Contribution of Agricultural Extension Services on Vegetable Marketing Activities in the Gezira State: A Case Study of Wad Medani Greater Locality, Sudan

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A Dissertation
Submitted to the University of Gezira in Partial Fulfillment of the Requirements for the Award of the Degree of Master of Science in

Agricultural Extension
Department of Agricultural Extension and Training
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February, 2015
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9/2/2015
Contribution of Agricultural Extension Services in Vegetable Marketing Activities in the Gezira State: A Case Study of Wad Medani Greater Locality, Sudan

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9/2/2015
DEDICATION

To soul of my father
To my Mother
To my brothers
To my wife and my sons
To my professors
To my friends
To all farmers in my country
ACKNOWLEDGEMENTS

Firstly I would like to express my thanks to Allah the merciful, the companions who blessed me and gave me strength to complete this work.

Secondly my thanks, sincere gratitude and appreciation to my supervisors Dr. Ahmed Mirghani Abdel Rahman the main supervisor of the study and Dr. Musa Hago El Faki the co-supervisor for their close supervision, guidance, encouragement, and constructive criticism.

Also my thanks to the staff in the Department of Agricultural Extension and Training- Faculty of Agricultural Sciences- University of Gezira- for their support and facilitations.

Lastly my thanks and gratitude to my family(mothers, brothers, wife), colleagues and friends for their wonderful encouragement.
Contribution of Agricultural Extension Services on Vegetable Marketing Activities in the Gezira State: A Case Study Wad Medani Greater Locality, Sudan

M.Sc. in Agricultural Extension (Feb, 2015)
Department of Agricultural Extension and Training
Faculty of Agricultural Sciences
University of Gezira

Abstract

Agricultural extension organizations in the Gezira State have worked since 1959 mainly on improving agricultural production and yields in all crops. Another mission of agricultural extension is to provide farmers with necessary information to allow them to increase their earnings through better marketing. The objective of this study was to assess the contribution of agricultural extension services to vegetable marketing activities in the Gezira State, specifically in Wad Medani Greater Locality. A field survey was used to collect the data from 100 vegetable farmers in 2013/2014 growing season. A close ended questionnaire was constructed and used in data collection. Data were statistically analyzed using statistical packages for social sciences (SPSS). The results showed a significant association between availability of cash or credit for farm investment and source of information on it, sources of information on the importance of cultivation of more than one crop and number of cultivated vegetable crops, between the source of information on vegetable production technical packages and their application by vegetable farmers, between source of information on prices of product and inputs and selling type followed by vegetable farmers. There was no significant association between the source of information on post harvest techniques and their application by vegetable farmers. It can be concluded that agricultural extension had very weak contribution to vegetable marketing. The study recommends that a national market information system and network should be built and adoption of well identified export and import policies for farm products and inputs. Attention should be paid to agricultural extension market research and distribution of inputs with reasonable prices through various agricultural centres in the State. Agricultural extension officers should be trained in all aspects of agricultural marketing extension activities. More efforts should be exerted in facilitating transport to fully exploit market opportunities and farmer's organizations should take care of marketing activities.
مساهمة خدمات الأرشاد الزراعي في أنشطة تسويق الخضر بولاية الجزيرة، دراسة حالة: محلية ودمني الكبري، السودان
درجة الماجستير في الأرشاد الزراعي (فبراير 2015)
قسم الأرشاد الزراعي والتدريب
كلية العلوم الزراعية
جامعة الجزيرة

ملخص الدراسة

انتظم العمل في الأرشاد الزراعي منذ العام 1959م وعمل على تطوير الإنتاج الزراعي وزيادة الإنتاجية في كل المحاصيل، وهناك جانب مفقود للإرشاد الزراعي وهو تزويد المزارعين بالمعلومات الضرورية التي تساهم في زيادة عائداتهم من خلال التسويق الجيد. الهدف الرئيسي من إجراء هذه الدراسة هو معرفة مساهمة الأرشاد الزراعي في أنشطة تسويق الخضر بمحليه ودمني الكبري / ولاية الجزيرة.

استخدم السحح الميداني كطريقة بحثية لجمع المعلومات من 100 مزارع خضر في موسم (2013/2014) باستخدام الطريقة العشوائية البسيطة وتم استخدام التحليل الوصفي البسيط لتحليل المعلومات حيث تم وصفها في شكل تكرارات ونسب مئوية إضافة إلى استخدام اختبار مربع كاي. أوضحت النتائج التالية: هناك دلالة معنوية بين مصادر التمويل والسيلة لإعمال الزراعية ووجود المعلومات الخاصة بالتمويل وتوفير السيلة لإعمال الزراعية، زراعة أكثر من محصول ومصادر المعلومات الخاصة بأهمية التدوين وزراعة أكثر من محصول، تطبيق الحزم التقنية من قبل المزارعين ومصادر المعلومات الخاصة بهذه الحزم التقنية، طريقة البيع المتنبأ من قبل المزارعين ومصادر المعلومات الخاصة بأعمال المنتجات ومتطلبات الإنتاج، لا توجد دلالة معنوية بين تطبيق تقنيات ما بعد الحصاد (الفرز، التجفيف، التخزين، المعالجة، طريقة الترحيل) ومصادر معلومات تقنيات ما بعد الحصاد. النتيجة الرئيسية في هذه الدراسة هي ضعف الشديد لمساهمة الأرشاد في الأنشطة التسويقية للخضر بالمحليه. توصي الدراسة بإنشاء شبكة ونظام قومي لمنسوبي العسكري التسويق، تبني سياسات مشجعة للمزارعين لصابرات وواردات المنتجات ومدخلات الإنتاج، الاهتمام ببحث الأرشاد التسويقية، توزيع مدخلات الإنتاج بأسعار معقولة من خلال المراكز الزراعية المنتشرة بالولاية، تدريب المزارعين على الأنشطة المختلفة للإرشاد التسويقي مع بناء مزيد من الجهد من قبل المنظمات الإرشادية العامة بالولاية من أجل تسهيل مشاركة المزارعين في عملية نقل مكاسبهم للمواجيج والمزارعين لتنظيم الأنشطة التسويقية المختلفة

لاستفادة القصوى من فرص التسويق المتاحة وتكوين جمعيات للمزارعين لتنظيم الأنشطة التسويقية المختلفة.
List of Content

DEDICATION .......................................................... I
ACKNOWLEDGEMENTS ........................................ II
Abstract ................................................................. IV
Arabic Abstract ........................................................ VI
List of content ........................................................ IX
List of Tables .......................................................... X
List of Appendices .................................................. XI

Chapter One: Introduction

1.1 Introduction ......................................................... 1
1.2 Statement of the problem ......................................... 3
1.3 Problem of the study .............................................. 3
1.4 Objectives of the study ............................................ 4
1.5 Question of the study .............................................. 5
1.6 Hypotheses of the study ......................................... 5
1.7 Variables of the study ............................................ 6
1.8 Importance of the study ......................................... 6

Chapter Two: Literature Review

2.1 Definitions of Agricultural extension ............................ 7
2.2 Agricultural extension in Sudan: (Historical Background) .... 7
2.3 Agricultural extension in Gezira State .......................... 9
2.4 Definitions of marketing .......................................... 13
2.5 Marketing information ........................................... 15
2.6 Importance of marketing information .......................... 16
2.7 Marketing extension as Globule trend .......................... 17
2.8 Marketing extension tasks ....................................... 18
2.9 Marketing and Production Decisions ........................... 19
2.10 Crop selection and production techniques ....................... 19
2.11 Finance and credit .............................................. 19
2.12 Variety of inputs and inputs supply ........................... 20
2.13 Growing management ........................................... 20
2.14 Harvest timing and marketing ................................. 22
2.15 Harvesting techniques ........................................... 23
2.16 Creating market and business linkages ...................... 25
2.17 Introducing buyers and sellers ................................. 25
2.18 Alternative systems of marketing .............................. 26
2.19 Marketing information system ................................. 31
2.20 Using market information ....................................... 31
2.21 Market Information and Intelligence Network .............. 33
2.22 Suggestions for improving market intelligence services .... 33
2.23 Marketing information and marketing extension in Sudan ... 34
2.24 Vegetables Status in Sudan .................................... 37
2.25 Major constrains in fruits and vegetables production in Sudan.. 41
2.26 Post-harvest handling and processing ........................ 42
2.27 The horticultural crop supply chain in Sudan ............... 43
2.28 Fruits and vegetables markets in Sudan ..................... 44
2.29 Marketing and technical barriers .............................. 45
2.30 Financial barriers ............................................... 45
2.31 Constraints and potentialities of the horticultural sector .... 46

Chapter Three: Research Methodology

3.1 Area of the study .................................................. 48
3.2 Study population and sample size ............................... 48
3.3 Data collection ..................................................... 49
3.4. Data analysis ..................................................... 49
3.5. Limitations of the study ......................................... 49

Chapter Four: Results and discussion

4.1 Descriptive analysis-Frequency ................................. 50
4.1.1 The personal profile of vegetable farmers .................. 50
4.1.1.1 Sex ....................................................... 50
4.1.1.2 Age ....................................................... 51
4.1.1.3 Educational level ........................................ 52
4.1.1.4 Kind of land ownership ........................................ 53
4.1.1.5 Farm Size ......................................................... 54
4.1.1.6 Years of experience in agricultural work of vegetable farmers. 55
4.1.2 Production variables ............................................. 56
4.1.2.1 Availability of cash or credit for farm investment ............. 56
4.1.2.2 Source of information on availability of cash or credit facilities for farm investment ........................................ 57
4.1.2.3 Cultivation of more than one crop ............................ 58
4.1.2.4 Source of information on the importance of cultivation of more than one vegetable crop ........................................ 59
4.1.2.4 Selection of crops information ................................. 60
4.1.2.5 Application of vegetable production technical packages .... 61
4.1.2.6 Source of information on vegetable production cultural practices ................................................................. 62
4.1.3 Post harvest variables ............................................. 63
4.1.3.1 Grading ................................................................. 63
4.1.3.2 Packing ................................................................ 64
4.1.3.3 Storage ................................................................. 65
4.1.3.4 Processing .............................................................. 66
4.1.3.5 Transportation ....................................................... 67
4.1.3.6 Information on post harvest techniques ....................... 68
4.1.4 Marketing variables .................................................. 69
4.1.4.1 Selling type ......................................................... 69
4.1.4.2 Information on prices of products and inputs ................ 70
4.2 Test of significance by using chi-squares test .................... 71
4.2.1 Source of information on availability of cash or credit facilities for farm investment and Availability of credits .......... 71
4.2.2 Source of information on the importance of cultivation of more than one crop and Number of cultivated vegetable crops ....... 72
4.2.3 Source of information on production technical packages and the application of them by vegetable farmers ................ 73
4.2.4 Source of information on post harvest techniques and application of them by vegetable farmers .......................... 74
4.2.5 Source of information on prices of the product and inputs and selling type followed by vegetable farmers ....................... 75

Chapter Five: Summary, Conclusion and Recommendations

5.1 Summary of findings .................................................. 76
5.2 Conclusion ............................................................... 78
5.3 Recommendations ..................................................... 79
References........................................................................ 80
List of Tables

Table1  Distribution of extension officers according to their qualifications..  11
Table2  Distribution of extension officers according to their sex ratio ....  12
Table3  Distribution of extension officers according to cost of transportation (movement) ...........................................  12
Table4  Distribution of extension officers according to number of training courses attended..................................................  13
Table5  Benefits of contract marketing ...........................................  27
Table6  The most important vegetables in Sudan  .........................  38
Table7  Distribution of the average cost of production and financial profit in Sudan .................................................................  45
Table8  Distribution of vegetable farmers according to their sex ...........  50
Table9  Distribution of vegetable farmers according to their age groups.....  51
Table10 Distribution of vegetable farmers according to their educational level ..............................................................................  52
Table11 Distribution of vegetable farmers according to their kind of land ownership ...............................................................................  53
Table12 Distribution of vegetable farmers according to their farm size.......  54
Table13 Distribution of vegetable farmers according to their years of experience .................................................................  55
Table14 Distribution of vegetable farmers according to availability of cash or credit .................................................................  56
Table15 Distribution of vegetable farmers according to the source of information on credit .................................................................  57
Table16 Distribution of vegetable farmers according to their number of cultivated vegetable crops .............................................................  58
Table17 Distribution of vegetable farmers according to their Source of information on the importance of cultivation of more than one vegetable ...........................................................................................................  59
Table18 Distribution of vegetable farmers according to their selection of profitable crops .................................................................  60
<table>
<thead>
<tr>
<th>Table 19</th>
<th>Distribution of the vegetable farmers according to their application of vegetable production technical packages</th>
<th>61</th>
</tr>
</thead>
<tbody>
<tr>
<td>Table 20</td>
<td>Distribution of the vegetable farmers according to their source of information on vegetable production cultural practices</td>
<td>62</td>
</tr>
<tr>
<td>Table 21</td>
<td>Distribution of vegetable farmers according to grading of their product</td>
<td>63</td>
</tr>
<tr>
<td>Table 22</td>
<td>Distribution of vegetable farmers according to packing of their product</td>
<td>64</td>
</tr>
<tr>
<td>Table 23</td>
<td>Distribution of vegetable farmers according to storage of their product</td>
<td>65</td>
</tr>
<tr>
<td>Table 24</td>
<td>Distribution of vegetable farmers according to processing of their product at market lower prices</td>
<td>66</td>
</tr>
<tr>
<td>Table 25</td>
<td>Distribution of vegetable farmers according to their transporting type to their product</td>
<td>67</td>
</tr>
<tr>
<td>Table 26</td>
<td>Distribution of vegetable farmers according to their source of information on post harvest techniques</td>
<td>68</td>
</tr>
<tr>
<td>Table 27</td>
<td>Distribution of vegetable farmers according to their selling type</td>
<td>69</td>
</tr>
<tr>
<td>Table 28</td>
<td>Distribution of vegetable farmers according to their source of information on price of product and inputs</td>
<td>70</td>
</tr>
<tr>
<td>Table 29</td>
<td>Chi-square test for the association between source of information on availability of cash or credit facilities for farm investment and availability of them</td>
<td>71</td>
</tr>
<tr>
<td>Table 30</td>
<td>Chi-square test for the association between source of information on the importance of cultivation of more than one crop and number of cultivated vegetable crops</td>
<td>72</td>
</tr>
<tr>
<td>Table 31</td>
<td>Chi-square test for the association between source of information on production technical packages and the application of them by vegetable farmers</td>
<td>73</td>
</tr>
<tr>
<td>Table 32</td>
<td>Chi-square test for the association between source of information on post harvest techniques and application of them by vegetable farmers</td>
<td>74</td>
</tr>
</tbody>
</table>
Table 33 Chi-square test for the association between the source of information on prices of product and inputs and selling type followed by vegetable farmers ................................. 75
# List of Appendices

1. Questionnaire for measuring Contribution of Agricultural Extension Services on Vegetable Marketing Activities in the Gezira State .......................................................... 83
2. Map of Gezira State .......................................................... 85
Chapter one

Introduction

1.1 Introduction:

Agricultural production can only be really efficient if the accompanying marketing and post-harvest systems are also efficient. Well-functioning marketing systems are thus essential to develop production, increase farmers' incomes and promote security (Andrew, 2010).

Marketing can be defined as the commercial functions involved in transferring goods from producer to consumer. Marketing is not just the final transaction of receiving a check. The acts of buying supplies, renting equipment, paying labor, and advertising, processing and selling are all part of a marketing plan. Marketing should begin as the first ideas for an enterprise start to bubble. Some say marketing is everything a business does, that it is the most important aspect of any business, and the only action that results in revenue (Dennis, 2011).

The focus of the extension functionaries needs to be extended beyond production. Farmers should be sensitized on various aspects of quality, consumer’s preference, market intelligence, processing and value addition and other marketing information. This will help the farming community realize high returns for the produce, minimize the production costs, and improve the product value and marketability (Reddy, 2001).

Past (FAO) work in the field of agricultural marketing extension has concentrated on horticultural marketing. This is because until recently the marketing and storage of the major grain crops in most African countries tended to be in the hands of government agencies (Andrew, 2010).

Most farmers see themselves as “price takers”, thinking that they have no control over prices and have to accept what is offered. They do not always know how to find new buyers nor how market demand is changing and which products are most
profitable to grow. They lack the understanding to improve the prices they receive profitability of their production. They need help to become better informed about the market. They can then start to make decisions on how to improve their marketing. For that farmers need to become owners of new ideas. In this way they become committed and aware that they are responsible for the success or failure of what they do. This increases the chances of a successful outcome (Dixie, 2005).

Agricultural marketing extension activities involve helping vegetable farmers to select profitable crops, production techniques, improving sales to achieve better prices in addition to reduce costs and losses (Abdel Rahman, 2011).

The neediest for marketing extension services are very important as farmers became market oriented. In such situation, extension agents should be in a position to advise them not only on how to grow crops but also on how to sell them. The extension agents should advise farmers on product handling (collection and processing), grading and standardization, packaging, transportation, storage, financing, risk bearing, market intelligence and selling (Ganesh, 2011).

Vegetable farmers frequently consider marketing as being their major problem. However, while they are able to identify such problems as poorer prices, lack of transport and high post-harvest losses, they are often poorly equipped to identify potential solutions. Successful marketing requires learning new skills, new techniques and new ways of obtaining information. Extension offices working with ministries of agriculture or NGOs (Non Governmental Organizations) are often well-trained in horticultural production techniques, but usually lack the knowledge of marketing or post-harvest handling. The emphasis is on assisting farmers to form mutually beneficial relationships with private-sector traders and Agra processors (Grahame, 2005).

As fruit and vegetable market is monopolized by the big traders who provide finance to the small producers and conditioned by selling them their produce at very low price. Promoting producer marketing groups and cooperatives and support for the
development of a marketing center for the preparation of vegetables and fruit for export seems to be rational intervention (Nepad, 2005).

Market information can help farmers take production and marketing decisions like what and how much should be produced, should new crops be grown, should certain crops be produced during the off-season, which varieties should be planted and where can these be bought, which post-harvest activities should be performed, is storage profitable, where production should be sold, who should it be sold to, is it worthwhile marketing together with other farmers, how to negotiate with buyers, also farmer needs to know about the collective action for market, and about linking between agriculture and industry or the exchange industry (Grahame,2005).

As in other African countries, vegetable crops in Sudan are produced by small farmers in Gezira and Rahad schemes and by private vegetable farmers on the banks of rivers and valleys. Different kinds of vegetables are now cultivated in various parts of Sudan such as tomato, eggplant, onion, okra, potato, cucumbers, watermelon, hot pepper, sweet pepper and carrot (Abdel Rahman, 1998).

Agricultural extension organizations in the Gezira State have worked since 1959 mainly on improving agricultural production and yields in all crops. Another mission of agricultural extension is to provide farmers with necessary information to allow them to increase their earnings through better marketing (Abdel Rahman, 2011).

1.2 Statement of the problem:

Generally vegetable farmers face a big risk due to market changes, low prices in addition to demand and supply. Profitability of vegetable farmers can be achieved if the vegetable farmers become more market oriented. Successful marketing requires, learning new skills, new techniques and new ways of obtaining information. Market information can help farmers take the best marketing decisions for their product, such as what and how much should be produced, how new crops should be grown, what certain crops should be produced during the off-season, which varieties should be planted and where can these be bought, which post-harvest activities should be performed, if storage profitable, where product should be sold, who should be sold to,
is it worthwhile marketing together with other farmers, how to negotiate with buyers. Also farmer needs to know about the collective action to market, and about linking between agriculture and industry or the exchange industry which will increase their income, benefits and to avoid any risk. We need to assist the farmer how to sell their crops as we assist them how to produce.

1.3 Problem of the study:

Although the Gezira State is considered as one of the largest agriculture area in the Sudan with very long experience in vegetable production, the author seen that vegetable farmers face big difficulties in marketing their produce. For that there is a need to assess the contribution of agricultural extension services on vegetable marketing activities in the Gezira State, The case study of Wad Medani greater locality.

1.4 Objectives of the study:

1.4.1 Main objective:

The main objective of this study is to assess the contribution of agricultural extension services to vegetable marketing activities in the Gezira State, specifically in Wad Medani greater locality.

1.4.2 Specific objectives:

The specific objectives of this study are to assess the following:

1. Selected personal characteristics of vegetable farmers (sex, age, education level, kind of land ownership, farm size and years of experience in agricultural work).
2. Contribution of extension services in providing vegetable farmers with information on :-
   1- Availability of cash or credit for farm investment..
   2- Selection of profitable crops
   3- Importance of cultivation of more than one crop.
4- Vegetable production technical packages and their application (land preparation, use of improved seeds, use of chemical fertilizers, irrigation and sowing date).
5- Information on post harvest techniques and their application (Grading, Packing, Storage, Processing and transportation).
7- Selling type.
8- Source of information on prices of product and inputs.

1.5 Question of the study:

Is there any contribution of agricultural extension to vegetable marketing in Wad Medani Greater locality?

1.6 Hypotheses of the study:

1.6.1 Null hypothesis:

Agricultural extensions of the Gezira state have no contribution to vegetable marketing in the state.

1.6.2 Alternate hypothesis:

Agricultural extensions of the Gezira state have a contribution to vegetable marketing in the state.
1.7 Variables of the study:

This table shows Variables of the study the independent variables as in column (A) and the dependent variables as in column (B).

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<tr>
<th>Independent variables (A)</th>
<th>Dependent variables (B)</th>
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<td><strong>Agricultural extension information channels:</strong></td>
<td><strong>1-Production variables:</strong></td>
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<tr>
<td>1. Extension officers (using individual and group contact methods).</td>
<td>1. Availability of cash or credit for farm investment.</td>
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<tr>
<td>2. Mass media communication (such as TV and radio agricultural extension programmes and extension publications).</td>
<td>2. Selection of profitable crops.</td>
</tr>
<tr>
<td>3. Others source of information (other farmers or farmers themselves).</td>
<td>3. Application of production technical packages (land preparation, use of improved seeds, use of Chemical fertilizers, irrigation, and sowing date).</td>
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2. Post harvest packages:

   (Grading, Packing, Storage, Processing and Transportation).

3. Market variables:

   1. prices of input and product.
   2. Selling type.

1.8 Importance of the study:

1. This study can help farmers to be more oriented to the market, which in turn may increase their income and help them to avoid marketing risks.

2. This study can help the extension organizations, government and the policy makers to know more about the market risks and problems facing vegetable farmers and develop ways and strategies which will assist farmers to avoid these problems and increase their income and finally lifting the standard of living of rural people as a whole which is the final goal of agricultural extension organizations.
2.1 Definitions of Agricultural extension:

Lewis, et al (2004), defined agricultural extension as "A series of embedded communicative interventions that are meant, among others, to develop and/or induce innovations which supposedly help to resolve (usually a multi - actor) problematic situations ".

As reported on Swanson, (1984), Maunder defined agricultural extension as a service or system which assists farm people, through educational procedures, in improving farming methods and techniques, increasing production efficiency and income, bettering their levels of living and lifting social and educational standards.

Roling (1988) defined agricultural extension as a professional communication intervention deployed by an institution to induce change in voluntary behaviors with a presumed public or collective utility.

In 1999, Neuchatel Group, said that (the essence of agricultural extension is to facilitate interplay and nurture synergies within a total information system involving agricultural research, agricultural education and a vast complex of information-providing businesses).

2.2 Agricultural extension in Sudan: (Historical Background):

The history of agricultural extension and agricultural technology transfer started in Sudan at the time of establishing the research centres in 1902, with the establishment of experimental cotton farms in Shendi (170 km north of Khartoum) on the main of the river Nile bank and in Elkamileen (96km south of Khartoum) ( Eltayeb, 2005).

However Demaya (2001) reported that agricultural extension was introduced in Sudan in 1958 when an agreement between the Sudan and U.S.A. was signed. As a result of this a unit for agricultural extension service was established in 1959. It was under the auspices of the Agriculture Department at that time. In the second half of
1959 Maridi unit was established as the first agricultural extension unit under supervision of the American AID programme.

The extension unit was a technical office consisting of a number of extension agents with different responsibilities; the unit was managed by subject matter specialist who had an agricultural education in addition to further training in agricultural extension. The technical office had mainly two functions, an advisory function to disseminate technical know-how. Another function was the extension demonstration for improved varieties of cereal crops and vegetables (Elagab, 2004).

The agricultural extension division was established in 1958 as a branch of Agricultural Education in the Department of Agriculture, to represent a central unit for the other scattered regional extension units. But the agricultural extension division was divided into two, the first for extension and information and the other for education and training. In 1970, the above two divisions were joined to form one division called Agricultural Extension and Education, the later consisted of three main departments, and those were agricultural extension; agricultural and technical training; and agricultural information. Furthermore, in 1974 the divisions and departments were renamed to become administrations, the extension service became a separate department under the ministry of Agriculture whereas Agricultural Education Department was transferred to the Higher Education and Scientific Research. The first decade of extension system in the Sudan witnessed a rapid growth to eight extension units. Furthermore, additional 12 units were established during the period (1970-76) to cover all Sudan regions except the Red Sea and North Darfour areas (Elagab, 2004).

Nepad (2005) reported that in Sudan, the weak performance of the agricultural sector is perpetuated by five main factors:

(i) Decades of civil conflict and underdevelopment that have ravaged traditional rain fed agriculture.
(ii) Disabling agriculture policies, including delayed financing of agricultural investments, insufficient financing of the running costs of agricultural services, and over taxation of agricultural commodities.

(iii) Inadequate land policy with the superposition of statutory and customary systems, which has led to the reallocation of land uses without consultation with the users, introducing an open access regime and weakening traditional institutions for land care; this dual system cannot deal effectively with competing land claims resulting from the expansion of farming, herding and mining.

(iv) Inadequate water policy, with no systematic implementation of the cost recovery of operation and maintenance costs of water services (whether for irrigation or livestock purposes), an inappropriate level of water pricing and no enforcement of user management of water facilities.

(v) Inefficient marketing arrangements owing to chronic low productivity and low output value in agricultural and pastoral production systems, high internal costs of transport due to limited road infrastructure, high costs of handling products moving to points of export, imposition of charges and taxes in the marketing chain for which no services are provided, and, finally, the weak organization and bargaining power of small-scale producers. These structural factors have constrained the growth of the agricultural sector and have thus trapped households in poverty. This situation is further aggravated by climate change and rising food prices.

The four factors (research, extension, farmers and market) are areas of policy intervention. The endogenous growth theory strongly supports government intervention in these sectors, for ensuring steady and continuous economic growth (Elfaki, 2000).

2.3 Agricultural extension in Gezira State:

The agricultural extension was introduced in the Gezira State (Blue Nile Province in the past) 1962 in Sinnar for the first time. The Province manager represents the manager of the agricultural extension. At that time the administration was central, all needs was available, and the approach used in this region is the traditional approach.
The agricultural extension with the horticultural department in the ministry of agriculture established many nurseries and farms away from the Nile (Matarat). The actual starting of agricultural extension was in 1981 at the introduction of a local government system. At that time many agricultural units were established and each unit contained an administration of agricultural extension. In 1983 at the time of introduction of empirical fertilizer project, the work in agricultural extension increased and all facilities required for agricultural extension work were available. Eleven units of agricultural extension were established, to provide the farmers with agricultural facilities and agricultural information, in addition to internal and external training for the workers. The approaches used were the project approach in addition to traditional approach. At the end of eighties, the Integrated Pest Management (IPM) programme was introduced. This project gave a big push for agricultural extension work, farmer field school, rural women schools were established and heavy training was given to agricultural workers. When these two projects stopped the fund to agricultural extension stopped also and the extension work deteriorated. Now there are four different approaches used in Gezira State these are Traditional approach, Integrated services approach, Commodity approach and Project approach (Yousif, 2013).

Agricultural extension organizations in the Gezira State worked since 1959 mainly on improving agricultural production and yields in all crops. Another mission of agricultural extension is to provide farmers with necessary information to allow them to increase their earnings through better marketing (Abdel Rahman, 2011).

2.3.1 Qualifications of the extension officers in the Gezira State:

Educational level of extension staff contributes directly to job performance and impact of extension work with rural people. Education level of extension staff is one of the most serious problems of extension in many countries as shown in the literature; therefore the success of extension activities depends mainly upon selection of qualified and motivated extension staff.
Distribution of extension officers of Gezira Stat according to their qualifications is shown in table (1)

<table>
<thead>
<tr>
<th>Qualifications</th>
<th>Frequency</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Bachelor and above</td>
<td>30</td>
<td>88.2</td>
</tr>
<tr>
<td>2. Diploma</td>
<td>3</td>
<td>8.8</td>
</tr>
<tr>
<td>3. Lower than Diploma</td>
<td>1</td>
<td>3.0</td>
</tr>
<tr>
<td>Total</td>
<td>34</td>
<td>100</td>
</tr>
</tbody>
</table>

Source (Abdel Rahman, 2010)

Table (1) revealed that the majority of the extension officers in Gezira State have bachelor and above.

2.3.2 Sex ratio of the extension officers in the Gezira State:

In many countries socio-cultural factors leading constraints to the effectiveness of agricultural extension such as gender, language and illiteracy. Regarding values, norms, religion and traditions of rural people in Sudan extension organizations should recognize and respect the gender issue in their field staff. In the overwhelming majority of countries, extension services have been staffed predominantly by men. Only countries such as the Philippines have women field staff deployed in sufficient numbers and with sufficient resources to become effective agents of change among women farmers. In some countries, individual contact has been complemented by group contact, especially, but not only, where it may be difficult for male change agents to have any type of contact with individual women other than their own relatives. In many cultural settings, group extension significantly increases women's access, because the group context calms the fears of male extension agents, husbands, and women about transgressing norms of approved social contact. This may be particularly true in Islamic areas where women are in partial or total seclusion. Furthermore, in Islamic societies, there are probably not enough qualified adult females who are able to take up the post of change agent at the field level.
Distribution of extension officers of Gezira Stat according to their sex ratio is shown in table (2):

<table>
<thead>
<tr>
<th>Sex ratio</th>
<th>Frequency</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>17</td>
<td>50</td>
</tr>
<tr>
<td>Female</td>
<td>17</td>
<td>50</td>
</tr>
<tr>
<td>Total</td>
<td>34</td>
<td>100</td>
</tr>
</tbody>
</table>

Source (Abdel Rahman,2010)

As shown in table (2) the extension officers in gezira state have equal number of both male and female.

2.3.3 Cost of transportation (movement) of the extension officers in the Gezira State:

Improvement of working conditions at field level is essential for field staff to exert better efforts in their filed activities; therefore all agricultural approaches should consider this vital element of field work. Living conditions of field extension workers must be improved by providing adequate facilities for housing, transport and medical and educational allowance for children.

Distribution of extension officers of Gezira Stat according to cost of transportation (movement) is shown in table (3):

<table>
<thead>
<tr>
<th>Cost of transportation</th>
<th>Frequency</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>High cost for transportation</td>
<td>12</td>
<td>35.3</td>
</tr>
<tr>
<td>Low cost for transportation</td>
<td>5</td>
<td>14.7</td>
</tr>
<tr>
<td>Reasonable cost for transportation</td>
<td>17</td>
<td>50</td>
</tr>
<tr>
<td>Total</td>
<td>34</td>
<td>100</td>
</tr>
</tbody>
</table>

Source (Abdel Rahman,2010)
As presented in table (3) the extension officers in the state have reasonable cost for transportation.

2.3.4 Training courses attended by extension officers in the Gezira State:

Training of extension staff contributes directly to the development of human resources and directed towards maintaining and improving current job performance. Distribution of extension officers of Gezira State according to number of training courses attended is shown in table (4).

<table>
<thead>
<tr>
<th>Number of trainings attended</th>
<th>Frequency</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>From 1 – 5</td>
<td>4</td>
<td>11.8</td>
</tr>
<tr>
<td>From 6 – 10</td>
<td>30</td>
<td>88.2</td>
</tr>
<tr>
<td>More than 10</td>
<td>0</td>
<td>-</td>
</tr>
<tr>
<td>Total</td>
<td>34</td>
<td>100</td>
</tr>
</tbody>
</table>

Source (Abdel Rahman, 2010)

As indicated in table (4) the extension officers were exposed to low number of in-service training which will negatively affect their work performance.

2.4 Definitions of marketing

According to Dixie (2005) there are many definitions of “marketing.” Here are two particularly relevant to horticultural marketing.

The first is: Marketing involves finding out what your customers want and supplying it to them at a profit. This stresses two important points.

• The marketing process has to be customer oriented.

• Marketing, as a commercial process, has to provide farmers, transporters, traders, processors, etc. with a profit or they will be unable to stay in business.
Marketing therefore involves:

- Identifying buyers.
- Understanding what they want in terms of products and how they want to be supplied.
- Operating a production-marketing chain that delivers the right products at the right time.
- Making enough profit to continue to operate.

**The second useful definition is:** The series of services involved in moving a product from the point of production to the point of consumption. This definition emphasizes that marketing is a series of inter-connected activities. In the case of horticultural marketing these include:

- Planning production.
- Growing and harvesting.
- Grading of products and their packing, transport, storage, processing, distribution and sale.
- Sending information from production area to market (e.g. products available, volumes) and from market back to producing areas (e.g. prices and supply levels, consumer preferences and changes in taste).

All of these activities are links in the production-marketing chain. Like any chain, it is only as good as its weakest link.

Marketing is one of the most important factors determining the success of any fruit or vegetable farming enterprise, encompassing all of the operations and decisions made by producers. These decisions range from identifying the most profitable crops for production to deciding how product should be delivered to buyers efficiently and economically while maintaining product quality. Contrary to popular belief,
marketing does not begin after a crop is produced. Instead, marketing alternatives need to be considered well before production takes place (Hall, 2002).

2.5 Marketing information:

According to Wandschneider et al (2006) all information about the buying and selling of products and services can be classified as market information. Market information is much more than just information about prices and quantities. This definition is broad enough to encompass information about both input and output markets. Marketing information is essential for producers in planning production and market led production. It is equally important for other market participants for trading.

Farmers are constantly making production and marketing decisions. Market information can help them make choices, from the very first stages of the production planning process until the moment when production is actually sold:

- What and how much should farmers produce? Information about costs and prices is essential for calculating the potential profit associated with different products and therefore for deciding what to produce?
- Decisions about what and how much to produce will vary across areas as well as across households within the same area, depending on their land and labor endowments, their investment capacity, and their risk-taking capacity.
- Should farmers grow off-season crops? This depends on the profitability of off-season cultivation.
- Which varieties should be planted? Information about the performance of different varieties, and their availability and cost, can help farmers answer this question.
- Which post-harvest operations should farmers undertake? This depends on what buyers want and the premium they are willing to pay for clean, sorted, graded and packaged product.
• Should farmers store their crops? Some crops can be stored. This can be a good strategy if the price is expected to increase over time and to such an extent that it more than compensates for the costs and risks of storage.

• Where should farmers sell their products? Farmers will get different prices in different markets and locations, but they will also face different marketing costs and risks.

• Who should farmers sell to? This will depend on the volume and quality requirements of different buyers, the price and other terms that they are offering, and the costs of supplying them.

• Should farmers sell individually or as a group? Because farmers usually sell small quantities, it is rarely economical for them to sell very far from home. The transport and time costs are simply too high. However, as a group, farmers may be able to target more distant markets and buyers.

• How should farmers negotiate with buyers? Information about current prices locally and in neighboring areas can help farmers decide whether to accept the price being offered, negotiate or look for another buyer.

2.6 Importance of marketing information:

i) Provides the up-to-date information on the arrivals and prices of agricultural commodities in different markets.

ii) Guides the producers to take right decision, when, where and how to market their product.

iii) Educate the producers/traders about the post harvest management i.e.:

   a. Harvesting care.

   b. Techniques to minimize losses during post harvest period.

   c. Value addition to the product by proper cleaning, processing, packaging, storage and transportation.

iv) Orient the producers/traders about prevailing price trends, demand and supply situation etc...
v) Orient the producer regarding the importance of grading, cooperative/group marketing, direct marketing, contract farming, futures trading etc...

vi) Provides the information about the sources of credit availability, various Govt. schemes, policies, rules and regulations etc. Information and contacts to increase their earnings through better marketing.

This involves helping them to:

- select profitable crops and improve production techniques.
- improve sales and achieve better prices.
- reduce costs and losses (Moni, 2006).

**2.7 Marketing extension as Globule trend:**

A market-oriented agricultural extension system requires a whole new set of skills, knowledge and attitudes from extension officers. Communication and facilitation skills and good knowledge of production technologies are still essential (Wandschneider et al, 2006).

Marketing extension is a key factor in enlighten the farmers and in removing their marketing constraints. While the production oriented agricultural extension service is available, the oriented marketing extension service is absent. Market extension is a vital factor enlightening the farmers about proper marketing and removal of marketing constraints and improves their awareness in various modern post harvest measures for efficient and cost effective marketability. The marketing extension educating farmers, traders and consumers, regarding marketing to bring desirable changes in their knowledge, attitude, skill and interest. It includes: (i) Advice in product planning. (ii) Securing market for farmers. (iii) Training and advice on important marketing practices. (iv) Advice on establishing and operating rural markets – setting up of physical distribution system for agricultural products (Manoj et al, 2012).

**2.8 Marketing extension tasks:**
Moni, (2006) mention that the main marketing extension task is providing farmers the necessary information:

- Production management: (site selection, profitable crop selection, planting and looking for credits).
- Growing management: (land preparing, improved seeds, fertilization, irrigation, sowing date).
- Marketing management: (post harvest techniques, Grading, Packing, Storage, Processing, Transportation).
- Marketing information and sells management.

Rowell (1999) argues that successful vegetable production generally requires the grower to make daily decisions regarding pest management, irrigation, and cultural practices. Would be growers unwilling to make serious investments of time (and money) should not attempt to expand beyond a space at the farmers market. It is important for vegetable growers to have a market outlet for their product before they choose to start production. Good marketing plans start with the customer and work backward to production. Potential growers should first determine exactly what buyers want, how they want it, and when they want it. Then they must determine how these crops should be grown. Even selecting varieties and determining planting times are basic marketing decisions. Vegetable marketing and production plans need to be developed simultaneously; the most successful growers put equal emphasis on growing and marketing their products.
2.9 Marketing and Production Decisions:

Two major obstacles to success in vegetable production are finding markets and establishing prices. Some producers, attracted by success stories about a particular crop, have carefully researched and grown it. Unfortunately, they never bothered to determine where, to whom, and at what price their products would be sold. Good marketing plans start with the customer and work backwards to production. Potential growers should first determine exactly what buyers want, how they want it, and when they want it. Then, they should determine how these crops should be grown. Even selecting varieties and determining planting times are basic marketing decisions (Dixie, 2005).

2.10 Crop selection and production techniques:

To know which crops generate better profits and how production choices, such as variety, production timing and product quality, can affect the profitability of individual crops.

This information can be gathered by talking to farmers and traders individually or by meeting with them as a group. Individual interviews make it easier to gather confidential commercial information (Dixie, 2005).

2.11 Finance and credit

Critical production constraints are often a shortage of working capital and funds for investment purposes. Potential sources of funds, apart from the farmer’s own resources, can be divided into two: formal and informal (Dixie, 2005).

**Formal sources:** These are mainly banks and other types of financial institutions such as credit unions, savings and credit cooperatives and various types of microfinance organizations. They offer different types of loan products and normally apply market-based interest rates. In the case of banks, they require specific types of collateral in order to grant loans and credits, which, together with often lengthy loan procedures, tend to seriously limit most farmers access. Providing banks with cost-of-production budgets, detailed information on likely returns and other relevant
information about the activity at the time of the loan request will enable them to assess more accurately the risk involved and may shorten the procedures. Credit unions and similar types of member-owned financial institutions are, by their nature, more open to farmers requiring smaller production-oriented loans. But, similar to microfinance institutions, they often face problems in providing large numbers of loans, due to limited funds (Dixie, 2005).

**Informal credit:** In many countries the availability of formal funds from financial institutions is very limited and farmers often have to depend on informal sources. Sources of informal credit include moneylenders, family members, friends, traders and input suppliers. Informal loans are often made on the basis of close family links or mutual trust and are free of time-consuming bureaucracy. In some countries, the most important source of informal credit is often the trader. The role of traders as sources of loans is much misunderstood. Traders provide credit to farmers to secure future supply and, therefore, income. The true costs of such credit to farmers are difficult to determine. Common criticisms are that high interest rates are charged and that growers who have borrowed money are forced into selling their product at low prices. In some cases this is no doubt true and, in the case of poor prices, farmers cannot switch to another trader or wholesaler. However, the opposite can also apply as farmers, knowing the trader has to buy from them, pay less attention to producing quality. Traders do not normally lend money to farmers in order to exploit them. They lend money in order to ensure that farmers will produce enough of a crop to meet the demand. Loans by traders are recovered simply by deducting the money advanced from value of the sales (Dixie, 2005).

2.12 Variety of input and input supply:

The supply of inputs can have a direct effect on profitability. Planting material is particularly important. Consumers can have strong preferences for particular varieties, colours and tastes. For example, in much of the Middle and Near East there is a preference for plum tomatoes (i.e. Roma types). Product colour can also be important. Growers’ returns can be improved by ensuring the supply of the correct planting material. Pest and disease damage will seriously reduce a crop’s price and its
potential shelf life. Sometimes these problems can be solved by the correct crop protection practices (Dixie, 2005).

2.13 Growing management:

Abdel Rahman (2012) reported that many studies pointed out that recommended cultural practice component for vegetables which can be called the core activity in vegetables is very important because it seeks to modify the physical environment biotic factors such as soil texture, structure and composition (tillage, fertilizers, organic matter), temperature and humidity (irrigation, plant density). It can help to divert adverse atmospheric conditions (sowing date, intercropping, protective boundary crops) to the betterment of the crop and the determent of pests or pathogens. In addition, they lead to a reduction in pest population and therefore they can be used as good instruments to reduce vegetable pest attacks.

2.13.1 The recommended cultural practice includes:

**Land Preparation:** Land preparation used to prepare fine seedbed for vegetable seed or transplant. The mechanical operations needed are dictated by the initial condition of the field, but under normal condition they encompass disking the soil to a depth of 18-20 cm to thoroughly disturb the root zone, harrowing to break large soil masses and leveling to smooth up the soil. The field could be used in the flat state or, if required can be ridged at the desired ridge spacing. The time to start land preparation is of important particularly when working with heavy clay soils.

**Nursery establishment:** A number of vegetables are normally transplanted such as tomato and onion seedlings are first raised in nurseries and then later transferred to the permanent site in the field. Adoption of nursery method for raising transplants before final to permanent field site is advantageous. Nurseries could be established in the open field or in a brick and bamboo structure. Open nurseries are established in the open field in sites which are well drained fertile, accessible and with readily available irrigation water.
**Sowing date:** The recommendation of sowing dates will result in low or no effecting by diseases or insect or others in the sowing date. And also results on the time of harvest the crop to the market.

**Transplanting (Spacing):** The recommended transplanting practice was to transplant seedlings in the ideal space to the planed.

**Intercropping:** Intercropping, the simultaneous cultivation of more than one crop species in close association is used in controlling diseases in many parts of the world.

**Irrigation:** Irrigation is an important cultural practice for the life of vegetables. Plant factors regulating irrigation are growth, habit, size of plant and physiological age. The physical soil structure, texture and structure also are important components in determining frequency and quality of water needed. Climate factors also affect the irrigation management. Also irrigation can be used as protective measure against pests and diseases.

**Fertilization:** Fertilizers are natural or synthetic substances that are added to the soil or plants to provide them with nutrients necessary for plant development. The use of fertilizers is a common practice to increase soil fertility and consequently the quantity and quality of fruits and vegetables.

2.14 Harvest timing and marketing

The storage of root vegetables such as sweet potatoes, carrots, onions, garlic, potatoes and yams is generally improved by harvesting them when they are fully mature. Some root crops, such as cassava and carrots, can be harvested over an extended period as they can be left in the ground. Melons have to be harvested at the correct stage; too early and the full sugar content is not developed, too late and they lose sugar and become soft. Some fruit, such as bananas, pineapples, mangoes and avocados, are harvested when they are not ripe in order to transport them to distant markets. Fruits that are suitable for long-term storage, such as apples, pears, citrus and grapes, often have specific requirements as to harvesting time, depending on variety, growing region and, sometimes, the season (Dixie, 2005).
2.15 Harvesting techniques

Harvest fruit on high trees with a hook and a catching bag on a pole, to prevent the fruit falling to the ground and being bruised. Harvest lettuce, cabbage, sweet pepper, egg-plant, melons and bananas using cutting tools.

Fruit should be harvested by using the palm of the hand, not by holding the fruit with the fingers. Whenever possible, the harvesting should be carried out by plucking the stem, for example, in the case of strawberries, fine beans and peas.

Leafy vegetables are harvested by cutting the plant with a sharp knife as close to the root as possible. Bulb crops such as garlic and onions are harvested by pulling the leaves at the neck and then cutting the leaves about 3 cm from the bulb. Tuber and root crops are normally harvested with forks or hoes. The digging should start some 15 cm (6 inches) away from the plant. It is preferable to lever and pull the roots rather than attempt to dig them out. Harvesting is easiest when the soil is relatively dry, as both damage and the need for washing are reduced (Dixie,2005).

2.15.1 Grading:

Grading is carried out so that:

• Disease-free and blemish-free product can be selected for long-term storage.

• Top-quality product can be selected for transport to distant markets.

• Product can be separated according to quality, ripeness, colour and size. Separated produce is packed into different containers to facilitate marketing to consumers with differing quality requirements (Dixie,2005).

2.15.2 Packaging:

The packaging of fruits and vegetables should aim at satisfying the requirements of both product and market place. The perishable nature of fresh product means that packaging is a necessary investment in order to:
- Protect the product at all stages of the marketing process from producer to consumer.

- Eliminate individual handling of product and thus greatly accelerating the marketing process.

- Unities and rationalize the product so that all traders handle standardized quality.

  • packaging design enhances the attractiveness of product, enables it to be handled and marketed in convenient units, and helps to prevent mechanical damage.

  • Locally available natural materials (e.g. wooden boxes or trays, baskets woven from bamboo or willow or cartons made from thin strips of wood or rushes). While use of local materials is normally recommended, overuse can have negative consequences for the environment.

  • Bags and nets are cheap but provide no protection from damage. They are used to package onions, garlic, cabbages and potatoes.

  • Plastic and paper are often used as lining or wrapping for product.

  • Packaging presentation. Attractive printing and brand names can add value to fresh products but only in markets where consumers are wealthy and appreciate aesthetics and image (Dixie, 2005).

2.15.3 Storage:

Product can be stored for both short-term and long-term purposes. Short-term storage is mainly used to provide flexibility in marketing (e.g. when awaiting transport), or because buyers are not immediately available. Most horticultural crops are perishable and can only be stored for a few days. Only rarely is it worthwhile storing perishable crops to await higher prices, as storage will reduce quality and shelf life whilst adding to costs.

Storage is costly and, in most instances, when the product is withdrawn from storage it has to compete in the market against much fresher product.
A few crops are adapted for long-term storage. These can be held in store well beyond the normal harvesting period. When they are eventually sold higher prices can usually be obtained and by extending the marketing season, a larger volume of product can be marketed (Dixie, 2005).

2.15.4 Transport:

Without adequate access to transport, farmers are at a disadvantage. They are dependent on visiting buyers. With transport, growers have control over what market the product is transported to and are therefore potentially in a far stronger marketing position. Improved efficiency in transport, e.g. larger loads, quicker turn-around times and better utilization of capacities, are all proven methods of lowering costs and opening new market opportunities. You can have an important role in helping growers to gain access to transport. This could involve introducing farmers to transporters, planning a collection route and helping organize the initial services.

Growers who do not sell to visiting traders usually have to transport product to market. The grower generally has to either pay a fixed price for the hire of the truck, no matter how little is transported, or is charged by the box or sack (Dixie, 2005).

2.16 Creating market and business linkages:

Production possibilities are often underdeveloped because buyers and sellers are unaware of each other’s existence. A buyer may be unaware of the products produced by farmers of a particular area or of the products they could produce if a market were available. A group of farmers may sell their product individually to a small-scale local buyer, unaware that a wholesaler is prepared to pay better prices if sufficient volume can be supplied. As noted earlier. It is important that negotiations are carried on directly between the farmers and the buyers (Dixie, 2005).

2.17 Introducing buyers and sellers:

- Establishing collection centers. Collection centers enable product to be assembled in volume. This attracts buyers and creates competition between them. Better prices are realized and economies can be achieved in transport.
• Agreeing with local growers to organize harvesting and deliver their product to the assembly points on a specific day of the week.

• Informing buyers, agents, wholesalers and truckers of when and where farmers will assemble.

• Encouraging growers not to compete with one another on price (Dixie, 2005).

2.18 Alternative systems of marketing:

Moni (2006) listed 4 types of marketing systems:

2.18.1 Direct marketing:

Direct marketing is an innovative concept, which involves marketing of products i.e. paddy/rice by the farmers directly to the consumers/millers without any middlemen.

Benefits:

1. Direct marketing helps in better marketing of paddy/rice.

2. It increases profit of the producer.

3. It minimizes marketing cost.

4. It encourages distributional efficiency.

5. It satisfies the consumer through better quality of product at reasonable price.

6. It provides better marketing techniques to producers.

7. It encourages direct contact between producers and consumer.

8. It encourages the farmers for retail sale of their products.
2.18.2 Contract marketing:

“Contract marketing” is a system of marketing in which the commodity is marketed by farmers under a pre-agreed buy-back contract with an agency engaged in trading or processing. In contract marketing, a producer will produce and deliver to the contractor, a quantum of required quality of product, based upon anticipated yield and contracted acreage, at a pre-agreed price. In this agreement, agency contributes input supply and renders technical guidance. The company also bears the entire cost of transaction and marketing. In the wake of economic liberalization, the national and multinational companies are selectively entering into contract marketing of rice.

Table (5) show Benefits of contract marketing

<table>
<thead>
<tr>
<th>Benefits</th>
<th>To Producer</th>
<th>To Contracting agency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Risk</td>
<td>It minimizes the price risk.</td>
<td>It minimizes risk of raw material supply.</td>
</tr>
<tr>
<td>Price</td>
<td>Price stability ensuring fair price.</td>
<td>Price stability as per pre-agreed contract.</td>
</tr>
<tr>
<td>Quality</td>
<td>Use of quality seed and inputs</td>
<td>Get good quality products and control on quality.</td>
</tr>
<tr>
<td>Payment</td>
<td>Assured and regular payments through bank tie up.</td>
<td>Easy handling and better control on payment.</td>
</tr>
<tr>
<td>Post-harvest</td>
<td>Minimizes risk and cost of handling.</td>
<td>Control and efficient handling.</td>
</tr>
<tr>
<td>handling</td>
<td></td>
<td></td>
</tr>
<tr>
<td>New technology</td>
<td>Facilitates in farm management and practices.</td>
<td>For better and desired product to meet consumer needs.</td>
</tr>
<tr>
<td>Fair trade</td>
<td>Minimizes malpractices and no involvement of middle man.</td>
<td>Better control on trade practices.</td>
</tr>
<tr>
<td>practices</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Crop insurance</td>
<td>Reduces risk.</td>
<td>Reduces risk.</td>
</tr>
<tr>
<td>Mutual relationship</td>
<td>Strengthens.</td>
<td>Strengthens.</td>
</tr>
<tr>
<td>Profit</td>
<td>Increases.</td>
<td>Increases.</td>
</tr>
</tbody>
</table>

Source: Moni (2006)

2.18.3 Cooperative marketing:

“Cooperative marketing” is the system of marketing in which a group of producers join together and register themselves under respective State Cooperative Societies Act to market their products jointly. The members also deal in a number of cooperative marketing activities i.e. processing of product, grading, packing, storage, transport,
finance, etc. The cooperative marketing means selling of the member’s products directly in the market, which fetches best prices.

Benefits:

1. Remunerative price to producers.
2. Reduction in cost of marketing.
3. Reduction in commission charges.
4. Effective use of infra-structure.
5. Credit facilities.
7. Easy transportation.
8. Reduces malpractices.
10. Marketing information.

2.18.4 Forward and futures markets:

Forward trading means an agreement or a contract between seller and purchaser, for a certain kind and quantity of a commodity for making delivery at a specified future time, at contracted price. The Forward Markets Commission (FMC) performs the functions of advisory, monitoring, supervision and regulation in future and forward trading. Forward trading transactions are performed through exchanges owned by the associations registered under the Act.

These exchanges operate independently under the guidelines issued by the FMC. Forward contracts are broadly of two types;

(a) Specific delivery contracts: Specific delivery contracts are essentially merchandising contracts, which enable producers and consumers of commodities to
market their product and cover their requirements respectively. Specific delivery contracts are again of two types:

i) Transferable specific delivery contracts (T.S.D.) and

ii) Non-transferable specific delivery contracts (NTSD). In the TSD Contracts, transfer of the rights or obligations under the contract is permitted, while in NTSD, it is not permitted.

(b) Other than specific delivery contracts: These are called as ‘futures contracts’. These contracts are usually entered under the auspices of an Exchange or Association. In the futures contracts, the quality and quantity of commodity, the time of maturity of contract, place of delivery etc. are standardized and contracting parties have to negotiate only the rate at which contract is entered into.

**Benefits:**

The other benefits of future trading are:-

1. Price stabilization: In times of violent fluctuations, futures trading reduce the price variations.
2. Competition: Futures trading encourages competition and provides competitive price to farmers, millers or traders.
3. Supply and demand: It ensures a balance in demand and supply position throughout the year.
4. Integration of price: Futures trading promotes an integrated price structure throughout the country.

2.18.5 Dixie (2005) listed 3 types of marketing systems:

**Farmer`s markets and village markets:**

Farmer`s markets enable farmers, or groups of farmers, to sell products directly to retailers or individual consumers. In Egypt and India, for example, successful village markets have been established. They operate on a weekly basis and enable farmers to sell either directly to consumers or to wholesalers agents who take the product back to the city markets.
2.18.6 Group marketing:

Establishing new outlets for growers increases the efficiency of traders and enables farmers to build up an understanding of what they need to produce to meet the demands of the market. When farmers have sufficient mutual trust there is scope for them to work informally together as groups to improve their sales. The first step in this process is for them to understand the benefits of working together and to develop commitment to coordinating their activities. These ideas are best developed collectively with the farmers. Possible ways that farmers can work together include:

- Consolidating loads to facilitate bulk buying by traders or bulk transport.
- Sharing transport to reduce costs.
- Joint negotiations with buyers.
- Collective purchase of inputs to reduce costs.
- Growing crops for which there is a strong demand.
- Being aware of prevailing market prices and conditions and how to relate these to farmer prices.
- Knowing the break-even cost of production and marketing.

2.18.7 A processor markets:

Introduce a system whereby selected farmers grow specifically for the factory. Suitable farmers can be identified and formed into a group or groups to:

- Introduce improved production techniques.
- Receive training in improved harvesting, handling, grading and packaging techniques.
- Agree on firm prices for the product.
- Coordinate the supply of packaging materials and transport.
2.19 Marketing information system:

Moni (2006), Reported that marketing information system is inadequate with limited involvement of private sector. Local marketing is constrained by lack of long–term contractual arrangements between producers and buyers. As the production process is dominated by millions of small scale producers who face only very few buyers to purchase farm product, effective monopoly do arise. The mostly rain fed production is perceived as unreliable to guarantee supplies at the right time and in correct quantities. Moreover, low quality product cannot compete in high–income, high–quality markets, and has to be sold entirely on the domestic market, which tends to be more price– than quality–conscious. Market information and intelligence is not widely disseminated, apart from amongst the major markets themselves. The farmer selling his product at a small market may not be aware of its value on the wider national market. Exporters need to know about the state of production in the different geographical areas every season as sources of supply and quality of product. They need to have information, regularly, about prices, quality of product and packaging, state of competition, conditions of supply and the consumer needs and preferences in foreign markets. Absence of this information is one of the main obstacles to competitiveness and exports. Moreover, post harvest information is not extended to farmers.

2.20 Using market information

According to Dixie (2005) an effective marketing chain not only takes product out of rural areas and returns money, but should also provide an ongoing stream of feedback to farmers on the state of the market. This information should keep producers in touch with the changing needs of the markets. Such knowledge enables farmers to be confident in negotiations, and provides insight on how the quality and prices of their product compares with the competition. Market information can be divided into short-term information, which helps farmers make instant marketing decisions on selling their products, and longer term market information, which can be used to make planting decisions and plan marketing strategies.
Short-term information includes:

• Up-to-date price information;
• Up-to-date information on supply and demand.

Government market information services have been set up in many countries but they have experienced problems. They are costly to run. The information is not always accurate. The time taken to process information often means that the market news provided is out of date by the time it reaches the farmer. These days, the most important source of information in many countries is often the telephone. Buyers and sellers contact each other and provide instant feedback on prices, supply and demand. Access to telephones, particularly mobile telephones, is increasingly important for market-oriented farmers.

In the absence of telephones farmers should be encouraged to share market information. For example, when they return from a visit to a market, they should circulate news on prices and opportunities to other growers in their neighborhood.

Longer term market information includes:

• Quarterly or annual price reports from market information services.
• Product and trader fact sheets.
• Contacts of companies providing services (e.g. transport, storage), and inputs (e.g. seeds, fertilizers and packaging).
• Descriptions of the marketing chain and how it operates.

This kind of information helps farmers decide which crops to grow, how they might market their products and which companies to sell through. Some of the information may be available from directories, catalogues and trade magazines. This specialist information needs to be drawn together from different sources and is not likely to be easily available.
2.21 Market Information and Intelligence Network:

For market mechanisms to work efficiently, marketing information is essential for producers, traders and consumers. Timely information to farmers, traders; policy planners and other market users will enable their arrival at proper decision-making. Marketing information is essential not only for the formulation of proper price policy and its successful implementation at a macro level, but also for farmers to aid them in improving their marketing performance.

Market intelligence data provide the materials necessary for quick decision and also for understanding the behavior of relevant factors, and thereby help in the evolution of corrective and regulatory measures (Moni, 2006).

2.22 Suggestions for improving market intelligence service:

The chief requirement for the successful market intelligence service is accuracy, timeliness and relevancy in the collection and dissemination of market information service needs to be developed with a view to improve the service system.

Therefore, it is proposed that the State Government should initiate steps towards procuring national hook-up through satellite and link all major markets with online system. On the one hand, it would bring efficiency, on the other it would help farmers fetch good price. Details of proposal can be prepared. Following types of information may also be collected for better transactions (Moni, 2006).

2.22.1 Types of market intelligence data needed:

Prices of agricultural commodities and supplies constitute a key item in the market. It is essential for prices to be collected in a uniform manner and on the basis of standard concepts and definitions by whole time technical reporting agencies/section and well trained market reporters. The price data to be collected are:

(a) Wholesale Prices

(b) Retail Prices
(c) Farm (harvest) prices

The data on farm (harvest) prices should be collected at least once a week from a number of villages during harvest season and arranged into district averages by taking their simple mean. In order of importance among the market intelligence data, marketed surplus of agricultural product comes next to prices. It is more direct determinant of prices of the commodity than any other factor. Keeping in view the importance of marketed surplus, the work of collecting and reporting data on arrivals of agricultural commodities in assembling as well as consuming markets, over the state, should be undertaken, at least, on a weekly basis. Data on market charges, cost of transportation, handling and processing etc. incurred by the producer-seller and intermediaries, and the data on prices at different stages of marketing, need to be regularly reported. This helps to ascertain, from time to time, the share of the producer and of the intermediary involved in various stages of marketing and to keep a constant watch on the variations in the producer’s price. Orderly marketing requires more than just a group of reports on production, supplies, stocks and prices. Reports and data on population served, the level of employment, villages served, and area served, wages, average production costs by item and such must be analyzed. These and other related data on business conditions, forecasting of prices, international scenario should brought together in the form of comprehensive situation reports as being practiced in Unites States. The ‘Situation Reports’ are proceeded by an ‘Annual Outlook’ report, which will help farmers processors and handlers in making decisions (Moni, 2006).

2.23 Marketing information and marketing extension in Sudan:

Market information and intelligence is not widely disseminated, apart from amongst the major markets themselves. The farmer selling his product at a small market may not be aware of its value on the wider national market. Exporters need to know about the state of production in the different geographical areas every season as sources of supply and quality of product. They need to have information, regularly, about prices, quality of product and packaging, state of competition, conditions of supply and the consumer needs and preferences in foreign markets. Absence of this
information is one of the main obstacles to competitiveness and exports. Moreover, post harvest information is not extended to farmers and exporters. This is imperative now since grades and standards for most export products have been established. (Nepad, 2005).

The major marketing problem of fruit and vegetables is the lack of diversity of production with in certain areas an example is mango production in Kordofan. The high seasonality of production is coupled with lack of adequate infrastructure like paved roads, cold storage facilities, cold transport, and inadequate formal credit. Under these conditions the high transport costs (in terms of money or time) do not justify distant marketing. The processing of fruit and vegetables in the Sudan is one of the activities that have been least successful. The key institutions involved in agricultural marketing in Sudan include:

(i) Public sector agencies both at the central and local government are principally playing policy and regulatory roles.

(ii) The organized and informal private sector.

(iii) Civil societies and nongovernmental organizations as well as development partners.

Throughout the country, the marketing and distribution systems are poorly developed. There is inadequate infrastructure for domestic and export marketing, including product promotion and sometimes there is complete isolation between producing areas and consuming centre. Crop finance for the majority of producers is also inadequate due to lack of collateral required by formal financing institutions (Nepad, 2005).

Marketing margins for agricultural products in Sudan are extremely high because of the lack of an adequate market price information system. Market information provides signals for producers. A strengthened market information system is therefore regarded as a pre–request for efficiency, and equity of the marketing system (Nepad, 2005).
As fruit and vegetables marketing is monopolized by the big traders who provide finance to the small producers, conditioned by selling them their product at very low price, promoting producers Marketing Groups and Cooperatives & Support to the development of a marketing centre for preparation of vegetables and fruit for export seems to be rational intervention. Marketing margins for agricultural products in Sudan are extremely high because of the lack of an adequate market price information system. Market information provides signals for producers. A strengthened market information system is therefore regarded as a pre-request for efficiency, and equity of the marketing system (Nepad, 2005).

Extension officers can help farmers understand markets better and develop improved links with buyers, thereby reducing the uncertainty associated with production and marketing decisions. In addition, extension officers may consider providing information to potential buyers about local availability, quality and price of agricultural products. This can reduce the risks that buyers face when purchasing from certain areas and lead to increased demand and higher prices for local products (Tiagoetol, 2006).

As in other developing countries, marketing business in Sudan is often small, has limited resources and is traditional in its nature. Therefore, vegetable farmers often face the biggest marketing problems in the country (Abdel Rahman, 2011).

Although the country produces a significant surplus of fruit and vegetables, about 25–40 percent of the production is lost due to its perishable nature, inadequate outlet, poor storage facilities and poor post harvest measures. The horticultural business is mainly a private sector activity. The role of government is to formulate a clearly defined development strategy to make use of the abundant resources and realize their potential. The condition of Sudanese horticultural product on the internal wholesale market is well below accepted international export standards. Fruit and vegetables are unwashed, and are unsorted. Yet, the potential quality can match that produced in any of the countries that compete with Sudan in the international export markets. This is particularly true for mangos, grapefruits, lime, bananas (as fruits), peppers, onions, tomatoes, green beans, eggplants, and gallia. To induce farmers to improve quality,
farmers need to see that there is differential pricing as a reward for good quality. Both the exporters and the government (by strictly enforcing the grades and standards law) have to take care of this aspect. Based on previous experiences in exporting fruit and vegetables, a number of factors need to be taken into accounts for successful marketing or export strategy. These include: product harvesting, post–harvest handling/storage, grading, packing, processing and quality control system and other marketing services in the form of equipment, cold store facilities and transport and handling equipments; and provision of marketing information on traditional and potential markets (Nepad, 2005).

Sudan has a great potential to produce good quality fruits and vegetables. This is because of its large areas of fertile soil, abundant amount of water from rivers, rains and underground water, suitable wide range of climate which allows variability of crops. Studies showed high losses (30→40%) of fruits and vegetables during harvesting, transport and handling. These losses add to the cost of production and have negative impact on marketing and hence national economy. Therefore adoption of proper post-harvest techniques, investment in the infrastructure and post-harvest technology should be established (Elbashir, 2010).

2.24 Vegetables Status in Sudan:

According to Elbashir (2010) Sudan is one of the largest countries in Africa (250 million hectares), strategically located in the center of Africa making it a melting pot between Arabs and sub-Saharan peoples. The country shares extensive boarders with nine countries in the northern, central eastern and western Africa. It lies within the latitudes 4-23 degrees north and longitudes 23-28 east. It has a wide climatic variation with several distinct ecological zones including high altitudes or mountainous regions in the west (Jabel Marra) and east (Red Sea Hills) that have Mediterranean climate. Considerable water resources are available which include the White Nile, the Blue Nile and the River Nile and their tributaries, seasonal streams and rains with an annual amount of 109 billion m³ of water in addition to the underground water i.e. the Nubian Sand-Stone Aquifer which is one of the largest water reservoirs in the world with an estimated rechargeable potential of 29 billion m³ of water.
Many types and cultivars of fruits and vegetables can be produced almost all the year round due to the climatic variations plus available land and water. This large potential could supply both local and export markets. However, horticultural crops represent about 12% of the national agricultural income, compared to 17% for cotton and 29.6% for cereals and oil seeds. Hence the economic impact of fruits and vegetables is still very limited compared to their actual production potential in the country. This is due to less attention paid to them compared with the cash crops e.g. cotton, gum Arabic and the staple food grains. Even reliable data on the area and production of fruits and vegetables are still difficult to obtain.

Various vegetables are grown in both irrigated and rain–fed plots, in a total area of about 273,000 ha i.e. about 3% of the total cultivated area producing on average about 3.4 million tons of vegetables. The most important vegetables are onions and tomatoes followed by potatoes, okra, eggplant, water melons, cucumbers, pumpkins and a number of leafy vegetables. Vegetables are grown in small plots with pumped water including the national corporations such as Gezira Scheme where about 30,000 ha are devoted to vegetables. Table (6) shows area and production of some major vegetables during the period 2005 to 2009. Area (feddan) and production (tons):

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Onion</td>
<td>110</td>
<td>688</td>
<td>113</td>
<td>900.8</td>
<td>115</td>
<td>920</td>
<td>117.3</td>
<td>938.4</td>
<td>128</td>
<td>1024</td>
</tr>
<tr>
<td></td>
<td>Tomato</td>
<td>66</td>
<td>396</td>
<td>68.3</td>
<td>409.8</td>
<td>72</td>
<td>432</td>
<td>76.3</td>
<td>453</td>
<td>80</td>
<td>480</td>
</tr>
<tr>
<td></td>
<td>Okra</td>
<td>42</td>
<td>210</td>
<td>45</td>
<td>220</td>
<td>48</td>
<td>235</td>
<td>48.4</td>
<td>249</td>
<td>48.9</td>
<td>252</td>
</tr>
<tr>
<td></td>
<td>Egg-plant</td>
<td>8.2</td>
<td>65.6</td>
<td>8.8</td>
<td>70.4</td>
<td>9</td>
<td>72</td>
<td>9.2</td>
<td>75.6</td>
<td>9.4</td>
<td>75.2</td>
</tr>
<tr>
<td></td>
<td>Potato</td>
<td>36</td>
<td>252</td>
<td>37.7</td>
<td>263.9</td>
<td>39</td>
<td>273</td>
<td>41</td>
<td>284</td>
<td>43</td>
<td>301</td>
</tr>
<tr>
<td></td>
<td>Cucurbits</td>
<td>72</td>
<td>504</td>
<td>78</td>
<td>546</td>
<td>81</td>
<td>567</td>
<td>84.2</td>
<td>589</td>
<td>88</td>
<td>616</td>
</tr>
<tr>
<td></td>
<td>Leafy-vegetables</td>
<td>10.8</td>
<td>54</td>
<td>11</td>
<td>55</td>
<td>13</td>
<td>65</td>
<td>15</td>
<td>66.3</td>
<td>17.2</td>
<td>68.8</td>
</tr>
<tr>
<td></td>
<td>Sweet potato</td>
<td>16</td>
<td>112</td>
<td>17</td>
<td>119</td>
<td>19</td>
<td>133</td>
<td>21</td>
<td>147</td>
<td>32</td>
<td>216</td>
</tr>
</tbody>
</table>

Source: Status Report on Fruits and Vegetables Production and Processing Industry in Sudan 2010

Other vegetables like carrot, cabbage, red beet and cauliflower are grown at the outskirts of large cities. These vegetables are grown in different areas and marketed in the same or other areas.
A number of vegetables are grown in Sudan such as okra, onion, tomato, potato, peppers, eggplant, melons, watermelon, pumpkins, squash, sweet potato, radish, jews-mallow, purselane, rocket and chard.

Okra (*Abelmoschus esculentus*) is the most traditional popular vegetable in Sudan, where both cultivated and wild types of okra are known. Some of the wild types belong to the cultivated species *A. esculentus* and others belong to other species such as *A. ficulneus* and *A. manihot*. Recent studies on okra collection of genetic resources revealed that the species *A. caillei* (West African okra) is possibly to be grown in Sudan. Farmers depend almost completely on the use and production of landraces, which in many cases are designated names relevant to the localities where they are usually produced. Recent collection efforts between 2003 and 2008 resulted in the collection of more than 200 accessions from North Kordofan, South Kordofan, Northern, River Nile, Red Sea, White Nile and Blue Nile states with variable plants and fruits characters.

Onion (*Allium cepa*) is a very important vegetable crop produced almost all over the Sudan. It is a crop seems to be introduced into Sudan long time ago. Since then a range of cultivated landraces has been known by farmers in the different parts of the country. Variability between the landraces is very prominent in the bulb characters such as shape, skin colour and storability. The landraces proved to be superior to introduced improved varieties. New improved lines have been selected from local and introduced germplasm and released to farmers by ARC vegetable breeders.

Tomato (*Lycopersicon esculentum*) is among the most important vegetables in Sudan, where it is used for salad and paste. It is an introduced vegetable and old introduced cultivars have been observed to still exist in some parts of the country especially in the Northern Kordofan and Darfur states. More than 50 accessions have been collected from local old cultivars of tomato between 2004-2008 from North Kordofan, South Kordofan, Northern, River Nile and Red Sea states, including 14 accessions recently collected from an old traditional area for tomato production that is
famous for producing different strains of old salad tomato types in North Kordofan state.

Peppers (\textit{Capsicum spp.}), both hot and sweet peppers are popular in Sudan. They are mainly used as spice or green vegetable in salad. Hot pepper was introduced to Sudan since a long time. Variable local cultivars are well known in the country, and in western Sudan some unique and distinct local cultivars are very famous. For example the type called ‘Dingaba’ which is extremely hot is produced in Darfur region, while the type called ‘Gabinet’ which is also very hot is produced in the Nuba Mountains in Kordofan region. A recent study in 2001 has revealed that both species of hot pepper, \textit{C. frutescens} and \textit{C. chinense}, are believed to be grown in Sudan.

Melon (\textit{Cucumis melo}) and watermelon (\textit{Citrullus lanatus}) are among the most important cucurbits grown in Sudan. Melons are believed to have originated in eastern Africa including Sudan. Four cultivated types of melons are grown in Sudan: Sweet melon (\textit{C. melo cantalupensis}), snake melon (\textit{C. melo flexuosus}), a salad melon known locally as (Tibish), and a melon type used for its edible seeds known locally as (Seinat). True wild melons known locally as (Humaid) and belong to the group \textit{C. melo agrestis} grow in central, northern and western parts of Sudan. Traditional local cultivars of sweet melons were grown in the past along the banks of White Nile. Such traditional cultivars have almost been replaced in the last few years by new improved cultivars imported from abroad. Snake melon cultivars used are totally of local landraces of which some are named after their areas where they were developed. Tibish and seinat cultivars are of local landraces and seem to be belonging to a different melon group, which is grown only in Sudan. Recent studies proved that germplasm of the true indigenous types of melons such as humaid, tibish and seinat included material which could be used as sources of resistance to known virus and fungal diseases. Watermelon used for production of seeds is a major crop in western Sudan, where variable landraces of watermelon are grown. Wild relatives of watermelon could also be found in Sudan. One of them is the wild species \textit{C. colocynthis} (\textit{bitter apple}), which grows extensively in the Northern region. Watermelon seed is an important source of income for the poor traditional farmers in
Kordofan states in western Sudan, as well as an important export commodity for the country. It plays an important role in the foreign trade of the country. A single species collection mission was launched early in 2003 to West Kordofan state for collecting samples of the local genetic resources of watermelon.

Leafy vegetables have an important role in the diet of the Sudanese people. Jewsmallow, purselane, rocket and chard are the most important types of leafy vegetables. Jewsmallow (*Corchorus olitorius*) is grown in many parts of the country using local selections from the germplasm of this species. Wild Corchorus species grow in the different regions of Sudan. Purselane (*Portulaca oleracea*) has almost the same importance of jewsmallow. Local cultivars are the known varieties being grown. Wild Portulaca species also exist in Sudan. Rocket (*Eruca sativa*) is the main leafy salad vegetable grown in Sudan. Culture of this crop depends mainly on local types of which the growers report a degree of variability (Elbashir, 2010).

### 2.25 Major constraints in fruits and vegetables production in Sudan:

1. Lack of sufficient improved management technologies.
2. Inadequate financial and credits facilities.
3. Land fragmentation.
4. Poor vegetables seed production.
5. Limited application of agricultural research findings due to inadequate extension services.
6. Low productivity due to poor and traditional cultural practices.
7. High cost and improper local transportation.
8. Weeds, pests and diseases.

Vegetables acreage increased tremendously in the last few years due to the increased urbanization, awareness of their nutritive value and high returns per unit
area. Both production and consumption of fresh vegetables and fruits are increasing due to relatively high demand locally and externally.

The rate of consumption from fresh vegetables and fruits per annum is about 43 kg and 32 kg/person respectively. The increase in vegetable production is rather horizontal, productivity remains low and lags far behind international yields indicating high potential for improvement through better cultural practices, improved varieties and protection against pests and diseases. At present horticultural production is a flourishing enterprise in the country. The national strategy (2002-2027) emphasized the importance and role of the horticultural sector in development plans and on the national income (Abdelkareem, 2003).

2.26 Post-harvest handling and processing:

Generally, huge losses occur in the horticultural crops due to poor post-harvest practices. Losses range between 30% - 40%. These have a negative impact on the national economy.

2.26.1 The following practices are specific causes of post-harvest losses

(1) Leafy vegetables: Leafy vegetables like Jews mallow, garden rocket, dill, purslane and parsley are produced for the local markets. These vegetables are packed in local straw containers and exhibited covered with jute sacks soaked in water. They are totally lost after 24 hours from harvest.

(2) Potatoes: Potatoes are harvested manually when the vines turn yellow. Tubers are cured for 10 days in the field in shallow pits called 'Boata' covered with potato vines. The tubers are then packed in jute sacks and placed in the same field under the direct sun rays (30-37°C) for 2-3 days waiting for loading to the cold store. This method leads to poor potato quality and about 30% losses (Elbashir, 2010).

2.26.1.1 Storage

Numerous packing materials mainly for bulk packing are used that do not satisfy the consumer taste, for example:
• 15 kg tin packs for tomatoes.

• Different sizes of local containers made of palm trees leaves.

• Onions jute bags 50 kg.

• Potato jute bags 50 kg.

• Fertilizers sacks which are used for eggplant and okra.

All these containers are available at the local markets and are the main reason for post-harvest losses for retailers (Elyas, 2008).

2.26.1.2 Packing

Refrigeration of fruits and vegetables started in the early seventies with the compelling need for potato storage. Later, many cold stores were established to about 10,000 tons capacity with extra storage in the Northern State. Exhibition of fruits and vegetables at the local markets is very poor because the markets are not properly equipped for their exhibition.

2.26.1.3 Industry:

There are many factories dealing with fruits and vegetables processing in Sudan but most of these factories are out of functioning because the grown variety is unsuitable for processing characteristic, financial storage and lack of technical experiences (Elbashir, 2010).

2.27 The horticultural crop supply chain in Sudan: The chain involves:

**Harvesting:** Manual.

**Handling and preparation:** Cleaning, sorting and grading all carried out manually.

**Packaging:** Manual e.g. tomatoes packed in 4-gallons tins, mangoes and grapefruits in locally made baskets and imported jute sacks for dates/lime or oranges.
**Transport:** Most of the crops are transported by animals or Lorries to local consumption villages or urban cities' central markets.

**Marketing:** The products are sold at road sides, village household stalls, urban cities street markets and some supermarkets. Some producers sell their products directly at different markets i.e. to an assemblers or itinerant wholesalers. No real markets exist in this case. The products are being transferred directly from the centre of supply to the centre of consumption (Elbashir, 2010).

### 2.28 Fruits and vegetables markets in Sudan:

There are no marketing institutions dealing with fruits and vegetables. Farmers and producers deal as individuals directly with local traders and exporters. The trade lacks exhibition sheds, loading and unloading platforms, cold stores and trucks loading equipments. Therefore the producers sell their products early in the morning at very low prices especially perishable vegetables, i.e. tomatoes. The central markets are administrated by local authorities who collect fees for services (waste disposal) and rents for selling stalls and shops. Farmers and traders associations exist in Kassala, Gedarif, River Nile and Northern states. The main local markets are in Khartoum, Khartoum North, Omdurman, Wad Madani and Port Sudan (Abdalazeez, 2005).

The performance of the horticultural crops marketing system in Sudan is irregular in terms of prices, profits and cost of production and is unsustainable hence it is a traditional and ineffective system are shown in the following:

![Marketing System Diagram](image-url)
Table (7) show the average cost of production and financial profit margin for main vegetables and fruits in one State in Sudan (Kassala State as a sample).

<table>
<thead>
<tr>
<th>Crops</th>
<th>Cost of production (SDG/ton)</th>
<th>Selling price (SDG/ton)</th>
<th>Profit (SDG/ton)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>During season</td>
<td>Off season</td>
<td>During season</td>
</tr>
<tr>
<td>Onions</td>
<td>150</td>
<td>200</td>
<td>1200</td>
</tr>
<tr>
<td>Tomatoes</td>
<td>500</td>
<td>1000</td>
<td>10000</td>
</tr>
<tr>
<td>Mangoes</td>
<td>535</td>
<td>1162</td>
<td>4980</td>
</tr>
<tr>
<td>Grapefruit</td>
<td>325</td>
<td>600</td>
<td>2000</td>
</tr>
</tbody>
</table>


The selling price fluctuates greatly at the beginning of the season and during the season. For example, tomatoes will be sold at a low price at the start of the winter season and for two months but in summer the price will increase up to 10000 SDG/ton (for two months).

2.29 Marketing and technical barriers:

• Poor quality of product as far as post-harvest treatments is concerned.

• Lack of sustainability.

• Poor internal transportation system and processing facilities.

• Poor production and the lack of specialized varieties.

• Absence of sanitary certificates required at the other end.

• Unreliable feedback and absence of market information.

• Limited technical marketing.

• Limited marketing organization with resources capable of gathering and disseminating market information.

2.30 Financial barriers
• Lack of agricultural finance.

• High production and risks which limits banks credit and finance.

• High cost of service fees and taxations.

• High cost of the agricultural inputs.

• Poor marketing extension in Sudan.

2.31 Constraints and potentialities of the horticultural sector:

- Low productivity due to disease and pest problems, lack of certified seeds and availability and high post-harvest losses (50%).

- Irregular production, consumption and prices.

- High temperatures lead to irregular flowering e.g. optimum flowering for mango is 8-15°C at night. It also increases the rate of ripening and hence relatively short shelf-life.

- High cost of agricultural inputs.

- Availability of proper packaging materials.

- Inadequate cold chain. Preservation of quality requires an unbroken chain from the field to the consumers. No cold stores facilities are available at the centers of production.

- Weak entrepreneurial skills.

- Inadequate market knowledge and weak marketing channels and mechanisms. No effective market linkages are established.

- Weak management skills in the fields of production planning, production practices and organization of harvesting at the correct maturity for fresh consumption, processing and export.
- Lack of extension services and weak technology dissemination mechanism for the application of proper post-harvest operations developed by Food Research Center (FRC) and the Agricultural Research Corporation (ARC) (Elbashir, 2010).
Chapter three

Research Methodology

3.1 Area of the study

This study is carried out in Gezira State, which lies in the center of the Sudan and represents one of the largest states with higher population density, and contributes much to agriculture of Sudan. Gezira state is located in the centre of Sudan, between latitude 13.32 South 15.30 North, and longitude 32.22 West 34.20 East. It is limited by Khartoum state from the North, Sinnar State from the South, Gadarif State from the East and the White Nile Stat from the western side. The area of Gezira State is estimated as 275,492 square kilometers, which is equivalent to less than 2% of the total area of the Sudan. This area is about 6.57 million feddans, 5.91 million feddans (91.9%) of it is arable land. The total number of the population in the Gezira State is about 4,244,000 (in year 2008). The State comes second to Khartoum state of the population number. Wad Medani is the capital of the state.

Wad Medani Greater Locality is one of eight Localites constituted Gezira State namely: ( Wad Medani Greater Locality, South of Gezira Locality, East of Gezira Locality, Um Elgura Locality, Elkamileen Locality, Alhasahisa Locality, Almanaqil Locality and Al Qurashi Locality. It is a well populated area suitable for agriculture and considered as very important agricultural area in the State and most of the population are working directly or indirectly in agricultural sector. In Wad Medani Greater locality there are four extension offices in the sub administrative units (Wad Medani East complexes, Hantoob complexes, Alshabarga complexes and Fadasi complexes).

3.2 Population and sample size

The total number of vegetable farmers in Wad Medani Greater locality for 2013/2014 growing season was estimated by 1000. Ten percent of the population was selected using the random sampling technique. The number of selected respondents was 100 farmers.
3.3 Data collection

A Close ended questionnaire was constructed and the personal interview technique was used to administer the questionnaire. Pretest for the questionnaire was made with 15 farmers. The interview took about two months (from May to June/2013).

3.4 Data analysis

The collected data were coded, fed to computer and statistically analyzed by using statistical packages for social sciences (SPSS), discussed interpreted using percentage, frequency distribution and chi-square test at (0.05) significance level or less.

3.5 Limitations of the study

1- Information, knowledge and literature on agricultural marketing extension in Sudan are limited.

2- The author faced some financial difficulties.
CHAPTER FOUR
Results and discussion

4.1 Descriptive analysis:-
4.1.1 The personal profile of vegetable farmers:
4.1.1.1 Sex:

Table (8): Distribution of the vegetable farmers according to their sex:-

<table>
<thead>
<tr>
<th>Sex</th>
<th>Frequency</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>92</td>
<td>92%</td>
</tr>
<tr>
<td>Female</td>
<td>8</td>
<td>8%</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100%</td>
</tr>
</tbody>
</table>

Source field survey 2013

The results in table (8) showed that the majority of vegetable farmers (92%) are male, while (8%) are female.
4.1.1.2 Age:

Table (9): Distribution of the vegetable farmers according to their age groups:

<table>
<thead>
<tr>
<th>Age groups</th>
<th>Frequency</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>less than 20</td>
<td>19</td>
<td>19%</td>
</tr>
<tr>
<td>20-40</td>
<td>48</td>
<td>48%</td>
</tr>
<tr>
<td>41-60</td>
<td>33</td>
<td>33%</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100%</td>
</tr>
</tbody>
</table>

Source field survey 2013

The results in table (9) showed that the majority of vegetable farmers (81%) are between 20-60 years of age which can be considered as the productive age groups.
4.1.1.3 Educational level:

Table (10): Distribution of the vegetable farmers according to their educational level:

<table>
<thead>
<tr>
<th>Educational level</th>
<th>Frequency</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Illiterate</td>
<td>9</td>
<td>9%</td>
</tr>
<tr>
<td>Khalwa</td>
<td>12</td>
<td>12%</td>
</tr>
<tr>
<td>Primary school</td>
<td>25</td>
<td>25%</td>
</tr>
<tr>
<td>Secondary school</td>
<td>30</td>
<td>30%</td>
</tr>
<tr>
<td>University and above</td>
<td>24</td>
<td>24%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

Source field survey 2013

The results in table (10) showed that the majority of vegetable farmers (91%) are literate while (9%) are illiterate. Which indicate that most of the farmers can accept change.
4.1.1.4 Kind of land ownership:

Table (11): Distribution of the vegetable farmers according to their kind of land ownership:

<table>
<thead>
<tr>
<th>Kind of land ownership</th>
<th>Frequency</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Owners</td>
<td>53</td>
<td>53%</td>
</tr>
<tr>
<td>Renters</td>
<td>28</td>
<td>28%</td>
</tr>
<tr>
<td>Share workers</td>
<td>19</td>
<td>19%</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100%</td>
</tr>
</tbody>
</table>

Source field survey 2013

The results in table (11) showed that the majority of vegetable farmers (53%) are owners while (28%) are renters and (19%) are share workers.
4.1.1.5 Farm Size:

Table (12): Distribution of the vegetable farmers according to their farm size:

<table>
<thead>
<tr>
<th>Farm size</th>
<th>Frequency</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>less than 3 Feddans</td>
<td>22</td>
<td>22%</td>
</tr>
<tr>
<td>3-10 Feddans</td>
<td>49</td>
<td>49%</td>
</tr>
<tr>
<td>more than 10 Feddans</td>
<td>29</td>
<td>29%</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100%</td>
</tr>
</tbody>
</table>

Source field survey 2013

The results in table (12) showed that (49%) of vegetable farmers have farm size between 3-10 feddans, (29%) of them have more than 10 feddans and (22%) of them have less than 3 feddans.
4.1.1.6 Years of experience in agricultural work of vegetable farmers:

Table (13): Distribution of the vegetable farmers according to their years of experience in agricultural work:

<table>
<thead>
<tr>
<th>Years of experience in agricultural work</th>
<th>Frequency</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>less than 7 years</td>
<td>32</td>
<td>32%</td>
</tr>
<tr>
<td>7-14 years</td>
<td>41</td>
<td>41%</td>
</tr>
<tr>
<td>more than 14 years</td>
<td>27</td>
<td>27%</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100%</td>
</tr>
</tbody>
</table>

Source field survey 2013

The results in table (13) showed that the majority of vegetable farmers (68%) have an experience in agricultural work more than 7 years.
4.1.2 Production variables:

4.1.2.1 Availability of cash or credit for farm investment:

Table (14): Distribution of the vegetable farmers according to availability of cash or credit for farm investment:

<table>
<thead>
<tr>
<th>Availability of cash of credit</th>
<th>Frequency</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self</td>
<td>57</td>
<td>57%</td>
</tr>
<tr>
<td>Banks</td>
<td>13</td>
<td>13%</td>
</tr>
<tr>
<td>Traders</td>
<td>30</td>
<td>30%</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100%</td>
</tr>
</tbody>
</table>

Source field survey 2013

The results in table (14) showed that the majority of vegetable farmers (57%) reported that they covered the costs of their farm investment from their own financial resources, while (30%) and (13%) of them reported that they obtained the cash or credit for their farm investment from traders and Banks respectively. This indicates that the relation with the banks is very weak.
4.1.2.2 Source of information on availability of cash or credit facilities for farm investment:

Table (15): Distribution of the vegetable farmers according to their source of information on cash or credit facilities for farm investment:

<table>
<thead>
<tr>
<th>Source of information on cash or credit facilities</th>
<th>Frequency</th>
<th>Percent%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other farmers</td>
<td>70</td>
<td>70%</td>
</tr>
<tr>
<td>Extension officers</td>
<td>17</td>
<td>17%</td>
</tr>
<tr>
<td>Mass media</td>
<td>13</td>
<td>13%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

Source field survey 2013

The results in table (15) showed that the majority of vegetable farmers (70%) reported that their source of information on cash or credit facilities is themselves compared to (17%) and (13%) of them reported that their source of information on cash or credit facilities are the extension officers and mass media respectively which indicates that the role of the extension officers is low.
4.1.2.3 Cultivation of more than one crop:

Table (16): Distribution of the vegetable farmers according to their number of cultivated vegetable crops:

<table>
<thead>
<tr>
<th>Number of cultivated vegetable crops</th>
<th>Frequency</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>one crop</td>
<td>19</td>
<td>19%</td>
</tr>
<tr>
<td>two crops</td>
<td>28</td>
<td>28%</td>
</tr>
<tr>
<td>more than two crops</td>
<td>53</td>
<td>53%</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100%</td>
</tr>
</tbody>
</table>

Source field survey 2013

The results in table (16) showed that the majority of vegetable farmers (53%) reported that they cultivated more than two crops compared to (28%) and (19%) of them reported that they cultivated two crops and one crop respectively.
4.1.2.4 Source of information on the importance of cultivation of more than one vegetable crop:

Table (17): Distribution of the vegetable farmers according to their Source of information on the importance of cultivation of more than one vegetable crops:

<table>
<thead>
<tr>
<th>Source of information on the importance of cultivation of more than one vegetable crop</th>
<th>Frequency</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>By themselves</td>
<td>76</td>
<td>76%</td>
</tr>
<tr>
<td>By other farmers</td>
<td>18</td>
<td>18%</td>
</tr>
<tr>
<td>By extension officers</td>
<td>6</td>
<td>6%</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100%</td>
</tr>
</tbody>
</table>

Source field survey 2013

The results in table (17) showed that the majority of the vegetable farmers (76%) reported that their source of information on the importance of cultivation of more than one vegetable crop is themselves, while (18%) and (6%) of them reported that their source of information on the importance of cultivation of more than one vegetable crop is other farmers and extension officers respectively which indicates that the role of the extension officers is very low.
4.1.2.5 Source of information about selection of profitable crops:

Table (18): Distribution of the vegetable farmers according to their Source of information about selection of profitable crops:

<table>
<thead>
<tr>
<th>Source of information about selection of profitable crops</th>
<th>Frequency</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>By themselves</td>
<td>71</td>
<td>71%</td>
</tr>
<tr>
<td>By other farmers</td>
<td>20</td>
<td>20%</td>
</tr>
<tr>
<td>By extension officers</td>
<td>9</td>
<td>8%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

Source field survey 2013

The results in table (18) showed that the majority of vegetable farmers (71%) reported that they select their profitable crops by themselves compared to (20%) and (8%) of them reported that they select their profitable crops with the help of other farmers and extension officers respectively which indicates that the role of the extension officers is very low.
4.1.2.6 Application of vegetable production technical packages:

Table (19): Distribution of the vegetable farmers according to their application of vegetable production technical packages:

<table>
<thead>
<tr>
<th>application of production technical packages</th>
<th>Frequency</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applied them</td>
<td>68</td>
<td>68%</td>
</tr>
<tr>
<td>Applied sometimes</td>
<td>5</td>
<td>5%</td>
</tr>
<tr>
<td>Did not Applied</td>
<td>27</td>
<td>27%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100</strong></td>
<td>100%</td>
</tr>
</tbody>
</table>

Source field survey 2013

The results in table (19) indicated that the majority of vegetable farmers (68%) reported that they applied the vegetable production technical packages, (5%) of them reported that they sometimes apply the production technical packages and (27%) of them they did not apply the production technical packages.
4.1.2.7 Source of information on vegetable production cultural practices:

Table (20): Distribution of the vegetable farmers according to their source of information on vegetable production cultural practices:

<table>
<thead>
<tr>
<th>Cultural practices</th>
<th>Source of information on vegetable production cultural practices</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Themselfs</td>
<td>Other farmers</td>
<td>Extension officers</td>
<td>Total</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Frequency</td>
<td>Frequency</td>
<td>Frequency</td>
<td>Frequency</td>
<td>Frequency</td>
<td>Frequency</td>
</tr>
<tr>
<td>Land preparation</td>
<td></td>
<td>69</td>
<td>69%</td>
<td>28</td>
<td>28%</td>
<td>3</td>
<td>3%</td>
</tr>
<tr>
<td>Use of improved seeds</td>
<td></td>
<td>68</td>
<td>68%</td>
<td>27</td>
<td>27%</td>
<td>5</td>
<td>5%</td>
</tr>
<tr>
<td>Use of chemical fertilizers</td>
<td></td>
<td>78</td>
<td>76%</td>
<td>18</td>
<td>18%</td>
<td>6</td>
<td>6%</td>
</tr>
<tr>
<td>Irrigation</td>
<td></td>
<td>75</td>
<td>75%</td>
<td>19</td>
<td>19%</td>
<td>6</td>
<td>6%</td>
</tr>
<tr>
<td>Sowing date</td>
<td></td>
<td>72</td>
<td>72%</td>
<td>20</td>
<td>20%</td>
<td>8</td>
<td>8%</td>
</tr>
</tbody>
</table>

Source field survey 2013

The results in table (20) showed that the majority of the vegetable farmers (69%), (68%), (76%), (75%) , (72%) reported that their source of information on vegetable production cultural practices and their application is themselves for land preparation, use of improved seeds, use of chemical fertilizers, irrigation and sowing date respectively. This indicates that the role of the exertion officers is very weak in providing farmers with the main recommended cultural practices.
4.1.3: Post harvest variables:
4.1.3.1 Grading of produce

Table (21): Distribution of the vegetable farmers according to grading of their product:-

<table>
<thead>
<tr>
<th>Grading of product</th>
<th>Frequency</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Practiced grading</td>
<td>41</td>
<td>41%</td>
</tr>
<tr>
<td>Practiced grading some times</td>
<td>23</td>
<td>23%</td>
</tr>
<tr>
<td>Did not practiced gradings</td>
<td>36</td>
<td>36%</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100%</td>
</tr>
</tbody>
</table>

Source field survey 2013

The results in table (21) revealed that only (41%) of vegetable farmers reported that they are usually grading their product before taking it to the market in order to increase the market value of the product. While (23%) of them reported that they are sometimes grading their product before taking it to the market and (36%) of them reported that they did not grade their product before taking it to the market.
4.1.3.2 Packing:

Table (22): Distribution of the vegetable farmers according to packing of their produce:-

<table>
<thead>
<tr>
<th>Packing</th>
<th>Frequency</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Those who practiced packing</td>
<td>66</td>
<td>66%</td>
</tr>
<tr>
<td>Those who did some times</td>
<td>23</td>
<td>23%</td>
</tr>
<tr>
<td>Those who did not</td>
<td>11</td>
<td>11%</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100%</td>
</tr>
</tbody>
</table>

Source field survey 2013

The results in table (22) showed that the majority of vegetable farmers (66%) reported that they are usually packing their product before taking it to the market because it provides a confident way of handling and transporting product and its costs would certainly be much higher if every charges had to be carried and moved without any form of packing, it provides protection for the product and finally packing can be used to divide the product into convenient units for retail sale and to make the product more attractive to their consumers which in the end will increase the price. While (23%) of them reported that they are sometimes packing their product before taking it to the market and (11%) of them reported that they did not packed their product before taking it to the market.
4.1.3.3 Storage:

Table (23): Distribution of the vegetable farmers according to storage of their produce:

<table>
<thead>
<tr>
<th>Storage of the product</th>
<th>Frequency</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Practiced storage</td>
<td>34</td>
<td>34%</td>
</tr>
<tr>
<td>Sometimes Practiced storage</td>
<td>36</td>
<td>36%</td>
</tr>
<tr>
<td>Did not Practiced storage</td>
<td>30</td>
<td>30%</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100%</td>
</tr>
</tbody>
</table>

Source field survey 2013

The results in table (23) showed that only (34%) of the vegetable farmers reported that they stored their product in order to extend the period of availability of some vegetable crops and sold them after storage at high price. (36%) of them reported that they sometimes stored their product and (30%) of them reported that they did not store their product.
4.1.3.4 Processing:

Distribution of vegetable farmers according to processing of their produce at market lower price is shown in table (24).

**Table (24): Distribution of the vegetable farmers according to processing of their produce at market lower price:-**

<table>
<thead>
<tr>
<th>Processing of the product</th>
<th>Frequency</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drying</td>
<td>8</td>
<td>8%</td>
</tr>
<tr>
<td>Other forms of processing</td>
<td>3</td>
<td>3%</td>
</tr>
<tr>
<td>Did not made any form of processing</td>
<td>89</td>
<td>89%</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100%</td>
</tr>
</tbody>
</table>

Source field survey 2013

The results in table (24) showed that the majority of vegetable farmers (89%) reported that they did not make any form of processing to their product at market lower price. While (8%) of them reported that they usually dried their product and (3%) of them reported that they made other forms of processing such as tomato paste.
4.1.3.5 Transportation:

Table (25): Distribution of the vegetable farmers according to their transporting type of their product:

<table>
<thead>
<tr>
<th>transportation type</th>
<th>Frequency</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sell it in the farm</td>
<td>31</td>
<td>31%</td>
</tr>
<tr>
<td>Individually transportation</td>
<td>51</td>
<td>50%</td>
</tr>
<tr>
<td>In groups transportation</td>
<td>18</td>
<td>18%</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100%</td>
</tr>
</tbody>
</table>

Source field survey 2013

The results in table (25) showed that the majority of the vegetable farmers (51%) reported that they transport their product to the market individually. (18%) of them reported that they transport their product to the market in groups. While (31%) reported that they sale their product in their farms.
4.1.3.6 Information on post harvest techniques:

Table (26): Distribution of the vegetable farmers according to their source of information on post harvest techniques:

<table>
<thead>
<tr>
<th>Source of information on post harvest techniques</th>
<th>Frequency</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Themselves</td>
<td>44</td>
<td>44%</td>
</tr>
<tr>
<td>Other farmer</td>
<td>47</td>
<td>47%</td>
</tr>
<tr>
<td>Extension officers</td>
<td>9</td>
<td>9%</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100%</td>
</tr>
</tbody>
</table>

Source field survey 2013

The results in table (26) showed that only (47%) of the vegetable farmers reported that their source of information on post harvest techniques is other farmers. While (44%) of them reported that their source of information on post harvest techniques is themselves, and (9%) of them reported that their source of information on post harvest techniques is the extension officers.
4.1.4 Market variables:

4.1.4.1 Selling type:

Table (27): Distribution of the vegetable farmers according to their selling type:

<table>
<thead>
<tr>
<th>Selling type</th>
<th>Frequency</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct to customers</td>
<td>7</td>
<td>7%</td>
</tr>
<tr>
<td>Retailing dealers</td>
<td>13</td>
<td>13%</td>
</tr>
<tr>
<td>Wholesale dealers</td>
<td>68</td>
<td>68%</td>
</tr>
<tr>
<td>Brokers</td>
<td>12</td>
<td>12%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

Source field survey 2013

The results in table (27) showed that the majority of vegetable farmers (68%) reported that they sold their product to the wholesale dealers. While (13%) of them reported that they sold their product to the retailing dealers, (12%) of them reported that they sell their product to the brokers and (7%) of them reported that they sold their product directly to customers.
Table (28): Distribution of the vegetable farmers according to their source of information on prices of product and inputs:-

<table>
<thead>
<tr>
<th>Source of information on prices of product and inputs</th>
<th>Frequency</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Market Visits</td>
<td>73</td>
<td>73%</td>
</tr>
<tr>
<td>Other farmers</td>
<td>13</td>
<td>13%</td>
</tr>
<tr>
<td>Extension officers</td>
<td>12</td>
<td>12%</td>
</tr>
<tr>
<td>Mass media</td>
<td>2</td>
<td>2%</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100%</td>
</tr>
</tbody>
</table>

Source field survey 2013

The results in table (28) showed that the majority of vegetable farmers (73%) reported that their visits to market are the main source of information on prices of product and inputs compared to (13%), (12%), (2%) of them reported that their sources of information on prices were other farmers, extension officers and the mass media respectively.
4.2 Test of significance using chi-squares test:

To test the association between agricultural extension services and sources of information on vegetable marketing activities:

4.2.1 Source of information on availability of cash or credit facilities for farm investment and Availability of credits:

Table (29): Chi-square test for the association between source of information on availability of cash or credit facilities for farm investment and availability of them:-

<table>
<thead>
<tr>
<th>Source of information on cash or credit facilities</th>
<th>Availability of credits</th>
<th>Total</th>
<th>Sig</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Self  Bank  Trader</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other farmers</td>
<td>45   6     19</td>
<td>70</td>
<td>.045</td>
</tr>
<tr>
<td>extension officers</td>
<td>9    4     4</td>
<td>17</td>
<td></td>
</tr>
<tr>
<td>Mass media</td>
<td>3    3     7</td>
<td>13</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>57   13    30</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

Significance level (0.05) or less

The results in table (29) showed that there was a significant association between availability of cash or credit for farm investment and source of information on it. Also the results showed that the higher source of information for vegetable farmers on cash or credit facilities is other farmers.
4.2.2 Source of information on the importance of cultivation of more than one crop and number of cultivated vegetable crops:

Table (30): Chi-square test for the association between source of information on the importance of cultivation of more than one crop and number of cultivated vegetable crops:

<table>
<thead>
<tr>
<th>Source of information on the importance of cultivation of more than one crop</th>
<th>Number of cultivated vegetable crops</th>
<th>Total</th>
<th>Sig</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>one crop</td>
<td>two crops</td>
<td>more than two crops</td>
</tr>
<tr>
<td>By themselves</td>
<td>13</td>
<td>18</td>
<td>45</td>
</tr>
<tr>
<td>By other farmers</td>
<td>4</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>By extension officers</td>
<td>2</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>19</td>
<td>28</td>
<td>53</td>
</tr>
</tbody>
</table>

Significance level (0.05) or less

The results in table (30) showed that there was a significant association between sources of information on the importance of cultivation of more than one crop and number of cultivated vegetable crops by vegetable farmers. Also the results showed that the higher source of information for vegetable farmers on the importance of cultivation of more than one crop is themselves.
4.2.3 Source of information on production technical packages and the application of them by vegetable farmers:

Table (31): Chi-square test for the association between source of information on production technical packages and the application of them by vegetable farmers:

<table>
<thead>
<tr>
<th>Source of information on production technical packages</th>
<th>Application of production technical packages</th>
<th>Total</th>
<th>Sig</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Applied them</td>
<td>Applied sometimes</td>
<td>Did not applied</td>
</tr>
<tr>
<td>Self</td>
<td>26</td>
<td>14</td>
<td>4</td>
</tr>
<tr>
<td>other farmers</td>
<td>36</td>
<td>10</td>
<td>1</td>
</tr>
<tr>
<td>Extension officers</td>
<td>6</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>68</td>
<td>27</td>
<td>5</td>
</tr>
</tbody>
</table>

Significance level (0.05) or less

The results in table (31) showed that there was a significant association between the source of information on production technical packages and the application of them by vegetable farmers. Also the results showed that the higher source of information for vegetable farmers on production technical packages is other farmers.
4.2.4: Source of information on post harvest techniques and application of them by vegetable farmers:

Table (32): Chi-square test for the association between source of information on post harvest techniques and application of them by vegetable farmers:

<table>
<thead>
<tr>
<th>Application of Post harvest techniques</th>
<th>Source of information on post harvest techniques</th>
<th>Sig</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Self</td>
<td>other farmer</td>
</tr>
<tr>
<td>Grading</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Practiced grading</td>
<td>22</td>
<td>13</td>
</tr>
<tr>
<td>Sometimes practiced grading</td>
<td>10</td>
<td>13</td>
</tr>
<tr>
<td>Did not practiced grading</td>
<td>12</td>
<td>21</td>
</tr>
<tr>
<td>Packing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Practiced packing</td>
<td>31</td>
<td>31</td>
</tr>
<tr>
<td>Some time practiced packing</td>
<td>8</td>
<td>10</td>
</tr>
<tr>
<td>Did not practiced packing</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>Storage</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Practiced storage</td>
<td>10</td>
<td>20</td>
</tr>
<tr>
<td>Sometimes practiced storage</td>
<td>15</td>
<td>17</td>
</tr>
<tr>
<td>Did not practiced storage</td>
<td>19</td>
<td>10</td>
</tr>
<tr>
<td>Drying</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Processing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other forms of processing</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Did not make any form of processing</td>
<td>40</td>
<td>42</td>
</tr>
<tr>
<td>Transportation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sell it in the farm</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>Individually transportation</td>
<td>24</td>
<td>22</td>
</tr>
<tr>
<td>In groups transportation</td>
<td>5</td>
<td>10</td>
</tr>
</tbody>
</table>

Significance level (0.05) or less

The results in table (32) showed that there was no significant association between the source of information on post harvest techniques and application of them by vegetable farmers (grading, packing, storage, transportation and processing) by vegetable farmers. Also the results revealed that there was no difference between sources of information in providing farmers with information on post harvest techniques.
4.2.5 Source of information on prices of product and inputs and selling type followed by vegetable farmers:

Table (33): Chi-square test for the association between the source of information on prices of product and inputs and selling type followed by vegetable farmers:

<table>
<thead>
<tr>
<th>source of information on prices of product and inputs</th>
<th>Sell type</th>
<th></th>
<th></th>
<th></th>
<th>Sig</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Direct to customers</td>
<td>Retailing dealers</td>
<td>Wholesale dealers</td>
<td>Brokers</td>
<td>Total</td>
</tr>
<tr>
<td>Market visits</td>
<td>4</td>
<td>5</td>
<td>54</td>
<td>10</td>
<td>73</td>
</tr>
<tr>
<td>Other farmers</td>
<td>1</td>
<td>3</td>
<td>7</td>
<td>2</td>
<td>13</td>
</tr>
<tr>
<td>Extension officers</td>
<td>2</td>
<td>5</td>
<td>5</td>
<td>0</td>
<td>12</td>
</tr>
<tr>
<td>Mss Media</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>7</td>
<td>13</td>
<td>68</td>
<td>12</td>
<td>100</td>
</tr>
</tbody>
</table>

Significance level (0.05) or less

The results in table (33) showed that there was a significant association between source of information on prices of product and inputs and selling type followed by vegetable farmers. Also the results showed that the higher source of information for vegetable farmers on prices of product and inputs is their market visits.
Chapter Five

Summary, Conclusion and Recommendations

The main objective of this study is to assess the contribution of agricultural extension services on vegetable marketing activities in the Gezira State, The case study of Wad Medani greater locality.

Field survey was used to collect data from 100 vegetable farmers in 2013/2014 growing season. Close ended questionnaire was constructed, consisting of 21 questions addressed some personal characteristics of vegetable farmers, production variables, Post harvest variables and market variables. Personal interview technique was used to administer the questionnaire.

A pretest for the questionnaire was made with 15 farmers. The interview continued from May 2013 to June 2013. The collected data were coded, fed to computer and statistically analyzed using statistical package for social sciences (SPSS), and interpreted by using percentage, frequency distribution and Chi-squares test.

5.1 Summary of findings:

1- The majority of vegetable farmers (92%) are male, while (8%) are female.
2- The majority of vegetable farmers (81%) are between 20-60 years age which can be considered as the productive age groups.
3- The majority of vegetable farmers (91%) are literate while (9%) are illiterate.
4- The majority of vegetable farmers (53%) are land owners while (28%) are renters and (19%) are share workers.
5- (49%) of vegetable farmers have farm sizes between 3-10 feddans, (29%) of them have more than 10 feddans and (22%) of them have less than 3 feddans.
6- The majority of vegetable farmers (67%) have years of experience in agricultural work for 7 years and more.
7- The majority of vegetable farmers (57%) reported that they covered the costs of their farm investment from their own financial resources.

8- The majority of vegetable farmers (70%) reported that their source of information on cash or credit facilities is themselves.

9- The majority of vegetable farmers (53%) reported that they cultivated more than two vegetable crops.

10- The majority of the vegetable farmers (76%) reported that their source of information on the importance of cultivation of more than one vegetable crop is themselves,

11- The majority of vegetable farmers (71%) reported that they select their profitable crops by themselves.

12- The majority of vegetable farmers (68%) reported that they applied vegetable production technical packages,

13- The majority of the vegetable farmers (78%), (75%), (72%), (69%), (68%) reported that their source of information on vegetable production technical package and their application is themselves for land preparation, use of improved seeds, use of chemical fertilizers, irrigation and sowing date respectively.

14- Only (41%) of vegetable farmers reported that they are usually grading their product before taking it to the market.

15- The majority of vegetable farmers (66%) reported that they are usually packing their product before taking it to the market.

16- Only (34%) of vegetable farmers reported that they stored their product.

17- The majority of vegetable farmers (89%) reported that they did not make any form of processing to their product at market lower price.

18- The majority of vegetable farmers (51%) reported that they carried their product to the market individually.

19- Only (47%) of vegetable farmers reported that their source of information on post harvest techniques is other farmers.

20- The majority of vegetable farmers (68%) reported that they sold their product to the wholesale dealers.
21- The majority of vegetable farmers (73%) reported that their visits to market are the main source of information on prices of product and inputs.

22- There was a significant association between availability of cash or credit for farm investment and source of information on it. Also the results showed that the higher source of information for vegetable farmers on cash or credit facilities is other farmers.

23- There was a significant association between sources of information on the importance of cultivation of more than one crop and number of cultivated vegetable crops by vegetable farmers. Also the results showed that the higher source of information for vegetable farmers on the importance of cultivation of more than one crop is themselves.

24- There was a significant association between the source of information on vegetable production technical packages and the application of them by vegetable farmers. Also the results showed that the higher source of information for vegetable farmers on production technical packages is other farmers.

25- There was no significant association between the source of information on post harvest techniques and application of them by vegetable farmers (grading, packing, storage, transportation and processing) by vegetable farmers. Also the results revealed that there was no difference between sources of information in providing farmers with information on post harvest techniques.

26- There was a significant association between source of information on prices of product and inputs and selling type followed by vegetable farmers. Also the results showed that the higher source of information for vegetable farmers on prices of product and inputs is their market visits.

5.2. Conclusion:

From this study it can be concluded that the contribution of agricultural extension officers was very weak in providing vegetable farmers with information on availability of cash or credit for farm investment, information on the importance of cultivation of more than one crop, information on vegetable production technical packages, information on post harvest techniques and information on prices of
products and inputs and selling type followed by vegetable farmers in Wad Madeni greater locality which contributed to this incorrect situation of vegetable marketing in the locality.

5.3. Recommendations

Based on the results of this study the authors recommend the following:

For the government:

- A national market information system and network should be built.
- Adoption of well identified export and import policies for farm product and inputs.

For universities and research organizations:

- Considerable attention should be paid to the agricultural extension market researches.

For extension organizations working in the State:

- Distribution of all inputs with reasonable prices through various agricultural centres in the State.
- Agricultural extension officers should be trained in all aspects of agricultural marketing extension activities.

For farmer's union of the State:

- More efforts should be exerted in facilitating the share of transport to fully exploit market opportunities for their members.
- Grass root farmer's organizations should be built and capacitated to organize different marketing activities.
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7. **Dennis**, Calvin (2011) - Director of Penn State Extension and Associate Dean, College of Agricultural Sciences-Penn State Extension is an Educational network - Pennsylvania University.


17. **NEPAD**, (2005) –Comprehensive Africa Agriculture Development Program-Sudan: Investment Project Profile “Agricultural Marketing and Rural Infrastructure Project”.


21. **Rowell**, Brent(1999) - Extension Vegetable Specialist; Tim Woods, Extension Horticultural Marketing Specialist; Jim Mansfield, Director, Division for Value-Added Horticulture and Aquaculture, Kentucky Department of Agriculture -
Marketing Options for Commercial Vegetable Growers- University of Kentucky-UK.


بسم الله الرحمن الرحيم

استمارة استبيان لجمع معلومات عن مساحة خدمات الأشاد الزراعي في أنشطة تسوية الخضر بولاية الجزيرة

(1) الสมات الشخصية :

- النوع:
  - ذكر
  - أنثى

- العمر:
  - أقل من 20
  - 20-40
  - 41-60

(2) التعليم :

- اللغة:
  - عربي
  - خليج
  -其它问题

(3) نوع المكلاة :

- 1- مالك

(4) مساحة الأرض :

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>نوع الأرض</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1- أقل من 3 فدان</td>
<td>2- 2-10 فدان</td>
<td>3- أكثر من 10 سنة</td>
</tr>
<tr>
<td>4- 7- 14 سنة</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5- 14 سنة</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(5) الخبرة الزراعية :

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>نوع الخبرة</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1- أقل من 7 سنوات</td>
<td>2- 2-10 فدان</td>
<td>3- أكثر من 10 سنة</td>
</tr>
<tr>
<td>4- 7- 14 سنة</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5- 14 سنة</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(6) معلومات الإنتاج والزراعة :

- نوع التمويل :
  - 1- ذاتي
  - 2- بنوك أو مؤسسات تمويل
  - 3- تمويل من تاجر

(7) مصادر الحصول على معلومات عن التمويل ومصادر التمويل :

- 1- المرشد الزراعي
  - 2- المزارعين الآخرين
  - 3- وسائل الإعلام

(8) النتوع في الزراعة :

- 1- زراعة محصول واحد
  - 2- زراعة محصولين
  - 3- أكثر من محصولين

(9) مصادر الحصول على معلومات عن أهمية زراعة أكثر من محصول :

- 1- ذاتى
  - 2- المزارعين الآخرين
  - 3- المرشد الزراعي

(10) هل تطبيق الحزم الفلاحية الخاصة لكل محصول :

- 1- نعم أقوم بالتطبيق
  - 2- أقوم بالتطبيق في بعض الأحيان
  - 3- لا أقوم بالتطبيق

98
7- مصادر الحصول على معلومات عن المعاملات ألفلاحية (الحزم ألفلاحية):

أ- تحضير الأرض: 1- المزارع نفسه 2- المزارعين الآخرين
3- المرشد الزراعي

ب- البذور المحصن: 1- المزارع نفسه 2- المزارعين الآخرين
3- المرشد الزراعي

ت- التشمية: 1- المزارع نفسه 2- المزارعين الآخرين
3- المرشد الزراعي

ث- الري: 1- المزارع نفسه 2- المزارعين الآخرين
3- المرشد الزراعي

ج- طريقة وتأخير البذور: 1- المزارع نفسه 2- المزارعين الآخرين
3- المرشد الزراعي

(3) معاملات ما بعد الحصاد (التصنيف، التخزين، المعالجات، الترحيل):

1- التصنيف: هل تقوم بفرز المحصول: 1- دائماً 2- بعض الأوقات
3- لا أقوم بفرز

2- عمليات التعبئة للمحصول: هل تقوم بتعبئة: 1- دائماً 2- بعض الأوقات
3- لا أقوم بالتعبئة

3- التخزين: هل تقوم بتخزين المحصول: 1- دائماً 2- بعض الأوقات
3- لا أقوم بالتخزين

- المعايير التي يقوم بها في حالة تدني الأسعار:

1- تجفيف
2- تحويل إلى منتج آخر
3- يبيع بأي سعر

3- طريقة ترحيل المحصول إلى السوق:

1- البيع في الحقل
2- ترحيل فردي
3- ترحيل جماعي

6- مصادر الحصول على معلومات عن معاملات ما بعد الحصاد:

1- المزارع نفسه
2- المزارعين الآخرين
3- المرشد الزراعي

(4) معلومات السوق:

1- طريقة البيع: 1- مباشر للمستهلك 2- تاجر قطاعي 3- تاجر جملة 4- سمسار

2- مصادر الحصول على معلومات عن السوق لمعرفة أسعار المحاصيل ومدخلات الإنتاج:

1- زيارة السوق
2- المزارعين الآخرين
3- المرشد الزراعي
4- وسائل الإعلام
Map of Gezira State