Employment preparation, competencies and job satisfaction of diploma agriculture graduates in Trinidad and Tobago, W.I.

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Agriculture is once more on the agenda of national governments and regionally it has undergone some dramatic changes in recent years. These changes are mostly due to global demands for reforms on production and marketing practices to ensure that food is safe for consumers and not produced in a manner that harms the environment. As the region tries to respond, there have been calls for The School of Agriculture of the Eastern Caribbean Institute of Agriculture and Forestry (ECIAF) in Trinidad and Tobago, West Indies to revise its curriculum to meet demands for agricultural development not only in Trinidad and Tobago but the entire Caribbean. This study examined the extent to which the training provided to graduates, is empowering them to support goals of national food and nutrition security. One hundred recent graduates were randomly selected from a list provided by the ECIAF of graduates in the last 5 years and interviewed. The instrument consisted mainly of closed ended questions and rating scales which sought to assess respondents' perceptions of the training they received, relevance of the training received to present job functions, changes in technical competencies over time and their level of job satisfaction. The instrument was pretested among 10 graduates and modified based on comments. It was administered over a two month period in 2010. Data were analyzed using SPSS V.17 and described. Means comparisons tests and categorical regression analyses were also done to explore relationships with Job satisfaction.

The main findings were that: level of technical preparation was the most important variable determining Job satisfaction; graduates perceived they were adequately prepared in the traditional areas of agriculture (crops, livestock and soils) but were under prepared for new areas required for food production in a modern environment (sustainable production, food safety and value addition); while Job competencies increased over time in all technical areas examined, there were significantly higher changes in the newer food production areas compared to the traditional areas.

The major recommendation was that the ECIAF and other agricultural education institutions urgently engage stakeholders constructively and review their curricula to meet requirements for agricultural development in a modernized environment.

Keywords: agriculture; curriculum; job competencies; job preparation; job satisfaction

Agricultural universities worldwide are facing numerous challenges including increasingly limited resource allocations, declining enrollments, inability to keep up with advances in information and other technologies, becoming aware of and responsive to clientele, and the need to aggressively globalize their teaching, research, and outreach programs (Jischke, Topel and Acker 1999). The partnerships between higher education and business and industry have huge implications for agriculture (Graham 2001). Martin et al. (2000) reminded providers of higher education of the need to prepare graduates to meet the demands of industry. It has been suggested (Kunkel, Maw, and Skaggs 1996) that the curricula of agriculture were out of

date and should be changed was further supported by Maguire and Atchoarena (2003) who indicated that higher agricultural education in many developing countries is experiencing serious problems that impact on the quality of education, bringing into question the relevance of programs offered.

In 1954, the Eastern Caribbean Farm Institute was established. The name of the Institute was changed in 1971 to the Eastern Caribbean Institute of Agriculture and Forestry (ECIAF), as it is known today, to reflect the introduction of the Diploma in Forestry. From1964, ECIAF has operated as a Trinidad and Tobago Institution, a change that has never interfered with its regional character in relation to function and student intake. The ECIAF is a tertiary level Institution where students are accepted into the programme based on passes in at least five (5) subjects at Ordinary level or at the Caribbean Secondary Examinations Council (CSEC) level of the Caribbean Examinations Council (CXC). The subjects must include Mathematics, English Language and any science, inclusive of Agricultural science. Neither Health Science nor Human and Social biology is considered a science subject for meeting matriculation requirements. The eligible age for entry into the agriculture diploma programme is 16 years.

The agriculture diploma programme offered at the Eastern Caribbean Institute of Agriculture and Forestry (ECIAF) in Trinidad and Tobago trains candidates at the para-professional level for the agricultural industry. Students come from across the Caribbean region and graduates obtain employment in both the private and public sector. Initially, training focused on farm activities, with the goals of increased production and productivity. Within recent times training has expanded to include agro-processing and agro-entrepreneurship. Additionally, beyond production objectives, post production concerns, issues of sustainability and management of natural resources have come to the forefront. It is of paramount importance that graduates of agricultural science are adequately prepared with levels of competencies to engage successfully with clients to meet regional agricultural development goals.

Worldwide, many colleges of agriculture are undergoing programmatic changes and are reexamining the philosophy underlying their missions (Graham 2001). According to Lindner and Baker (2003), trends in academic, social, and business environments are reshaping degree programs around the world. Universities are responding by reconstituting curricula, courses, and programs to help students acquire the competencies needed to be professionally successful. They further indicated that students are challenging faculty and administrators to deliver curricula, courses, and programmes that are up-to-date, in line with industry standards, socially responsive, and pragmatic. In response to these issues, colleges of agriculture and departments of agricultural education have developed extensive lists of generic student competencies (California State Polytechnic University 2001; University of Arizona 2001),

If agricultural industries are to survive, the agriculture curriculum must be dynamic and able to adjust to new situations and environments that help to improve on-the-job effectiveness of future graduates (Coorts 1987, Slocombe and Baugher 1988). The ECIAF is seeking to respond to the call by Curtis (1995), validated by Hermsen (2000) based on a study at the ECIAF, for agricultural science programmes of the next century to take into account profound changes in the structure of society.

Appropriate curricula develop competent individuals. Competence has been defined as the integration of knowledge, skills and attitudes that enables a person to perform certain tasks (Wesselink et al. 2007). Armstrong (2006) stated that competencies are factors that contribute to high levels of individual and organizational performance. Competency has also been defined as knowledge, skills, or abilities required of the job (Cooper and Graham 2001) and Spencer and Spencer (1993, p.9) viewed competency as "an underlying characteristic of an individual that is causally related to criterion-referenced effective and/or superior

performance in a job or situation". Moreover, competencies have behavioral dimensions that help identify effective from ineffective performance (Maxine 1997).

Levels of competency also impact on job satisfaction, consequent commitment to job and ultimately overall agricultural development. Garton and Robinson (2006) indicated that job satisfaction plays an important role in determining whether or not graduates remain in their chosen career. Job satisfaction is a complex variable and is influenced by situational factors of the job as well as the dispositional characteristics of the individual (Sharma and Ghosh 2006). It has also been described as one's feelings or state-of-mind regarding the nature of their work (Mudor and Tooksoon 2011). There are numerous issues impacting job satisfaction. Job satisfaction, from the employee's perspective, is related to the job itself, the types and quality of social relations in the work place, the degree of initiative or voice an employee is granted in matters and the financial and social benefits derived from the job (Ayranci 2011). Some studies discovered that job satisfaction increases when education level increases (Gurbuz 2007; Verhofstadt and Omey 2003).

As such, a safe assumption would be that the competencies of ECIAF graduates would be dependent on their level of preparation as guided by the curriculum's objectives. Any actions taken on the curriculum should be based on some systematic analysis of present offerings and new development needs. While this study could have examined the perceptions of all stakeholders impacted by ECIAF graduates, the focus was on graduates' perceptions. The argument is that having graduated within recent times and having gained some industry experience, they might be better positioned than most other stakeholders to reflect on their curriculum in light of present work demands and provide valuable insights that can be used to construct a more useful curriculum.

This particular study is timely not only because of worldwide trends calling for curriculum reform in agricultural education but because no tracer studies have been conducted to inform and guide curriculum development at the ECIAF. However**,** more than a decade ago**,** Hermsen (2000), after reviewing the ECIAF curriculum suggested that the organization should revise its curriculum to ensure that it responds to demands in agricultural development in the Caribbean and especially in Trinidad and Tobago. This recommendation has been left largely unattended.

Objective of study

The objective of this study was to investigate ECIAF graduates' perception of their technical preparation and competencies and their relationship with job satisfaction. Specifically, the study sought to (1) determine graduates' perception of their preparation at ECIAF in key food production areas: Crops, Soils, Livestock, Extension/Communication, Sustainable Agriculture, Farm management, Food Safety, Farm machinery and Value addition. (2) the relationships between graduates perception of their preparation at the ECIAF and the technical requirements for their present job functions, (3) assess differences in graduates perception of their preparation for their present job functions and their present competencies, and (4) to investigate the determinants of graduates' Job satisfaction from selected personal and work-related variables.

Methodology

One hundred Trinidad and Tobago graduates from the ECIAF were randomly selected from lists obtained from the ECIAF of students who graduated in the last five years. The study intended to do a census of graduates. However, due to inadequate contact information, this was not possible. The final sample (n=100) represented 88% of total graduates for the period 2004 to 2008. The research instrument, a self-reporting, structured questionnaire was used to collect data. The questions related to perceptions and

competencies were evaluated using rating scales. There were fixed response sets for each area examined and responses were scored accordingly. The instrument was reviewed for content validity by two Faculty at the ECIAF and two extension professionals. Pretesting was done prior to execution among ten ECIAF graduates and revisions made. Instruments were mailed, hand delivered and sent electronically for completion.

The survey instrument was divided into several parts as shown below.

Personal and job related information of the respondents: This section included age, gender, employment status, highest level of agricultural education, years of service and job tenure.

Assessment of Overall preparation: Respondents were asked to rate the extent of their overall level of preparation at ECIAF using a satisfaction scale and scored as follows; Very satisfied (score =3), Satisfied (score =2) and Dissatisfied (score =1).

Assessment of Preparation in selected areas: The respondents were asked to rate the training received in nine specific areas. These areas were identified from The Ministry of Agriculture Land and Marine Affairs Development plan as well as documents from development agencies such as the Caribbean Agricultural Research and Development Institute (CARDI) and The Inter American Institute for Cooperation on Agriculture (IICA). They included the traditional Crop and Livestock areas, but also other areas such as Sustainable agriculture, Value addition, Extension and Communication, Machinery, Food safety and Farm management. Responses were scored as follows; Very Good (score =4), Good (score=3), Fair (score= 2), and Poor (score =1).

Job function requirements: Respondents were required to indicate how important the nine areas selected were to their present job functions. These functions were obtained from the job description details accessed from potential employers. Each area was scored as follows; Very important (Score = 4), Important (Score = 3), Somewhat important (Score = 2) and Unimportant (Score = 1)

Competency differences. Data to assess level of competence on job entry and level of competence at present were captured using a rating scale; Very Good (Score =4), Good (Score = 3), Fair (Score = 2) and Poor (Score =1). Independent T-tests evaluated differences at $P \leq .05$ level of significance.

Job Satisfaction measure: Respondents were asked to respond to 19 unidimensional statements on a rating scale to determine their overall job satisfaction The item set included the degree of independence, diverse nature of the job, flexibility in scheduling work, opportunity for promotion, remuneration for the job, relationship with other colleagues, relationship with supervisors, recognition received from the job, physical working environment, and opportunity for skill development through training. Some item statements were related to satisfaction with the service rendered to clients, the extent of interaction, the timeliness of interaction, the quality of advice given and the amount of time available for interaction. Scoring was as follows: Very Satisfied (Score =4), Satisfied (Score =3), Somewhat satisfied (Score =2) and Dissatisfied (Score =1). The items were reviewed for face validity by three colleagues in the field and thereafter adjusted based on comments received. The reliability estimate (Cronbach α) was calculated at 0.78 reflecting fairly good reliability of the scale.

Data were analyzed using SPSS V.17 and described. Means comparisons tests and Categorical regression analyses were also conducted to explore relationships and results summarized and reported. Categorical regression is similar to multiple regression, except that it can accommodate nominal and ordinal variables as used in the study.

Results

The sample of 100 graduates of the ECIAF in the last 5 years comprised 54% male respondents and 46% female respondents. The majority were within the age group of 20-25 (49%) followed by 34% in the under 20 years age group and 17% in the 25-30 group.

Some 9% of the respondents had a Bachelor's degree in Agriculture, 58% had Associate degree qualification, 32 % diploma level certification, and 1% had further qualifications in agriculture at the Master's level. Results showed that the majority of the respondents (71%) had fewer than 2 years service, followed by (25 %) with 2-4 years of service and some 4 % with more than 4 years service. As regards job tenure, 49% of the sample was employed on a contracted basis; 40% in some sort of temporary employment, mostly the Government-run "On the Job Training" programme, and 11% held secure employment in the field of agriculture. The largest percentage of the respondents (42%) was from State assisted organizations, followed by the Private sector (33%) and Government (25%).

Satisfaction with Overall Job Preparation

Respondents were asked to rate their perception with the overall training they received at the ECIAF. Data showed that 69% of the respondents perceived their overall preparation as very satisfactory and 31% of the respondents were just satisfied. No respondents indicated dissatisfaction with their overall preparation. Mean overall preparation score was 2.69 (Very satisfied score=3; Satisfied score=2 and dissatisfied score=1).

Level of Preparation in main curriculum areas

Data in Table 1 (column 2) show responses for graduates' perceptions of their level of preparation in nine selected areas. Highest mean scores were reported in the traditional areas of training (Livestock = 3.64, Crops= 3.52; and Soils= 3.39). Scores were lower for Farm management (2.93); Extension/ communication (2.83) and Sustainable agriculture (2.72). The areas of Machinery, Food safety and Value added attracted lowest mean scores.

Requirements for Job Function

Data in Table 1 (column 3) show that although the traditional areas were still very important for present job functions, the newer areas were also quite important. While level of preparation mean scores were higher than "requirement for present job function" scores in the traditional areas (Crops, Livestock and Soils), they were less in the areas of Extension/ Communication, Sustainable agriculture, Food safety and Value addition, the areas considered very important for modern agriculture.

Comparison of Level of Preparation and Requirement for Job Function

When perceived Level of preparation and Requirements for job function mean scores were compared (Table 1), significant differences were determined in the areas of Crops ($P \leq .001$), Livestock ($P \leq .001$), Soils ($P \leq .001$), Farm management ($P \leq .01$), Machinery ($P \leq .001$), Food safety ($P \leq .001$) and Value addition $P \leq .001$).

Further examination of the data show that in the relatively new areas of competencies required for present day agriculture, Level of preparation mean scores were lower than scores for requirements for job functions. These were reflected in the areas of Extension/ Communication, Sustainable Agriculture, Food Safety, and Value addition. However, only Food Safety and Value addition were significantly different at the $P \leq .001$ level.

For the traditional areas of agriculture, students perceived that they were adequately prepared for the job functions they were asked to perform. Means for Level of preparation were higher than means for Requirements for job functions.

Table 1: Comparison of Perceived Level of Preparation and Requirements for Present Job Function

Selected Technical areas	Perceived Level of Preparation* Means (SD)	Requirements for Present Job Function** Means (SD)	T-test (p values Sig. levels)
Crops	3.52 *(0.52)*	3.32 (0.40)	3.13 (.002)
Soils	3.39 (0.57)	2.98 (0.89)	5.23 (.000)
Livestock	3.64 *(0.50)*	2.50 (0.79)	12.17 (.000)
Extension and Communication	2.83 *(0.67)*	2.96 (0.50)	1.52 (.13)
Farm Management	2.93 *(0.54)*	2.70 (0.64)	2.66 (.01)
Sustainable Agriculture	2.72 *(0.67)*	2.78 (0.52)	0.81 (.42)
Machinery	2.69 *(0.58)*	2.28 (0.55)	4.87 (.000)
Food Safety	2.06 *(0.69)*	2.71 (0.67)	6.91 (.000)
Value Addition	1.63 *(0.65)*	2.25 (0.86)	5.84 (.000)

* Very Good (score =4), Good (score=3), Fair (score= 2), and Poor (score =1).
**Very important (Score = 4), Important (Score = 3), Somewhat important (Score = 2) and Unimportant (Score = 1).

Table 2: Means' Comparisons for Job Competencies on Job Entry and Competencies at Present

Areas	Level of Competence on Job Entry * Means (SD)	Level of Competence at Present* Means (SD)	T-test (p values)
Crops	3.48*(0.58)*	3.70 *(0.50)*	9.80 (0.00)
Soils	3.39 *(0.53)*	3.42 *(0.58)*	0.28 (0.53)
Livestock	3.67 *(0.51)*	3.67 *(0.54)*	0.21 (0.83)
Machinery	2.47 *(0.71)*	2.68 *(0.71)*	4.02 (0.00)
Farm management	2.14 *(0.67)*	2.71 *(0.72)*	12.73 (0.00)
Extension/Communication	2.78 *(0.69)*	3.04 *(0.64)*	9.38 (0.00)
Sustainable Agriculture	2.43 *(0.67)*	2.79 *(0.74)*	8.53 (0.00)
Value Added	2.08 *(1.01)*	2.28 *(1.02)*	4.16 (0.00)
Food safety	2.13 *(1.02)*	2.61 *(1.00)*	9.58 (0.00)

*Very Good (Score =4), Good (Score = 3), Fair (Score = 2) and Poor (Score =1).

On the job change in competencies

Data (Table 2) show that students perceived their competencies to be significantly improved in all areas investigated, except Livestock and Soils which changed minimally over the period. There were significant changes in competencies from time of entry to the job until the present (all at P≤.001), in the areas of Crops, Machinery, Farm management, Extension/communication, Sustainable Agriculture, Value addition, and Food safety.

Job satisfaction levels

Results showed that the respondents were fairly satisfied with their jobs with an overall mean of 2.82 (where score 4 = very satisfied) over the 19 items on which they were assessed. However, some items on the scale attracted higher mean scores than others. The degree of independence had the highest mean score of 3.41 indicating that the majority of the respondents were very satisfied with this job satisfaction parameter. This was followed with satisfaction for relationships with colleagues (M=3.05), the diverse nature of the job (M=3.04), the physical work environment (M=3.04), their relationships with supervisors (M=3.0) and flexibility in scheduling work (2.99). Respondents were also fairly satisfied with the remuneration for the job (M=2.83), and the recognition received for the job (M=2.58) and with the opportunity for skill development through training (M=2.42).

Opportunity for promotion had the lowest mean of 1.92 indicating respondents being dissatisfied with this aspect of their job.

Determinants of Job satisfaction

Zero-order correlations (Table 3) show a strong relationship between Satisfaction with Technical Preparation and Job Satisfaction (0.89) and moderate correlations between Employment (0.36), Overall Competencies at Present (0.33) and Job Tenure (0.30) and Job Satisfaction. The other factors investigated were weakly correlated.

Categorical regression results show that one factor, Overall Satisfaction with level of Technical Preparation was mainly responsible (β= .78) for determining the job satisfaction of graduates. It was the most important contributor of all the variables. In combination with others it accounted for 84% of the variance in Job Satisfaction. Other significant, but small contributors were Job Tenure (β= .19), Years in Service (β= .13), and Gender (β= .15).

Table 3. Summary Results of Categorical Regression of Selected Factors on Job Satisfaction.

Predictor variables	**Beta (df)**	**F value (significance)**	**Zero-order correlations**	**Importance (%)**
Age	.016 (2)	.070 NS	.075	.1
Gender	.155 (2)	8.11***	.180	.3
Highest Level of Education	.097 (2)	4.20**	-0.15	.2
Years in Service	-.133 (3)	4.84***	-.150	2.3
Job Tenure	.189 (1)	4.75**	.291	6.3
Employment	.103 (1)	4.15*	.361	4.3
Satisfaction with Overall preparation	.034 (2)	1.27 NS	.188	.7
Satisfaction with Technical Preparation	.782 (3)	66.54 ***	.890	79.9
Overall Job Competencies at Present	.087 (2)	1.89 NS	.326	3.3
Multiple R: 0.933 R^2: 0.871 : Adjusted R^2 : 0.842 F = 30.34 : Sig. P≤.000				

NS: Not Significant;
***: Significant at .001 Level; **: Significant at .05 Level; *: Significant at .01 Level

Discussion

One of the most important pieces of information to have regarding an employee in an organization is a validated measure of his or her level of job satisfaction (Judge, Hanisch and Drankoski 1995). The main finding of this study was that graduates' satisfaction with their technical preparation had the greatest impact on their Job Satisfaction. The issue of technical preparation has to be critically reviewed if the ECIAF is to continue to be relevant and deliver industry ready graduates.

Diploma level students were adequately prepared in the traditional areas of agriculture, for example in areas such as crops, livestock and soils. Approximately 50% of the present curriculum at ECIAF is devoted specifically to these traditional areas. The rest of the curriculum is shared among the sciences, mathematics, computer science, sociology, statistics, final year project and extension. These areas were incorporated into the curriculum for general education, research and outreach purposes to create a well-rounded graduate.

Over the last 10 years new trends in Food Production have emerged worldwide and consequently demand that graduates be adequately prepared to meet the new requirements. Diploma students were less prepared in these areas such as Value Addition, Sustainable Agriculture and Food Safety. Moreover, they received significantly higher levels of training in the traditional areas than what was needed for present job functions. This suggests that there is less demand in the work environment for some of

the traditional subject areas compared to other emerging areas.

Job functions have expanded within recent times, and as such the deployment of graduates resulted in a variety of job functions with some of these being in the newer areas of Food Production. In these areas, graduates perceived that the required competencies needed for their effective functioning were significantly higher than the preparation they received at the ECIAF. This points to urgent need for curriculum reform in this regard.

Williams and Dollisso (1998) indicated that agriculture is a rapidly changing industry. As such curricula cannot be static. They need to be revised regularly to meet the needs of the working environment of the graduates. Providers of such higher education should periodically engage key stakeholders in some form of needs' assessment if they are to produce work-ready graduates. Evolving from production to the ever-changing science, business and technology of agriculture involves major changes in the content of instruction (Case and Whitaker 1998).

The Ministry of Agriculture (Trinidad), in its transformation plan from "agri-culture to agri-business" indicated that the agro-processing sub-sector is still at an infancy stage (Ministry of Agriculture Land and Marine Resources 2008, pp. 9). This current plan transforms primary production agriculture to the establishment of internationally competitive value-added agricultural products. As a consequence of the new directions proposed for the agricultural sector in Trinidad, there would be a gap between the current curriculum and the expected demands by the industry. The ECIAF, as well as other organizations involved in the preparation of agricultural technicians, need to take steps to correct this situation as recommended based on the findings of Martin et. al. (2000), that graduates need to be prepared for industry demands.

Muir–Leresche and Scull–Carvalho (2006) stated that the major focus of tertiary agricultural education has been on the production of public sector employees. Findings showed that none of the respondents were self-employed in the sector. A revised curriculum based on an approach to modern day agricultural education that seeks to develop agro-entrepreneurs, has the potential to enable graduates to be self-employed business oriented professionals, who would be less dependent on public sector jobs. It is expected that curriculum modification would create the mechanism for filling the gap between what is currently offered and future plans for the agricultural sector. A long established guide line for curriculum reform (Lindsay 1986), indicated that lecturers must make judgments about what information they can afford to ignore in order that they can consider new information. Although much of the information can be learnt after graduation as is evidenced by the significant increases in job competencies in these new areas reported in this study, the curriculum must create the transformational framework for optimizing the new trends in agricultural education.

Conclusion

The study found that graduates' competencies increased over time while executing job functions. However, while the practice of food production has changed rapidly in the last few years becoming global and embracing health, safety and environmental issues, graduates were not well prepared to meet these new demands. At the same time the traditional areas were reinforced and they received good preparation in these areas. The finding that graduates' overall level of technical preparation played a significant part in job satisfaction is a serious cause for concern and positive action. If graduates are not prepared adequately to meet new industry needs then they will have great difficulty on the job. If organizations do not have capabilities to do retraining of staff, the sector will not be enhanced, so that even though sufficient manpower is provided in terms of new graduates, the technical competencies required to move the sector forward may still be lacking. While there will always be a time gap, during which period graduates will acquire the competencies in these new areas of food production, if institutions revise their

curricula to develop relevant graduate competencies to meet current industry needs for a modern agriculture, then development can be achieved much faster. It is recommended that tertiary level agriculture institutions generally, and in this case the ECIAF, regularly meet stakeholders in Food Production and re-structure training to more readily meet the changed needs of the industry. Other agricultural training institutions in the Caribbean may also wish to re-examine their curricula.

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