TECHNIUM
SOCIAL SCIENCES JOURNAL

Vol. 29, 2022

A new decade for social changes

ISSN 2668-7798

www.techniumscience.com

Technium Social Sciences Journal
Vol. 29, 700-711, March, 2022
ISSN: 2668-7798
www.techniumscience.com

Demography of smallholder agricultural women and youth enterprises and their association with the cultivation of the tomato (*Solanum Lycopersicum*) vegetable crop

[1]Azwihangwisi E. Nesamvuni, [12]Khathutshelo A. Tshikolomo, [13]Ndivhudzannyi S. Mpandeli, [1]Melanie de Bruyn, [13]Samkelisiwe Hlophe-Ginindza, and [1]Johan van Niekerk

[1]Centre for Sustainable Agriculture, University of the Free State, Bloemfontein, 9300, South Africa, [2]Limpopo Department of Agriculture and Rural Development, Private Bag X9487, Polokwane, 0700, South Africa, [3]Water Research Commission of South Africa, Private Bag X03, Gezina, 0031, South Africa

nesamvunie@gmail.com

Abstract. The study was conducted at the Madimbo corridor and upper Mutale valley smallholder irrigation schemes. The purpose of the study was to characterize smallholder agricultural women and youth entrepreneurs (SHAW-YE). A semi-structured household questionnaire together with facilitation was used to survey a sample, purposively focusing on Smallholder Agriculture Women and Youth Enterprises (SHAW-YE). The sample was comprised of 294 respondents with sub-samples of respondents selected through gender category, age category, and gender by age category. The study revealed that the SHAW-YE are characterized by small land areas under cultivation. There were some associations between age, education, and income of SHAW-YE with their capacity to produce tomatoes. Participation of women was 48.4% compared to 20% of men in the winter production of tomatoes. Production participation by SHAW-YE farmers for summer revealed that women were participating at 9.7% compared with 13.3% for men. The participation of SHAW-YE around the ages of 36-59-year was at 52.9% while that for ages >60-year was at 51.5%. The main source of variation may be the level of experience that the said age group of SHAW-YE may have in the production of tomatoes compared to 29.6% of 18–35-year participants. About 61.7% of SHAW-YE were at the level of Adult Basic Education & Training (ABET). About 45.8% of the SHAW-YE earned less than R5000.00 compared with 50.7% earning more than R5000.00. Market channels and access should be promoted for SHAW-YE to enable the throughput of tomatoes to not only informal but also fresh produce and retail markets.

Keywords. Tomato (*Solanum Lycopersicum*), smallholder agriculture, women & youth agricultural entrepreneurs

1. Introduction

The tomato (*Solanum Lycopersicum*) is the second most important and popular vegetable crop after potatoes in South Africa. South Africa is the dominant producer in the Southern African Development Community (SADC) region, growing 54% of tomatoes on 11%

Technium Social Sciences Journal
Vol. 29, 700-711, March, 2022
ISSN: 2668-7798
www.techniumscience.com

of the total cropped area. Despite ranking 35th in the world based on the total tonnage in 2011, South Africa remains a major regional tomato producer in Sub-Saharan Africa. The crop is produced in all South African provinces, but Limpopo Province with its warm climate is best suited for the production of tomatoes. Limpopo Province is the major production area with 3 590 ha (Northern Lowveld at 2 700 ha and far Northern areas of Limpopo at 890 ha). The province accounts for more than 75% of the total area planted with tomatoes in South Africa (DAFF, 2017).

The other main producing areas are the Onderberg area of Mpumalanga province at 770 ha and the Border area of Eastern Cape province at 450 ha. Production is very limited in the winter months and tomatoes can only be produced in frost-free areas during winter or under protection by structures such as tunnels (DAFF, 2017).

Tomato contributed approximately 18.3% to the gross value of vegetable production in 2015. Tomato is consumed in a variety of ways including raw, as an ingredient in many dishes and sauces and drinks. Tomatoes are a rich source of vitamins A and C and folic acid. In South, Africa tomatoes are used in stews to complement the staple diet of maize meals. As a result, it is also one of the main vegetables used for hawking by small-scale entrepreneurs in the informal sector. Tomato as a commodity has a mature market system enabling SHAW-YE to produce for formal markets mainly fresh produce, processing, and retail shops. The demand for the crop and favourable price lends itself as an economically sustainable crop for SHAW-YE especially women and youth in the informal markets as well.

There are about 695 producers of tomatoes in both commercial and emerging sectors in Limpopo - South Africa. It is not only cultivated commercially but also grown by backyard gardeners, subsistence, smallholder farmers in irrigation schemes inclusive of women and youth. Out of the eight most produced irrigated vegetable crops by SHAW-YE, tomato ranked first with 46.9% followed by okra (44.6%), butternut (14.3%), spinach (10.9%), green paper (7.1%), cabbage (6.8%) and onion (5.8%). The commercial sector contributes 95% of the total production while the emerging sector contributes only five per cent (DAFF, 2017).

Of the five per cent production produced by the emerging group, the majority are women who constitute 80% of the SHAW-YE in the rural areas who are part of the informal value chain from low-cost production to informal markets at farm gate, hawkers, and street vendors (Statistics South Africa: 2002). A growing number of medium to commercial small-holder entrepreneurs produce to supply fresh produce and processing facilities. The SHAW-YE produce tomato on average plots of 3.71 ha per entrepreneur under irrigation which is the highest of all the vegetable crops. In the context that 89% of the population of Limpopo Province is classified as rural, the smallholder sector through tomato production plays a major role in the economic development of rural areas of the province (Nesamvuni et.al., 2003). Job creation and employment are already a challenge for South Africa and all developing countries.

The World Bank reports (S4YE, 2015) indicated that approximately 75 million youth are unemployed worldwide and the International Labour Organization (ILO) (ILO, 2016) also projected growth in unemployment of about 1 million people in the developing world by 2021. There is therefore a consensus to the fact that the neglect of the SHAW-YE, which constitute mostly women and youth in the rural areas would only render their social and economic conditions worse resulting in rural-urban mass migration. Socio-economic factors continue to play a critical role in determining the levels of production undertaken and the sort of crops planted. This was corroborated by von Braun and Mirzabaev, (2015) who stated that the production levels are not the only areas affected but also the way business enterprises are managed which put the socio-economic characteristics of the smallholder farmers and

Technium Social Sciences Journal
Vol. 29, 700-711, March, 2022
ISSN: 2668-7798
www.techniumscience.com

entrepreneurs into focus. Previous studies (Mwaniki, 2006; Abdulai et al., 2013; Asante et al., 2013; Onumah et al., 2013) have resolved that if assistance is to be extended to crop producers their demography is worth investigating to fully comprehend their needs.

The relationship between demography and socio-economic factors will be described in this study to produce appropriate policy information for agricultural stakeholders and the government. In developing women and youth agricultural entrepreneurs producing tomatoes there is a lack of knowledge on the contribution of the crop to women and youth livelihood and incomes in rural South Africa. The main objective of this study was therefore to assess the demography of SHAW-YE and the association with the cultivation of tomatoes under irrigation.

2. Methodology

2.1. Study Area

The study was carried out in Vhembe District Municipality of Limpopo Province, South Africa. The specific areas were Madimbo Corridor in Musina and Mutale Valley in Thulamela Local Municipality. The SHAW-YE in the two areas were categorized as independent enterprises each with a private water supply in the case of Madimbo and as irrigated smallholders which are served by communal water supply infrastructure in the case of Mutale. The two areas of Madimbo corridor and upper Mutale valley irrigation schemes constitute a total of more than 2270 ha of production area.

2.2.Sampling Procedure

Stratified random sampling was used to obtain a representative sample of villages and households for interview (Leedy et.al, 2005) with the target population being SHAW-YEs. A two-stage random sampling process was conducted using SURVEYSELECT procedure of SAS. The PROC SUREVEYSELECT allowed for probability-based random sampling where sampling in a category or class depended on the number of units within that class. The sampling was regarded as appropriate for handling selection bias.

2.3. Data Collection

A semi-structured household questionnaire was used to survey with an emphasis on SHAW-YE. The total number of SHAW-YE interviewed were two hundred and ninety-four (N=294) with a response rate of 75 per cent. The sample was comprised of 71 youths aged 18 to 35 years old (56 females and 15 males) and 223 women of whom 153 were adults (36-59 years) and 70 pensioners (≥ 60 years old).

2.4.Data analysis

The Statistical Package for the Social Sciences (SPSS) version 22 was used to analyze quantitative data. Descriptive statistics included frequency tables and measures of central tendency. Inferential statistics were in the form of Chi-square analyses, which assessed the association between major demographic variables (gender, age, education, and income) and vegetable/ field crop production, water resources and governance. Fischer Exact tests were interpreted in cases where the assumptions for Chi-square analysis had been violated. A Bonferroni adjustment was made to prevent a type I error; therefore, significance was considered when $p < 0.013$.

Technium Social Sciences Journal
Vol. 29, 700-711, March, 2022
ISSN: 2668-7798
www.techniumscience.com

3. Results and Discussions

3.1. The production potential of tomato crop by smallholder agricultural women and youth enterprises

The average area of production under irrigation was 3.71 ha per farmer. The production area in summer was 0.59 ha bigger than in winter. The production potential, however, was higher in winter with up to 30 000 crates (750 000 Kg) (from what area of land) whereas in winter/summer? the production was just up to 1000 crates (25 000Kg /ha). The average price earned for the production was R150 / crate (25Kg).

3.2.The association between cultivating tomatoes and gender

A chi-square test for association was conducted between cultivating tomatoes and gender in winter and summer (Table 1). It is necessary to establish the differences in the roles played by males and females in farm households since these gender differences are likely to influence their capacity to adapt to climate change as well as their choices of climate change adaptation strategies (IFPRI, 2009).

In determining the association between cultivating tomato and gender, it should be noted that a Bonferroni correction was made due to multiple comparisons with the same dependent variable, this correction decreases the possibility of making a type I error. Therefore, the significant value of 0.05 was adjusted to 0.013 (0.05/4). This level of significance was too steep for the effects of the demographic traits to be significant.

Focusing on the winter season all the expected cell frequencies were greater than five, therefore the assumption was not violated. After a Bonferroni adjustment, there was not a statistically significant association between cultivating tomatoes and gender, $\chi 2 = 4{,}606$, $p = 0.032$.

However, it was determined that 20.0% of males cultivated tomatoes compared to 48.4% of females (Table 1). In line with the result not being statistically significant, the effect size showed a weak association (Cohen, 1988), as measured by the Phi measure of effect size, $\varphi = 0.125$, $p = 0.032$. In summer not all the expected cell frequencies were greater than five, therefore the assumption was violated, and the Fischer Exact test was conducted. The Fischer exact test showed that there was not a statistically significant association between cultivating tomatoes and gender, $p = 0.649$. It was determined that 13.3% of males cultivated tomatoes compared to 9,7% of females.

In line with the result not being statistically significant, the effect size showed a weak association (Cohen, 1988), as measured by the Phi measure of effect size, $\varphi = 0.27$, $p = 0.644$. Though there were seasonal differences found in this study, males were still participating more in producing tomatoes. Similar observations were made in a study of youth agricultural projects in Limpopo Province, Maele et al. (2015) revealed that the majority of farmers (74%) were male.

The finding that men were the majority owners of agricultural projects was also affirmed by Bembridge and Tshikolomo (1998) who revealed that 90% of fruit growers in the Phaswana area of the Limpopo Province were males. Despite the effort of the democratic government to promote women empowerment and their equal participation in socio-economic activities (Maele et al., 2015), men still constituted the majority in agricultural projects, further affirming the dominance of men in farming.

Technium Social Sciences Journal
Vol. 29, 700-711, March, 2022
ISSN: 2668-7798
www.techniumscience.com

Table 1. Association between gender of Smallholder Agricultural Women and Youth Entrepreneur and seasonal cultivation of tomato crop in Vhembe District of Limpopo Province, South Africa

GENDER	VARIABLE	WINTER SEASON		SUMMER SEASON	
		NO	YES	NO	YES
MALE	Count	12	3	13	2
	Expected Count	8.0	7.0	13.5	1.5
	% within Gender of the respondent	80.0%	20.0%	86.7%	13.3%
	% within seasons crop: Tomatoes	7.7%	2.2%	4.9%	6.9%
	% of Total	4.1%	1.0%	4.4%	.7%
FEMALE	Count	144	135	252	27
	Expected Count	148.0	131.0	251.5	27.5
	% within Gender of the respondent	51.6%	48.4%	90.3%	9.7%
	% within seasons crop: Tomatoes	92.3%	97.8%	95.1%	93.1%
	% of Total	49.0%	45.9%	85.7%	9.2%
TOTAL	Count	156	138	265	29
	Expected Count	156.0	138.0	265.0	29.0
	% within Gender of the respondent	53.1%	46.9%	90.1%	9.9%
	% within seasons crop: Tomatoes	100.0%	100.0%	100.0%	100.0%
	% of Total	53.1%	46.9%	90.1%	9.9%
		$\chi 2 = 4{,}606$, $p = 0.032$		**Not Significant**	

3.3.The association between cultivating tomato and age

A chi-square test for association was conducted between cultivating tomatoes and age as indicated in Table 2. In the current study, and for the winter season, the results indicated that all expected cell frequencies were greater than five, which met the requirement for the chi-square test. After a Bonferroni adjustment, there was a statistically significant association between cultivating tomatoes and age, $\chi 2 = 11.367$, $p = 0.003$. It was determined that 29.6% of 18–35-year participants cultivate tomatoes compared to 52.9% and 51.5% of 36-59-year participants and >60 years participants respectively.

Although there is a statistical association the effect size showed a weak association (Cohen, 1988), as measured by the Phi measure of effect size, $\varphi = 0.197$, $p = 0{,}003$. When we compare with results for the summer season all the expected cell frequencies were greater than five, therefore the assumption was also not violated. There was not a statistically significant association between cultivating tomatoes and age, $\chi 2 = 1.886$, $p = 0.390$.

Technium Social Sciences Journal
Vol. 29, 700-711, March, 2022
ISSN: 2668-7798
www.techniumscience.com

Table 2 Association between the age of Smallholder Agricultural Women and Youth Entrepreneur and seasonal cultivation of tomato crop in Vhembe District of Limpopo Province, South Africa

AGE (YEARS)	VARIABLE	WINTER SEASON		SUMMER SEASON	
		NO	YES	NO	YES
18 -35	Count	50	21	61	10
	Expected Count	37.7	33.3	64.0	7.0
	% within Gender of the respondent	70.4%	29.6%	85.9%	14.1%
	% within seasons crop: Tomatoes	32.1%	15.2%	23.0%	34.5%
	% of Total	17.0%	7.1%	20.7%	3.4%
36 - 59	Count	73	82	142	13
	Expected Count	82.2	72.8	139.7	15.3
	% within Gender of the respondent	47.1%	52.9%	91.6%	8.4%
	% within seasons crop: Tomatoes	46.8%	59.4%	53.6%	44.8%
	% of Total	24.8%	27.9%	48.3%	4.4%
>60	Count	33	35	62	6
	Expected Count	36.1	31.9	61.3	6.7
	% within Gender of the respondent	48.5%	51.5%	91.2%	8.8%
	% within seasons crop: Tomatoes	21.2%	25.4%	23.4%	20.7%
	% of Total	11.2%	11.9%	21.1%	2.0%
TOTAL	Count	156	138	265	29
	Expected Count	156.0	138.0	265.0	29.0
	% within Gender of the respondent	53.1%	46.9%	90.1%	9.9%
	% within seasons crop: Tomatoes	100.0%	100.0%	100.0%	100.0%
	% of Total	53.1%	46.9%	90.1%	9.9%
		$\chi 2 = 11.367$, $p = 0.003$		**$\chi 2 = 1.886$, $p = 0.390$**	

It was determined that 14.1% of 18-35-year participants cultivated tomatoes compared to 8.4% of 36-59-year participants and 8.8% of >60-year participants. Similar, there was not a statistically significant result, the effect size showed a weak association (Cohen, 1988), as measured by the Phi measure of effect size, $\varphi = 0.080$, $p = 0.390$. The results confirmed the findings by Mulinya, (2017) who reported that farmers within the ages of 30-34 years are likely to understand well the issues involved in farming and therefore are armed with necessary information regarding climate change adaptation strategies that can be well achieved and adhered to. In the main, the results showing 52.9% and 51.5% of 36-59-year participants and >60 years participants agreed with the observation by Simotwo et al. (2018) who revealed that farmers were ageing. However, Fussel and Klein, (2006) on the contrary also reported that older farmers could be resistant to change and thus may not see the need of employing new

Technium Social Sciences Journal
Vol. 29, 700-711, March, 2022
ISSN: 2668-7798
www.techniumscience.com

technologies and would prefer the traditional models of farming that they are familiar with other than adopting new methods.

Farm productivity has been shown to deteriorate with the farmers' age, especially among the smallholders who largely rely on their physical labour to execute many farming responsibilities (Uddin et al., 2014). Hassan & Nhemachena (2008) in determining farmers" strategies for adapting to climate change reveals that for farmers' age, in particular, older farmers were more experienced and expect older farmers to adapt to climate change better than farmers whose age are lesser. However, they also assumed younger farmers to have a longer planning horizon and to take up long term measures that will influence their decision to increase production levels.

3.4.The association between cultivating tomatoes and education

A chi-square test for association was conducted between cultivating tomatoes and household head education as shown in Table 3. The importance of education in successful developmental activities such as farming cannot be overemphasized. The level of education has a strong influence on the extent to which a farmer can access new information and technology, not only through improved literacy that enables the farmers to access written information but also through the increased ability to search for information using modern information technologies. Citing Appleton and Balihuta (1996), Oduro-Ofori et al. (2014) described the effect of education on agricultural productivity as cognitive and non-cognitive.

Cognitive effects reportedly emphasize basic literacy and numeracy that farmers achieve from education while non-cognitive effects emphasize the change in the attitude of farmers who attended school due to improved discipline introduced by formal schooling. Better education may therefore be associated with the improved adaptive capacity to adverse effects of climate change and variability. In this after compliance with the Chi-square test and Bonferroni adjustment for the winter season; there was a statistically significant association between cultivating tomato and household head education, $\chi 2 = 12.399$, $p = 0.006$. It was determined that 34.4% of participants whose household head had no, or only primary school education cultivated tomato, while 47.4% and 36.4% of participants with household head education levels of secondary and tertiary level education cultivated tomato respectively compared to the 61.7% of participants with household head education of ABET.

Table 3 Association between the education of Smallholder Agricultural Women and Youth Entrepreneur and seasonal cultivation of tomato crop in Vhembe District of Limpopo Province, South Africa.

EDUCATION	VARIABLE	WINTER SEASON		SUMMER SEASON	
		NO	YES	NO	YES
PRIMARY	Count	40	21	54	7
	Expected Count	32,1	28.9	54.9	6.1
	% within Gender of the respondent	65.6%	34.4%	88.5%	11.5%
	% within season crop: Tomatoes	26.1%	15.2%	20.6%	24.1%
	% of Total	13.7%	7.2%	18.6%	2.4%
	Count	61	55	107	9

Technium Social Sciences Journal
Vol. 29, 700-711, March, 2022
ISSN: 2668-7798
www.techniumscience.com

SECONDARY	Expected Count	61.0	55.0	104.4	11.6
	% within Gender of the respondent	52.6%	47.4%	92.2%	7.8%
	% within seasons crop: Tomatoes	39.9%	39.9%	40.8%	31.0%
	% of Total	21.0%	18.9%	36.8%	3.1%
TERTIARY	Count	21	12	29	4
	Expected Count	17.4	15.6	29.7	3.3
	% within Gender of the respondent	63.6%	36.4%	87.9%	12.1%
	% within season crop: Tomatoes	13.7%	8.7%	11.1%	13.8%
	% of Total	7.2%	4.1%	10.0%	1.4%
ABET	Count	31	50	72	9
	Expected Count	42.6	38.4	72.9	8.1
	% within Gender of the respondent	38.3%	61.7%	88.9%	11.1%
	% within season crop: Tomatoes	20.3%	36.2%	27.5%	31.0%
	% of Total	10.7%	17.2%	24.7%	3.1%
TOTAL	Count	153	138	262	29
	Expected Count	153.0	138.0	262.0	29.0
	% within Gender of the respondent	52.6%	47.4%	90.0%	10.0%
	% within season crop: Tomatoes	100.0%	100.0%	100.0%	100.0%
	% of Total	52.6%	47.4%	90.0%	10.0%
		$\chi 2 = 12.399$, $p = 0.006$		**$\chi 2 = 1{,}074$, $p = 0.783$**	

Although there is a statistical association the effect size showed a weak association (Cohen, 1988), as measured by the Phi measure of effect size, $\varphi = 0.206$, $p = 0.006$. For the Chi-square test in summer the results showed at least 80% of the expected cell frequencies that were greater than five, therefore the assumption was not violated.

There was not a statistically significant association between cultivating tomatoes and household head education, $\chi 2 = 1{,}074$, $p = 0.783$. It was determined that 11,5% of participants whose head of household only had no / primary school education cultivated tomato while 7,8% of participants with household head with secondary education cultivated tomato and 12,1% and 11,1% of participants with household heads with tertiary education and ABET respectively cultivated tomato. Also, the effect size showed a weak association (Cohen, 1988), as measured by the Phi measure of effect size, $\varphi = 0.061$, $p = 0.783$. From this study it can be resolved that reading and writing are basic conditions for farmers to have the ability to access information available in written and electronic media and to use that information for the exercise of their citizenship, thus creating conditions for adaptation to climate change (O'Brien et al., 2004a).

Technium Social Sciences Journal
Vol. 29, 700-711, March, 2022
ISSN: 2668-7798
www.techniumscience.com

3.5.The association between cultivating tomatoes and income

A chi-square test for association was conducted between cultivating tomatoes and monthly income (Table 4). Literature is explicit about the five pillars of livelihood which includes financial capital (stocks of money or assets in liquid form), natural capital (land, water, and biological resources), social capital rights or claim derived from group membership, physical capital (infrastructure, resources created through economic production), and human capital (Ijatuyi et al., 2017). High-income households can afford their needs much more than low-income households.

According to Nouman et al. (2013), household income is also one of the determinants of the amount of credit that can be borrowed by the farmers. High income of farming households can therefore not only better afford needs such as production inputs and other production factors but would also easily qualify for credit to procure the assets that would otherwise not be affordable. In this study, the results for the winter season showed that all the expected cell frequencies were greater than five, therefore the assumption was not violated (Table 4). There was not a statistically significant association between cultivating tomato and monthly income, $\chi 2 = 0.519$, $p = 0.471$. It was determined that 45.8% of participants earning < R5000 a month cultivated tomatoes, compared to 50.7% of those earning > R5000 a month. In line with the result not being statistically significant, the effect size showed a weak association (Cohen, 1988), as measured by the Phi measure of effect size, $\varphi = 0.042$, $p = 0.471$.

For the summer season comparison, the chi-square test for association was conducted between cultivating tomatoes and monthly income. All the expected cell frequencies were greater than five, therefore the assumption was not violated. There was a statistically significant association between cultivating tomatoes and monthly income, $\chi 2 = 8{,}171$, $p = 0.004$.

It was determined that 7,1% of participants earning < R5000 a month cultivated tomato, compared to 18,8% of those earning > R5000 a month. Although the association was significant, the effect size showed a weak association (Cohen, 1988), as measured by the Phi measure of effect size, $\varphi = 0.167$, $p = 0.004$. Based on the results it can be concluded that high-income farming households will be better adapted to adverse effects of climate change and seasonal variability when compared to their low-income counterparts. Farmers with higher incomes are likely to embrace and will be interested in adapting by changing practices and modern methods such as irrigation to cope with the changing climate (Gbetibou, 2009).

Table 4 Association between monthly income of Smallholder Agricultural Women and Youth Entrepreneur and seasonal cultivation of tomato crop in Vhembe District

INCOME	VARIABLE	WINTER		SUMMER	
		NO	YES	NO	YES
< 5000	Count	122	103	209	16
	Expected Count	119.4	105.6	202.8	22.2
	% within Gender of the respondent	54.2%	45.8%	92.9%	7.1%
	% within season crop: Tomatoes	78.2%	74.6%	78.9%	55.2%
	% of Total	41.5%	35.0%	71.1%	5.4%
>5000	Count	34	35	56	13

Technium Social Sciences Journal
Vol. 29, 700-711, March, 2022
ISSN: 2668-7798
www.techniumscience.com

	Expected Count	36.6	32.4	62.2	6.8
	% within Gender of the respondent	49.3%	50.7%	81.2%	18.8%
	% within seasons crop: Tomatoes	21.8%	25.4%	21.1%	44.8%
	% of Total	11.6%	11.9%	19.0%	4.4%
TOTAL	Count	156	138	265	29
	Expected Count	156.0	138.0	265.0	29.0
	% within Gender of the respondent	53.1%	46.9%	90.1%	9.9%
	% within season crop: Tomatoes	100.0%	100.0%	100.0%	100.0%
	% of Total	53.1%	46.9%	90.1%	9.9%
		$\chi 2 = 0.519$, $p = 0.471$		**$\chi 2 = 8{,}171$, $p = 0.004$**	

4. Conclusion

The results of the study indicate some imperative conclusions about the demographic profile of the Smallholder Agricultural Women and Youth Enterprises and their association with the production of tomatoes. The study revealed that gender, age, education, and income seem to influence the production of tomatoes in the Madimbo Corridor in Musina and Mutale Valley in Thulamela Local Municipality. The study revealed that the SHAW-YE are characterized by small land areas under cultivation.

Policy efforts to promote women and youth are bearing fruits measured by participation of women with 48.4% compared to 20% of men in winter production of tomato was not statistically significant. Though the numbers for summer indicated that fewer (9.7%) women were participating compared with 13.3% of men. The participation of SHAW-YE around the ages of 36-59-year at 52.9% and >60-year at 51.5% indicates in the main the level of experience that the SHAW-YE may have in the production of tomato compared to 29.6% of 18–35-year participants. Farmer Field Schools and other partnership models should be promoted by the government for the transfer of skills from experienced farmers to youth. In return, youth farmers should help transfer technology and information to older farmers.

Farmers should also be provided with content related education through extension agents and other appropriate means. About 61.7% of SHAW-YE were at the level of Adult Basic Education & Training (ABET) indicating a low level of education for most women farmers. Government should enhance skills training on-farm to SHAW-YE to complement the farmer's experience with the cultivation of tomatoes. About 45.8% of the SHAW-YE earned less than R5000.00 compared with 50.7% earning more than R5000.00. Markets channels and access should be promoted for SHAW-YE to enable throughput of tomato to not only informal but also fresh produce and retail markets.

References

[1] Abdulai S, Nkegbe P K, Donkoh SA (2013). Technical Efficiency of Maize Production in Northern Ghana. Afr. Journal of Agric. Research 8 (43):5251-5259.

[2] Asante BO, Osei MK, Dankyi AA, Berchie JN, Mochiah MB, Lamptey JNL, Haleegoah J,

Osei K, Bolfrey-Arku G (2013). Producer Characteristics and Determinants of Technical Efficiency of Tomato-Based Production Systems in Ghana. J. Dev. Agric. Econ. 5(3):92- 103

[3] Bembridge. T.J. & Tshikolomo K.A. (1998). Communication and decision making among fruit growers in the Phaswana Area of Northern Province. South African Journal of Agricultural Extension. 27: 19-29.

[4] Cohen J. (1988). Statistical Power Analysis for the Behavioral Sciences. New York, NY: Routledge Academic

[5] DAFF, (2017). A profile of South African Tomato Market Value. Directorate Marketing, DAFF.

[6] Füssel, H-M., and Klein, R.J.T., 2006. Climate Change Vulnerability Assessments: An Evolution of Conceptual Thinking. Climate Change 75: 301-329.

[7] Gbetibouo, G.A, & Ringler, C., 2009, 'Mapping South African farming sector vulnerability to climate change and variability: A subnational assessment', IFPRI Discussion Paper 00885, IFPRI, Washington, DC.

[8] Hassan, R and Nhemachena., C., 2008. Determinants of African farmers' strategies for adapting to climate change: Multinomial choice analysis. African Journal of Agricultural and Resource Economics 2(1): 83-104

[9] IFPRI, International Food Policy Research Institute, 2009. Washington, D.C. Climate Change Impact on Agriculture and Costs of Adaptation, Gerald C. Nelson, G.C., Rosegrant, M.W., Koo, J., Robertson, R. Sulser, T. Zhu, T., Ringler, C. SiwaMsangi, A.P. Batka, M., Magalhaes, M., Valmonte-Santos, R., Ewing, M. and Lee, D.

[10] ILO, 2016. World Employment and Social Outlook 2016: Trends for youth International Labour Office – Geneva.

[11] Ijatuyi, E.J., Omotayo, A.O. and Mabe, L.K., 2017. Effect of extension service(s) and socio-economic on the livelihood of Nguni Cattle development project beneficiaries in North West Province: a TOBIT-OLS Regression Approach. South African Journal of Agricultural Extension, 45(1): 64-77. DOI: http://dx.doi.org/10.17159/2413-3221/2017/v45n1a427 (Copyright).

[12] Maele, L.M., Nesamvuni, A.E., Tshikolomo, K.A., Afful, D.B. and Norris, D., 2015. Characterization of Youth Agricultural Projects in Limpopo Province of South Africa. Journal of Agricultural Science, 7(7): 42 – 52.

[13] Mulinya, C., 2017. Factors Affecting Small Scale Farmers Coping Strategies To Climate Change In Kakamega County In Kenya. Journal of Humanities and Social Science, 22 (2), 100-109

[14] Mwaniki A (2006). Achieving Food Security in Africa: Challenges and Issues. Rep. N.p.: United Nations

[15] Nesamvuni, AE, Oni, S.A., Odhiambo, J.J.O., and Nthakheni, N. D. (2003). Agriculture as the cornerstone of the Economy of the Limpopo Province. A Study Commissioned by the Economic Cluster of the Limpopo Provincial Government – Department of Agriculture.

[16] Nouman, M., Siddiqi, M.F., Asim, S.M. and Hussain, Z., 2013. Impact of socio-economic characteristics of farmers on access to agricultural credit. SARHAD Journal of Agriculture, 29(3): 469-476

[17] O'Briena, K., Leichenkob, R., Kelkarc, U., Venemad, H., Aandahla, G., Tompkinsa, H.,

Technium Social Sciences Journal
Vol. 29, 700-711, March, 2022
ISSN: 2668-7798
www.techniumscience.com

Javedc, A., Bhadwalc, S., Bargd,S., Nygaarda, L. and West, J., 2004. Mapping vulnerability to multiple stressors: climate change and globalization in India. Glob. Environ. Change 14, 303:313. (doi:10.1016/j.gloenvcha.2004.01.001).

[18] Oduro-Ofori E., Aboagye A.P. and Acquaye N.A.E., 2014. Effects of education on the agricultural productivity of farmers in the Offinso Municipality. International Journal of Development Research, 4(9): 1951-1960.

[19] Onumah JA, Al-Hassan RM, Onumah EE (2013a). Productivity and Technical Efficiency of Cocoa Production in Eastern Ghana. J. Econ. Sustain. Dev. 4(4):109-118.

[20] Onumah JA, Onumah EE, Al-Hassan RM, Brümmer B (2013b). Metafrontier Analysis of Organic and Conventional Cocoa Production in Ghana. Agric. Econ. Czech 6:271-280

[21] S4YE (Goldin, N. & M. Hobson with P. Glick, M. Lundberg, S. Puerto). 2015. "Toward Solutions for Youth Employment: A Baseline for 2015." Solutions for Youth Employment, Washington D.

[22] Simotwo. H.K. Mikalitsa S.M. and Wambua B.N.. 2018. Climate change adaptive capacity and smallholder farming in Tras-Mara East sub-Country. Kenya. Geoenvironmental Disasters. 5:5.

[23]Stats SA – 2002. Library Cataloguing-in-Publication (CIP) Data South African Statistics 2002 / Statistics South Africa. Pretoria: Statistics South Africa.

[24] Uddin, M., Bokelmann, W., and Entsminger J., 2014. Factors affecting farmers' adaptation strategies to environmental degradation and climate change effects: A farm-level study in Bangladesh. Climate Retrieved from http://www.mdpi.com/2225-1154/2/4/223/htm.

[25] Von Braun J, Mirzabaev A (2015). Small Farms: Changing Structures and Roles in Economic Development, ZEF- Discussion Papers on Development Policy No.204, Centre for Development Research, Bonn.