity among the Mutoko farmers. However it was noted that the production levels attained by smallholder farmers were below district expected targets. For all the main horticultural crops that were sampled in the study farmers were producing below the district averages and this could be attributed to the skills gap, lack of extension support, shortages of agricultural input, limited financial support and lack of access to irrigation water by these farmers to reach their full potential. Haggblade *et al* (1988) agrees with this view when he noted that if smallholder farmers are to be successful in adopting new technologies and in their farming interventions they need to have access to knowledge, skills and inputs. However, instead of farmers just waiting for financial relief from government and other donors their situation presents an opportunity for them to mobilize resources through savings schemes to support the expansion of their market gardening businesses.. Based on the findings of the study it can be deduced that the smallholder market gardening farmers need extension support and financial support to enable them to produce more.

The constraints faced by smallholder farmers were viewed from two perspectives, one from the farmer's perspective and the other from the extension staff perspective. The major

constraint from the farmers' point of view was the unreliability of the market at Mutoko and at Mbare. The above observation is in agreement with (Al-Hassan *et al* 2006) who observed that access to guaranteed markets for farm produce and acquisition of inputs was a major problem confronting smallholder farmers in most parts of the developing world. Some of the farmers were so used to their traditional markets that they were afraid of moving out of the comfort zone to venture into new opportunity areas.

This scenario presents an opportunity for the smallholder farmers to look for alternative markets that could reward them for the benefit of their enterprise. Smallholder farmers could explore the possibilities of forming strategic market linkages with new buyers like supermarket chains, wholesalers and government institutions, like hospitals, boarding schools, hotels and lodges. Farmers need to work in groups in order to have a voice and influence the prices of their produce through group bargaining power. This position is supported by a study done in Bangladesh by Kar and Datta (2001) where an evaluation that was done by an NGO called Proshika revealed that poor farmers could improve their access to, and control of local markets by bypassing 'middlemen' and selling their produce directly to consumers and wholesalers. Farmer organization could help smallholder farmers to deal with transport and other related challenges which can be better handled by groups rather than individuals.

Capacity building of smallholder farmers through training in various aspects of marketing is one of the strategies that could be adopted to improve the performance of the smallholder market gardening farmers. Strategic partners like NGOs, the private sector and other stakeholders could come in and complement government extension efforts through the training of these farmers in marketing. The issue of capacity building ties well with Tacoli (2004) who noted that smallholder farmers were often constrained by their lack of knowledge about the markets, limited business negotiating skills, and lack of organization that could give them the bargaining power they require to interact on equal terms with larger and stronger market intermediaries. , Tschirle (2007) observed that smallholder farmers have not been able to penetrate the supermarket system mainly due to the stringent requirements by these organizations. These organizations normally require suppliers to provide them with stable all-year round supply of safe, high quality produce at competitive prices, a condition which most small holder market farmers are unable to meet. The issue of farmer organization was supported by Barigye *et al* (2005) who observed that previous efforts to help the smallholder

farmers to access high value markets focused on pooling of the produce to meet the quantities and frequency of supply required by the markets.

The gap in training left out by extension staff presents an opportunity for other stakeholders like NGOs and the private sector to come in and complement government efforts in capacitating these farmers.

The study suggests four major strategies that could be pursued in an effort to improve the performance of the smallholder farmers. In order of priority the first strategy involved the establishment of a processing plant for vegetables in the district. This blends well with studies conducted in Kenya's horticultural processing sub-sector which revealed that the market for the processed food products was highly segmented and rewarding (Maritim 1994). The processing would include canned vegetables, fruits, jams and marmalades, dehydrated vegetables, spices, and juice concentrates. This would help add value to the product the farmers were producing instead of just trading in raw product which gave the farmers low returns. Such agribusiness development would require the active participation of the private sector.

This suggestion of private sector involvement blends well with Tracey-White (2005) who observed that the sector was playing an increasingly active role in most developing countries in providing inputs, agro-processing and marketing services to smallholder farmers. Studies in China, Chile, Brazil, Thailand, Taiwan and Mexico revealed that agro-enterprise was a powerful source for growth, diversification and poverty alleviation (Jaffee *et al*, 2003). While this proposal is a noble one the major challenge is that it involves a lot of capital injection into the project and this would require the support of the local authority and the political leadership to take off the ground. This option presents a long term strategy for the improvement of viability of smallholder market gardening farmers.

The second option involved promotion of contract farming among smallholder farmers as a way of ensuring that the market is always available to absorb what the farmers produce. It must be noted however, strict production and handling of produce will be expected in contract farming as the contractor or contracting company would always need to ensure high quality of the product. This is in line with the observation made by Dolan and Humphrey (2000) in Kenya which revealed that, among the four largest fruit and vegetable exporters in country, 40 percent of their production was from their own farms and the balance for their export quota was coming through contract farming by smallholder farmers. However Birthal

*et al.* (2008) argue that contract farming is, viewed with skepticism as some people believe that contract farming is a partnership between unequal players, with the producer being the weaker party; thus, the producer is seen as vulnerable to exploitation by the dominant party, the “integrator.”

In some cases, assessments of producers, prior to getting into a contract, could be very thorough resulting in most farmers failing the initial assessments. This view is corroborated by the scheme in Zimbabwe where Cottco requires applicants to demonstrate that they can achieve a specified minimum yield before being accepted on the scheme (Coulter et al, 1999). The contract option presents a short to medium term strategy for the improvement of the viability of smallholder market gardening farming activities. The option would involve identification of players that would be keen to go into contract farming with the smallholder farmers, resulting in a win-win situation for the farmer and the contractor.

The third strategy was to improve the input support for the farmers by providing credit lines for the farmers. Provision of credit lines for smallholder farmers would help them to view their market gardening activities from a commercial point of view as opposed to free input support. The issue of credit lines is supported by studies done in most Sub-Sahara Africa (SSA) and poorer areas of Asia. However due to cash flow constraints both input and credit markets did not work very well (Tracey-White, 2005). Farmers must be encouraged to make savings to finance their business activities rather than becoming crying babies all the time.

The final and long term strategy is to invest in research and development. This is one of the key strategies that could be pursued in an effort to improve the viability of the smallholder market gardening farmers. Research is critical because it scouts for new market opportunities and provides information to extension agents for dissemination to farmers. The development aspect of this strategy would concentrate on new products and market development. The option can provide short, medium and long-term solutions to some of the market challenges facing the smallholder farmers. It must be noted that public investment in agricultural research and development, in Zimbabwe, has declined over the past two decades, with the ever-changing consumer demand. Therefore there is need to pursue research in market development to cope with the rapid changes in technology in order to meet specific requirements for grades and standards of the products demanded by the market. From the literature review and findings of the research it can be concluded that the smallholder farming

sector has a lot of potential to develop farming strategies and market linkages which would ensure viability of smallholder farmers in Zimbabwe.

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