COMPARATIVE STUDY ON TYPES OF TRACTORS SUITABLE FOR AGRICULTURAL CONDITIONS IN IRAQ

By

FURQAN JALAL ALI AL-FRHOOD
B.Sc. Agric. Sci. (Agric. Mechanization), Fac. Agric., Baghdad Univ., 2007

THESIS
Submitted in Partial Fulfillment of the Requirements for the Degree of

MASTER OF SCIENCE

In

Agricultural Sciences
(Agricultural Engineering)

Department of Agricultural Engineering
Faculty of Agriculture
Cairo University
EGYPT

2013

APPROVAL SHEET

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SUPERVISION SHEET

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Title of Thesis: Comparative study on types of tractors suitable for agricultural conditions in Iraq
Supervisors: Dr. Abdel-Aal Z. Taieb
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Department: Agricultural Engineering
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ABSTRACT

The aim of the study was to select the most suitable tractor to complete the implementation of the basic agricultural operations through suitable time in the agricultural production conditions in Iraq.

A field experiment was conducted at the Faculty of Agriculture, Baghdad University 2011, to evaluate the performance rates, determine power and energy requirement, calculate operating costs and measuring exhaust gases.

To test three tractors of different powers (70 – 80 – 105) HP were used to execute the commonly mechanized operations in Iraq. Three different types of operations were used ploughing with mouldboard plough, harrowing with disc harrow and land levelling by land leveller.

The results obtained from this investigation could be summarized as follows:

The highest actual field capacity 1.035 ha/h was observed with the tractor 105 HP when carrying levelling operation, and the least actual field capacity 0.422 ha/h was observed with the tractor 70 HP when carrying ploughing operation.

The highest total engine power for operations (22.82 kW) was observed with the tractor of 105 HP when carrying ploughing operation, and the least total engine power for operations (11.03 kW) was observed with the tractor of 70 HP when carrying levelling operation.

The highest energy consumed (78.80 kW.h/ha) was observed with the tractor of 105 HP when carrying ploughing operation, and the least energy consumed (17.90 kW.h/ha) was observed with the tractor of 70 HP when carrying levelling operation.

The least value of total costs per unit area (14.78 $/ha) was observed with the tractor of 80 HP when carrying levelling operation, and the highest value of the costs per unit area (42.82 $/ha) was observed the tractor of 70 HP when carrying ploughing operation.

Increasing exhaust gasses emissions affect negatively on the environment, the least value CO emissions, O_2 emissions, HC emissions and NO_x emissions were observed with the tractor 80 HP. According to technical, economical and environmental parameters it is preferable to use the tractor 80 HP for all basic agricultural operations.

Key words: Agricultural tractors, ploughing, harrowing and levelling.

DEDICATION

I dedicate this job:-
For god's face gifting to Allah,
To the humanity teacher and the source of the Science our prophet Mohammed (God prayers be upon him& his family & his fellowship)
To my Wisdom and my knowledge...To my Literature and my dream...To my example in my life path…To who taught me that the big actions not done without the Patience, purposefulness and insistence,
To who I carried his name Proudly…To my father ,Allah Protracts his age and wears him the wellness & health robe, and enjoy me with his beneficence to return his favor.
I dedicate Fruit from his implantation fruits
To you my mother...your Branches are bloomed…your invocations are yielded…Droplet in your great sea… Love, Obedience and beneficence because you are life's flower and its light.
To whom they closer to me than my soul … To whom shared me the mother's embrace and I am from their deriving my glory and my insistence…My brothers.
With the love... to my partner in my pathway… We sowed it together... and we harvested it together… And we will stay together… with permission of Allah.
My children I love you... love if it passed on a barren earth will explode the loving sources from it.
I dedicate to all of you the result of my humble effort.

ACKNOWLEDGEMENT

In the name of god the Beneficent, the Merciful

(Do [as you will], for Allah will see your deeds, and [so, will] His Messenger and the believers.)

Allah the almighty spoke the truth

Praise be to Allah, Who has guided us to this and never could we have found guidance, had it not been for the guidance of Allah, I thank Allah for his favor and grace, and I am praying and I am greeting upon the humanity teacher, and the guider to the light, our master ***MUHAMMAD*** *and his family & his fellowship.*

(Be a scientist, if you couldn't, be an educated, if you couldn't, like the scientists, if you couldn't, don't make them angry).

My tongue unable to find the words that are describing my thanks and my gratitude and my great Acknowledgements to all who contributed in this humble job to add a drop in the ocean of science.

Abdel all Zaki Taieb *Associate professor of Agric. Eng., Fac. of Agric., Cairo Univ. for suggesting the problems, supervision, continued assistance and their guidance through the course of study and revision the manuscript of this thesis.*

Also this study has been done with supervision of ***(Dr. Mohamed S. Omran and Dr. Abdulrazzak A. Jasim)*** *the great gratitude and thankfulness and the respect to them.*

And I don't forget to present my thanks and my gratitude to my generous teachers, the teaching staff, my classmate and my friends of Agricultural Engineering Department, Faculty of Agriculture, Cairo University and Baghdad University

At last I present my gratitude to my family for the continued moral support.

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