TRNC

NEAR EAST UNIVERSITY

INSTITUTE OF EDUCATIONAL SCIENCES

ENVIRONMENTAL EDUCATION AND MANAGEMENT

PERCEPTION OF AGRICULTURAL STUDENTS TOWARDS LIVESTOCK WASTE MANAGEMENT EDUCATION IN LIBYA

MASTER THESIS

Master Student:

Fadel Ali AGILA

Thesis Advisor

Dr. Ahmet BİLİR

Nicosia,

June, 2018

The Directorate Institute of Educational Sciences,

We certify that thesis is fully adequate in scope and quality for the degree of Master of Arts in Environmental Education and Management.

Chairman: Assoc. Prof. Dr. Şerife GÜNDÜZ ……..

Member: Dr. Fidan ASLANOVA ……..

Member: Dr. Ahmet BİLİR ……..

…./ …. / 2018

Director of the Institute:

Prof. Dr. Fahriye ALTINAY AKSAL

ABSTRACT

PERCEPTION OF AGRICULTURAL STUDENTS TOWARDS LIVESTOCK WASTE MANAGEMENT EDUCATION IN LIBYA

Fadel Ali AGILA

Master Degree, Environmental Education and Management ABD

Thesis Advisor: Dr. Ahmet BİLİR

June 2018, 70 pages

This study focused on perceptions of agricultural students towards Livestock Waste Management Education in Libya. A quantitative method for the research by considering 300 questionnaire to address the targeted aim of the study in order to describe the demographic characteristics of agricultural students, determining their general perceptions in relation to the management of livestock wastes, to determining their perceptions of agricultural students about the management of livestock waste, explain the perception of students regarding teaching methods and tools used to manage livestock wastes and then compare the perceptions of participants based on their demographic characteristics.

The result show that agricultural students in this region are between 21 - 30 years of age dominated by males between, 41 - 50 years of age with college certificate and with 501 to 1000 TY monthly income. Aagricultural student should be experts in livestock management, agricultural engineers should have some knowledge about how adults learn, should involve learners in planning of educational programs, should involve learners in the delivery of educational programs, should offer a variety of programs to meet the need of their clients and they should facilitate participants learning processes. The agricultural students have positive perceptions of currently used *teaching methods* as effective. and the agricultural students perceived the *teaching method* for education about livestock waste management as effective they also have positive perceptions of currently used *teaching tools* for education about livestock waste management and the agricultural students perceived *teaching tools* in livestock waste management education.

There is no statistically significant difference (t (298) = -0.385, p = .700 > 0.05) between a male and female agricultural student's perception regarding the teaching tools used in education of livestock waste management. There was no statistically significant difference (t (298) = -.356, p = .722 > 0.05) between a male and female regarding the teaching method used in education of livestock waste management.

Keywords**:** perception, agricultural student, livestock, waste management, education, teaching tools

ÖZET

LİBYA'DAKİ HAYVANSAL ATIK YÖNETİMİ EĞİTİMİNE YÖNELİK TARIM ÖĞRENCİLERİNİN ALGISI

Fadel Ali AGILA

Yüksek Lisans, Çevre Eğitimi ve Yönetimi Anabilim Dalı

Tez Danışmanı: Dr. Ahmet BİLİR

Haziran 2018, 70 sayfa

Libya'daki tarım öğrencilerinin hayvansal atıkların yönetimi eğitimine yönelik algıların belirlenmesi için yapılan bu çalışmada tarım öğrencilerinin demografik özelliklerinin tanımlanması, tarım öğrencilerinin hayvansal atıkların yönetimi ile ilgili genel algılarının belirlenmesi, tarım öğrencilerinin hayvansal atık yönetiminde kullanılan öğretim yöntem ve araç gereçle ilgili algılarının izah edilmesi ve daha sonra da bu algıların katılımcıların demografik özelliklerine göre karşılaştırılması amaçlanmıştır.

Çalışmada kantitatif yöntem kullanılarak 300 anket uygulanmıştır. Sonuç; bu bölgedeki tarım öğrencilerinin yaş aralığı 21-30 ile 41-50 arası olup üniversite mezunu ve aylık geliri 501 ile 1000 TL arası erkeklerden oluşmaktadır. Ziraat mühendislerinin hayvansal atık yönetiminde uzman olmaları, yetişkinlerin nasıl öğrendiği konusunda bilgi sahibi olmaları, bununla beraber eğitim programlarını planlarken öğrencileri de bu sürece dâhil etmeleri gerekmektedir. Buna ek olarak ziraat mühendislerinin müşterilerinin ihtiyaçlarını karşılayacak çeşitli programlar sunmaları ve katılımcıların öğrenme süreçlerini kolaylaştırmaları gerekmektedir.

Tarım öğrencileri, hayvansal atık yönetimi konusunda hali hazırda kullanılan eğitim-öğretim yöntemi ve eğitim-öğretim araçlarını etkili bulmaktadırlar. Hayvansal atık yönetimi ile ilgili eğitimde kullanılan eğitim-öğretim araçlarında kadın ve erkek tarım öğrencilerinin algılarında istatistiksel olarak anlamlı bir fark yoktur ($t(298) = -0.385$, $p = .700 > 0.05$). Hayvansal atık yönetiminin eğitiminde kullanılan eğitim-öğretim metodunda kadın ve erkek öğrenciler arasında istatistiksel olarak anlamlı bir fark yoktur ($t(298) = -.356$, $p = .722 > 0.05$).

Anahtar kelimeler: algı, tarım öğrencisi, hayvan/hayvancılık, atık yönetimi, eğitim, eğitim araç gereçleri

ACKNOWLEDGMENT

It gives me great pleasure to acknowledge and distribute some praiseof my own for the help I received from all the involved.

Firstly, I wish to express my most sincere gratitude to my supervisor Assoc. Prof. Dr. Şerife GÜNDÜZ for her incredible patience and valuable suggestions from the beginning to the end of this study. I am also grateful to all the tutors for their advice and suggestions on various aspects of this research.,

This study would be incomplete without my Libyan friends and the members of my family.

I am grateful to my wonderful mates friends and well-wishers.

Fadel AGILA

June, 2018,

Nicosia

CONTENTS

CHAPTER III

METHODS

CHAPTER IV

RESULTS AND DISCUSSION

CHAPTER V
CONCLUSION AND RECOMMENDATION

FIGURES

TABLES

ABBREVIATIONS

ARC	Agricultural Research Centre
BMPs	Best Management Practices
EPA	Environmental Protection Agency
ICN	Interactive Communication Network
LSEA	Livestock System Environmental Assessment
Mt	Metric Ton
%	Percentage

CHAPTER I
INTRODUCTION

The most important component of any agricultural development process is educational training and this includes new and particular technology or knowledge about the new technology to farmers. This can be done by communicating information (Seevers, Graham, Gamon & Conklin, 1997; Pickering, 1987) to help farmers have or create good decisions and have an opinion about the system they require to use for their agricultural production (van den Ban & Hawkins, 1996). At first it was adult education programs that the term "extension" was used in the description of the program in England which was around half 19th Century and this was mainly because universities expanded their campuses to neighboring rural communities (Wikipedia, 2007; Seevers et al., 1997). The way scientific research are applied and the new knowledge added to agricultural practices through farmers education is known as agricultural extension and this was an early year's concept (Wikipedia, 2007).

Education as an idea of extending training was introduced into The United State through their library was in 1890 and courses for the extension was frequently chosen (Seevers et al., 1997) .The following year, when it was founded in 1891, a university offered courses in a program for disseminating agricultural knowledge in the fields of soil and crops, plant nutrition, and animal breeding at a farming college in New Jersey Rutgers at the University of Ohio (Seevers et al., 1997).

There is an establishment of more than 15 intermediate pre-universities/technical agricultural universities around Libya mainly to train and assist engineers at different stages and fields. There are 5 agricultural colleges which help in also preparing agricultural students in all disciplines. These establishments are specially to enhance the technical knowledge of individuals in the agricultural sector. Its establishment as a research centre in the 70s was aimed at giving the sector technical assistance required for agricultural development lead in research and development by using available experts and giving out new scientific and technical knowledge into the agricultural system (Jamahiriya, 2006). In Libya, the major national agricultural research system is the Agricultural Research Centre

(ARC). Centre implements or provides its services through a network which is provided nationwide and its Board of Directors is headed by a director general and has 8 departments including soil and water, field crops, horticulture, plant protection, animal production, forestry and range, agricultural mechanics, and agricultural economics. 90% of their time is dedicated to mainly research while the rest 10% is on consultancies and extension (El-Azzabi et al., 1999).

According to Cranton (2006) adult education as education to develop socially capable people interested in supported casual or formal exercises that lead them to obtain new information, aptitudes or qualities, expound on existing learning, abilities or qualities, reconsider their fundamental beliefs and presumptions; or change the way they see a few parts of themselves or their general surroundings. As an adult education process, students work by drawing in training as an information conveyance and critical thinking errands, which could be with people, groups or by broad communications (Seevers et al., 1997).

1.1 Problem

There is a gap in the educational direction of Livestock Waste Management that is not really expressed. It does not reveal what agricultural engineers are doing in Education in Livestock Waste Management and how they perceive the training processes in the management of livestock waste. The focus of this work is based on waste management in livestock in Libya.

1.1.1 Sub problem

- Is there a difference between genders' perceptions of agricultural students regarding the teaching tools used in education about Livestock Waste Management?
- Is there a difference between genders perceptions of agricultural students regarding the teaching methods used in education about livestock waste management?
- What is the perception of agricultural students regarding livestock waste management?
- What are the perceptions of agricultural students regarding the teaching methods used for education about livestock waste management?

- What are the perceptions of agricultural students regarding the teaching tools used in education about livestock waste management?

1.2 Aim of the study

The aim of this research is to define the education processes used in the management of animal wastes and the perception of Libyan agricultural students in the management of livestock wastes. Specific goals of the work include:

1) To describe the demographic characteristics of agricultural students.

2) To determine the general perceptions of agricultural students in relation to the management of livestock wastes.

3) To determine the perceptions of agricultural students about the management of livestock waste.

4) To explain the perception of students regarding teaching methods and tools used to manage livestock wastes.

5) To compare the perceptions of participants based on their demographic characteristics.

1.3 The importance of the study

A major agricultural education program, which is liable to important adjustments inside the setting of local conditions, is fundamental to any purposeful exertion which aims at combing a major horticultural issue. The proper management of livestock waste in Tripoli, is for the environment and human health in the region (Zilberman et al., 2006; McCann et al., 2006; Powers & Horn, 2001; Sund et al., 2001; Zilberman et al., 2001). This work aims to provide useful information for the successful management of livestock waste management in Tripoli.

1.4 Assumption

- The knowledge given by the agricultural students of the studied area is assumed to be based on their perception about waste management.
- The questionnaire was restricted to the study area.

- The questionnaire used for this research is assumed to be adequate for the aim of the study.
- The agricultural students' lack of awareness of waste management reflects negative actions and behaviors towards the environment.

1.5 Limitations

- The study was limited to 300 participants
- The questionnaires used for this study were limited to its aim and objectives
- Participants were only selected from the higher and intermediate students from the institute of Agricultural Technology of Ghiran in Tripoli.

1.6 Definition

- Livestock waste: Defecation and related losses, bedding, wash water, water sprinkling resulting from animal cooling, rainfall contaminated by falling or flow of livestock activities, and other substances contaminated by animals (Illinois EPA, 2001).
- Livestock waste management system: Any land, structure or method used for the collection, storage, storage, distribution, application or application of animal wastes resulting from limited feed operations (The Kansas Department of Health and Environment, 2007).

CHAPTER II
LITERATURE REVIEW

2.0 Animal products in Libya

Libya has a yearly annual meat of 160 000Mt created privately which went around for household usage at about 98%. Libya is mainly dependent on meat and egg. The deficiency, around 2%, was provided by a normal yearly import of 5 000 Mt mostly beef and Lamb. Yearly lamb and beef import is estimated around 5 Million USD from 1998 to 2002. The measure of eggs every year fulfills almost the greater part of the nation's usage as sustenance. Dairy products, around 191 000 Mt/year, accommodated just half of Libya's total household usage during 1995 to 2002. Thus, the nation imported what might as well be called its equivalent at a normal estimation of around 61 million USD every year from 1998 to 2002. Libya is an exporter of skin, wool, and hair of cattle, sheep, and goats, whose esteems positioned among its best agricultural fare products since 1998. Yearly aggregate estimation of these fares was 5.18 million USD from 1998 to 2002 (Ahmed, 2002).

2.1 Livestock waste

Usually, nutrients from livestock waste are reused in agriculture when associated with item and field grounds to propel plant improvement (Kellogg et al., 2000). However, environmental concern as for the debasement of the soil nature, surface and groundwater resources as a result of surface spillover and leaching of excess nitrogen and phosphorus have been raised from its over application to crop and field lands (Goolsby et al., 2001; Rabalais, et al., 2001; Rowe, 2001). The est management practices (BMPs) for livestock waste management have been made as answers for the potential issues related with livestock waste contamination of the environment (Fukumoto, 2005; Alam et al., 2003). Nevertheless, the ampleness of such BMPs especially for nitrogen and phosphorus management has been addressed (Boesch et al., 2001). As indicated by Boesch et al (2001), standard BMPs have not altogether diminished agricultural nonpoint wellsprings of contamination. A lot of research findings have shown the importance and significance of livestock waste management which they indicate that it is important to manage these wastes in

order to protect the environment and also for good health (Zahn, 2001; Gooslby, et al., 1999; Sharpley et al., 1998). The most essential technical component of livestock management is the best management practices (BMPs) as indicated by Fukumoto, (2005); Alam et al., (2003).

The report by Boesch et al (2001) additionally demonstrates that vast increments in the agricultural contributions of nitrogen and phosphorus amid the last 50% of the twentieth century have been broadly acknowledged as representing the most genuine dangers to the Chesapeake Bay ecosystem, including the development of regular hypoxia in more profound parts of the Bay. Given the significance of good ecological quality to practical jobs and human health, it is basic that sufficient education with respect to Livestock Waste Management is given to agriculturists by teachers. Livestock waste management education has been perceived as one of the extension drives in the United States and other parts of the world (Richardson and Mustain, 1993).

There are initiations of educational programs regarding diverse aspect of waste management by cooperative extension services of the United States (Richardson and Mustain, 1993). Many agriculture professional perceive adult learners as super learners (Long, 2004). Who truly is the adult learner? Cranton (2006) defined adult learners as “mature, socially responsible persons participating in sustainable non-formal or official events that force them to acquire new knowledge, skills or values; you can change how or the way they work, or you can keep an eye on their basic beliefs and assumptions. Galbraith (2004) defines adults as independent individuals with desires, goals and anticipations. Adults are neither super-consumers nor simple observers in terms of autonomy, wishes, goals and expectations, but are equally capable of participating in learning while making decisions that affect their well-being (Galbraith, 2004).

In addition, adult learners have a wide range of cognitive, personal, empirical, and role characteristics that affect adult learning (Galbraith, 2004). It is important to understand the importance of the human role in the learning process (Cranton, 2006). Thus, learning based on the experience of previous adult life experiences and the application of what is learned influences adult learning (Galbraith, 2004). Thus, the participation of adults in any learning activity depends

on internal motivation (Cookson, 1998) and normative beliefs (Park, 2000). Wlodkowski (2004) described intrinsic motivation as an evocation; It is called the environment in which it connects with what is culturally significant to people. Park (2000) described normative beliefs as individuals' perceptions as to certain behaviors as influenced by the judgment of significant others in societies. Thus, intrinsic motivation of adults is associated with learning activities associated with adults' perceptions and adherence to behavioral intentions (Chatzisarantis & Biddle, 1998).

2.2 Methods and Principles used in Educating farmers

This method can also be called andragogy, which occurs in a variety of settings and transactional modes, in addition to the traditional formal structure of classrooms and written assignments (Etling, 1993; Boyd & Apps, 1980). In the evening or on weekends, community action groups and intense weekly seminars are all forms of andrography (Boyd & Apps, 1980). Transactional mode characterizes the situation of adult students, individual, small group or community situations (Kang & Song, 1984; Boyd & Apps, 1980). According to Boyd & Apps (1980), transactional mode explains the situation when an adult learns herself. Group processing mode describes a situation in which adult learners meet together in a class or work together (Boyd & Apps, 1980). In group transactional mode, group members share a common purpose and share the obligation to attend regular meetings at certain times . In other cases, a group of people in the community can be gathered to solve specific tasks that their community faces. When this happens, the public transactional mode is engaged (Boyd & Apps, 1980).

2.2.1 Instructional Methods, Techniques and Devices of Education

Conti & Kolody (2004) discussed guidelines for selecting methods and techniques for andragogy and further distinguished between methods, techniques and devices. This method determines how adults are organized in educational activities (Conti & Kolody, 2004). Techniques are the distinctive procedures that are involved in advancing learning once strategies have been resolved and devices

are those things, for example, visual guides, which bolster the methods and encourage the learning procedure (Conti & Kolody, 2004).

Examples, forums, discussion forums, conferences, interactive television, learning contracts, short courses, critical thinking methods, demonstration and simulation, case studies, symposiums and media (Galbraith, 2004, Kang & Song, 1984). There is no perfect acceptable technique (Creswell & Martin, 1993; Kang & Song, 1984). However, depending on the learning and learning situation, the adult educator can decide which teaching method is most appropriate (Creswell & Martin, 1993). According to Creswell and Martin (1993), successful adult teachers use different teaching methods and strategies depending on program content, expected outcomes, learning the environment and current educational resources. Creswell and Martin (1993) concluded that the most common teaching methods in pesticide practitioner education are lectures, discussions and interview methods. Newsome et al. (2005) compared experiential learning and lesson-centered training methods to cognitive successes of deferred post-test in relation to the topic.

The results show that there is no uniform method of teaching that is more effective in each grade and subject area, and even classroom cases, but Newsome et al., (2005) defended the need for careful choice of students based on things and situations and using different teaching methods in spite of significant age and gender differences between the two groups (Martin & Omer, 1990). In this study, the researcher examined the relationship between teacher education and adult education. Moving on from the above, the preferences of adult educators are specific to the methods, and devices that are affected by perceptions. Below is a brief overview of the results of studies on perception.

2.3 Research Findings Regarding Perceptions

There is an affiliation with awareness and the result of judgment yielded and it constitutes complex psychological processes from perception (Clark, 1994). According to van den Ban & Hawkins (1996, p.282) perception is “transforming information into psychological awareness from our environment through information or stimuli” and they are rather relative, selective, organized and directional (van den Ban & Hawkins, 1996). Perceptions are selective because “at

any moment our senses are receiving a veritable flood of stimuli from the environment around us. Despite its capacity to process vast amount of information, our nervous system cannot make sense of all the stimuli available. Hence an individual pays attention only to a selection of these stimuli. Several physical and psychological factors, including attitudes influence what he or she selects or pays attention to" (van den Ban & Hawkins, 1996. p. 60).

Secondly, perceptions are sorted out in light of the fact that individuals tend to structure their tangible encounters in ways that sound good to them (van nook Ban and Hawkins, 1996). Finally, perceptions are directional on the grounds that people see what they anticipate that or are set will see individual mental sets impact what individuals select, how they sort out and translate it (van sanctum Ban and Hawkins, 1996). The assorted variety of adults with respect to inspiration, objectives, psychological advancement and scholastic arrangement, work foundation, experience, skill level and initiative (Rollins and Yoder, 1993) impact perceptions and present difficulties to the procedures of extension education. As indicated by the hypothesis of constructivism "all learning and subsequently all-important reality in that capacity, is dependent upon human works on, being built all through the cooperation between individuals and their reality, and created and transmitted inside a basically social setting" (Crotty, 2005). Essentially expressed, is subjective, in the light of perceptions and individual realities. Therefore, individual encounters with adults in view of their realities prompt individual inclinations. George et al., (1955) placed his own build hypothesis as an option constructivism, that the world is seen by singular people as far as whatever importance every individual applies to it and that every individual has the opportunity to pick distinctive implications of whatever he or she needs.

Generally, the hypothesis proposes that "a man's procedures are mentally channelized by the courses in which he anticipates events" (Kelly, 1955). Cognizance and influence, which are extraordinarily impacted by the mental elements of reflection, feeling, detecting and instinct (Cranton, 2006), specifically support human perceptions and feelings, which are likewise firmly connected to states of mind, identity qualities and work centrality or role (Ladebo, 2004). In organizations, organizational beliefs and qualities characterize the social

personality, work part, perceptions and conduct of representatives (Bolman and Deal, 2003; Schauber, 2001). Bolman and Deal (2003) examined four organizational beliefs (structural, human resources, political and symbolic), which characterize associations and their workers and connected confidence, custom, and culture, which are firmly connected to beliefs and estimations of organizations to the symbolic edge. Schauber (2001) characterized the way of life of an organization as the qualities, beliefs, standards, practices, and practices of the organization. Professionally, teachers have a typical social personality in the light of work, standards, logic and shared objectives (Ladebo, 2004; Schauber, 2001; White and Brockett, 1987). However, the diversity in cultural backgrounds, individual beliefs and esteem frameworks of individuals possibly characterize a person's feelings, perceptions, dispositions and practices (Schauber, 2001). The significance of perceptions in agriculture is reflected in the quantity of research that has been directed all globally in agricultural education in regards to some major agricultural issues (Farouque & Takeya, 2007; Chizari et al., 1999; Bruening et al., 1992; Blezek & Dillon, 1991).

Warnick et al., (2004) defined the perceptions of science instructors, in regards to educational change with the coordination of science in horticultural education. Science educators perceived the combination of science in rural education to add to educational change by helping students meet state models (Warnick et al., 2004). Bruening et al., (1992) contemplated the perceptions of agriculturists about the usefulness of data and organization sources. Bruening et al., (1992) inferred that agriculturists saw water contamination and manure management as the most genuine ecological issues. However, agriculturists were not sure if nutrient management and groundwater pollution were serious ecological issues or not (Bruening et al., 1992).

The perceptions of educators with respect to instructor preparing and changing educational programs and direction in agrarian schools were contemplated (Shao and Bruening, 2005). Agricultural instructors had the observation that attempting new thoughts in their showing practice and best educator training and proficient improvement projects could upgrade educational programs and instructional changes in farming education (Shao and Bruening, 2005). Ikeoji et al.,

(2007) studied the perceptions of farming science instructors with respect to issues and difficulties of vocational agriculture delivery in secondary schools. In an investigation agrarian science instructors saw poor financing of professional farming, staying informed concerning advancements in the field of agriculture and imparting such improvements to students were the most difficulties to the conveyance of professional agriculture in secondary schools (Ikoeji et al., 2007). Ikoeji et al (2007) recommended that those perceived difficulties of poor subsidizing of professional agriculture, staying up to date with advancements in the field of farming and imparting such improvements to students ought to be incorporated with brief period in-service education and refresher projects of serving instructors in agricultural science. Ozor et al., (2007) likewise examined the perceptions of farmers in regards to cost-sharing of agricultural technology transfer.

The investigation of Ozor et al., (2007) reasoned that 80.6% of agriculturists and 85.7% of professionals had positive discernment towards cost-sharing, which filled in as a pointer towards acknowledgment of the change. Farouque and Takeya (2007) contemplated the view of farmers with respect to the combination of soil fertility and nutrient management for maintainable harvest generation. Mattila et al., (2007) directed an investigation to decide designers' perceptions of vital management aptitudes. Mattila et al (2007) presumed that farmers saw the application for appropriations and the obtaining of information on sponsorships, the speculation choice process and the upkeep of safety, health, the capacity and inspiration to function as the most difficult managerial undertakings and topics. Some exploration discoveries on perceptions including extension experts and rural science teachers in Europe, the Middle East, Africa and the United States have been accounted for (Al-Subaiee et al., 2005). The perceptions of extension agents with respect to their significance and capability in certain assignment areas of their profession were considered (Androulidakis and Siardos, 1994). Androulidakis and Siardos (1994) presumed that paying little respect to involvement, extension operators saw themselves as more important as experts in executing extension programs because of clientele requests at the opportune time and equipped in creating and keeping up desirable customers relations. Baker and Villalobos (1997) decided the perceptions of county faculty of the Florida Cooperative Extension

Service (FCES) in regards to the expert advancement needs of specialist. A similar report inferred that province chiefs saw state authorities as exceptionally effective in the areas of their capacity to use the examination base in taking care of issues, interfacing with industry groups and relational abilities (Baker and Villalobos, 1997). Positive perceptions or convictions prompt particular expectations and demeanors that encourage positive conduct (Knobloch and Martin, 2000). Studies uncovered positive perceptions of extension professionals with respect to the idea of sustainable agriculture (Chirazi et al., 2001; Al-Subaiee et al., 2005).

In Iran, despite the fact that wheat farmers of the Luresran Province did not see supportable agricultural practices as compelling cultivating practices for wheat generation because of dangers related with those cultivating practices and absence of profit, extension operators were of a contrary view (Chirazi et al., 2001).

Rather than sustainable agricultural practices, wheat farmers of the Luresran Province of Iran saw agricultural extension courses on the utilization of chemical fertilizer, pesticides, rural machinery, soil culturing, the advantages of crop rotation and seed treatment as the most valuable to their cultivating business (Chirazi et al., 2001). The positive perceptions of extension specialists with respect to supportable agriculture gave the premise to the improvement of practical agricultural projects by extension operators (Al-Subaiee et al., 2005). Teachers of farming education had positive perceptions about sustainable agriculture and further perceived themselves as learned in sustainable agricultural practices (Udoto and Flowers, 2001). Udoto and Flowers (2001) detailed that agricultural education teachers had worries about the measure of work and administration required for the usage of feasible agricultural practices and its cost viability.

Williams and Wise (1997) researched the perceptions of secondary school agricultural education teachers and their students with respect to sustainable agriculture practices and detailed that agriculture teachers saw the idea of feasible agriculture as new and expected to take in extra things about the idea. Then again, their agriculture students evaluated themselves as knowing almost nothing about sustainable agricultural practices. In another examination, where perceptions with respect to the idea of sustainable agriculture were resolved as a feature of rising patterns for teaching extension instructors, the idea was seen by extension

instructors as to some degree questionable (Jayaratne et al., 2001).However, extension teachers in this examination had positive perceptions in regards to the advantages related to reasonable agricultural practices.

2.4 Perceptions Regarding Instructional Methods and Learner Preferences for Learning Strategies in Extension Education

Extension education is a basic part of any farming advancement process (Park et al., 2007; Rogers, 2003). Kang and Song (1984) designated "the essential obligation of extension workers is education". Various demonstrated educational strategies exist from which the extension teacher may set up learning circumstances and amplify the exchange of data to students (Kang and Song, 1984). Once an extension instructor has surveyed and distinguished the requirements of a region or a group, it is his or her obligation to pick the instructional strategies that will be best in accomplishing the educational targets (Kang and Song, 1984). In picking instructional techniques utilized for extension education, the perceptions of extension teachers with respect to the helpfulness and viability of the strategies impact the strategies picked (Park et al., 2007; Creswell and Martin, 1993; Martin and Omer, 1990; Kang and Song, 1984).

Park et al., (2007) examined the utilization of e-learning system of the computer-based rural extension programs for agricultural extension. The investigation reasoned that adults favor intelligent adapting instead of reading technical information. In an investigation to decide the perceptions of extension experts and post-optional farming teachers with respect to the instructional techniques in grown-up educational projects in Iowa (Martin and Omer, 1990), respondents put a high need on an assortment of instructional strategies. In any case, respondents depended more on the address talk instructional strategy (Martin and Omer, 1990). In a similar report, rural extension experts considered the utilization of media outlets, for example, radio projects, transmissions and satellite programming to be exceptionally compelling in teaching group individuals (Martin and Omer, 1990).

Creswell and Martin (1993) distinguished and evaluated the instructional strategies and apparatus utilized by extension agriculturalists in the preparation of

pesticide applicators. This investigation reasoned that respondents, in general, did not utilize a variety of instructional techniques and tools in pesticide training. The discussion addresses techniques as the dominating strategies for direction in pesticide implement training by area extension agriculturalists. In adult education programs, students' inclinations for learning methodologies can fill in as valuable aides for the assurance of procedures that teachers may embrace for certain learning exercises (Rollins and Yoder, 1993).

Dollisso and Martin (1999) found out that young agriculturists were propelled to take an interest in educational projects where learning exercises were hands-on and by experimentation, regardless of whether independently or in groups. The conclusion of the investigation directed by Dollisso and Martin (1999) has suggestions for program planning in agricultural education. In another investigation where a Livestock System Environmental Assessment tool (LSEA) was produced to help agreeable extension programs, close joint effort with livestock commodity group turned out to be the best conveyance technique (Koelsch, Howard, Pritchard and Hay, 2000). Coordinated groups with teachers were met with anxiety by producers and were moderately incapable unless producers started the demand. Producers' inclination was a support in little group gatherings (Koelsch et al., 2000).

In another investigation, farmers in Iowa had the perception that enhanced communication and training were expected to guarantee appropriate management of chemicals utilized as a part of agriculture (Bruening and Martin, 1992). In a similar report the instructional strategies for discourses, field exhibitions (visits), on-cultivate assessment, region and neighborhood gatherings, trade fairs and instructive tools, for example, magazines, printed materials (handouts), visual materials (slides, photos), TV projects, tapes and radio were recognized as valuable for farmers educational training (Bruening and Martin,1992).

Miller (1997) examined the states of mind and perceptions of secondary educators with respect to the convenience of Interactive Communication Network (ICN) for agricultural training at the optional school level. As indicated by Miller (1997), educators were more positive about ICN innovation and saw that the obstructions to the utilization of the innovation were less significant.

In another investigation at the school level, the perceptions of agriculture staff in regards to electronic innovations in instructing were examined (Dooley and Murphy, 2001). In spite of the fact that agriculture employees saw themselves as positive about their specialized capability, their absence of experience to show students was because of less accessible training and help with the utilization of instructional technologies for distance learning/training (Dooley and Murphy, 2001). In the Southern area of the United States, agriculture educators saw that the most basic needs of adults engaged with agricultural production related to cultivating management and the utilization of the most recent farm innovation (Chizari and Taylor, 1991).

Chizari and Taylor (1991) suggested that state administrators and optional school agriculture instructors concentrate on the zones of farm management and the utilization of the most recent farm innovation when planning adult education projects in an agricultural generation. Trede and Russell (1999) examined the perceptions of partners of urban agriculture training in the United States towards linkages and educational modules in urban agricultural projects. Partners of urban agriculture training apparent linkages built up with groups in which urban agriculture programs lived to improve the advancement of urban agricultural projects. Besides, partners perceived that communications, authority, and basic leadership were vital to agribusiness linkages with urban agriculture programs and ought to, in this manner, be emphasized in agricultural training/education (Trede and Russell, 1999).

Of recent investigations on the perceptions of educational instructors in regards to major agricultural issues with suggestions for agricultural training concentrated on pesticide application (Creswell, 1990); practical agriculture (Jayaratne, 2001) and water quality (Camara, 2006). Research discoveries on the development of perception with education teachers as subjects are restricted in the district. In particular, the examination could discover no data on the perceptions of extension educators with respect to livestock waste management training in the locale. Varieties in the geography, soils, vegetation, and livestock of the district put diverse accentuations on livestock production in the locale (USDA, 2002). It is hence likely that the perceptions of educators with respect to livestock waste

management and the educational methods expected to teach agriculturists about livestock waste management may shift over the conditions of the area. As an imperative agricultural center point advance agricultural profitability or ensure the environment with an education part would be monetarily valuable and further maintain employment in the area. This investigation was directed with the reason to recognize the perceptions of teachers in regards to livestock waste management education and the related educational procedures utilized as a part of educational projects concentrated on livestock waste management.

2.5. Livestock Waste Management and Environmental Impacts

Agricultural waste refers to the by-products obtained from agricultural activities that are generally organic in nature and therefore biodegradable and energy rich (Sabiiti, 2011). Agricultural waste as livestock waste is therefore an important resource which if not managed properly, easily interrupts local ecosystems.

2.5.1. Animal Waste

The definition of animal waste is as follows: Any substance of mammal, bird, fish, reptile or amphibian which is a member of the phylum vertebrates, including carcass of any such creature, regardless of whether that substance can be decreased, reused, recycled and recovered – (a) That is in excess, undesirable, rejected, disposed of, deserted or discarded; (b) which the generator has no further utilization with the end goal of production; (c) that must be dealt with or discarded; or (d) that is recognized as a loss by the minister by notice in the Gazette, and incorporates wastes produced by other segments, but;

i. a by-product is not considered waste;

ii. any portion of waste, once re-used, recycled and recovered, ceases to be waste.

Animal wastes exist in the solid, fluid and vaporous stages. Wastes is thought to be in a fluid form when the moisture content is over 96% and in a solid shape at levels under 84% (Mijinyawa and Dlamini, 2006). At the point when the moisture content extents from 85 to 96%, wastes is thought to be a slurry. Strong

and fluid waste incorporates the body and parts of dead creatures, for example, bones, hides, blood, feathers, polluted water; contaminated feed; and manure (Haines, 2004), while vaporous waste is delivered by fermentation processes and lost soon after they are produced (Sabiiti, 2011).

2.5.2. Emerging farmer

The livestock industry is comprised of business farmers; emerging farmers and subsistence farmers. Emerging and subsistence farmers make up the casual division, or emerging cultivating segment, however separation of the two is not generally evident. The terms are regularly compatible (Greenberg, 2010) as casual farmers are as differing in estimate as they are in their farming and development practices (Vétérinaires Sans Frontières Europa - VSF Europa, 2012). Davenport and Gambiza (2008) separate between subsistence farmers and emerging farmers in that subsistence farmers have restricted information, as well as money related and administration abilities and accordingly share in household production with low measures of business action. The Agricultural Development Agency, conversely contends that there are three sorts of farmers present inside the casual livestock farming segment: distressed farmers (farmers who are in money related distress and are in risk of losing their territory); entrant farmers (farmers who are making a benefit from agricultural exercises however still face critical difficulties in being reasonable) and emergent farmers (farmers that are included or work in co-operation or with business farmers to make the change to the business part). Emergent farmers are viewed as a change stage for those farmers who need to create marketable items and who might in the end claim their own particular land for business cultivating purposes (Davenport and Gambiza, 2008). The basic component of subsistence and developing farmers lies in the intra-generational exchange of farming practices and knowledge (VSF Europa, 2012).

FAO (2013) credits this trouble to an absence of market access and infrastructure that characterizes customary farming system. Historical social suppression of indigenous farmers has brought about an absence of know-how and experience in agricultural production strategies; and an absence of physical assets, for infrastructure, equipment and capital. Emerging farming is that as it may, in

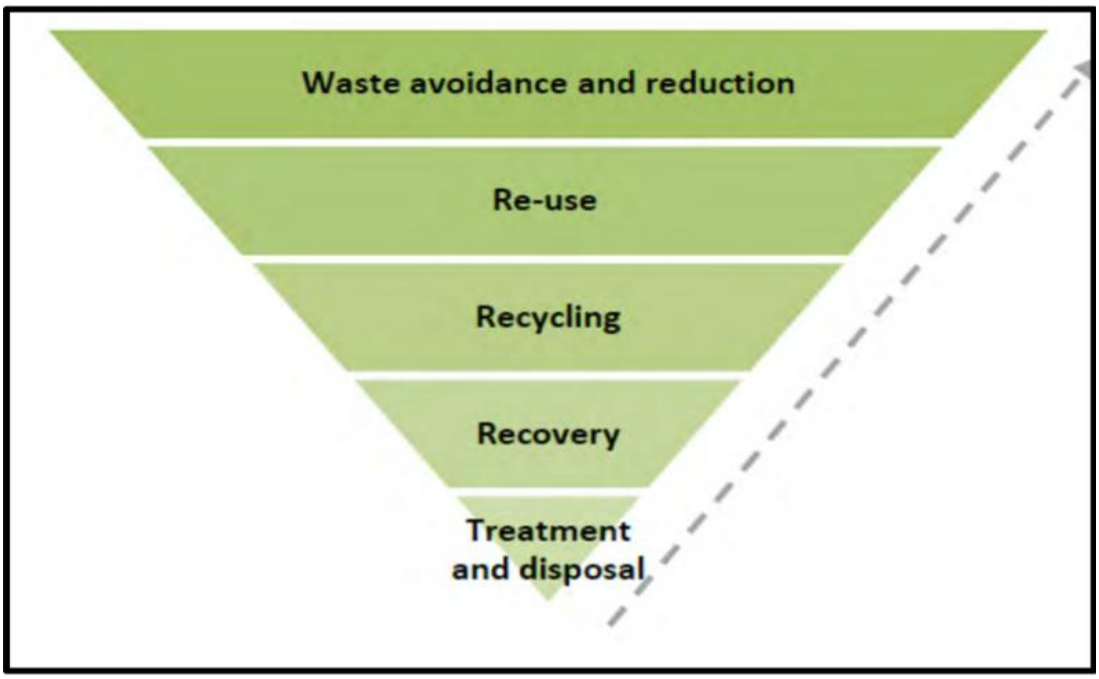
many parts of the world, still thought about family farming. This seems to be accurate on account of Libya, where the larger part of rural farmers enjoy farming exercises to support their own particular families and occupations. VSF Europa (2012) portrays emerging farming as "a kind of production/ system that bears the engraving of the basic connection between monetary action and family structure". Here the farmer and family members are typically the proprietor of the farm and the fundamental leader, assuming sole liability for farm administration and work organization (VSF Europa, 2012).

2.5.3. Waste hierarchy

The most popular method of waste disposal adopted internationally is to send waste directly to landfill. However the appropriate waste management system according to Arvanitoyannis (2008), should be for waste to be managed using the waste hierarchy (Figure 1), which is as follows:

1. Waste reduction;
2. Reuse for original purpose;
3. Recycle and reuse of material;
4. Composting;
5. Biological treatment;
6. Incineration with energy recovery;
7. Incineration without energy recovery;
8. Landfilling

Figure 1.
The waste hierarchy (Arvanitoyannis, 2008)



Despite being the last step in the waste management hierarchy, recycling is the most popular method used worldwide because it is perceived as the most effective method of waste disposal (Arvanitoyannis, 2008).

The cost of filling has increased due to the reduction of storage areas in recent years. In addition, an increase in municipal and industrial wastes with the increase in population the storage land for storage is closing further (Arvanitoyannis, 2008). In many countries, animal wastes are not accepted to prevent contamination of water and parasites in landfills (EPA, 1999). Animal husbandry plays an important role in the processing of waste, that may otherwise be used, and other valuable products (Godfray et al., 2010). After recycling and completion of the first function, the reuse of associated wastes in a different or similar manner, (Arvanitoyannis 2008). This will not only reduce the use of natural resources, it will also reduce costs and reduce the amount of waste disposed of at random in the environment, but will only carry them for households and industry.

The impact of new agricultural practices on environmental degradation will increase exponential growth in livestock production, albeit unimportant compared to commercial farmers. Stroebel et al., (2011) stated that the livestock sector should

grow by an average of 4.2% per annum in order to be able to benefit from rising demand for livestock products. Keeping the farm waste at the minimum level will reduce both the official and informal pollution risk and reduce the costs that the agricultural industry is exposed to.

In addition, the initiation of waste management is based on the livelihoods of the production of energy-rich materials; coal; raw materials such as biogas, biodiesel and feed (Sabiiti, 2011). According to the United States Department of Agriculture (2014), among the types of wastes the farmers encountered were fertilizer, urine, feed waste, used plastic packaging, chemical containers, medical packaging; green wastes such as plants, unused chemical precipitate, used veterinary products, animal carcasses, and other lethal wastes containing blood, feathers, skin, organs, bones, hooves and horns (Qian et al., 2013).

That microorganisms are removed in the water and air, thus violating the functions of the ecosystem and ultimately affecting the health of humans and animals. Correct use of waste mitigates environmental stress. For example, excessive use of rice in China can be used as a filler in the composting process to absorb excessive leaks (Qian et al., 2013).

Despite landfilling being the final step and last resort in the waste management hierarchy, it is the most popular disposal method, used globally as it was incorrectly perceived to be the most cost effective means of disposal (Arvanitoyannis, 2008). In recent years, the cost of landfilling has increased due to a decreasing number of landfill sites. Furthermore, land scarcity for landfills has been compounded by an increase in the population, and thus an increase in municipal and industrial waste (Arvanitoyannis, 2008). In many countries livestock waste is not accepted on landfill sites to avoid water contamination and vermin infestations (Environmental Protection Agency- EPA, 1999). Livestock plays a significant role in terms of recycling as they essentially convert waste food products, which would not otherwise be used, into consumables and other valuable products (Godfray et al., 2010). Recycling and the reuse of waste involves the reuse of something in a dissimilar or similar manner, respectively, after its initial function has been completed (Arvanitoyannis, 2008). This does not only reduces the use of natural resources but also in most cases saves costs incurred to households and

industry while reducing the quantity of waste that would be sent to landfill and indiscriminately discarded into the environment. The impact of emerging farming operations on environmental degradation, even though considered negligible in comparison to commercial farmers, will increase as the result of the exponential growth of livestock production. Stroebel et al. (2011) states that to cope with increased demand for livestock products, livestock industry is required to expand at an average rate of 4.2% annually. Keeping farm waste to a minimum will therefore reduce the risk of pollution and reduce the costs incurred to the farming industry, both formal and informal. Furthermore, the implementation of waste management best practices as a livelihood strategy and has the potential to improve upon the asset base of rural livelihoods with the production of energy rich materials such as: charcoal; biogas, bio diesel and raw materials such as fodder (Sabiiti, 2011).

According to United States Department of Agriculture (2014), the types of wastes that farmers are faced with include: dung; urine; feed waste; used plastic silage wrapping; chemical containers; medical packaging; green waste such as grass cuttings; unused chemical dip; used veterinary products; animal carcasses; and other slaughter waste which includes blood, feathers, hide, organs, bones, hoofs and horns. These wastes, although degradable, are hazardous to local environments in significant quantities and therefore need to be dealt with in a particular manner to reduce environmental pollution and sustain natural resources (Qian et al., 2013).

Proper waste management practices are further emphasized in cases where the accumulation of waste or even the use of inappropriate disposal methods can act as a substratum for disease causing microorganisms that contaminate soil, water and air, thus disrupting ecosystem functions and ultimately affecting human and animal health. Proper waste management also alleviates stresses on the environment asserted by other industry sectors. For example, in China, the use of excess rice straw that would otherwise be burnt because of lack of proper disposal practices can be used alternatively as a bulking agent in the composting process to absorb excess leachate (Qian et al., 2013).

2.5.4 Livestock agricultural waste

As a result, the number of livestock has tripled when compared to the human population (Aneja et al., 2012). Livestock management, by definition, covers animal health, animal welfare, biosecurity and traceability. Livestock management is an integrated system that requires extensive analysis to achieve sustainable performance. The greatest contribution to local environmental impacts is the number of livestock to which it is directed (Todd et al., 2009). Most of the rural waste is organic and therefore cleaned and processed for both animal feed and compost (Couth and Trois, 2010).

2.5.4.1 Feed waste

One of the most studied areas of livestock management is grassland management, which is a long-term provision of meadow productivity and maximum productivity of farm livestock according to Todd et al. (2009). The key to proper pasture management is now to protect plant biological diversity, an urgent global problem. The use of an imbalance theory like animal husbandry management has no effect on arid and semi-arid regions such as KwaZulu-Natal. In the theory of non-equilibrium, we believe that the number of cattle in non-agricultural systems remains low as the result of extreme drought effects and livelihood as other sources (Todd et al., 2009).

In pasture management there is a very compelling factor to enter the game. It is vital for farmers to consider factors such as grass species; the type of animal found in the stern; seasonal, climate, as well as animal husbandry, to determine what they will graze, as these factors are an important influence on product quality and waste of these results. Pasture management also accounts for the size and animal movement of the feed bed in relation to the grazing management system to ensure better nutrition and prevent landscape erosion. Todd et al. (2009) states that the grazing system is defined by "the frequency and duration of the livestock profession at different camps on the farm" (Todd et al., 2009).

In this study, we have investigated for the relationship between the number of animals and the number of animals per unit area, and waste management strategy. One of the most popular pasture systems used by Libyan native farmers is

both the rotating and the informal sectors. Rotational grazing requires periodic division of pastures into smaller units (Lapointe et al., 2000).

According to Di Grigoli et al. (2012) and Lapointe et al. (2000) the advantages of the use of rotational grazing are that it:

- increases the growth and longevity of vegetation biomass
- distributes the usage of the pasture by livestock
- facilitate the regrowth of vegetation
- allows to the cutting and storage of excess forage
- reduces exposure of livestock to gastrointestinal parasites
- maintains forage at the vegetative stage thus at their most digestible phase.

Best practice strategies recommend that fodder parcels and property fencing be done to allow the control of cattle, as well as to prevent theft of animals. In addition, construction of containment means during chemical dips application ability to breed animals to prevent unwanted pregnancies and reduce aggression and arrangement of herd order. During the dry season, grazing does not provide the cattle with the necessary nutrients and feed additives (Palmer and Ainslie, 2006). Turlington (2014) reported that 150 million tonnes of livestock feed were produced in the United States in 2013 to provide the livestock industry. Rural farmers, unlike post-harvest, remain to protect their animals during the winter months and drought period (FAO, 2006). Losses of crops obtained during harvest, such as discarded cabbage leaves, a non-sold product, and a damaged or poor quality product. (D'Mello, 2004). In this study, we investigated the effect of micros on human environmental pollution. When consumed, contaminating substances help to create infectious diseases. In the case of heavy metals, bioaccumulation poses a threat to human health when animal products such as meat or milk are consumed (D'Mello, 2004).

2.5.4.2. The reuse of manure and sludge

Livestock excrement (referred to as manure) consists of feces and gut (Imbeah, 1998). Manure has been used for centuries as a means to maintain soil fertility of agricultural land (Tanner et al., 2001), thus improving soil structure by

preventing pollution erosion and increasing moisture retention, stabilizing soil aggregates (Martinez et al., 2009) correction of drainage problems in zones (Haines, 2004). Mkhabela, 2002) defined as the transport of manure from one site to another with no manure to provide a substitute nutrient for the soil fertility. Environmental problems arising from excessive use are associated with odor pollution, biogas emissions, increased risk of illness such as typhoid disease, an increase in insect populations transmitting disease (Suman et al., 2010), and contamination of soils and waterways with nitrogen and potassium (Imbeah, 1998).

Although organic manure offer soil necessary nutrients for plant growth like Nitrogen, phosphorus, potassium and macro-nutrients such as copper and zinc which can cause macro-nutrients to accumulate, has a deleterious effect on the environment and therefore on human health (Tanner et al., 2001). Sabiiti (2011), states that nitrogen and potassium contamination can pollute groundwater and may lead to nitrogen and potassium water spills in areas where excessive use of manure is a serious problem in areas related to animal farms, resulting in misuse of fertilizer, and the amount of surface flow and leakage.

The presence of excessive potassium in surface waters increases the effect of oxygen demand and denitrification on fish and other marine organisms (Sabiiti, 2011) and stimulates the growth of algae and other aquatic plants (Aubry et al., 2006). The nitrogen content of chicken breed is high, this is the only time crops are planted and treated for long periods (Makhabela, 2004). In addition, it is not suitable for in situ use because it contains fresh animal pest, pathogens and unbalanced nutrients for the animal (Imbeah, 1998). The most important example of this is the Reunion Island, a self-sufficient system in terms of food production (Aubry et al., 2006). In recent years, the strengthening of livestock has led to a high concentration of wastes. These factors led to the accumulation of environmental problems and lead in the name of Reunion, manure in large quantities for inefficient methods of land use (Imbeah, 1998). Other adverse effects of nutrient overload were found when heavy metals were applied to the soil and ventilation was reduced in the air (Petersen et al., 2007). There are various ways of managing animal husbandry waste. Some countries store manure in the form of diluted suspensions stored in lagoons until required for irrigation (Petersen et al., 2007). Quality is

reduced and exposed to air and water because nitrogen, both potassium and phosphorus, is lost by evaporation. Different waste reservoirs were prepared by Salman et al., (2008) significantly affect the levels of zoonotic agents as well and defines "intermediaries" as those who are "guilty or opposed to it". Hutchison et al (2005) indicate that zoonotic pathogens decrease over time in the storage of animal wastes. Most ranches have disposable waste and are constantly injecting zoonotic agents. Hutchison et al., (2005) mud lagoons with less zoonotic agent than surface reservoirs and other storage types. It has also been proven that the fertilizer too contains significant quantities of methane, ammonia and nitrogen in the form of oxide during decomposition (Sabiiti, 2011). The presence of nitrogen oxides contributes to the reduction of ozone, and the volatilization of ammonia facilitates acid precipitation in the causative atmosphere of the acid rain phenomenon. The aesthetic consequence also occurs if not properly processed and can lead to health problems such as headache (Suman et al., 2010).

2.6. Waste Management technologies

Zander et al. (2013), stated that technological innovation can radically increase productivity and income levels in developing countries. It is important to note that farmers need to improve their agricultural practices. The use of technology will help rural farmers create sustainable developing farmers and even commercial states through sustainable, advanced practices that are economically and environmentally beneficial.

2.6.1 Methods of waste disposal

According to Gwyther et al., (2012) the global livestock population consists of approximately 1.9 x 1010 birds and 2.31 x 106 mammals. Farmers therefore require practical, economical and socially viable carcass and slaughter disposal methods to deal with significant quantities of mortalities (Imbeah, 1998) and husbandry waste. Furthermore, FAO (2006) estimates that farmers in rural communities produce significant amounts of organic waste in the form of manure, feed and plant residues. Mismanagement of these wastes will result in deterioration of water quality by increasing nitrogen levels, the release of ammonia, methane and

oxides of nitrogen in excess. If excessive amounts of potassium and phosphorus-containing soil quality deteriorate, pests and diseases remain in stagnation in addition to the dissolution of nutrients (FAO, 2006). Throughout history, the most commonly used waste disposal methods on farms have been burying or burn to waste (Yuan et al., 2013), due to the minimum availability and cost, one example of this ban process is the European Union (Gwyther et al., 2012). Thus, over the last few decades it has emerged, and for this reason we have adopted the global livestock industry.

2.6.1.1 Burial

Traditionally, the burying method is used for the removal of dead stocks and other meat wastes by collectors of producers, abattoirs and dead stocks (Haines, 2004). A new method for estimating the trench magnitude is proposed (Gwyther et al., 2012). There were fears (Rahman, 2009) that human health and principles could be contaminating water and land in dumping animal wastes at the beginning of the nineteenth century (Williams et al., 2009). Thus, burying was banned by the EU for the implementation of Sub-Product Regulations for animals to prevent health problems (Williams et al., 2009). Yuan et al., (2013) stated that the disposal of animal wastes, increased concentration of ammonia which is thought to have been found only in the fact that there are very few studies, although the submerged nitrate, chloride and fecal pathogens place birds near the burial point. Gwyther et al., (2012), argue that these assumptions are drawn from the evidence of new farmers' burial in the field, thus having a profound influence on the environment and being collected during possible public events.

2.6.1.2 Burning

Despite the burning of agricultural waste being frowned upon in Libya, it is a commonly used practice in poverty stricken rural areas of third world countries (Naidoo, 2009). The process, according to Gwyther et al. (2012), involves the burning of animal waste on pyres in open air. Being utilized chiefly for the mass transfer of carcasses coming about because of diseases outbreak, there are numerous biosecurity worries that have risen with the utilization of this strategy with the

outflow of contaminated particles into the environment activating outbreaks of ailments, for examplea, "foot and mouth". Concentrates however have not shown a risk to soil or groundwater assets. Concerns lie for the most part in that open air combustion (Gwyther et al., 2012) is thought to be deficient and accordingly prions, characterized as "a little infectious particle made out of abnormally collapsed protein that causes dynamic neurodegenerative conditions", may even now be a hazard when scattered ash to neighboring land (Sabiiti, 2011). Likewise, amid the consuming procedure air contamination happens with the arrival of different gases amid the combustion process adding to climate change (Gwyther et al., 2012).

2.6.1.3. Incineration

As indicated by Jagath (2010), "mass burning incineration is a type of thermal treatment whereby wastes is combusted in incinerators". Amid the incineration or combustion process waste is burnt in an incinerator at temperatures higher than 850 ^{o}C (Gwyther et al, 2012) to deliver carbon dioxide, water, deposits, that are typically comprised of little amounts of hydrochloric acid, sulfur, other volatile inorganic compounds, cinder (Chen et al., 2003); and tremendous measures of steam, that might be utilized as a part of energy recuperation (Jagath, 2010). Burning is a technique for waste reduction as opposed to conclusive transfer, decreasing waste volumes by up to 90% (Arvanitoyannis, 2008) to produce and inert ash that might be discarded securely on a landfill site (Jagath, 2010). Incineration as a transfer strategy is expensive as it is energy and labour intensive and is therefore mostly used to discard little volumes of waste (Rahman et al., 2009). Besides, the contamination gotten from the incineration procedure is significant (Jagath, 2010). In the United States, the burial of birds is disapproved of because of the abundance arrival of arsenic and different cancer-causing agents (Nachman et al., 2005). Incineration is in this manner performed on-site in little amounts to deal with the everyday mortality of poultry and keep away from extra hazard forced by temporary storage (Rahman et al., 2009).

2.6.1.4. Composting

Composting according to Jagath (2010) alludes to "the natural degradation of biogenic (natural) waste in the presence of oxygen, creating carbon dioxide, ammonia, water and compost". The composting procedure is made out of four stages in view of temperature changes (Jagath, 2010) amid which microorganisms, microbes and growths separate the natural waste and diminish its mass and volume to form a soil alteration. The heat displayed during the process inactivates pathogens and furthermore goes about as an indicator that organic movement is happening (Barrena et al., 2009). The principal stage, the latent stage, encourages the development of micro-organisms in the waste. From there on the mesophilic development stage is characterized by the development of the microorganisms and an increase in temperature to that of a mesophilic extend (Jagath, 2010), roughly 30-40 ^{o}C (Gwyther et al., 2011). Composting is typically done in one of three ways: pile or windrow composting, bin composting, or using mini-composters (Rahman et al., 2009). The pile or windrow composting method involves the creation of 2-3m high compost piles, arranged in a length of 100m rows, to allow for oxygen and temperature flow through the waste piles (Jagath, 2010).

CHAPTER III
METHODS

The concepts and models used in this research will be highlighted in this chapter by focusing on the data collection, application of the collected data tools, and data analysis which is carried out to determine the perceptions of agricultural Students towards livestock waste management education in Libya.

3.1 Research Model

This study mainly aims at getting the perception of agricultural students towards livestock waste management education in Libya. This study is based on field research carried out in Libya in 2017. The quantitative method applied in this study is to make it more reliable through research questionnaire adopted from Kwaw-Mensah (2008), articles, textbooks, and studies on the subject and internet source.

3.2 Participants and sample

The study was carried out in Tripoli University involving 300 cross-sectional agricultural students in Tripoli district of the Libya. This study concentrated on the students' population. The criteria for eligibility in this study will include (i) Students of agriculture (ii) the respondent's willingness to oblige to the study protocols and complete the study.

An organized questionnaire focused on gender, age, education, general perception regarding livestock waste management, perception about education regarding livestock management and teaching methods and tools (See detailed questionnaire Appendix 1).

Table 1 and Figure 2 show demographic of the students. 47 (15.7%), 139 (46.3%), 59 (19.7%), and 55 (18.3%) of the students were < 20 years, between 21 - 30 years, 31 - 40 years and 41-50 years respectively. Also, 166 (51.25%) of the students were male whiles 134 (48.75%) were female. This signifies gender were fairly distributed. In addition, 104 (34.7%), 151 (50.3%) and 16 (5.3%) of them attended high school, college and tertiary respectively. Only 29 (9.7%) did not

attend school. As for monthly income, 85 (28.3%) earn less than 500 USD, 112 (37.3%) between 5001-1000 USD, 65 (21.7%) between 1001-2001 USD while and 38 (12.7%) of the students received monthly income above 2000 USD.

Figure 2.
Demographic distribution of the study

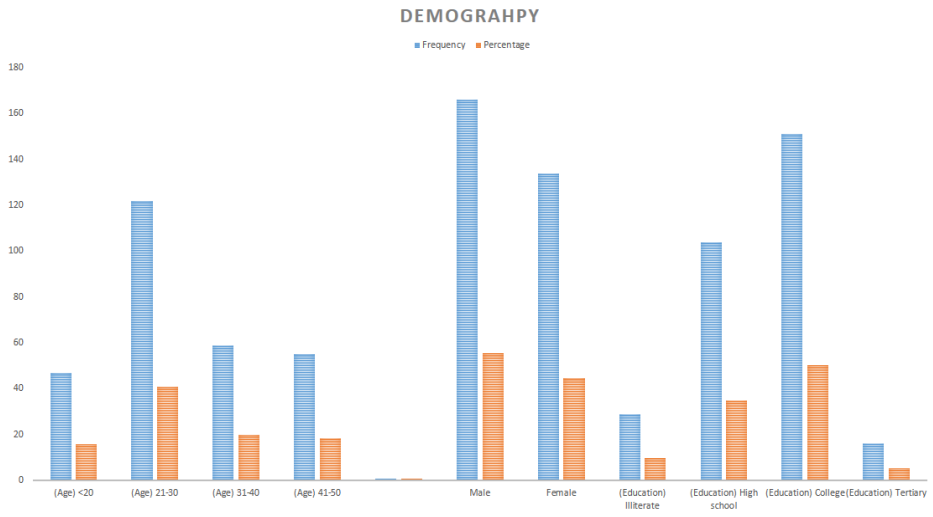


Table 1.
Demographic distribution (n = 300)

Age	**Frequency**	**Percentage**
<20	47	15.7
21-30	139	46.3
31-40	59	19.7
41-50	55	18.3
Total	**300**	**100**
Gender	**Frequency**	**Percentage**
Male	166	51.25
Female	134	48.75
Total	**300**	**100**
Educational level	**Frequency**	**Percentage**
None	29	9.7
High school	104	34.7
College	151	50.3
Tertiary	16	5.3
Total	**300**	**100**
Monthly income ($)	**Frequency**	**Percentage**
Less 500	85	28.3
From 501-1000	112	37.3
From 1001-2000	65	21.7
2001 and above	38	12.7
Total	**300**	**100**

3.3 Data Gathering Tools

Data collection involved accepted methods for Personal Information, Environmental Perceptions, Knowledge and Behavior Scale Test and Information test.

3.4 Scoring Scale Classification of the Substance

The perception of waste management education in Libya by students that participated in this study regarding livestock waste management education and its tools and method of educating the students were revealed and interpreted based on the survey questions.

3.5 Data Analysis

The associations between perception and waste management education tools and methods used in Tripoli were analyzed by means of t-test, ANOVA and descriptive statistics. The data was analyzed using the statistical software SPSS 20.0. No laboratory or medical tests were conducted.

3.6 Research Ethics

For the study to be reliable and legitimate, logical process inquire about morals were viewed. The general population that took an interest in the investigations were given direct questions. The analysts really exhibited an objective attitude during the research by showing a decent work conduct not to influence the study.

3.7 Reliability of the study

Table 2.
Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Prlwm	12.1798	1.751	.744	.709
Perlm	11.9691	1.743	.682	.731
Ecu	12.3294	1.671	.620	.758
PE	12.5641	1.706	.493	.831

Table 2 displays the summary of the total reliability test. The reliability of the construct was examined using Cronbach's alpha. The construct reliability should exceed 0.7 to fall within an acceptable level (Fraenkel and Wallen 2000). The reliability of the construct of this study ranged from .709 to 0.831 which indicates excellent internal consistency.

CHAPTER IV
RESULTS AND DISCUSSION

This chapter explains in detail the result of the study from the respondents' participation and the statistical interpretation which answered all the research questions and the aim of the study.

4.1 What is the perception of agricultural students regarding livestock waste management?

Table 3.
Students perception regarding livestock waste management

Item	Statement	Response			Mean	Sd
		D	N	A	4	5
1	Livestock waste management means different things to different people	5(1.7)	45(15.0)	250(83.3)	4.19	0.810
2	Livestock waste management is a controversial issue	5(1.7)	33(11.0)	262(83.3)	4.37	0.769
3	Livestock waste management is a complex environmental issue	8(2.7)	23(7.7)	269(89.6)	4.16	0.728
4	Livestock waste management is essential to human health	5(1.7)	70(23.3)	225(75.0)	3.87	0.725
5	Best management practices for Livestock waste management are easy to understand	7(1.7)	0(0.0)	293(97.7)	4.55	0.670
6	Best management practices for Livestock waste management include riparian buffers	6(1.7)	34(11.3)	260(86.7)	4.24	0.783
7	Best management practices for Livestock waste management do not improve the value of livestock waste as fertilizer.	5(1.7)	84(28.0)	211(70.3)	3.86	0.766
8	Best management practices for Livestock waste management protect water quality	8(2.7)	31(10.3)	261(87.0)	4.31	0.789
9	Best management practices for Livestock waste management protect air quality	5(1.7)	56(18.7)	239(79.3)	4.12	0.802
10	Best management practices for Livestock waste management do not protect soil quality	10(3.3)	54(18.0)	236(78.7)	4.19	0.785
11	Not all best management practices are accepted agricultural practices	5(1.7)	83(27.7)	212(70.6)	3.85	0.747
12	Efficient Livestock waste management practices require regular waste analysis	12(4)	45(15.0)	243(81.0)	4.23	0.840
13	The highest risk with livestock waste management is not from point source pollution.	5(1.7)	50(16.7)	245(81.6)	4.24	0.848

This research question sought to determine the perceptions of agricultural students regarding livestock waste management. Descriptive statistics were used to determine mean scores, standard deviations, frequencies and percentages which were used for the analysis. In the analysis, 'strongly disagree' and 'disagree' were

categorized as ‘disagree’ while ‘strongly agree’ and ‘agree’ were categorized as ‘agree’. The results of the analysis are presented in Table 3. A mean score above or below 3 was considered positive and negative perception respectively while 3 was considered as neutral. The minimum and maximum frequencies of the students’ responses to the questionnaire were 5 and 293 respectively and the mean scores ranged from 3.86 (SD = 0.766) to 4.55 (SD = 0.670). Generally, the agricultural students agreed with all the items (Item 1 to Item 13).

Table 4.
Perception of education regarding livestock management

Item	Statement	Response			Mean	Sd
		D	N	A		
14	Agricultural students should be experts in livestock management	5(1.7)	0(0.0)	295(83.3)	4.52	0.656
15	Agricultural students should have some knowledge about how adults learn	9(3.0)	14(4.7)	277(92.3)	4.25	0.685
16	Agricultural students should involve learners in planning educational programs	5(1.7)	6(2.0)	289(96.3)	4.45	0.685
17	Agricultural students should involve learners in the delivery of educational programs	6(2.0)	7(2.3)	287(95.7)	4.40	0.689
18	Agricultural students should offer a variety of programs to meet the need of their clients	10(3.3)	5(1.7)	285(85.0)	4.40	0.684
19	Agricultural students should facilitate participants learning processes	12(4.0)	10(3.3)	278(92.7)	4.24	0.661

Furthermore, in Table 4, the minimum and maximum frequencies of the students’ responses’ to the questionnaire were 5 and 295 respectively and the mean scores ranged from 4.24 (SD = 0.661) to 4.52 (SD = 0.656). Generally, agricultural students agreed that they should be experts in livestock management, have some knowledge about how adults learn, should involve learners in planning of educational programs, should involve learners in the delivery of educational programs, should offer a variety of programs to meet the needs of their clients and they should facilitate participants learning processes.

4.2 What are the perceptions of agricultural students regarding the teaching methods used for education about livestock waste management?

Table 5**.**
current use teaching methods for livestock waste management education

Item	Statement	Response			Mean	Sd
		NU	S	U		
20	Discussion	5(1.7)	61(20.3)	134(78.0)	4.103	0.8133
21	Lecture-Discussion	5(1.7)	53(18.0)	142(80.7)	4.217	0.8400
22	Case studies	5(1.7)	50(16.7)	245(81.6)	4.037	0.755
23	Demonstration	4(1.3)	94(31.3)	202(67.4)	3.767	0.717
24	Meetings	3 (1.0)	21 (7.0)	276(92.0)	4.413	0.717
25	Questioning	16(5.3)	51(17)	233(77.6)	3.973	1.129
26	Workshop	12(4.0)	38(12.7)	250(83.4)	4.193	1.058
27	Field days	18(6.0)	72(24)	210(70.0)	3.853	1.204
28	Quizzes	18(6.0)	63(21)	219(73)	3.870	1.171
29	Problem solving	17(5.7)	55(18.3)	228(76)	3.920	1.157
30	Distance learning	16(5.3)	68(22.6)	216(72)	3.850	1.191

Note: NU = not used, sometimes used = S and U = Used

This research question sought to determine the perceptions of agricultural students regarding the teaching methods used in education about livestock waste management. Descriptive statistics were used to determine mean scores, standard deviations, frequencies and percentages were used for the analysis. In the analysis, ‘not used’ and ‘rarely used’ were categorized as ‘not used’ while ‘frequently used’ and ‘Always used’ were categorized as ‘used’. The results of the analysis are presented in Table 5. A mean score above or below 3 was considered positive and negative perception respectively. The minimum and maximum frequencies of the students’ responses to the questionnaire were 3 and 250 respectively and the mean scores ranged from 3.767 (SD = 0.717) to 4.413 (SD = 0.717). Generally, the agricultural students have positive perceptions of currently used teaching method.

Table 6.
Students perceived effectiveness of teaching method for livestock waste management education

Item	Statement	Response			Mean	SD
		D	N	A		
31	Discussion	44(14.6)	26(8.7)	230(76.7)	3.963	1.158
32	Lecture-Discussion	36(12)	25(8.3)	239(79.6)	4.107	1.116
33	Case studies	72(24)	27(9.0)	201(67)	3.637	1.411
34	Demonstration	69(23)	30(10.0)	201(67.0)	3.670	1.352
35	Meetings	65(217)	30(10)	205(68.3)	3.680	1.320
36	Questioning	51(17)	20(6.7)	229(76.3)	3.943	1.256
37	Workshop	36(12)	26(8.7)	238(79.3)	4.880	1.702
38	Field days	56(18.7)	43(14.3)	201(67.0)	3.728	1.218
39	Quizzes	59(19.7)	26(8.7)	215(71.6)	3.767	1.261
40	Problem solving	44(14.6)	35(11.7)	221(73.7)	3.918	1.187
41	Distance learning	49(16.3)	29(9.7)	222(74.)	3.938	1.237

The results of the analysis are presented in Table 6. The minimum and maximum frequencies of the students' responses to the questionnaire were 35 and 239 respectively and the mean scores ranged from 3.637 (SD = 1.411) to 4.107 (SD = 1.116). Generally, the agricultural students perceived the teaching method in education of livestock waste management as effective (Item 31 to Item 41)

4.3 What are the perceptions of agricultural students regarding the teaching tools used in education of livestock waste management?

Table 7.
Students' perception regarding teaching tools in education of livestock waste management

Item	Statement	Response			Mean	SD
		D	N	A		
42	Posters	41(13.7)	29(9.7)	230(76.6)	3.963	1.158
43	Video-tape	36(12)	25(8.3)	239(76.7)	4.107	1.116
44	Websites	72(24)	27(9.0)	201(67.0)	3.637	1.411
45	Computer	69(23)	30(10.0)	201(67.0)	3.670	1.352
46	Internet	65(21.7)	30(10.0)	205(68.3)	3.680	1.320

47	Compact disc	51(17)	20(6.7)	229(76.3)	3.943	1.256
48	Pamphlets	36(12)	26(8.7)	238(79.3)	4.880	1.702
49	Satellites	56(18.7)	43(14.3)	201(67.0)	3.727	1.218
59	Newsletter	59(19.7)	26(8.7)	215(71.7)	3.767	1.261
51	Textbook	44(14.7)	35(11.7)	221(73.7)	3.917	1.186
52	Research publication	49(16.3)	29(9.7)	222(74.0)	3.937	1.237

This research question was to find out perceptions of agricultural students regarding the teaching tools used in education of livestock waste management. The results of the analysis are presented in Table 7. The minimum and maximum frequencies of the students' responses to the questionnaire were 20 and 238 respectively and the mean scores ranged from 3.637 (SD = 1.411) to 4.880 (SD = 1.702). Therefore, agriculture students' positive perception of the current use of teaching tools in education of livestock waste management (Item 42 to Item 52)

Table 8.
Students' perception regarding teaching tools in education of livestock waste management

Item	**Statement**	**Response**			**Mean**	**Sd**
		D	**N**	**A**	**4**	**5**
53	Posters	47(15.7)	29(9.7)	224(74.4)	3.943	1.248
54	Video-tape	57(19)	59(19.7)	184(61.3)	3.600	1.240
55	Websites	65(21.7)	47(15.7)	188(62.7)	3.587	1.279
56	Computer	51(17)	37(12.3)	212(70.7)	3.760	1.206
57	Internet	50(16.7)	36(12.0)	214(71.3)	3.803	1.135
58	Compact disc	44(14.7)	47(15.7)	209(69.7)	3.757	1.144
59	Pamphlets	40(13.3)	31(10.3)	229(76.3)	3.013	1.346
60	Satellites	82(27.3)	47(15.7)	171(57.0)	3.433	1.285
61	Newsletter	62(20.7)	35(11.7)	203(67.7)	3.730	1.418
62	Textbook	65(21.7)	30(10.0)	205(68.3)	3.537	1.211
63	Research publication	63(21)	37(12.3)	200(66.7)	3.683	1.271

The results of the analysis are presented in Table 8 The minimum and maximum frequencies of the students' responses to the questionnaire were 30 and 229 respectively and the mean scores ranged from 3.013 (SD = 1.346) to 3.943 (SD = 1.248). Therefore, the agricultural students perceived teaching tools in education of livestock waste management as effective.

4.4 Is there a difference between genders perceptions of agricultural students regarding the teaching tools used in education of livestock waste management?

Table 9.
Independent Samples Test for teaching tools

		Levene's Test for Equality of Variances		**t-test for Equality of Means**						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
PE	Equal variances assumed	.008	.927	-.385	298	.700	-.02742	.07115	-.16744	.11259
	Equal variances not assumed			-.385	283.097	.701	-.02742	.07126	-.16768	.11284

The independent sample t-test was used to test the hypothesis at a p = 0.05. The results are provided in Table 9. The t-test results, however, showed that there was no statistically significant difference (t (298) = -0.385, p = .700 > 0.05) between a male and female agricultural student's perception the teaching tools used in education of livestock waste management. Therefore, gender difference between male and female perception of agricultural students regarding the teaching tools used in education of livestock waste management.

4.5 Is there a difference between gender's perceptions of agricultural students regarding the teaching methods used in education of livestock waste management?

Table 10.
Independent Samples Test for teaching methods

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	T	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
ECU	Equal variances assumed	.046	.831	-.356	298	.722	-.02297	.06451	-.14992	.10399
	Equal variances not assumed			-.352	270.224	.725	-.02297	.06525	-.15144	.10551

The independent sample t-test was employed to investigate the hypothesis at p = 0.05. The results are provided in Table 10. The t-test results, however, revealed that there was no statistically significant difference (t (298) = -.356, p = .722 > 0.05) between a male and female regarding the teaching method used in education of livestock waste management. Therefore, there is no difference between male and female perception of agricultural students regarding the teaching methods used in education of livestock waste management.

CHAPTER V
CONCLUSION AND RECOMMENDATION

The demography of the agricultural students in this region shows that the students are between 21 - 30 years, 41 - 50 years dominated by male college certificate holders with a monthly income of about 501 to 1000 TY. According to Amireault et al., (2008) age and experience appear to be two important factors for stable intentions in individuals.

5.1 Conclusion

The perception of agricultural students regarding livestock waste management is that: agricultural students/engineers should be experts in livestock management, should have some knowledge about how adults learn, should involve learners in planning of educational programs, should involve learners in the delivery of educational programs, should offer a variety of programs to meet the needs of their clients and should facilitate participants learning processes. According to Fukumoto, 2005; Alam et al., 2003; Tyson, 1995, the best waste management methods for livestock, has been developed as technical interventions for possible environmental pollution problems in the livestock environment. The extension educators perceived themselves as the most appropriate and relevant professionals to give educational programs regarding waste management, therefore with educational professionals waste management knowledge can be passed on to agricultural students (Androulidaks & Sardis, 1994).

Generally, the agricultural students have positive perceptions of currently used *teaching method* and they perceived the *teaching method* in education of livestock waste management as effective. As suggested by Chizari et al (1998) there is a perceived demonstration that formal group meetings and informal discussions the most appropriate teaching methods, though there is a need for training in identifying and organizing training content and various teaching methods.

Agriculture students have positive perceptions of the currently used *teaching tools* in education of livestock waste management. They perceived *teaching tools* in education of livestock waste management as effective. This shows that extension

educators can successfully use field demonstrations to educate farmers in manure calibration (Manel & Slates, 2005).

There is no statistically significant difference (t (298) = -0.385, p = .700 > 0.05) between a male and female agricultural students' perception regarding the teaching tools used in education of livestock waste management.

There was no statistically significant difference (t (298) = -.356, p = .722 > 0.05) between a male and female regarding the teaching method used in education of livestock waste management. Therefore, there is no difference between male and female perception of agricultural students regarding the teaching methods used in education of livestock waste management.

Generally, the agricultural students have agreed to get an expert in livestock management, and have some knowledge about how adults learn, involve learners in planning and delivery of educational programs of, agreed to offer a variety of programs to meet the need of their clients and facilitate participants learning processes. Here is a positive perception for the agricultural students about the current use of Teaching method and perceived that the teaching method for education about livestock waste management as effective. Also about the current use of teaching tools for education about livestock waste management was a positive perception of the agriculture students. There is no statistically significant difference between a male and female agricultural student's perception regarding the teaching method and tools used for education about livestock waste management.

5.6 Recommendation

- Best management practices, good and acceptable working conditions should be defined as crucial and main educational activities for educators.
- Identification of risks of non-existent pollution sources and the best methods of managing animal wastes that have been developed and delivered to teachers and used when necessary.

- Continuing education and training programs appropriate to the current situation should be developed and transferred to regional educators to help the agricultural students in the area get better use of communication technologies.
- An experiential approach to adult learning for in-service training for district education teachers should be used in relation to the use of computers, the internet, websites and interactive writing boards.
- Identify perceptions of educators about motivation and professional competence regarding livestock waste management education.
- Identify available in-service training and educational programs and perceptions of educators regarding the effectiveness of such programs.
- More teaching tools should be developed and used by livestock waste management education.
- Teaching methods used by livestock waste management educators should be improved.
- The livestock waste management educators should educate the waste management students about the effect of toxicity of livestock waste and house to minimize them.

Further research is therefore needed to:

- Identify perceptions of educators about motivation and professional competence regarding livestock waste management education.
- Identify available in-service training and educational programs and perceptions of educators regarding the effectiveness of such programs.
- Agricultural students' Perception and awareness of livestock waste toxicity.

REFERENCES

Alam, M., Thompson, C., Trooien, T. Schlegel, A. (2003). Demonstration of best management practices to avoid groundwater pollution from application of livestock manure to cropland. *Project Report KDHE Project- NPS 99-004.* Kansas State University Research and Extension. Garden City, KS.

Al-Subaiee, S. S. F., Yoder, E. P. Thompson, J. S. (2005). Extension agents' perceptions of sustainable agriculture in the Riyadh region of Saudi Arabia. *Journal of International Agricultural and Extension Education 12(1),* 5-14.

Amireault, S., Godin, G., Vohl, M-C. Pérusse, L. (2008). Moderators of the intentionbehavior and perceived behavioural control-behaviour relationships for leisure-time physical activity. *International Journal of Behavioral Nutrition and Physical Activity 5(7),* doi: 10.1186/147-5868-5-7.

Androulidakis, S. I. Siardos, G. C. (1994). Agricultural extension agents' perceptions regarding their relevance and competence in certain professional task areas. *Journal of Agricultural Education and Extension, 1(3),* 1-14.

Aneja, V, P., Schlesinger, W, H., Erisman, J, W., Behera, S, N., Sharma, M., Battye, W. (2012). *Reactive nitrogen emissions from crop and livestock farming in India, Atmospheric Environment, 47,* 92-103.

Arvanitoyannis I. S. (2008). 'Waste Management in Food Packaging Industries'. In Arvanitoyannis I. S. eds. Waste Management for Food Industries. Greece: Academic Press. 941-1045.

Aubry, C; Paillat, J and Guerrin, F. (2006). A conceptual representation of animal waste management at the farm scale: *The case of the Reunion Island, Agricultural systems, 88,* 294-315.

Baker, M., Villalobos. (1997). Perceptions of county faculty of the professional development needs of specialists. *Journal of Extension 35(4).* Retrieved October 31, 2017 from http://www.joe.org/joe/1997august/al.html.

Barrena, R., Artola, A., Vazquez, F. Sanchez, A. (2009). The use of composting for the treatment of animal by-products: *Experiments at lab scale, Journal of hazardous Materials, 161*:380-386

Boesch, D. F., Brinsfield, R. B., Magnien, R. B. (2001). Chesapeake Bay eutrophication: scientific understanding, ecosystem restoration and challenges for agriculture. *Journal of Environmental Quality 30*, 303-320.

Bolman, L. G., Deal, T. E. (2003). *Reframing organizations: Artistry, Choice, and Leadership*. San Francisco, CA: Jossey-Bass.

Boyd, R. D. Apps, J. W. (1980). The conceptual model for adult education. In William S. Griffith & Howard Y. McClusky (Eds.), *Redefining the discipline of adult education.* 1-15. San Francisco: Jossey-Bass.

Bruening, T. H., Radhakrishna, R. B., Rollins, T. J. (1992). Environmental Issues: Farmers' perceptions about usefulness of information and organizational sources. *Journal of Agricultural Education.* Summer 1992, 34-42.

Camara, M. (2006). Agricultural extension educators' perceptions regarding the teaching and learning process related to water quality issues in the North Central Region of the United States. PhD Dissertation. Iowa State University, Ames.

Chen, S., Hsieh, L., Chui, S. (2003). *Characteristics of the PAH emissions from the incineration of livestock wastes with/ without APCD, Environmental International, 28,* 659-668.

Chizari, M., Taylor, W. N. (1991). Agriculture teachers' perceptions of adult education programs: An examination of critical educational needs, obstacles faced and support needed. *Journal of Agricultural Education, 45*, 23-28.

Chizari, M., Karbasioun, M. & Lindner, J. R. (1998). Obstacles facing extension agents in the development and delivery of extension educational programs

for adult farmers in the province of Esfahan, Iran. *Journal of Agricultural Education, 39(1),* 48-54.

Chizari, M., Lindner, J. R. & Lashkarara. F. (2001). Perceptions of Lurestan Province, Iran wheat farmers with respect to sustainable agricultural practices. *Journal of International Agricultural and Extension Education, 27,* 65-71.

Chizari, M., Lindner, J. R., Zoghie, M. (1999). Perceptions of extension agents' educational needs regarding sustainable agriculture in the Khorasan Province, Iran. *Journal of Agricultural Education 40(4),* 20-27.

Clark, A. (1994). Contemporary problems in the philosophy of perception. *American Journal of Psychology, 107(4),* 613-622. Retrieved September 2, 2017 from http://vm.uconn.edu/~wwwphil/crane.html.

Coates, P. (1998). Perception and metaphysical skepticism. *Proceedings of the Aristotelian Society, Supplementary,* 1-28.

Conti, G. J., Kolody, R. C. (2004). Guidelines for selecting methods and techniques. In Michael W. Galbraith. *Adult learning methods: A guide for effective instruction* (3rd ed.) 181-192. Malabar: Krieger Publishing.

Cookson, P. S. (1998). *Program planning for the training and continuing education of adults: North American perspectives*. Malabar: Krieger Publishing.

Couth, R., Trois, C. (2010). Carbon emissions reduction strategies in Africa from improved waste management: *A review, waste management, 30,* 2246-2346.

Cranton, P. (2006). *Understanding and promoting transformative learning: A guide for educators of adults* (2nd ed.). San Francisco: Jossey-Bass.

Creswell, J. L. & Martin, R. A. (1993). An assessment of teaching strategies used in private pesticide applicator education. *Journal of Agricultural Education, Summer 1993,* 18-24.

Crotty, M. (2005). *The foundations of social research: Meaning and perspective in the research process*. London: SAGE. (Original work published 1998).

D'Mello, J. P. F. (2004). Contaminants and toxins in animal feeds'. In D'Mello, J, P, F. eds. Assessing quality and safety of Animal Feeds, Issue 160. United Kingdom: Scottish Agricultural College. 107-128.

Davenport, N, A and Gambiza, J. (2008). Municipal commonage policy and livestock owners: *Findings from the Eastern Cape, South Africa, Land Use Policy, 26*, 513-520.

Di Grigoli, A., Todaro, M., Di Miceli, G., Genne, V., Tornambe, G., Alicata, M, L., Giambalvo, D., Bonanno, A. (2012). Effects of continuous and rotational grazing of different forage species on ewe milk production. *Small Ruminant Research, 106,* 29- 36.

Dollisso, A. D., Martin, R. A. (1999). Perceptions regarding adult learners motivation to participate in educational programs. *Journal of Agricultural Education 40(4),* 38-46.

Dooley, K. E. Murphy, T. H. (2001). College of agriculture faculty perceptions of electronic technologies in teaching. *Journal of Agricultural Education, 42(2),* 1-10.

El-Azzabi.T,Ben Mahmoud, K. R. .(1999). The National Agricultural Research System of Libya. *Wana Nars Study,* 59-66.

EPA (1999). Review of On-Farm Disposal and the Potential for Recycling of Wastes Produced from Commercial chicken Farms and Processors. Australia: PPK Environment and Infrastructure Pty Ltd.

Etling, A. (1993). What is nonformal education? *Journal of Agricultural Education.* Winter 1993, 72-76.

Etling, A. (1995). Needs Assessment: A Handbook. *Journal of Extension*, *33*(1).

FAO. (2006). Livestock's long shadow: environmental issues and options. Italy: FAO.

FAO. (2012). Agricultural cooperatives: paving the way for food security and rural development. Italy: FAO.

Farouque, Md. G., Takeya, H. (2007). Framers' perception of integrated soil fertility and nutrient management for sustainable crop production: A study of rural areas in Bangladesh. *Journal of Agricultural Education 48(3),* 111-122.

Fukumoto, G. F. (2005). Animal waste management strategies. EPA PIEC Pre-Conference Working Session June 21, 2005, Guam. Cooperative Extension Service. CTAHR, University of Hawaii at Manoa.

Galbraith, M. W. (2004). The teacher of adults. In Michael W. Galbraith. *Adult learning methods: A guide for effective instruction.* Malabar: Krieger Publishing.

George, D. Mallery, P. (2008). *SPSS for Windows step by step: A simple guide and reference 15.0 update* (8th ed.). Boston, MA: Allyn & Bacon.

Godfray, H, C, J., Beddington, J, R., Crute, I, R., Haddad, L., Lawrence, D., Muir, J, F., Pretty, J., Robinson, S., Thomas, S, M., Toulmin, C. (2010). *Food security: the challenge of feeding 9 billion people, Science, 327*, 812- 818.

Goolsby, D. A., Battaglin, W. A., Aulenbach, B. T., Hooper, R. P. (2001). Nitrogen input to the Gulf of Mexico. *Journal of Environmental Quality 30,* 329-336.

Goolsby, D.A., Battaglin, W. A., Lawrence, G. B., Artz, R. S., Aulenbach, B. T., Hooper, R. P., D. Keeney, R. & Stensland, G. J. (1999). Flux and sources of nutrients in the Mississippi-Atchafalaya River Basin-topic 3 report for the integrated assessment on hypoxia in the Gulf of Mexico: Silver Spring, Md., *NOAA Coastal Ocean Office, NOAA Coastal Ocean Program Decision Analysis Series. 17,* 130.

Greben, H, A and Oelofse, S, H, H. (2009). Unlocking the resource potential of organic waste: a South African perspective, *Waste Management and Research, 20,* 1-9.

Gwyther, C, L., Jones, D, L., Golyshin, P, N., Edwards-Jones, G., Williams, P. (2012 ivestock carcasses, Waste Management. 32). *Fate of pathogens in a simulated bioreduction system for,* 933-938.

Haines, J, R. (2004). Farm to fork: A strategy for meat safety in Ontario. Report of the meat regulatory and inspection review. Ontairo: Ontario Ministry of the Attorney General.

Hutchinson, M, L., Walters, L, D., Avery, S, M., Munro, F., Moore, A. (2005). Analyses of livestock production, waste storage, and pathogens levels and prevalence's in farm manures. *Applied and Environmental Microbiology, 71(3),* 1231-1236.

Ikeoji, C. N., Agwubike, C. C., Disi, J. O. (2007). Perceptions of head agricultural science teachers regarding problems and challenges of vocational agricultural delivery in secondary schools in the Delta State, Nigeria. *Electronic Journal of Science Education 11*(2). Retrieved October 31, 2017 from, http://ejse.southwestern.edu.

Illinois Environmental Protection Agency (EPA) (2001). Livestock waste regulations. Section 506.103 Definitions [510ILCS77/10.35]. 35 Illinois Administrative Code. p.4.

Imbeah, M. (1998). Composting piggery waste: a review. *Bioresource technology. 63*:197- 203

Jagath, R. (2010). An assessment of carbon emissions reduction potential through zero waste activities in South African Municipalities. Degree of Masters of Science in Engineering. University of KwaZulu-Natal, South Africa.

Jamahiriya, G. O. T. L. A. (2006). Food Security Scheme (Wheat, Dates and Olives, Seed Production). In Nations, F. A. A. O. O. T. U. (Ed.). *New Partnership For Africa's Development,* 150.

Jayaratne, K.S. U., Martin, R. A., Dewitt, J. R. (2001). Perceptions regarding sustainable agriculture: emerging trends for educating extension educators. *Proceedings of the 17th Annual conference April 4-7, 2001. Association for International Agricultural and Extension Education,* 191-197.

Kang, J. T., Song, H. K. (1984). Individual and group extension teaching methods. In Burton E. Swanson (Ed.), *Agricultural Extension: A reference manual*. Second Edition 130-143. Rome: Food and Agricultural Organization.

Kelly, G. A. (1955). *The psychology of personal constructs: A theory of personality.* New York: Norton.

Knobloch, N. A., Martin, R. A. (2000). Agricultural awareness activities and their integration into the curriculum as perceived by elementary teachers. *Journal of Agricultural Education 41(4),* 15-26.

Kwaw-Mensah, David, (2008). Perceptions of agricultural extension educators regarding livestock waste management education in the North Central Region" *Retrospective Theses and Dissertations*. 15807. http://lib.dr.iastate.edu/rtd/15807

Ladebo, O. J. (2004). Job behavior and attitudes of agricultural faculty; Beyond the influence of biological factors. *Journal of Extension Systems 20(2),* 89-103.

Laytimi, A. (2002). Market and Trade Policies for Mediterranean Agriculture: The case of fruit/vegetable and olive oil. Agricultural Situation Report – LIBYA. Accessed 9th November, 2017. http://medfrol.maich.gr/documentation/view/reports/wp1-asr/Libya.pdf

Lapointe, S; Giroux, J, F; Bélanger, L and Filion, B. (2000). Benefits of rotational grazing and dense nesting cover for island-nesting waterfowl in southern Quebec. *Agriculture, Ecosystems and Environment. 78,* 261-272.

Long, H. B. (2004). Understanding adult learners. In Michael W. Galbraith (Ed.), *Adult learning methods: A guide for effective instruction.* Third Edition, 23-37. Malabar: Krieger.

Manel, K. M., Slates, J. D. (2005). Demonstrating manure spreader calibration at field days. *Journal of Extension 43(4).*

Martin, R. A., Omer, M. H. (1990). Perceptions regarding instructional methods used in adult agricultural education programs. *Journal of Agricultural Education*, 2-6.

Martinez, J., Dabert P., Barrington S., Burton C. (2009). Livestock waste treatment systems for environmental quality, food, safety, and sustainability. *Bioresource Technology, 100,* 5527-5536.

Mattila, T. E. A., Kaustell, K. O., Leppälä, J., Hurme, T., Suutarinen, J. (2007). Farmers' perceptions of necessary management skills in Finland. *Journal of Agricultural Education and Extension 13*(4), 287-300.

McCann, L. M. J., Nowak, P., Nunez, J. T. (2006). Barriers to adoption of animal waste management strategies. In J. M. Rice, D. F. Caldwell, F. J. Humenik (Eds.), *Animal Agriculture and the Environment National Center for Manure and Animal Waste management*. White Paper. (pp109-134). St. Joseph, Michigan. ASABE Publication number 913C0306.

Mijinyawa, Y., Dlamini, B, J. (2006). Livestock and poultry waste management in Swaziland. *Livestock Research for Rural Development, 18(91),* http://www.cipav.org.co/lrrd/lrrd18/07/mand18091.htm.

Miller, G. (1997). Agricultural education at a distance: Attitudes and perceptions of secondary teachers. *Journal of Agricultural Education 38(1),* 54-60.

Mkhabela, T, S., Materechera, S, A. (2003). Factors influencing the utilization of cattle and chicken manure for soil fertility management by emergent farmers in the moist Midlands of KwaZulu-Natal Province, *South Africa, Nutrient cycling in agroecosystems, 65(2),* 151-162.

Mkhabela, T, S. (2004). Substitution of fertiliser with poultry manure: is this economically viable?, *Agrekon, 43(3),* 347-356.

Nachman, K, E; Graham, J, P. and Sibergeld, E, K. (2005). Arsenic: A roadblock to potential animal waste management solutions. *Environmental Health Perspective, 113,* 112-1124.

Naidoo, K. (2009). An analysis of municipal solid waste management in South Africa using the Msunduzi Municipality as a case study. Master of Science. University of KwaZuluNatal, Pietermaritzburg.

Newsome, L. A., Wardlow, G. W., Johnson, D. M. (2005). Effects of lecture versus experiential teaching methods on cognitive achievement, retention and attitude among high school agriscience students. *National AAAE Research Conference,* 146-156.

Ozor, N., Agwu, A. E. Chuckwuone, N. A., Madukwe, M. C., Garforth, C. J. (2007). Cost sharing of agricultural technology transfer in Nigeria: Perceptions of farmers and extension professionals. *Journal of Agricultural and Extension Education 13(1),* 23-37.

Palmer, T and Ainslie, A. (2006). Country pasture/ forage resource profiles South Africapart II. South Africa: FAO.

Park, D-B, Cho, Y-B & Lee, M. (2007). The use of an e-learning system for agricultural extension: A case study of the rural development administration, Korea. *Journal of Agricultural and Extension Education 13(4),* 273-285.

Park, H. S. (2000). Relationships among attitudes and subjective norms: Testing the theory of reasoned action across cultures. Central States Speech Association. ProQuest Information and Learning Company. Retrieved October 23, 2017 from http://findarticles.com/p/articles/mi_qa3669/is_200007/ai_n8888791/print. Pickering,

Petersen, S, O., Sommer, S, G., Beline, F., Burton, C., Dach, J., Dourmad, J, Y., Leio, A., Misselbrook, T., Nicholson, F., Poulsen, H, D., Provolo, G., Böhm, R., Juhász., Mihelic, R. (2007). *Recycling of livestock manure in a whole-farm perspective, Livestock Science, 112,* 180-191.

Powers, W. J. & Horn, H. H. (2001). Nutritional implications for manure nutrient management planning. Applied Engineering in Agriculture, *American Society of Agricultural Engineers 17(1),* 27-39.

Qian, X., Shen, G., Wang, Z., Guo, C., Liu, Y., Lei, Z., Zang, Z. (2013). Co-composting of livestock manure with rice straw: *Characterization and establishment of maturity evaluation system, Waste Management, Waste Management 34*, 530–535.

Rabalais, N. N., Turner, R. E. & Wiseman, Jr. W. J. (2001). Hypoxia in the Gulf of Mexico. *Journal of Environmental Quality 30,* 320-329.

Rahman, S, R., Dvorak, T., Stoltenow, C., Mukhtar, S. (2009). Animal Carcass Disposal Options. North Dakota: North Dakota State University.

Richardson, J. G., Mustain, D. (1993). Waste management education. *Journal of Extension, 31(1),* http://www.joe.org/joe/1993spring/a3.html.

Rogers, E. M. (2003). *Diffusion of innovations*. (5th ed.), New York: Free Press.

Rollins, T. J., Yoder, E. P. (1993). Adult learning preferences: A profile of extension educators. *Journal of Agricultural Education,* 18-25.

Rowe, G. T. (2001). Seasonal hypoxia in the bottom water off the Mississippi river delta. *Journal of Environmental Quality 30*, 281-290.

Sabiiti, E, N. (2011). Utilising agricultural waste to enhance food security and conserve the environment, Nairobi: African Scholarly Science Communications Trust.

Salman, M., New Jr. J. C., Bailey, M., Brown, C., Detwiler, L., Galligan, C., Hall, C., Kennedy, M., Lonergan, G., Mann, L., Renter, D., Renter, D., Saeed, M., White, B., Zika, S. (2008). Global food systems and public health: production methods and animal husbandry, a national commission on industrial production report. Pew commission on industrial farm animal production, Biomedical and Diagnostic Sciences: http://trace.tennessee.edu/utk_compmedpubs/32

Schauber, A. C. (2001). Effecting extension organizational change toward cultural diversity: A conceptual framework. *Journal of Extension 39(3).* Retrieved November 21, 2017 from http://www.joe.org/2001june/al.html.

Seevers, B, Graham, D., Gamon, J., Conklin, N. (1997). *Education through cooperative extension*. Albany: Delmar.

Segun R. B. (2012). Agriculturl Engineering: Principles and Practice. 1-37 https://www.researchgate.net/profile/Segun_Bello2/publication/275642284_Agricultural_Engineering_Principles_and_Practice/links/554649b50cf234bdb21d8c40/Agricultural-Engineering-Principles-and-Practice.pdf

Shao, X., Bruening, T. (2005). Teacher's perceptions of curriculum reforms and teacher training programs in Chinese agricultural schools. *Journal of International Agricultural and Extension Education 12(1),* 37-46.

Sharpley, A., Meisinger, J. J., Breeuwsma, A., Sims, J. T., Daniel, T. C. Schepers, J. S. (1998). Impacts of animal manure management on ground and surface water quality. *Animal waste utilization: Effective use of manure as a soil resource,* 173-242. Ann Arbor Press, Ann Arbor, MI.

Stroebel, A., Swanepoel, F, J, C., Pell, A, N. (2011). Sustainable smallholder livestock systems: *a case study of Limpopo Province, South Africa, Livestock Science, 139,* 186- 190.

Suman, P., Thys, E., Mfoukou-Ntsakala; Ouegradogo, M., Van de Bossche, P., Hulenbroeck, G, V., Berkvens, D., Speybroeck, N. (2010). Methodology for assessing determinants of manure use in urban areas of Africa. Belgium: International solid waste association.

Sund, J. L., Evenson, C. J. Strevett, K. A., Nairn, R. W., Athay, D & Trawinski, E. (2001). Nutrient conversions by photosynthetic bacteria in a concentrated animal feeding operation lagoon system. *Journal of Environmental Quality 30(2),* 648-655.

Tanner, J, C., Holder, S, J., Owen, E., Winugroho, M., Gill, M. (2001). *Livestock sustaining intensive smallholder crop production through traditional feeding practices for generating high quality manure-compost in upland Java, Agriculture, Ecosystems and Environment, 84,* 21-30.

The Kansas Department of Health and Environment. (2007). Animal and Related Waste Control. Article 18. *Bureau of Water*. Retrieved July 24, 2017 from http://www.kdheks.gov/feedlots/reg28_18.htm.

Todd, S., Milton, S., Dean, R., Carrick, P., Meyer, A. (2009). Ecological Best-Practice Livestock Production Guidelines for the Namakwa District. Namakwa District: Karoo Consortium.

Trede, L. Russell, D. (1999). Perceptions of stakeholders towards linkages and curriculum in urban agricultural education. *Proceedings of the 26th Annual national Agricultural Education Research Conference*, 240-250.

Turlington, H. (2014). Controlling potential contaminants to protect the food of livestock and pets. USA. Food quality and safety. http://www.foodquality.com/details/article/6275451/Contamination_and_Animal_Feed.html?tzcheck=1 [Accessed September 20, 2017].

Tyson, T. W. (1995). Best management practices to handle dairy wastes. Alabama Cooperative Extension System Publication ANR-970.

Udoto, M., Flowers, J. (2001). Perceptions of agricultural education teachers towards sustainable agricultural practices. *28th Annual National Agricultural Education Research Conference, December 12, 2001*. pp. 433-444.

United States Department of Agriculture. (2014). Animal Product Manual. United States: United states Department of Agriculture.

USDA. (2002). Census of agriculture state and county profiles. *National Agricultural Statistics Service 2002*. Retrieved November 25, 2017 from http://www.nass.usda.gov/census02/profiles/index.htm.

van den Ban, A.W., Hawkins, H. S. (1996). *Agricultural Extension* (2nd ed.), Malden: Blackwell Science.

VSF Europa. (2012). Small scale livestock farming and food sovereignty. Belgium: VSF Europa.

Warnick, B. K., Thompson, G. W., Gummer, E. S. (2004). Perceptions of science teachers regarding the integration of science into the agricultural education curriculum. *Journal of Agricultural Education 45(1),* 62-73.

White, B. A., Brockett, R. G. (1987). Putting philosophy into practice: Developing a working philosophy. *Journal of Extension 25(2).* Retrieved November 21, 2017 from http://www.joe.org/joe/1987summer/a3.html.

Wikepedia (2007). Agricultural Extension. *Wikipedia, the free encyclopedia.* http://en.wikipedia.org/wiki/Agricultural_extension.

William, D. L., Wise, K. L. (1997). Perceptions of Iowa secondary school agriculture education teachers and students regarding sustainable agriculture. *Journal of Agricultural Education 38(2),* 15-20.

Williams, A, P., Edward-Jones, G., Jones, D, L. (2009). *In-vessel bioreduction provides an effective storage and pre-treatment method for livestock carcasses prior to final disposal, Bioresource Technology, 100:*4032-4040

Wlodkowski, R. J. (2004). Creating motivating learning environments. In Michael W. Galbraith. *Adult learning methods: A guide for effective instruction* (3rd ed.), 141-164, Malabar: Krieger Publishing.

Yuan, Q., Snow, D, D., Bartelt-Hunt, S, L. (2013). Potential water quality originating from land burial of cattle carcasses, *Science of the Total Environment, 57(4),* 246-253.

Zahn, J. A., Dispirito, A. A., Do, Y. S., Brooks, B. E., Cooper, E. E., Hatfield, J. (2001). Correlation of Human olfactory responses to airborne concentrations of malodorous volatile organic compounds emitted from swine effluent. *Journal of Environmental Quality 30(2),* 635-647.

Zander, K, K., Mwacharo, J, M., Drucker, A, G., Garnett, S, T. (2013). Constraints to effective adoption of innovative livestock production technologies in the Rift Valley (Kenya), *Journal of Arid Environments, 96,* 9-18.

Zilberman, D. Metcalfe, M., Ogishi, A. (2006). Creative solutions to the animal waste problem. In J. M. Rice, D. F. Caldwell, F. J. Humenik (Eds.), *Animal Agriculture and the Environment National Center for Manure and Animal Waste management*. White Paper, 161-180.

Zilberman, D., Ogishi, A., Metcalfe, M. (2001). Innovative policies for addressing livestock waste problems. *National Center for Manure and Animal waste management*. White Paper Summaries. 1-3.

Appendix – 1

QUESTIONNAIRE

Dear respondents

The objective of the questionnaire is to collect information about ***Perceptions of agricultural Students towards livestock waste management education in Libya***. The information you provide will be valuable for academic purpose of Near East University, Turkish Republic of North Cyprus (TRNC). Therefore, your genuine, honest, and prompt response will be valuable input for the quality and successful completion of the research. The information you give will be used only for academic purpose and will be kept confidential.

I. Demographic Data

i. Sex: ( ) Male ( ) Female

ii. Age: < 20 ( ) 21-30 ( ) 31-40 ( ) 41- 50 ( ) 51 -60 ( ) >60 ( )

iii. Educational level: None ( ) High School ( ) College ( ) Tertiary ( )

iv. What is your monthly income? ($)

Less than 500 □ 501-1,000 □ 1,001-2,000 □ □ □ □

2,001 and above □ □

PART I. The following statements are related to general perceptions regarding livestock waste management. Please indicate your level of agreement with each statement by ticking the appropriate box on the 5-likert-type scale provided. (1-Strongly Disagree, 2-Disagree, 3-Neutral, 4-Agree, 5-Stongly Agree).

	Statement	**1**	**2**	**3**	**4**	**5**
1	Livestock waste management means different things to different people					

2	Livestock waste management is a controversial issue					
3	Livestock waste management is a complex environmental issue					
4	Livestock waste management is essential to human health					
5	Best management practices for Livestock waste management are easy to understand					
6	Best management practices for Livestock waste management include riparian buffers					
7	Best management practices for Livestock waste management do not improve the value of livestock waste as fertilizer.					
8	Best management practices for Livestock waste management protects water quality					
9	Best management practices for Livestock waste management protects air quality					
10	Best management practices for Livestock waste management does not protect soil quality					
11	Not all best management practices are accepted agricultural practices					
12	Efficient Livestock waste management practices require regular waste analysis					
13	The highest risk with livestock waste management is not point source pollution.					

PART II. Perceptions of education regarding livestock management.

14	Agricultural students should be experts in livestock management					
15	Agricultural students should have some knowledge about how adults learn					
16	Agricultural students should involve learners in planning of educational programs					
17	Agricultural students should involve learners in the delivery of educational programs					
18	Agricultural students should offer a variety of programs to meet the need of their clients					
19	Agricultural students should facilitate participants learning processes					

PART III: Teaching methods and tools

The following is the list of teaching methods and tools. Please indicate the extent to which you use each method or tool and its effectiveness by circling the appropriate number on the 5-likert-ype scale.

Column A represents the extent of current use (1-Not used, 2-Rarely used, 3-Sometimes used, 4-Frequently used, 5-Always used) and column B represents perceived effectiveness (1-Not effective, 2-Of little effectiveness, 3-Somewhat effectiveness, 4-Effective, 5-Very effective)

A.						**B.**				
Extent of current use					**Methods/Tools**	**Perceived effectiveness**				
1	2	3	4	5	Learning	1	2	3	4	5
					Discussion					
					Lecture-Discussion					
					Case studies					
					Demonstration					
					Meetings					
					Questioning					
					Workshop					
					Field days					
					Quizzes					
					Problem solving					
					Distance learning					
					Posters					
					Video tapes					
					Websites					
					Computers					
					Internet					
					Compact disc					
					Pamphlets					
					Satelites					
					Newsletters					
					Textbooks					
					Research publications					

Curriculum Vitae

My name is Fadel Aali Agila . I was born in 4/5/1983 in Tripoli / Libya. In 2001, I started high school and completed in 2003, and began to study at the Higher and Intermediate Institute of Agricultural Technology of Ghiran /Tripoli. I have been awarded the Higher Diploma in the Agricultural Science Technology, Specializing in poultry Technology and Farm Animal . Poultry Technology Division with the general grade (BB very good) and an average (81.21%). For spring semester for the academic year 2007. I have appointed as a teaching assistant 2008.

I have been nominated to study abroad for a master's degree by the Admiration of the Higher and Intermediate of Agriculture Technology of Ghiran / Tripoli.

I studied the English language in the United Kingdom (UK) and afterword I had the opportunity to travel to the Republic of Northern Cyprus to get a good education in this country. My master began (2016) in the field of management science and environmental education.

Thesis

ORIJINALLIK RAPORU

%4	%3	%2	%
BENZERLIK ENDEKSI	İNTERNET KAYNAKLARI	YAYINLAR	ÖĞRENCI ÖDEVLERI

BIRINCIL KAYNAKLAR

1	www.nou.edu.ng İnternet Kaynağı	<%1
2	scienceandnature.org İnternet Kaynağı	<%1
3	www.stellenbosch.gov.za İnternet Kaynağı	<%1
4	repository.uinjkt.ac.id İnternet Kaynağı	<%1
5	www.ipe.ro İnternet Kaynağı	<%1
6	Mohamed Camara. "Water Quality Issues in the North Central Region of the United States: A Teaching-Learning Model", Journal of Sustainable Agriculture, 04/2009 Yayın	<%1
7	www.msinga.org İnternet Kaynağı	<%1
8	Subhas C. Misra, Sandip Bisui. "Modelling vital	

	success factors in adopting personalized medicine system in healthcare technology and management", Engineering Science and Technology, an International Journal, 2018 Yayın	<%1
9	www.eed.state.ak.us İnternet Kaynağı	<%1
10	www.ros.hw.ac.uk İnternet Kaynağı	<%1
11	www.dfa.gov.za İnternet Kaynağı	<%1
12	Yuichi Tagane, Naeko Naganuma, Patrick Dougherty. "Chapter 5 Xreading Versus Paper-Based Extensive Reading: Perceptions of Students", Springer Nature, 2018 Yayın	<%1
13	ep3.uum.edu.my İnternet Kaynağı	<%1
14	Shepherd, Robert L.. "Federally mandated furloughs: the effect on organizational commitment and organizational citizenship behavior.", Defense A R Journal Yayın	<%1
15	R. F. Korte. "Training Implementation: Variations Affecting Delivery", Advances in Developing Human Resources, 11/01/2006	<%1

Yayın

16	www.theseus.fi İnternet Kaynağı	<%1
17	www.bbfarmstay.com.au İnternet Kaynağı	<%1
18	www.balticuniv.uu.se İnternet Kaynağı	<%1
19	Tiraieyari, Neda, Azimi Hamzah, and Bahaman Abu Samah. "Extension Agents and Sustainable Cocoa Farming: A Case Study of Extension Agents in Sabah State, Malaysia", Modern Applied Science, 2014. Yayın	<%1
20	www.tdx.cat İnternet Kaynağı	<%1
21	jechbeta.bmj.com İnternet Kaynağı	<%1
22	www.tojned.net İnternet Kaynağı	<%1
23	Kwaw-Mensah, David, and Robert A. Martin. "Perceptions Regarding Selected Educational Strategies used by Extension Educators", The Journal of Agricultural Education and Extension, 2013. Yayın	<%1

24	Thanapan Laiprakobsup. "Leadership, trust, proximity to government, and community-based enterprise development in rural Thailand", Asian Geographer, 2018 Yayın	<%1
25	Lucía Lijó, Nicola Frison, Francesco Fatone, Sara González-García, Gumersindo Feijoo, Maria Teresa Moreira. "Environmental and sustainability evaluation of livestock waste management practices in Cyprus", Science of The Total Environment, 2018 Yayın	<%1
26	M. Keil, Lei Li, L. Mathiassen, Guangzhi Zheng. "The Influence of Checklists and Roles on Software Practitioner Risk Perception and Decision-Making", Proceedings of the 39th Annual Hawaii International Conference on System Sciences (HICSS'06), 2006 Yayın	<%1