



**UNIVERSITI PUTRA MALAYSIA**

**ECONOMIC EFFICIENCY OF SHARECROPPING IN DRYLANDS:  
A CASE STUDY OF GUM ARABIC PRODUCTION  
IN KORDOFAN GUM BELT, SUDAN**

**ELRASHIED ELIMAM ELKHIDIR**

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**By**

**ELRASHIED ELIMAM ELKHIDIR**

**Thesis Submitted to the School of Graduate Studies, Universiti Putra Malaysia,  
in Fulfilment of Requirement for the Degree of Doctor of Philosophy**

**March 2003**



*To my father Professor Dr. Elimam Elkhidir,  
who always being there for me during my education.*



Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfilment of the requirement for the degree of Doctor of Philosophy.

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**Chairman: Professor Ahmad Zubaidi Baharumshah, Ph.D.**

**Faculty: Economics and Management**

The enigma of sharecropping as an economic institution of resource allocation has a long history and always been a fruitful source of controversy in economic literature. The Marshallian economists generally condemned sharecropping as an inefficient institution in that it did not provide incentives to the sharecroppers, because producers had to share the output with the landlords, while the Cheungian economists claimed sharecropping to be as efficient as any other tenure system. This study examines the empirical validity of these two approaches, using evidence from the Kordofan gum arabic orchards of Sudan.

This study was planned mainly to examine the differences in input and output intensities among the mixed and pure sharecroppers of gum arabic orchards. Mixed sharecroppers are gum farmers who rent-in land besides cultivating own land. Pure sharecroppers are gum farmers who rent-in land with no land of their own. We examined these differences by modeling three comparison cases. Case (A) compares input and output differences on owned versus sharecropped gum orchards of mixed sharecroppers. Case (B) compares input and output differences on the owned

orchards of mixed sharecroppers with the gum orchards of pure sharecroppers. Case (C) compares input and output differences on the shared gum orchards of mixed sharecroppers with the gum orchards of pure sharecroppers.

The significance of these differences in input and output intensities was measured by employing two test procedures. An F-test based on Hotelling's  $T^2$  statistic was employed to measure the significance of differences in input and output intensities of comparable but different cases. The second test, which is based on Shaban's methodology, measures the impact of tenancy on input and output intensities by isolating the pure tenancy effect from the total variation in input and output intensities. Shaban's methodology was modified to incorporate five new variables: gum orchard size, gum trees capital services flow, gum trees tapping intensity, rainfall and its fluctuation, and soil type, in the model.

The findings of the study reveal that total differences in inputs and output intensities across the tenure systems can be explained by differences in gum orchard size, gum trees capital services flow, gum trees tapping intensity, rainfall and its fluctuation, soil type and the tenancy effect. The tenancy effect and gum orchard specific characteristics (in particular differences in gum orchard size, gum trees capital services flow, rainfall and its fluctuation, and tapping intensity) are the most significant factors in determining inputs and output intensities.

The results of this study also indicate that the impact of tenancy is stronger and more sizeable for those inputs that are not shared by the gum orchard owner. Mixed sharecroppers apply more family labour in their owned-operated gum orchards than in the shared-operated orchards they tap. Among the shared inputs, differences in

input intensity are sizeable and significant for other inputs variable. There are similar results in case (B) (comparing owned-operated gum orchards of mixed sharecroppers and pure sharecroppers), though differences in inputs and output intensities are relatively smaller, a result consistent with Bell's findings.

Our case (C) comparison between mixed sharecroppers and pure sharecroppers is fully corroborating Bell's findings. A sharecropper-owned resources such as family labour is used more intensively in pure sharecropped gum orchards in the case (C) comparison. Input intensity of other inputs is mainly determined by input share rules applicable to them. Mixed as well as pure sharecroppers' input intensity increases when their gum orchard owners share these inputs.

Our empirical results, moreover, contain some implications for the theoretical controversy between the traditional and the Cheungian views of land tenure arrangements. Our results, which confirm and extend the earlier views of Bell and Shaban, support the traditional view of the matter; in some relative sense sharecropping arrangements are less efficient than production on owned gum orchards.

Abstrak tesis yang dikemukakan kepada Senat of Universiti Putra Malaysia sebagai memenuhi keperluan untuk ijazah Doktor Falsafah.

**KEBERKESANAN EKONOMI PERKONGSIAN KEUNTUNGAN DI TANAH  
KERING: SATU KAJIAN KES PENGELUARAN GAM ARAB  
DI KORDOFAN GUM BELT, SUDAN**

Oleh

**ELRASHIED ELIMAM ELKHIDIR**

**Mac 2003**

**Pengerusi: Profesor Ahmad Zubaidi Baharumshah, Ph.D.**

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Perkongsi keuntungan sebagai satu institusi ekonomi pembahagian sumber mempunyai perkembangan sejarah yang lama. Namun, ia selalu menjadi punca kontroversi dalam literasi ekonomi. Secara am, para ahli ekonomi Marshallian tidak setuju dengan aktiviti perkongsi keuntungan yang dianggap kurang effisyen dan gagal untuk memberi insentif kepada pihak yang terlibat. Ini disebabkan pengusaha tanah terpaksa berkongsi hasil pengeluaran bersama tuan tanah. Sebaliknya, para ahli ekonomi Cheungian pula menyokong sistem perkongsi keuntungan sebagai sistem yang sama effisyen berbanding sistem penyewaan tanah yang lain. Kajian ini mengkaji kesahihan empirikal kedua-dua kaedah tersebut melalui bukti yang diperolehi daripada kebun gam arab di Kordofan, Sudan.

Kajian ini dirancang untuk mengkaji perbezaan intensiti input dan output di antara pihak berkongsi keuntungan tulen dan campuran bagi kebun gam Arab. Pihak yang berkongsi keuntungan campuran merupakan peladang gam yang menyewa tanah disamping mengusahakan tanah sendiri. Manakala pihak berkongsi keuntungan tulen merupakan peladang gam yang menyewa tanah dan tidak mempunyai sendiri.

Perbezaan ini dikaji melalui perbandingan model untuk tiga kes berikut. Kes (A) membandingkan perbezaan input dan output di antara pihak tuan tanah dengan pihak peladang berkongsi keuntungan. Kedua-duanya berkongsi untung campuran. Kes (B) membandingkan perbezaan input dan output di antara pihak tuan tanah yang berkongsi keuntungan campuran dengan pihak yang berkongsi keuntungan tulen. Kes (C) pula mengkaji perbezaan input dan output di antara kebun gam pihak peladang yang berkongsi keuntungan campuran dengan kebun gam kepunyaan pihak berkongsi keuntungan tulen.

Kesignifikanan perbezaan intensiti input dan output diukur melalui dua kaedah ujian. Ujian F yang berdasarkan statistik Hotelling's  $T^2$  digunakan bagi mengukur signifikan perbezaan input dan output bagi kes yang berbeza. Ujian kedua yang berdasarkan metodologi Shaban pula mengukur kesan penyewaan terhadap input dan output dengan mengasingkan kesan penyewaan tulen daripada jumlah variasi intensiti-intensiti input dan output. Model Shaban telah diubahsuaikan dengan mengambilkira lima pembolehubah baru iaitu saiz kebun gam, aliran khidmat kapital pokok gam, keamatan torehan pokok gam, taburan hujan dan perubahannya, serta jenis tanah.

Penemuan kajian mendapati jumlah perbezaan antara input dan output (bagi sistem-sistem yang dikenalpasti) boleh diterangkan melalui perbezaan dalam saiz kebun gam, aliran khidmat kapital pokok gam, intensiti torehan pokok gam, taburan hujan dan perubahannya, jenis tanah dan sistem penyewaan. Sistem penyewaan dan ciri-ciri spesifik berkaitan kebun gam (khususnya perbezaan dalam saiz kebun gam, aliran khidmat kapital pokok gam, taburan dan perubahannya serta keamatan



torehan) merupakan faktor-faktor yang paling signifikan dalam menentukan intensiti input dan output.

Hasil kajian turut menunjukkan bahawa sistem penyewaan adalah lebih bermakna dan lebih mudah diukur bagi input-input yang tidak dikongsi oleh pemilik kebun gam. Pihak berkongsi keuntungan campuran menggunakan lebih banyak tenaga kerja keluarga untuk mengusahakan kebun sendiri berbanding kebun yang dikongsi. Di antara input yang dikongsi, perbezaan dalam intensiti input boleh diukur dan signifikan bagi pembolehubah input yang lain. Walaupun perbezaan di antara keamatan input dan output secara relatifnya adalah kecil, hasil yang sama telah diperolehi bagi kes (B) (membandingkan kebun gam yang diusahakan sendiri oleh pihak berkongsi keuntungan campuran dan tulen). Hasil kajian ini konsisten dengan penemuan Bell.

Perbandingan di antara pihak berkongsi keuntungan campuran dan tulen dalam kes (C) menyokong penuh penemuan Bell. Perbandingan ini mendapati sumber kepunyaan pihak berkongsi keuntungan seperti bekalan tenaga kerja daripada pihak keluarga digunakan secara lebih intensif ke atas kebun gam pihak berkongsi keuntungan tulen. Intensiti bagi input yang lain adalah ditentukan oleh peraturan perkongsian input. Intensiti input bagi pihak berkongsi keuntungan campuran dan tulen meningkat apabila pemilik-pemilik kebun berkongsi input-input tersebut.

Implikasi kajian ini adalah ketara, khasnya dari segi kontroversi teori di antara pendapat tradisional dan Cheungian dalam sistem penyewaan tanah. Penemuan kajian ini menyokong dan mendalami pendapat awal Bell dan Shaban, di samping

menyokong pandangan tradisonal bahawa pelaksanaan perkongsian keuntungan adalah kurang berkesan berbanding penghasilan dari tanah sendiri.

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## ABBREVIATIONS AND GLOSSARY OF TERMS

<i>Abusa</i>	Type of tree sharecropping in Ghana (palm oil), evolve out of a labour tenancy arrangement.
<i>ALARD ALIGTISADI</i>	Name of economical magazine issued in Egypt.
<i>Allah Yarham</i>	Ask Allah to be merciful toward a dead Muslim person
<i>ARC</i>	Agricultural Research Corporation, Wad Medani, Sudan.
<i>Dagali</i>	A worker involved in gum production by selling only his labour.
<i>dan</i>	A local Malaysian word, which means and.
<i>FAO</i>	Food and Agriculture Organization of the United Nations.
<i>Feddan (Feddans)</i>	A local unit for area measurement, equivalent to 0.42 hectares (4200 m <sup>2</sup> ).
<i>GAC</i>	Gum Arabic Company, Sudan.
<i>Gamali</i>	A worker involved in gum production by selling both his labour and services of his camel.
<i>Gardud</i>	Heavy transitional sandy clay loamy soil having mostly a reddish brown colour.
<i>GDP</i>	Gross domestic product.
<i>Ghifar land</i>	A communal land in the vicinity of the village, where all people have free access and completely under the responsibility of the village leader ( <i>Sheikh</i> ).
<i>Gineina (Gineinas)</i>	Gum orchard or gum garden.
<i>Haresti riba'e</i>	Ethiopian type of sharecropping, involve a landowning family and a landless family or person.
<i>Hari</i>	A local Malaysian word, which means a day.
<i>Hashab tree</i>	The gum arabic producing tree. Latin name: <i>Acacia senegal</i> . English name: Gum arabic, Three horned <i>acacia</i> . Arabic name: <i>Hashab, Alloba</i> .

<i>Hashab El-fiafi</i>	Large <i>Hashab</i> holdings that are located at great distances from villages.
<i>IES</i>	Institute of Environmental Studies, University of Khartoum.
<i>IIED</i>	International Institute for Environment and Development.
<i>ILO</i>	International Labour Organization.
<i>ITCZ</i>	Inter-Tropical Convergence Zone.
<i>JECFA</i>	Joint FAO/WHO Expert Committee on Food Additives.
<i>Kampung</i>	A local Malaysian word, which means a village.
<i>Kardafa</i>	They are financially capable individuals migrating from Kordofan to the Blue Nile to deal with gum production there.
<i>Khor (Khors)</i>	Seasonal temporary water courses.
<i>Ls.</i>	Sudanese pound; one US \$ is equivalent to <i>Ls.</i> 2600 during data collection phase.
<i>Majool</i>	A fixed amount of gum allocated from the first collection to the <i>Hashab</i> owner or renter.
<i>Makhamas</i>	A local unit for area measurement, equivalent to 0.75 hectares (7500 m <sup>2</sup> ).
<i>Miri</i>	Transfer of unregistered property rights in land to the State.
<i>Mixed sharecropper</i>	A landlord tenant cultivating his land and leased-in an additional piece of land.
<i>MNP &amp; ES</i>	Ministry of National Planning and Economic Survey.
<i>Nazara</i>	The tribe headmanship.
<i>NEA</i>	The Sudanese National Energy Administration.
<i>Nkotokuano</i>	Type of tree sharecropping in Ghana (cocoa tree), the sharecropper is paid a fixed amount for each load of cocoa produced.

<i>Omodiya</i>	Chieftainship.
<i>Pure sharecropper</i>	A landless tenant cultivating only sharecropped land.
<i>Qoz</i>	Common name for light poor sandy soils with low nutrient contents and high water permeability.
<i>Raya</i>	A local Malaysian word, which means a feast day of Islamic fasting month.
<i>SAW</i>	Allah blessing and peace be upon Prophet Mohamed.
<i>Selamat</i>	An arabic term, used by the Malaysian people to celebrate the feast days.
<i>Sharecropping</i>	A type of land tenure contract where a tenant cultivates the land for the landlord and the output that is produced is shared on some pre-determined basis.
<i>Sheikh</i>	The village leader.
<i>Shiyakha</i>	The village headmanship.
<i>Sunki</i>	The recently developed tool for tapping gum trees. it has a metal head fixed to a long wooden handle.
<i>SW</i>	Allah to Whom be ascribed all perfection and majesty.
<i>Taya (Tayas)</i>	Groups of labourers enter the gum arabic production and assign a specific area.
<i>Tetebani</i>	Ethiopian type of sharecropping, occur between two landholding families.
<i>Thangata</i>	Sharecropping between estate owners and smallholders in Malawi.
<i>Tugundi</i>	An agreed amount of advanced cash payment in return for use of the land.
<i>UNDP</i>	United Nations Development.
<i>UPM</i>	University of Putra Malaysia
<i>Ushr</i>	Land tax, Islamic payment.
<i>Wadi gum</i>	A gum orchard that has grown naturally on a village wasteland