Evaluation of Factors Affecting the Attitude of Female Agricultural Science Students using Censored Tobit Regression Model

Tsion T. Kidane, Steven H. Worth*

ABSTRACT

The primary purpose of this study was to investigate what factors influenced the attitude of female high school agricultural science students towards Agricultural Education and Training (AET). More specifically, the study sought to determine whether the identified factors would have a positive or negative effect on the attitude of female agricultural science students towards AET. The research was organized in nested concurrent mixed sampling designs. The study area was KwaZulu-Natal, one of South Africa’s nine provinces. Ten agricultural schools were purposively selected. The sample population was identified using probability sampling and consisted of 210 female agricultural science students from the selected high schools. A survey was conducted using a pre-tested, structured interview schedule and questionnaires with both structured and unstructured questions. The collected data was analysed using descriptive statistics and the Censored Tobit Regression Model. The reliability coefficient result was found to be 0.8. The results showed that family size, family access to farming land, discussions about AET and the students’ mothers’ education had a significant and positive (P ≤ 0.05) effect on the attitude of female agricultural science students towards AET. The students’ fathers’ education had a significant and negative (P ≤ 0.05) effect on female students’ attitudes towards AET. Creating community and student awareness of agriculture and its importance, by using different means should be conducted. Identifying parents’ perceptions and the information they have towards their children’s education could help to regulate the students’ perceptions of their studies and future career prospects.

Keywords: Agriculture, Education, Factors affecting, Female student, Tobit Regression Model.

INTRODUCTION

Agricultural education is important for sustainable agricultural production and development. Agricultural education is vocational education, supporting economic development and a family’s food supply. Female students’ participation in agricultural education and economic development has a significant input on the transformation of society and agricultural sector development (Kabeer, 2005; Rosegrant and Cline, 2003; Thirlwall, 2006; Atinaf and Petros, 2016; Alebachew et al., 2017). In global economies, trained and skilled manpower is key for productive, profitable and sustainable agricultural production, agro-processing, agricultural research and relevant policy formulation for the benefit of all farming sectors (Acker, 1999; Alam, 2009).

Agricultural Education and Training (AET) at high school level aims at providing background agricultural knowledge to learners, in preparation for further studies in various agricultural science, engineering and technology disciplines (Vandenbosch, 2006). In the teaching and learning process a learner’s perception of the subject being studied can have a significant effect on their attitudes and achievements,(Alam and Farid, 2011) which ultimately influences development in the agricultural sector (Méndez López, 2011; Ayuba and Gatabazi, 2009; Talbert and Larke Jr, 1995; Wang, Huang, and Knerr, 2010).

However in South Africa, for many young people an agricultural career is not an attractive option, and poor teaching in secondary schools results in high failure rates (DoA, 2005). In South Africa 51.3% and 48.7% of the population are female and male, respectively (Africa, 2011). Personal and community beliefs, socioeconomic and cultural conditions may all have a significant effect on a female student’s subject choice, participation, decision and success towards AET and post-secondary
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education (De Graaf, De Graaf, and Kraaykamp, 2000; Lee and Luykx, 2007; Fernando, 2017). In this regard, identifying those factors which affect female agricultural science students’ attitudes towards AET will guide and inform interventions aimed at improving the delivery and impact of Agricultural Education and Training (AET) in South Africa. The identified factors could support and foster positive attitudes by the students towards agriculture and AET, and thus contribute to the improvement of social, economic and environmental conditions in the country. Within this context, identifying and controlling the positive and negative influencing factors will help policy-makers and policy implementers improve female agricultural science students’ perceptions of agriculture as a career option through a more effective and relevant Agricultural Education and Training process.

Purpose and Objectives
This study investigated what factors influence the attitude of high school students toward AET. More specifically, the study sought to determine whether the identified factors would have a positive or negative effect on female students’ attitudes.

Materials and Methods
Data Collection and Analysis
The research was organized in nested concurrent mixed sampling designs. The study was conducted in KwaZulu-Natal, one of South Africa’s nine provinces. Ten agricultural schools were purposively selected (Johnson and Christensen, 2012). The sample population was identified using probability sampling and consisted of 210 pupils from the selected high schools, and distributed equally across the selected schools. A survey was conducted using a pre-tested, structured interview schedule and questionnaires with both structured and unstructured questions. The quantitative data was coded, described and interpreted for analysis using descriptive statistics, such as frequency, mean and the Censored Tobit Regression Model (Henningsen, 2010; Niño-Zarazúa, 2012). The left censored scores were computed by multiplying the lower score of the attitude statement by the total number of attitude statements. The right censored score of the model was computed by multiplying the highest score of the attitude statement by the total number of attitude statements. The following Censored Tobit Regression Model general equation was employed in this study:

\[ y_i = x_i \beta + \varepsilon_i \]

\[ a \text{ if } y_i^* \leq a \]

\[ y_i^* \text{ if } a < y_i^* < b \]

\[ b \text{ if } y_i^* \geq b \]

Where: \( a \)- is the lower limit of the dependent variable, \( b \)- is the upper limit of the dependent variable, \( Y_i^* \)- is an observed (“latent”) variable, \( \beta \)- is a vector of unknown parameters, \( \varepsilon_i \)- is a disturbance term, \( \chi_i \)- is a vector of explanatory variable, \( i=1,.....,n \) (indicate the observation).

Definition of Variables
Dependent variables
In this study, the focal dependent variable was the attitude of agricultural science students towards AET. Attitude is the degree of positive or negative perception of AET (McIver and Carmines, 1981; Neuman and Neuman, 2006) displayed by the students. Attitude is the liking or disliking of an object based on what is known about it (Rameela, 2004), and usually created by direct exposure to the attitude’s objects or ideas (Hossain, Eley, Gorman, and Coutts, 2010). In this study, attitudes were measured by adding the total scores obtained for the attitude statements in the case of positive items as follows: attributing a 5 score for strongly agree; 4 score for agree; 3 score for undecided; 2 score for disagree; and 1 score for strongly disagree responses. In the case of negative attitude statements the scoring pattern was reversed.

The scale was used with multi-item scales and summed rating scores (Gliem and Gliem, 2003; McIver and Carmines, 1981). The scale covered various statements which were developed after being reviewed by a panel of experts, and before the actual data collection they were pre-tested for relevance. Pre-testing was done...
using Cronbach’s alpha. The standardized Cronbach’s alpha can be calculated from the following equation:

\[
\alpha_{\text{standardized}} = \frac{K\bar{T}}{(1 + (K - 1)\bar{T})^{0.5}}
\]

Where: \( K \) = is the number of components (K-items or test lets), \( \bar{T} \) = the mean of the \( K(K-1)/2 \).

The reliability coefficient result was found to be 0.8. Statements with a Corrected Item-Total Correlation less than 0.40 were excluded from the survey (Gliem and Gliem, 2003).

**Independent variables**

The independent variables were selected based on evidence from past research in published literature, as well as from discussion with experts. Based on these assessments, the following eleven independent variables were identified and listed for relevancy ratings: family education; racial background; field for practical lessons; family access to land; family size; family monthly income; discussion about agriculture; cosmopolitan attitudes; school distance; internet access and computer access. Relevancy coefficients of the independent variables were selected based on relevancy ratings by a panel of experts. For this procedure, the lists of ten identified independent variables were subjected to ratings on a four-point continuum. The relevancy coefficients were calculated using the formula:

\[
RC = \frac{OS}{PS} \times 100\%
\]

Where:

- \( RC \) = Relevancy coefficient
- \( OS \) = Obtained score
- \( PS \) = Potential score

Those variables with relevancy coefficients (RC) below 50% were excluded from the list. Based on this process, seven independent variables were selected as follows: family education; racial background; family access to land; family size; family monthly income; discussion about agriculture; and cosmopolitan attitudes. These were defined as follows: Family education referred to the level of formal education of a student’s parents. These were: No formal education (1); Grade 1-9 (2); Grade 10-12 (3); Diploma (4); and Degree (5). The variable was expected to have a positive influence on the dependant variables and was measured as a discrete variable; Racial background referred to the student’s racial background. The groupings were: African (1), White (2), Coloured (3) and Indian (4). All racial backgrounds were expected to influence the dependent variable positively, and was measured as a discrete variable; Family access to land referred to the student’s accessibility to farmland through the family. This variable is discrete and expected to have a positive influence on the dependent variable; Family size was measured as the number of people living with the student in the same house. This variable is continuous and expected to have a positive influence on the dependent variable; Family income referred to the monthly income earnings of the student’s family. The sample was measured as R 500-2,000 (1); R 2,000-5000 (2); R 5,000-10,000(3) and (4), above R 10,000.

Family monthly income was a discrete variable and was expected to positively influence the dependant variables; Discussion about agriculture was operationally defined as the degree to which the respondent had discussions with knowledgeable people about the prospects and opportunities in agricultural education training. This was measured as exposed to discussion (1), lack of exposure to informed people and/or information and opportunities in agriculture and agricultural educational training (0). This variable was discrete and was expected to have a positive influence on the dependent variable; a cosmopolitan attitude referred to the respondent’s degree of exposure towards social systems outside their own (Kaske, 2007). This was measured by the number of visits to agriculturally related activities.

**Multicollinearity analysis**

\[
VIF (x_i) = \frac{1}{1-R_i^2}
\]

Multicollinearity is the examination of existing relationships among the independent variables, and exists when the two independent variables are closely related. This makes it difficult for the model to determine which variables have the most influence on the dependent variable (Dormann et al., 2013; Walker and Maddan, 2008). The Variance Inflation Factor (VIF) was used for testing the association among the hypothesized continuous variables. A VIF value greater than 10, and tolerance value greater than 1 are known to have multicollinearity problems among the independent variables (Hamilton, 2013), and were excluded from the analysis. It is suggested that ideally the VIF value should be less than 10, and the tolerant value less than 1. The VIF was calculated using the formula:
where, $K^2$ was the squared multiple correlation coefficient between $X$, and the other explanatory variables (Maddala and Lahiri, 1992). To test the multicollinearity problem among discrete as well as dummy variables, contingency coefficient tests were also conducted. The contingency coefficient test result was greater than 0.75, indicating the existence of multicollinearity problems between the independent variables. These independent variables were excluded from the analysis. It is suggested that ideally the contingency coefficient test results value should be less than 0.75. The contingency coefficients were calculated using the formula:

$$C.C = \sqrt{X^2/(n + X^2)}$$

where: C.C = Contingence coefficient, n = sample size, $\chi^2$ = Chi square value (Healy, 1984 as cited in Mesfin, 2005). However, the analysed results in this study indicated that there was no multicollinearity problem among the explanatory independent variables, and hence all the hypothesized independent variables were acceptable and were included in the analysis in the Censored Tobit Regression Model.

**Results and Discussion**

**Descriptive statistic**

As can be seen in Table 1, out of the total sample 206 (98%) of the female agricultural science students were South African, while 4 (1.9%) of the students were not South Africans. In terms of female students’ racial background, the majority 208 (99%) were African. Also, the families of 163 (77.6%) students had a monthly income was less than R 5,000. Concerning the female students’ family educational background, 49 (23.35%) and 81 (38.6%) of the female students’ fathers had completed their primary and secondary education, respectively. Also 29 (13.8%) and 20 (9.5%) female students’ fathers had a diploma and degree certificate, but 31 (14.8%) fathers did not have a formal education (see Table. 1). Moreover, regarding the female agricultural science students’ mothers, 53 (25.2%) and 84 (40%) of them had completed primary and secondary schools, respectively. On the other hand 22 (10.5%) and 25 (11.9%) mothers had a diploma and degree, respectively. Similarly, 26 (12.4%) mothers had no formal education. Furthermore, the family of 79 (37.7%) female students had access to farming land, while 131 (62.3) had no access to farming land. Half or 109 (51.9%) female students had only one family member earning an income in the family, while 52 (24.8%) had two family members providing an income in the family.

In the light of students’ care givers, 112 (53.3%) female agricultural science students indicated that their mother was the only care giver in their family, and was responsible for them. However, 44 (21%) students were getting care from both parents (mother and father), with the remaining 37 (17.6%) living with neither their mother nor father, but were receiving care from the extended family. These figures clearly indicate that the majority of female agricultural science students were being cared for by their mothers. The majority of 171 (81.4%) female agricultural science students had received information, and have had discussions with experienced people in the agricultural science field about the future prospects for agricultural education and training. Information is crucial in shaping the information receiver’s attitude towards the subject, with the students’ perceptions being influenced either positively or negatively by the information giver’s existing level of experience (Cheung and Thadani, 2012; Huang, Cai, Tsang, and Zhou, 2011; Sweeney, Soutar, and Mazzarol, 2008). The figure shows that the majority of female agricultural science students had received information about agricultural education and training. This information may influence students and help develop specific intentions towards AET while they are in the process of making choices regarding future careers.

Table (2) displays the likelihood ratio. A Chi-Square factor of 77.93 (df = 15) with significance level of $P \leq 0.0001$ indicates that the model as a whole fits well and was found to be better than an empty model (i.e. a model with no predictors) with 95% confidence interval.

**Family size**

Student’s family size had a positively increasing effect ($P = 0.05$) on a female student’s attitude towards AET (Table 2). The result shows that an increasing family size correlated with positively and significantly increasing a female agricultural science student’s attitude towards AET. In South Africa women are the major role players in small-scale farming to secure their family’s food security and balanced nutritional food intake (Machethe, 2004; Raidimi, 2014), with women farmers using their backyards to produce crops and run livestock. This clearly indicates that in female
headed farmers household agriculture is the potential source of families’ food supply and food security. As can be seen in Table 1 the majority of female students were cared for by their mothers. As discussed earlier, increased involvement by women farmers in subsistence backyard agriculture, coupled with an increase in the size of families has resulted in more farming activity. This may result in an increased positive perception towards AET (Africa, 2011) by female agricultural science students.

Table (1) Definition of variables and their descriptive statistics (n = 210)

<table>
<thead>
<tr>
<th>Variable definition</th>
<th>symbol</th>
<th>Mean (Std)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nationality South African</td>
<td>NSA</td>
<td>0.980(±0.137)</td>
</tr>
<tr>
<td>Nationality Non South African</td>
<td>NNSA</td>
<td>0.019(±0.137)</td>
</tr>
<tr>
<td>Racial Background (African)</td>
<td>RBC 1</td>
<td>0.990(±0.097)</td>
</tr>
<tr>
<td>Racial Background (Coloured)</td>
<td>RBC 1</td>
<td>0.009(±0.097)</td>
</tr>
<tr>
<td>Family Monthly income R 500-2,000</td>
<td>FMI 1</td>
<td>0.638(±0.481)</td>
</tr>
<tr>
<td>Family Monthly income R 2,000-5,000</td>
<td>FMI 2</td>
<td>0.138(±0.345)</td>
</tr>
<tr>
<td>Family Monthly income R 5,000-10,000</td>
<td>FMI 3</td>
<td>0.157(±0.364)</td>
</tr>
<tr>
<td>Family Monthly income above R 10 000’</td>
<td>FMI 4</td>
<td>0.066(±0.250)</td>
</tr>
<tr>
<td>Father Educational (No formal education)</td>
<td>FED 0</td>
<td>0.233(±0.423)</td>
</tr>
<tr>
<td>Father Educational level (grade1-9)</td>
<td>FED 1</td>
<td>0.385(±0.487)</td>
</tr>
<tr>
<td>Father Educational level (grade10-12)</td>
<td>FED 2</td>
<td>0.138(±0.345)</td>
</tr>
<tr>
<td>Father Educational level (Diploma)</td>
<td>FED 3</td>
<td>0.095(±0.294)</td>
</tr>
<tr>
<td>Mother Educational (No formal education)</td>
<td>MED 0</td>
<td>0.252(±0.435)</td>
</tr>
<tr>
<td>Mother Educational level (grade1-9)</td>
<td>MED 1</td>
<td>0.400(±0.491)</td>
</tr>
<tr>
<td>Mother Educational level (grade10-12)</td>
<td>MED 2</td>
<td>0.104(±0.306)</td>
</tr>
<tr>
<td>Mother Educational level (Diploma)</td>
<td>MED 3</td>
<td>0.119(±0.324)</td>
</tr>
<tr>
<td>Mother Educational level (Degree)</td>
<td>MED 4</td>
<td>0.123(±0.330)</td>
</tr>
<tr>
<td>Caregiver (Mother)</td>
<td>CGM</td>
<td>0.533(±0.500)</td>
</tr>
<tr>
<td>Caregiver (Father)</td>
<td>CGF</td>
<td>0.080(±0.273)</td>
</tr>
<tr>
<td>Caregiver (Both parents)</td>
<td>CGBP</td>
<td>0.209(±0.407)</td>
</tr>
<tr>
<td>Caregiver (Aunt)</td>
<td>CGA</td>
<td>0.052(±0.223)</td>
</tr>
<tr>
<td>Caregiver (Grandparent)</td>
<td>CGGM</td>
<td>0.095(±0.294)</td>
</tr>
<tr>
<td>Caregiver (Brother)</td>
<td>CGB</td>
<td>0.028(±0.166)</td>
</tr>
<tr>
<td>Discuss with experienced people about AET (No)</td>
<td>DAA 1</td>
<td>0.185(±0.389)</td>
</tr>
<tr>
<td>Discuss with experienced people about AET (Yes)</td>
<td>DAA 2</td>
<td>0.814(±0.389)</td>
</tr>
<tr>
<td>Visit to other towns /Cosmoplitness (No)</td>
<td>TV 1</td>
<td>0.123(±0.330)</td>
</tr>
<tr>
<td>Visit to other towns /Cosmoplitness (Yes)</td>
<td>TV 2</td>
<td>0.876(±0.330)</td>
</tr>
<tr>
<td>Family access to farming land (No)</td>
<td>AFL 1</td>
<td>0.623(±0.485)</td>
</tr>
<tr>
<td>Family access to farming land (Yes)</td>
<td>AFL 2</td>
<td>0.377(±0.485)</td>
</tr>
</tbody>
</table>
Table (2)

Coefficients obtained as the result of Censored Tobit Regression Model using primary data \((n = 210)\).

<table>
<thead>
<tr>
<th>Items</th>
<th>Coefficients</th>
<th>Standard Error</th>
<th>t-value</th>
<th>P &gt; t</th>
</tr>
</thead>
<tbody>
<tr>
<td>Family Size</td>
<td>0.3240437</td>
<td>0.164491</td>
<td>1.97</td>
<td>0.05</td>
</tr>
<tr>
<td>FMI 1</td>
<td>-1.489246</td>
<td>1.645623</td>
<td>-0.9</td>
<td>0.367</td>
</tr>
<tr>
<td>FMI 2</td>
<td>-0.072471</td>
<td>1.888783</td>
<td>-0.04</td>
<td>0.969</td>
</tr>
<tr>
<td>FMI 3</td>
<td>-1.429748</td>
<td>1.866251</td>
<td>-0.77</td>
<td>0.445</td>
</tr>
<tr>
<td>FED 0</td>
<td>0.617396</td>
<td>1.344118</td>
<td>0.46</td>
<td>0.647</td>
</tr>
<tr>
<td>FED 1</td>
<td>-3.067872</td>
<td>1.344459</td>
<td>-2.28</td>
<td>0.024</td>
</tr>
<tr>
<td>FED 2</td>
<td>-6.647658</td>
<td>1.733619</td>
<td>-3.83</td>
<td>0.000</td>
</tr>
<tr>
<td>FED 3</td>
<td>-9.984336</td>
<td>2.104233</td>
<td>-4.74</td>
<td>0.000</td>
</tr>
<tr>
<td>MED 0</td>
<td>3.630362</td>
<td>1.406414</td>
<td>2.58</td>
<td>0.011</td>
</tr>
<tr>
<td>MED 1</td>
<td>4.068762</td>
<td>1.398422</td>
<td>2.91</td>
<td>0.004</td>
</tr>
<tr>
<td>MED 2</td>
<td>2.644268</td>
<td>1.740888</td>
<td>1.52</td>
<td>0.130</td>
</tr>
<tr>
<td>MED 3</td>
<td>6.327808</td>
<td>2.01719</td>
<td>3.14</td>
<td>0.002</td>
</tr>
<tr>
<td>AFL 2</td>
<td>2.055801</td>
<td>0.8046029</td>
<td>2.56</td>
<td>0.011</td>
</tr>
<tr>
<td>TV 2</td>
<td>-1.898392</td>
<td>1.22484</td>
<td>-1.55</td>
<td>0.123</td>
</tr>
<tr>
<td>DAA 2</td>
<td>3.334257</td>
<td>1.071165</td>
<td>3.11</td>
<td>0.002</td>
</tr>
<tr>
<td>_cons</td>
<td>54.4352</td>
<td>2.495565</td>
<td>21.81</td>
<td>0.000</td>
</tr>
</tbody>
</table>

P ≤ 0.0001 Log likelihood = -653.26011 Chi-Square of 77.93(15)

Mother’s education

A student’s mother’s education had a significant, increased and positive \((P = 0.011)\) effect on a female student’s attitude towards AET. For a one unit increase in family education (MED 0, MED 1, MED 2, and MED 3), there is a 3.63, 4.07, 2.64 and 6.33 point increase, respectively, in the predicted value. Showing a positive and increased female student’s attitude towards AET. However, MED 2 had an increasing but no significant impact on female student’s attitude towards AET at \(P ≤ 0.05\) level of significance (Table 2). This result indicates that the effect of the mother’s education on the daughter shows a positive and increased attitude by female agricultural science student’s towards AET. As shown in Table 1, the majority of female students were being cared for by their mothers. Likewise, similar data Africa (2011) indicated that in South Africa, the majority, 41.9% of children, were supported and grew up with mothers only; 3.6% and 27.2% were living with their father only and both parents, respectively; and 24.7% of children were living without either parent’s support. The findings confirm that the majority of female adults living with their own children aged 0–17 years, is a greater percentage than that of male adults (Statistics South Africa, 2011). Mothers are the bread winners and responsible for their family, and as family leaders recognize the importance of agriculture for family food security and nutritional requirements. This positive attitude towards agriculture is one of the reasons for the positive attitude of female agricultural science students towards AET, and could lead to further involvement by female students in agricultural science education and careers in South Africa.

Discussion with other people

As expected, discussions with other people had a significant and positive \((P ≤ 0.01)\) probability level (see Table 2). The results show that a one unit increase in involvement in discussions concerning agricultural science and its future, both educationally and for employment, was associated with a 3.3 unit increase in the predicted value of the female agricultural science student’s attitude towards AET. In KwaZulu-Natal province, 71.8% of the household population were non-agricultural, and 28.2% were agricultural households, indicating that more than two thirds of the population were not engaged in agriculture (Africa, 2014). Information about agricultural science is crucial for communication and to create positive attitudes by female students towards agriculture and AET. Crucially, the information sender’s knowledge, experience, skill and attitude level (Cheung and Thadani, 2012; Huang et al.,
2011; Sweeney et al., 2008) towards the information also determines the amount of influence on the student’s perceptions. The information receivers’ attitude is mainly regulated by the type of information the sender has, and the level of satisfaction felt by the receiver of the information (Huang et al., 2011). A female agricultural science student who has an opportunity to be involved in discussions about AET, job prospects and opportunities about agriculture will have a positively increased attitude to AET. This result is found to be consistent with the findings of Israel, Beaulieu, and Hartless (2001); (Kilpatrick, 2000). Thus, student interactions and the sharing of information with an experienced person can assist students in developing a favourable disposition towards AET (Ayanda et al., 2012). A greater awareness and engagement in discussions about agriculture is results in a positive and increasing female agricultural science student’s attitude toward AET. Sufficient discussions and information on job and career opportunities in agriculture could therefore contribute positively to influencing the attitudes of more female agricultural science students towards AET.

**Father’s education**

The father’s education had a significant (P < 0.05) and negative influence on the female students’ attitudes towards AET (Table 2). A one unit increase in a female agricultural science students’ education level FED 1, FED 2 and FED 3, was associated with a negatively -3.0, -6.6 and -9.9 increase in a female student’s attitude towards AET. Conversely, literature shows that a family’s education has a positive influence on their children’s perceptions and achievements in education (Linnehan, 2001; Salami and Okeke, 2017). However, in South Africa due to the fact that migrant mining workers (lived in hostels), occupational mobility and the Bantu Education Act could be the reason for the correlation between an increasing level of father’s education with the negatively increasing female agricultural science student’s attitude to AET. Similar findings by DoA (2005) indicated a developed negative perception to agriculture among the majority of youth in South Africa. The current findings were found to be in agreement with a report Cheung and Thadani (2012); (Huang et al., 2011; Jeynes, 2007) which showed that the female student’s perception towards their education was influenced by the level of perception and information their parents had. Therefore, the family’s educational background does not always favourably contribute to the student’s attitude towards the educational subjects their children are learning at high school level. A parent’s education and other explanatory factors could also regulate a student’s family’s perception and be reflected by the student’s aspirations and attitudes towards the subject they are learning or their future career direction (Hossler and Stage, 1992). In most cases, parents work towards ensuring their children have a career offering future achievement and success, with their reinforcement based on their previous experiences and information (Cotton and Wiklund, 1989; Jeynes, 2007). Therefore, this finding confirms that the information and perception that a parent has towards the subject their child is learning could regulate the student’s perception towards that subject.

**Access to farm land**

A student’s family’s access to farm land had a positive and significant (P ≤ 0.05) effect on female agricultural science students’ attitudes towards AET. For a one unit increase in a student’s family’s access to farm land, there is a 2 unit increase in the predicted value positive and increased female agricultural science student’s attitude towards AET (see Table 2). However, the results of the descriptive statistics as shown in Table 1, indicate that the majority of female agricultural science students’ families do not have access to farm land, despite this providing opportunities to implement students’ knowledge and skill for the survival or development of their family’s agricultural activities (Brkic, Tratnik, Bobanac, and Žutiniæ, 2002; Carreira, Mane, Danforth, and Wailes, 2004). This is consistent and in agreement with the respondents’ responses during informal discussions. Availability of family access to farm land has a significant effect on agricultural science students’ attitudes towards AET, and agricultural science knowledge and skill advancement. Additionally, it is known that learning is easier when the context is familiar, therefore students with access to family land may find it easier to study Agricultural Science, as argued by Song (2011) “context familiarity had positive effects on students’ levels of inference-making, their self-reported levels of motivation, and perceived levels of difficulty”. This is in agreement with the findings of this study where positive student attitudes motivate students to seek further knowledge in agriculture, and may encourage them to study agricultural sciences at a high level.
Therefore, access to farmland by the student’s family has been found to have a positive influence on the attitude of female agricultural science students towards AET.

**Conclusion and remarks**

The results show that family size, mother’s education, family access to farming land, and discussions with other people about AET have a positive and significant (P = 0.05), (P = 0.011), (P ≤ 0.05) and (P ≤ 0.01) probability levels, respectively, and affect student attitudes towards AET. Furthermore, a student with an educated father has a negative and significant effect (P ≤ 0.05) probability level respectively, on student attitudes to AET.

The result also showed that out of six independent variables in the model used to identify influences on agricultural science students’ attitudes to AET, at least four were found to be statistically significant, and having the probability of influencing female students’ attitudes to AET. The findings suggest that the various bodies responsible for the governance of AET, should be conscious of the factors that may influence female students’ attitudes toward AET, and will need to use various innovative strategies to create community and student awareness of agriculture, its importance and its potential as a line of study and future career choice.

Identifying a parent’s perceptions and information concerning the direction of their child’s education could help to favorably regulate and adjust a parent’s perception towards their child’s study area and future career prospects. This could contribute to more positive attitudes and an understanding of the importance of AET.

It is also recommended that responsible parties (e.g. the provincial Department of Education) should make every effort to ensure that every high school that offers agricultural science has land available for practical learning.

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تقييم العوامل المؤثرة في سلوك طلاب العلوم الزراعية الإناث باستخدام نموذج الانحدار الرقابي

تسيون كيدن، ستيفن وورث *

ملخص

الغرض الأساسي من هذه الدراسة هو معرفة العوامل التي أثرت على موقف طلاب العلوم الزراعية الإناث من التعليم الزراعي والتدريب (إيت). وبشكل أكثر تحديدًا، سعت الدراسة إلى تحديد ما إذا كانت العوامل المحددة سيكون لها أثر إيجابي أو سلبي على موقف طلاب العلوم الزراعية الإناث نحو إيت. أظهرت النتائج أن حجم الأسرة، والوصول الأسري إلى الأراضي الزراعية، والمناقشات حول إيت وتعليم الأمهات الطلاب كان لها تأثير إيجابي وإيجابي (P ≤ 0.05) على موقف طلاب العلوم الزراعية الإناث نحو إيت. وكان تعلم أباد الطلبة تأثيراً إيجابياً وسلباً (P ≤ 0.05) على اتجاهات الطالبات تجاه التعليم والتدريب المهني. وينبغي خلق الوعي المجتمعي والطلائي بالزراعة وأهميتها، باستخدام وسائل مختلفة.

الكلمات الدالة: الزراعة، التعليم، العوامل المؤثرة، طالبة، توبيت نموذج الانحدار.

* كلية الزراعة، علوم الأرض والبيئة، جامعة كوازولو ناتال. تاريخ استلام البحث 18/6/2015، وتاريخ قبوله 6/9/2015.