# Sudan University of Science and Technology College of Graduate Studies

Factors Affecting Productivity of Guava (*Psidium guajava* L.) and Mango (*Mangifera indica* L.) in Khartoum North District.

A thesis Submitted in Partial Satisfaction of the Requirements for the Degree of Master of Science in Horticulture

By:

Salih Ali Abdalla Abdrahman

**Supervisor:** 

Prof. Dr. Elsadig Hassan Elsadig

### بـسم الله الرحمن الرحيم

#### قال تعالى :-

"فلينظرالإنسان إلى طعامه (24) أنا صببنا الماء صباً (25) ثم شققنا الأرض شقاً (26) فأنبتنا فيها حباً (27) وعنباً وقضباً (28) وزيتوناً ونخلاً (29) وحدائق غلباً ( 30) وفاكهة وأباً (31) متاعاً لكم ولأنعامكم (32) "

11

سورة عبس "

#### **Dedication**

This research is dedicated to my Mother, Father, Brothers, Sisters, Wife, Son, Daughter, Friends and every one seeks scientific learning.

#### Acknowledgement

Praise is to Allah the almighty who gave me the health . strength and patience to conduct this work

I would like to express my gratitude to my supervisor Prof . Elsadig Hassan Elsadig for his guidance, encouragement, .help and patience throughout the term of this study

I am thankful to the members of Administration of . Horticulture Sector for encouraging me during this study

My thanks are also due to my friends for their continuous . help during this work

Finally , my deep thanks to all member of my family for . their patience and help

#### Table of contents

Title Pages	
Al ayah I	
Dedication II	
Acknowledgement III	
List of tables VIII	
List of Histograms X	
Abstract XII	
Abstract ( in Arabic ) XIII	
Chapter one 1	
Introduction 1	-1
Guava 1	1-1
Mango 2	1-2
Objectives 3	1-3

Chapter two	
4	
Literature review 4	-2
Guava (Botanic description) 4	2-1
Environmental requirements	5 2-1.1
Propagation	5 2-1.2
Major pests and diseases 7	2-1.3
Species and varieties 9	2-1.4
IV	
Mango (taxonomy and morphology) 10	2-2.1
Environmental requirements 11	2-2.2
Propagation 12	2-2.3
Biennial or alternate bearing 14	2-2.4
Major pests and diseases 15	2-2.5
Varieties 17	2-2.6
Chapter three 20	

Material and Methods 20	-3
Site of research 20	3-1
Material and methods 20	3-2
Data analysis 21	3-3
Factors which are studied 21	3-4
Chapter four 24	
Results and Discussion 24	-4
Factors affecting productivity of guava 24	4-1
Location and area of orchard 24	4-1.1
Type of soil 25	4-1.2
Age of trees 27	4-1.3
Guava cultivars 27	4-1.4
Spacing of guava 28	4-1.5

Environmental factors 30	4-1.6
V	
Cultural practices 31	4-1.7
Irrigation 31	4-1.7.1
Fertilization 32	4-1.7.2
Weed control 33	4-1.7.3
Pest control 34	4-1.7.4
Disease control 36	4-1.7.5
Pruning 37	4-1.7.6
Harvest 38	4-1.7.7
Alternate bearing 39	4-1.7.8
Extension services 41	4-1.8
Horticultural engineering's assistance 42	4-1.9
Marketing 43	4-1.10

Factors affecting productivity of mango 44	4-2
Location and area of orchard 44	4-2.1
Type of soil 45	4-2.2
Age of trees 46	4-2.3
Mango cultivars 47	4-2.4
Spacing of mango 48	4-2.5
Fruits which are grown with mango 49	4-2.6
Effect of environmental factors 50	4-2.7
Cultural practices 51	4-2.8
VI	
	Irrigation 4-2.8.1 51
Fertilization 52	4-2.8.2
Weeding 53	4-2.8.3
Pest control 54	4-2.8.4

Disease control 55	4-2.8.5
Pruning 56	4-2.8.6
Harvest 57	4-2.8.7
Marketing 58	4-2.8.8
Alternate bearing 59	4-2.9
Extension services 61	4-2.10
Horticultural engineering's assistance 62	4-2.11
Economic factors 63	4-2.12
Chapter five 65	
Conclusion and Recommendations 65	-5
Conclusion 65	5-1
Recommendations 65	5-2
References 67	5-3

#### VII

#### List of Tables

No	Title	Page
1	Location and area of orchard	24
2	Type of soil	26
3	Guava cultivars	27
4	Spacing of guava	29
5	Effect of environmental factors	30
6	Irrigation system	31
7	Fertilization	32
8	Weed control	34
9	Pests control	35
10	Disease control	36
11	Pruning	37
12	Means of harvest	38
13	Alternate bearing	39
14	Extension services	41
15	Horticultural engineering's assistance	42

16	Marketing	43
17	Location and area of orchard	44
18	Type of soil	45
19	Mango cultivars	47
20	Spacing of mango	48
21	Fruits which are grown with mango	49
22	Affect of environmental factors	50
23	Irrigation system	51
24	Fertilization of mango	52
25	Methods of weed control	53
26	Pests control	54
27	Disease control	55
28	Pruning of mango	56
29	Means of harvest	57
30	Marketing	58
31	Alternate bearing	60
32	Extension services	61
33	Horticultural engineering's assistance	62
34	Labour availability	64

## List of Histograms

No	Title	Page
1	Location and area of orchard	25
2	Type of soil	26
3	Guava cultivars	28
4	Spacing of guava	29
5	Effect of environmental factors	30
6	Irrigation system	32
7	Fertilization	33
8	Weed control	34
9	Pests control	35
10	Disease control	36
11	Pruning	37
12	Means of harvest	39
13	Alternate bearing	40
14	Extension services	41
15	Horticultural engineering's assistance	42
16	Marketing	43
17	Location and area of orchard	45
18	Type of soil	46

19	Mango cultivars	47
20	Spacing of mango	48
21	Fruits which are grown with mango	49
22	Effect of environmental factors	50
23	Irrigation system	51
24	Fertilization of mango	52
25	Methods of weed control	53
26	Pests control	54
27	Disease control	55
28	Pruning of mango	56
29	Means of harvest	58
30	Marketing	59
31	Alternate bearing	60
32	Extension services	62
33	Horticultural engineering's assistance	63
34	Labour availability	64

This research was done to study factors affecting . productivity of guava and mango in Khartoum North district

Data related was collected through questionnaires with farmers and personal meetings with the staff of Agriculture Research Corporation(ARC), Shambat and Horticultural. Sector, Ministry of Agriculture

From the study mean , productivity of guava is about 8-10 tons /feddan while mean productivity of mango is about 7-8 . tons /feddan

Less care , less extension services , pests and disease , old trees , cultivars, high production cost , and environmental factors are important factors affecting productivity of guava . and mango

The study recommended good care, improving extension services, pest and disease control, improving means of harvest and providing farmers with inputs for agricultural production

#### العوامل المؤثرة على إنتاجية الجوافة والمانجو بمنطقة الخرطوم بحري

#### ملخص الدراسة

أجري هذا البحث بغرض دراسة العوامل المؤثرة على انتاجية الجوافة والمانجو بمنطقة الخرطوم بحري. تم جمع البيانات المتعلقة بالدراسة عن طريق اجراء استبيانات مع المزراعين ومقابلات شخصية مع الكوادر الزراعية بهئية البحوث الزراعية ( أبحاث البساتين شمبات ) والقطاع البستاني, وزارة الزراعة الإتحادية

بلغ متوسط انتاجية فدان الجوافة حوالي 8-10 طن ومتوسط انتاجية فدان المانجو حوالي 7-8 اطنان.

توصلت الدراسة الى ان اهم العوامل المؤثرة على انتاجية الجوافة والمانجو هي رداءة العمليات الفلاحية وغياب المعلومات الفنية وضعف الخدمات الارشادية وانتشار الافات والامراض وتقدم الاشجار في العمر وارتفاع تكاليف الانتاج والظروف البيئية .

أوصت الدراسة بأهمية تجويد العمليات الفلاحية وتفعيل الخدمات الارشادية وزراعة الاصناف ذات الصفات الجيدة ومكافحة الامراض والافات وتطوير طرق الحصاد وتوفير مدخلات الانتاج للمزارعين وتمويلهم .