Global Scientific JOURNALS

GSJ: Volume 6, Issue 5, May 2018, Online: ISSN 2320-9186

www.globalscientificjournal.com

AN ANALYSIS OF FACTORS AFFECTING COTTON PRODUCTION IN ZVISHAVANE: A CASE OF WARD 4 IN ZVISHAVANE DISTRICT

T. Kumirai[1] A. T. Kugedera[1*] and F. Chimbwanda[1]

Zimbabwe Open University, Department of Agriculture Management, Faculty of Agriculture, P. O. Box 1020, Masvingo
**Corresponding author email: kugederaandrew48@gmail.com; cell: +263775977187; +263719977187*

Abstract

The main objective of the study was to determine the factors affecting cotton production in Zvishavane District in Midlands Province. Strategies to address effects of these factors were raised. Data was collected from April to June 2017 through the use of personal interviews, focus group discussions and questionnaires. Data was analysed using excel and Minitab 18 to obtain graphs and analysis of means. The results show that 66.7% of the participants were males, 43.3% planted cotton on 1-2 hectares with 23.4% grow cotton on above 4 hectares. The results also showed that factors affecting cotton were significantly different with p = 0.011. Thirty farmers indicated that technology is the major factor which affects cotton production in Zvishavane. Transport and pests and diseases were indicated as major problems faced by cotton farmers with 33.3% and 22.2% indicated these problems respectively. The results show that there is significant different between problems faced by farmers with p = 0.041. Interviewed participants also highlighted strategies which can be used to counteract effects of factors affecting cotton production and these strategies were not significantly different with p = 0.773. Most farmers interviewed (70) indicated the need for farmer training to acquired knowledge of cotton production. The government is recommended to act on addressing factors such as marketing and prices of inputs by setting price floors and ceilings.

Keywords: Cotton, Factors, Production, Ward 4, Zvishavane

INTRODUCTION AND BACKGROUND

In the world, about 8% of the cotton traded is harvested in Sub Saharan Africa (Rukuni *et al*., 2006). Australia, Sudan, South Africa, Tanzania, Malawi, and Kenya to name a few, supplied cotton (Nelson Sibanda, 2013). In Africa cotton is extensively grown by smallholder farmer and there are very few large plantations. African countries which grow cotton include South Africa, Zimbabwe, Malawi, Tanzania and Zambia with largest proportion once grown in Zimbabwe (Mahofa, 2007). In Zimbabwe cotton is grown by small scale and large scale farmers as well. Cotton is mainly grown by small scale farmers in Gokwe, Sanyati, Muzarabani, Mt Darwin, Guruve and Cheshire. Cotton production is mainly done in low rainfall areas since it does not require a lot of rainfall. On a large scale it is grown in Chinhoyi, Mazowe, Rafingora and Triangle (Sibanda, 2013). Zimbabwean economy contribute about 18.5 percent of the GDP and 22,8 percent of the foreign exchange earnings of about 23 percent of formal employment (Rusare *et al*., 2006). Cotton is a perennial cash crop but it is grown as annual crop by smallholder cotton farmers in Zvishavane. Cotton is grown for its fruiting body, the boll. The variety of cotton grown in Zvishavane is Albar G5O1 and SZ 9314.Cotton suited the climatic conditions of low rainfall received in Zvishavane. Cotton prefers deep clay soils or sandy loam under fertilizer application (Chard, 2001).

In Zimbabwe, cotton was grown since 1920 (Mutsvangwa *et al*., 2011). The establishment of the Cotton Research lnstitution in Kadoma in the year 1925 triggered devotion of small holder farmers in Zvishavane to boost in cotton production. Furthermore, in 1969, the establishment of the cotton marketing board through the cotton marketing Act opened a reliable market for cotton produced by farmers in Zvishavane (Rukuni *et al*., 2006). The government's indigenisation policy of 1981 of helping smallholder farmers in crop

production, motivated cotton farmers to produce more cotton and grow from strength to strength. The farmers made best use of the cotton marketing board up to a point when the government denationalised Cotton Marketing Board to COTTCO in 1994. C0TTCO is a major buyer of cotton nationally and Zvishavane is a potential supplier. Cotton production increased in Zvishavane up to a point where a sub COTTCO station was established in Zvishavane for easy marketing of cotton (Baffes, 2001).

Cotton produces important products in form of cotton seed cakes for livestock feeds and cotton seed oil used domestically. A lot of money is earned from cotton selling. Living standards of farmers improved. Zimbabwe earned a lot of foreign currency from exporting cotton (Mutema, 2012). No matter all the effects of the cotton to the smallholder farmers and the country, the number of farmers growing cotton in Zvishavane is currently declining to levels behind expectation. Cotton production is now very low (Baffes, 2001). This caused the sub COTTCO station which was established in Zvishavane to vacate the area and moved on to cotton productive places. This drastic decline in cotton production by smallholder farmers in Zvishavane has caused the writer to develop keen interest or curiosity to investigate the factors affecting cotton production in Zvishavane district from 2011 to 2016 (Baffes, 2001). Shortage of inputs, pests and diseases, poor harvesting methods, shortage of manpower are major factors affecting cotton production. Poor rains and shortage of knowledge in post harvesting techniques as well as low market prices are some of the factors contributing to reduction in cotton produce as some farmers are shunning to grow the' white gold'(cotton) (Mutema, 2012). The main objective of the study was to determine the factors affecting cotton production in Zvishavane District in Midlands Province.

Methodology

Study Area

The research was carried out in ward 5, ward 14 and ward 19 of Zvishavane District in Midlands Province. The district consists of 19 wards and only 6 wards grew cotton. The area is in natural region 4 which experience erratic rains ranging from 450mm to 500mm per annum. The population is around 14400 people from 99 villages and 2880 households (Mutsvangwa *et al*., 2011). The district is approximately 120km from Gweru in the south western part of Zimbabwe. The area is characterized by red clay soils and the soils are fertile. The vegetation is characterized by Mopane woodlands.

DATA COLLECTION PROCEDURES

The researcher notified the ward councilors, village heads and Agritex officers about the objectives of the study and gained permission to carry out the research. A consent form was designed and this was signed by respondents to the interviews as evidence of their informed consent. Appointments were booked to the some farmers to be interviewed. Data from interviews was noted down on paper by the interviewer during the interview.

QUESTIONNAIRE

Statistics Canada (2010) defines a questionnaire as a document with a list of questions usually printed to get facts for survey. Therefore, questionnaires were administered to cotton farmers. Open and closed questions were used in carrying out the research. Questionnaires were used because they are considered economical and easy to formulate and analyse. Moreover, questionnaires elicit a lot of information and gives greater depth of response. According to Chiromo (2009:35) questionnaires reach out to the respondents in a short period of time. The advantage of using a questionnaire is that the researcher will be able to collect information from a large group of population at the same time within a short space of time.

However, questionnaires have some disadvantages for example; the researcher may consult one another as an appropriate way of responding which may result in getting biased information. It should be noted that questionnaires are difficult to probe where more information is required (Bland, 2010:89). Therefore, the researcher used triangulation to counter this challenge.

INTERVIEW

Francis and Jingura (2010) define interviews as face to face questionnaires. Statistics Canada (2010) also defines interviews as a question and answer session which are carried in face to face between the interviewer and the interviewee. Direct interviews help in the clarification of points by both the researcher and the respondents (Francis and Jingura, 2010) Interviews are more appropriate in increasing the response rate as people are more willing to express their news and react verbally than to write answers.

However, interviews have their own disadvantages. They are time consuming taking into consideration the researcher takes more time interviewing respondents. According to Cox (2003:45) there is no anonymity that might make respondents not willing to reveal some information. The researcher shall explain to respondents that their contributions will be kept confidential. There is also the problem of bias of the interviewer and in order to correct this, the interviewer will allow the respondents to give their ideas without giving them a hint.

DATA ANALYSIS AND PRESENTATION PROCEDURE

Data was presented using tables to show the responses from farmers during the interviews. Tables were also used to show observation results and how farmers showcase their participations. Data was subjected to analysis using excel to obtain graphs and Minitab 18 for the analysis of means, variance and to obtain graphs. Student T-test was also used to analyse paired data.

Results

Household characteristics

Of all the participants, 66.7% were males and 33.3% were females. Most of the participants (86.6%) were married with only 6.7% representing single and widowed. The majority of the participants (60%) were educated as they attained tertiary education and 13.3 % attained primary education. Majority of household (63.3%) had household size ranging from 6-10 children with only 16.7% having 11^{+} children. Of all the participants, 43.3% planted cotton on 1-2 ha due to shortage of land as a result of increased population growth in the area. Only 23.4% of the participants managed to plant cotton on above 4 hectares.

Table 4.1: Demographic information of participants

Gender	**Number**	**Percentage**
Males	**20**	**66.7**
Females	**10**	**33.3**
Marital status		
Single	**2**	**6.7**
Married	**26**	**86.6**
Widowed	**2**	**6.7**
Level of education		
Primary	**4**	**13.3**
Standard 6	**3**	**10.0**
Secondary	**5**	**16.7**
Tertiary	**18**	**60.0**
Household size		
5 and below	**6**	**20.0**
6 – 10	**19**	**63.3**
11^{+}	**5**	**16.7**
Hectares planted		
I – 2	**13**	**43.3**
2.1 – 4	**10**	**33.3**
4.1- 6	**7**	**23.4**

Factors affecting cotton production in Zvishavane

The results show that cotton production was mainly affected by technological changes in the world so many farmers failed to coup with the technology. Most farmers (33.3%) indicated that lack of technological advancement had affected cotton production negatively. Farmers indicated lack of irrigation technology in their area as a major drawback in cotton production in Zvishavane. Certin *et al.* (2010) indicated that the use of irrigation also improves reduction of temperature effects especially when it is too hot. Gitonga *et al*. (2012) also indicated that technological innovations such as irrigation are needed to reduce effects of dry spell but if not well managed it may lead to waterlogging reducing yields. Of all the participants, only 5 farmers (5.6%) indicated that cotton production is affected by poor rainfall received in the area and there is need for use of moisture conservation techniques or introduction of irrigation. Marketing of cotton was also raised by farmers as a factor which affects cotton production with 16.7% of participants supporting the notion. This was also supported by Mariga (1994) in Mahofa (2007) who indicated that cotton is facing marketing challenges in Zimbabwe. Mlambo and Poulton (2003) revealed that problem of side marketing is increasing in Zimbabwe and this affected cotton production at large as contract farming is being reduced. Prices of inputs were also raised as a major factor but only supported by 11.1% of participants with others saying nowadays cotton production inputs were given under the presidential scheme. Outbreak of pests and diseases were also a major factor raised by farmers (22.2%) and those who indicated this factor raised an issue of lack of chemicals which can easily kill new strains of pests. The results are shown in Table 4.2 below.

Table 4.2: Factors affecting cotton production as viewed by thirty participants

Factor	Number	Percentage
Marketing	15	16.7
Price of inputs	10	11.1
Technology	30	33.3
Pests and diseases	20	22.2
Knowledge	5	5.6

The results are well represented in Fig 4.1 below showing the variation of these factors.

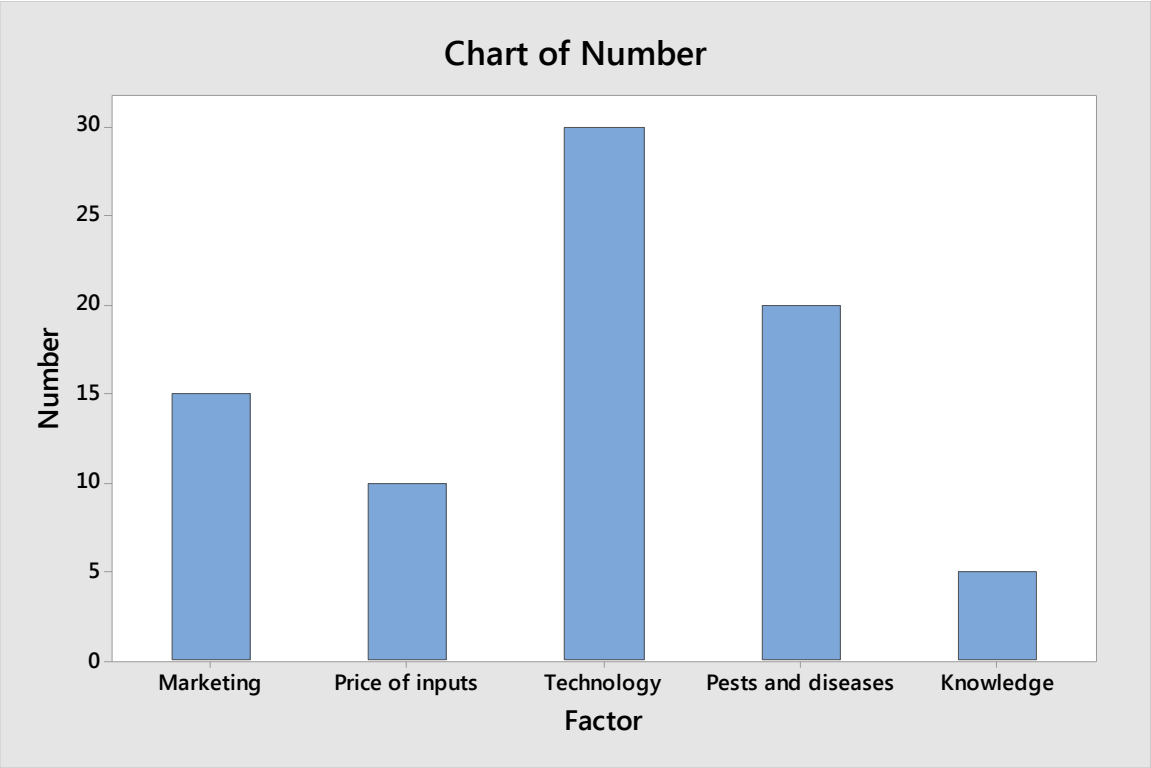

Fig 4.1: Factors affecting cotton production as viewed by ninety participants

Results on Fig 4.1 show that technology was viewed as a major problem by participants followed by pests and diseases with marketing and price of inputs also viewed as threats to

cotton production. Only knowledge was viewed by few farmers as a factor with low impact due to presents of Agritex officers in all wards in Zvishavane. This work also coincide with results and views indicated by Gitonga *et al*. (2012) in Kenya where lack of technical knowhow affected cotton production. Framers also viewed that if issue of technology is addressed cotton production will increase rapidly. The results shows that there is a significant difference between the factors affecting cotton production with p = 0.011. The results are shown in Fig 4.2 below showing that factors are different using 95% confidence interval. The effect of technology is significantly different from effects of other factors affecting cotton production in Zvishavane.

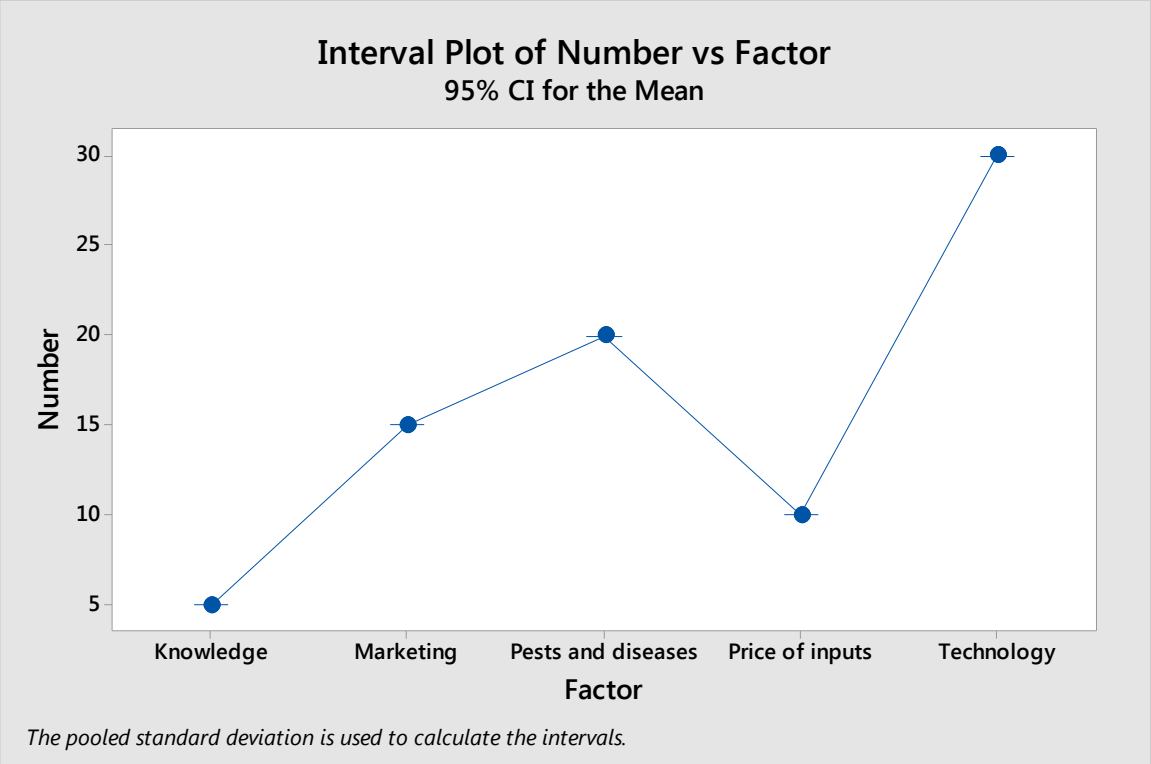

Fig 4.2: Confidence interval for the mean of each factor

4.3 Problems faced by cotton farmers in Zvishavane

Most farmers (33.3%) indicated that they face transport problems as a major factor affecting cotton production. They indicated that they struggled to ferry their cotton to marketing points

due to bad roads. Only 3 (3.3%) of the participants indicated that fertiliser shortage is another problem they face as cotton farmers since their soils are not fertile. Pest and disease outbreak was also indicated as a problem by 20 farmers (22.2%) with 10% of participants indicated climatic factors (temperature and rainfall) as major problem they face in cotton production. They viewed that some rains fall when cotton is prior harvesting and this downgrades cotton from superior grade to lower grade. Problems of chemicals to control pest and diseases were indicated by 11.1% of the farmers interviewed. The same sentiment was raised by Mujeyi (2013) where he highlighted different prices offered by cotton companies. The results are summarised in Table 4.3 below. Some problems were indicated by many farmers. The summarised results show problems indicated by individual farmers.

Table 4.3: Problems faced by cotton farmers as viewed by ninety participants

Problems	Number	Percentage
Transport	30	33.3
Climatic factors	9	10.0
Pests and diseases	20	22.2
Price fluctuation	5	5.6
Labour force	8	8.9
Chemicals	10	11.1
Fertiliser shortage	3	3.3
Cotton seeds	5	5.6

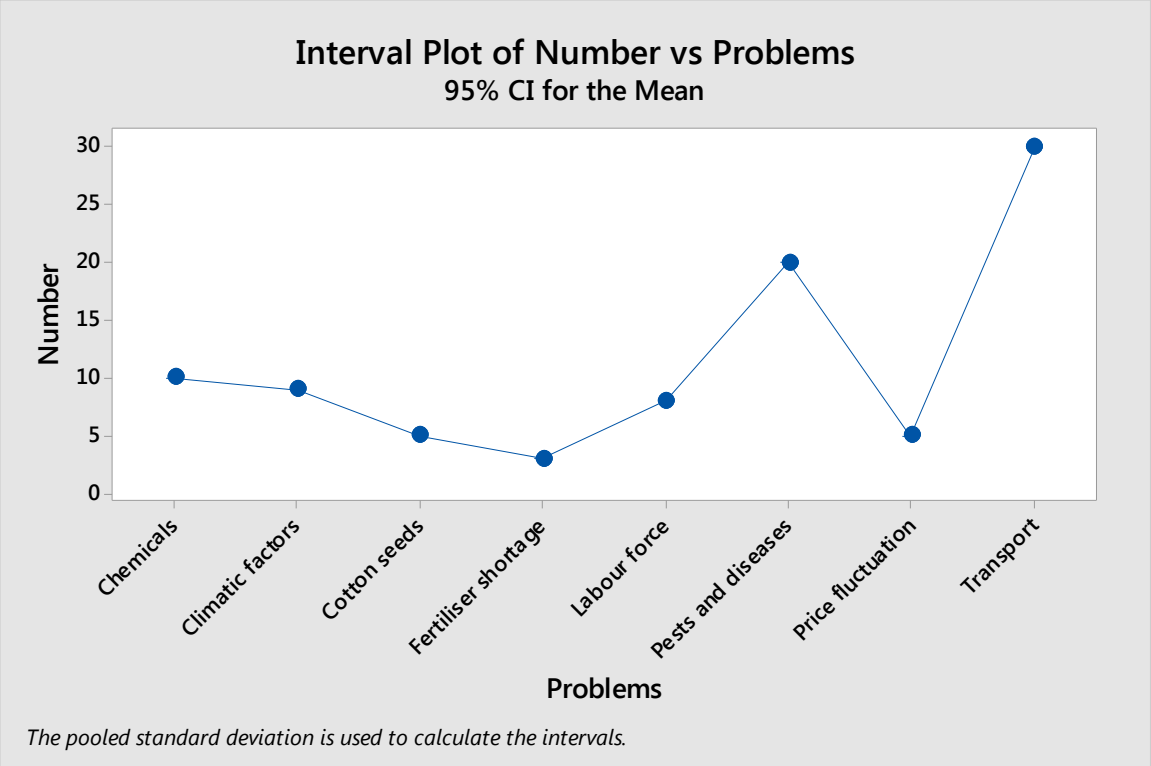

Fig 4.3: Confidence interval for the mean of each problem

The results show that there is significant difference between problems faced by farmers in cotton production with p = 0.041. This shows that these problems have different effects to cotton farmers in Zvishavane. The results show that problems caused by shortage of cotton seeds and transport have significant different effects since they affect cotton production at different stages of production.

Table 4.4: Problem faced by cotton farmers in Zvishavane as viewed by farmers together with other problems

Problem	Number
Transport	48
Shortage of inputs	40
Labour force	38
Pests and diseases	70

The results show that pests and diseases was indicated by many farmers (70) as a major problem they face in cotton production since some pests develop resistant to chemicals usually used by farmers such as Cabaryl 85WP. Gitonga *et al*. (2012) also indicated that the use of pesticides and herbicides may be used to reduce the problems of pests and weeds respectively. Of all the farmers, 48 farmers mentioned transport as a problem together with other problems. All these problems were indicated to affect cotton production differently although they were indicated by farmers together with other problems.

Farmers also indicated other problems such as packaging materials, draught power and ownership of farms but these problems were crashed by other farmers during focus group discussion because most farmers indicated that these problems are minor and they do not affect cotton production to a larger extent. Some were saying these problems only affected one or two farmers in the ward or district.

Strategies used to address factors affecting cotton production

Many factors were indicated to affect cotton production and results from interviews and focus group discussions brings many strategies which can be used to address effects of these factors. These results are shown in Table 4.5 below.

Factor	Strategy	Number of participants
Technology	Water conservation	10
	Irrigation	15
	Use of herbicides	20
	Use of GMO seeds	10
Price of inputs	Contract farming	12
	Government intervention	25
Marketing	Hedging	30
	Contract sales	40
	Spreading sales	18
Pests and diseases	Use of new chemicals	25
	Use of natural chemicals	11
Rainfall	Irrigation	46
Knowledge	Farmer training about cotton	70

The results show that there is no significant different between the strategies suggested by farmers with p = 0.773. This shows that all strategies suggested by farmers have same overall effect of increasing cotton production in Zvishavane district. The results also concurred with results by Gitonga *et al*. (2012) where farmers were encourage to use irrigation and water conservation techniques to improve yields. Most farmers (70) suggested that there is need for government to train farmers about cotton production so that their production increases with time and they will adjust from traditional methods to modern methods. Gitonga *et* al. (2012) encouraged farmers in Kenya to also use water harvesting techniques to improve moisture conservation. Although there is no significant difference between strategies indicated by farmers, there is significant different on the effects of factors withy p = 0.011. This means that factors affecting cotton production differently. The results are shown in Fig 4.4 below.

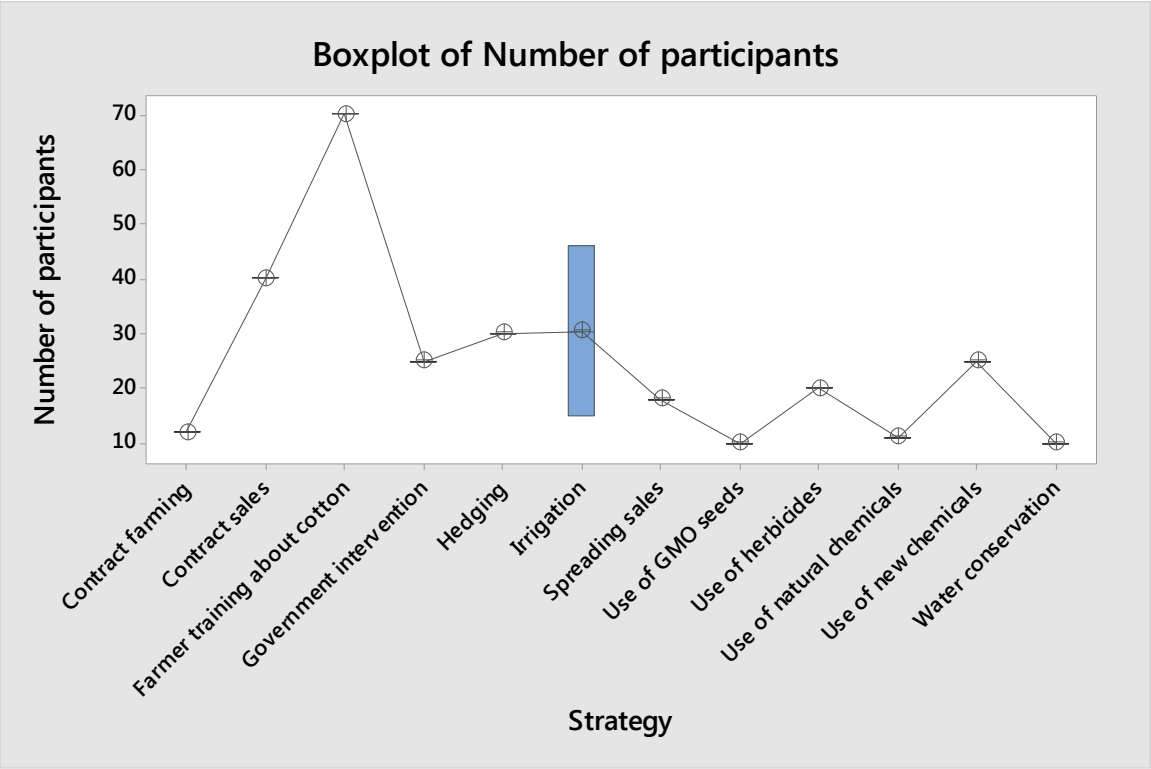

Fig 4.4: Strategies indicated by participants to combat effects of different factors

The box plots show that many farmers (70) need training so that they acquire knowledge about how cotton production can be improved in Zvishavane. Only few farmers (10) indicated that water conservation can be used as new technology, for example the use of infiltration pits and tied contours. Gitonga *et al*. (2012) supported the use of water harvesting techniques as they improve soil moisture and reduce erosion especially in semi-arid and arid areas like Zvishavane here in Zimbabwe. This also concurred with work by Nyamadzawo *et al*. (2016a) where rainwater harvesting of tied contours and infiltration pits improved maize yield in semi-arid areas of Zimbabwe. This technique can also be applied to cotton in low rainfall areas of Zimbabwe such as Zvishavane.

Conclusion, summary and recommendations

The results shows that most indicated that cotton production is affected by factors such climate, pest and diseases, inputs which includes seeds, fertiliser, chemicals and other factors such as transport, labour and prices offered at markets. The results indicated that these factors are significantly different meaning that they affect cotton production differently. Interviewed farmers also raised problems faced in cotton farming such as pest and diseases, shortage of inputs and transport. These problems were significantly different. When farmers were asked about strategies which they think can help address effects of factors affecting cotton production, they raised strategies such as irrigation, water conservation techniques such as infiltration pits, use of herbicides and GMO seeds to move in line with technology. Other farmers also indicated that farmer trainings about cotton production also address the factor of lack of knowledge about the crop. Farmers also indicated that government intervention can address the case of marketing prices and price of inputs. Strategies raised were not significantly different as they all want to improve cotton production. Farmers are recommended to seek cotton information from Agritex officers and cotton companies such as

Cottco which are major players in cotton industry. The researcher also recommend farmer to try new farming systems such as early planting, conservation farming and use of GMO seeds to increase cotton production. Government is also recommended to provide inputs to cotton farmers at low prices then buy cotton to farmers at reasonable price to motivate farmers to grow cotton.

Acknowledgements

The researchers are indebted to Zimbabwe Open University for their assistance with documents about cotton production and assistance with field work techniques. This study would not have been possible without the support and co-operation of the people of ward 4 cotton farmers in Zvishavane District. Many thanks go to the Councilor of Ward 4 for granting permission to study in their area.

References

Agrios, G. N. 1988. Plant Pathology. Third Edition. Academic Press, Inc., New York.

Baffes, J. 2005. Cotton Marketing Setting, Trade Policies, and Issues in Beghin, J, C and Aksoy, A, M: Global Agricultural Trade and Developing countries, World Bank Publications.

Casley, D. J and Lury, D. A. 1987. Data collection in Developing countries. Oxford, UK: Second Edition. Clarendon Press, 225p.

Cetin, O and Basbag, S. 2010. Effects of climatic factors on cotton production in semi-arid regions– A review. *Res. on Crops* 11 (3): 785-791 (2010)

Chizarura, L. 2007. Cotton contract farming in southern Africa. Southern and Eastern African Trade, Information and Negotiations Institute (SEATINI) Bulletin. 10(7), July 2007.

Cotlook, T. 2006. The Cotlook indices: An explanation. Merseyside, UK.

Coulter, J., Goodland, A., Tallontire, A., and Stringfellow, R. 1999. Marrying farmer cooperation and contract farming for agricultural service provision in sub-Saharan Africa. Natural Resources Institute (NRI).

Francis, J and Jingura, R. M. 2010. Survey techniques and Experimental Design in Agriculture, module 2. Zimbabwe Open University, Mount Pleasant, Harare.

Gillson, I., Poulton, C., Balcombe, K and Page, S. 2004. Understanding the Impacts of Cotton Subsidies on developing countries. Working paper.

Gitonga, W., Macharia, J. M. K., Mungai, A., Njue, H., Karanja, D. K and Olweny, H. 2012. Cotton production, constraints, and research interventions in Kenya.

Govereh, J and Jayne, T. S. 2003. Cash cropping and food crop productivity: synergies or trade-offs, Agricultural Economics.

Greene, W. H. 2005. Econometric Analysis. Fifth Edition, Pearson Education.

Hanyani-Mlambo and Poulton, C. 2003. Collaborative Research Project on Competition and Coordination in Cotton Market Systems in Southern and Eastern Africa'. Zimbabwe Country Report, University of Zimbabwe and Imperial College, London.

Kalton, G. and Schuman, H. 1982. The Effect of the Question on Survey Responses: A Review. *Journal of the Royal Statistical Society*, 145(1): 42-73.

Mazarura, U. 2010. Cotton Production. University of Zimbabwe, Mount Pleasant, Harare.

Mahofa, G. 2007. Economic analysis of factors affecting cotton production in ZIMBABWE: A Thesis Submitted In Partial Fulfilment of the Requirements of the Master of Science Degree in Agricultural and Applied Economics

Mujeyi, K. 2013. Viability Analysis of smallholder cotton production under contract farming in Zimbabwe, 4th ICAAAE, 22-25 September Conference in Tanzania

Mutambara, S and Munodawafa, A. 2014. Production Challenges and sustainability of Samllholder Irrigation schemes in Zimbabwe. Journal of Biology, Agriculture and Horticulture, Vol 4, No 15.

Rukuni, M., Tawonezvi, P., Eicher.C. Munyuki, M and Mutondi, P. 2006. Zimbabwe`s Agricultural Revolution Revisited, University of Zimbabwe Publications, Harare.

Rusare, M., Chihuri, C and Muzorori, T. 2006. Zimbabwe's Cotton Sector: Growth and Prospects under Changing Trade Environment, ZEPARU Working Paper Series.

Satin, A and Shastry, W. 1993. *Survey Sampling: A Non-Mathematical Guide – Second Edition*. Statistics Canada. 12-602E.

Sibiya, J. 1999. Crop Physiology and Crop Protection: Plant Pathology. ZOU publishers. Harare, Zimbabwe.

Statistics Canada. 2010. Survey methods and Practices. Ministry of Industry, Canada.