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Chancellor College**

**DEPARTMENT OF
ECONOMICS**

Working Paper No. 2006/03

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Malawi: Do Contractual
Arrangements Matter?**

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Farm-Level Productivity in Smallholder Tea Farming in Malawi: Do Contractual Arrangements Matter?*

Ephraim W. Chirwa[†] and Jonathan Kydd[§]

Abstract: This study investigates the relationship that exists between contractual arrangements in production and marketing of smallholder tea and productivity taking into account gender differences and characteristics of farmers in Malawi. We find evidence that institutional arrangements matter – with smallholder farmers that have contracts with commercial estates producing more productively than those that have contractual arrangements with the reformed state-enterprise factory. These differences may be due to differential services offered by the factories with commercial estates offering extension services and the state-owned factory offering no extension services in addition to input credit. Bundled contracts with an array of services that improve input use among smallholder farmers may be important for productivity improvement in smallholder tea.

1. Introduction

Agricultural markets in many developing countries are characterized by market failures. This has prompted many governments to intervene in such markets in various ways including state involvement in the marketing and pricing of agricultural crops and establishment of out-grower or contract farming schemes. Out-grower schemes have been particularly important in tree crops

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whose product characteristics and technologies have the potential to exclude smallholder growers from cash crop farming. These products include tea, sugarcane, coffee, rubber and oil palm. Product characteristics such as perishability, bulkiness and input requirements in production and economies of scale in processing make contract farming a viable option for smallholder cash crop farming (Baumann, 2000; Kirsten and Sartorius, 2002). In Malawi, contract farming under contracting state authorities was introduced in coffee, tea and sugarcane, crops that were mainly grown on large scale plantations.

Tea farming has special characteristic features that necessitate state intervention and institutional arrangements. Tea farming is a high fixed investment at production and processing levels, and requires large economies of scale in factory operations. Tea has a five year period to full maturity for farmers to start plucking at economic levels, and a short-time span is required between harvesting and processing. At farm level, cultivation requires continued financing to pay for inputs and labour. At the processing level, a steady flow of green leaf is required to support expensive specific investments in processing plants. The production structures of tea, therefore, require heavy investments in tea plantations and factories for processing. Thus, the tea industry makes major financial demands at the establishment stage which cannot be met by capital-constrained smallholder farmers. In such cases, the market may limit the participation of smallholder farmers in a high value export crop.

Smallholder tea production in Malawi began in the early 1960s and the contractual arrangements have changed from statutory arrangements to private contract farming following state-enterprises failure and liberalisation. In 1979, the government created a state-owned crop authority charged with the responsibility of development and marketing on smallholder tea. During the colonial period, tea was only grown in estates owned by European and multinational corporations. The estate farmers have production activities that are vertically integrated – ownership of tea plantations and processing facilities. The state intervened to open up the industry to smallholder farming through the establishment of an out-grower scheme managed and coordinated by a purposely created state-owned enterprise. Although the state enterprise was instrumental in the development of smallholder tea, in the late 1990s it was dogged with problems of inefficiency, resulting in the collapse of the state coordinated system. At the same time, state extension services in agricultural were coming under severe strain following the adoption of structural adjustment programme. Within the smallholder tea sector, extension services offered by the state virtually collapsed. Smallholder farmer began to seek new ways of directly engaging

with commercial estates in the marketing of green leaf and access to an array of agricultural services. Another feature in smallholder tea in Malawi is the increasing participation of women in tea production through inheritance of tea plots upon death of their spouses.

The justification for state intervention in the tea industry was market failure. However, the financial crisis and service erosion of the state-owned enterprise have resulted in a reconfiguration of the contractual arrangements in the production and marketing of smallholder tea. There are three market channels through which smallholder farmers sell their green tea leaf. First, some farmers sell their leaf to the restructured state-owned tea factory, which still provides inputs to growers but no longer offers extension services to smallholder farmers. Secondly, a large proportion of farmers, particularly those in the catchment areas of commercial estates, sell their green leaf to factories owned by commercial estates. These commercial estates in turn provide services such as fertilizer credit, extension services and social services such as health facilities and market for maize. Finally, some farmers belonging to a new smallholder farmer association have leased one of the factories owned by the Tea Research Foundation, and purchase tea from some of the association members. This smallholder-leased factory also provides inputs to its farmers but does not offer extension services.

With these differential contractual arrangements and service levels, this study investigates the relationship between contractual arrangements and productivity among smallholder farmers taking into account the gender differences that may exist. The paper is organised as follows. The next section presents the literature on contract farming and farm productivity. Section 3 reviews the historical developments in smallholder tea in Malawi. Section 4 presents empirical evidence on the relationship between gender and institutional arrangements and farm productivity. Section 5 presents concluding remarks.

3.0 Contract Farming and Agricultural Development

Contract farming is a system where a central processing or exporting unit purchases the harvests of independent farmers and the terms of the purchase are arranged in advance through contracts (Baumann, 2000). Contract farming allocates risks between producers and buyers of the produce. Private firms that opt not to integrate vertically use contract farming to obtain raw materials for processing or marketing in order to reduce transaction costs and minimise supply uncertainties. There are different types of contacts that firms can use to ensure the supply of raw materials or agricultural produce. Key and Runsten (1999) and Baumann (2000)

distinguish contracts with respect to market specification, resource-providing and production management. Market specification contracts focus on the marketing on the crop at pre-harvesting agreed prices, quality and timing of supply between the firm and the growers. Contracts that are resource-providing entail firms supplying inputs, credit and extension services in return for an exclusive marketing agreement. Production management contracts impose specific production methods on the farmer in exchange for a marketing or resource agreement. The contracts may also vary in the intensity of control over production decisions by firms and smallholder growers. Nonetheless, it is possible in practice to find a combination of the two or all three categories in one contractual agreement.

The main justification for contract farming is to address market failures due to asset specificity and commodity characteristics. The market failures that may result in the exclusion of smallholder farmers in the production of high value cash crops include the lack of credit markets, lack of insurance, lack of information about optimal production technology, imperfect input markets and lack of or imperfect product markets (Key and Runsten, 1999; Kirsten and Sartorius, 2002).

Baumann (2000) notes that contracts should in theory specify in details the rights and obligations between smallholder growers and contracting firms, including the rewards and penalty systems. However, in practice most contracts are informal and where there is formality, such contracts are drawn by contracting firms with smallholder growers on the receiving end without really understanding the contents of such contracts. Baumann (2000) cites examples of a lengthy formal contract in Zambia in contrast to non-formal contract in smallholder tea in Kenya.

Pricing of agricultural produce is one of the central issues in contract farming and the agreed price will depend on the countervailing power of the smallholder growers. Baumann (2000) notes that where growers face only one market channel the contracting firm can use its monopsony power to dictate the prices; thereby exploiting smallholder growers. If switching costs for growers are high (cost of switching to a new product or buyer), smallholder growers tend to have lower bargaining power. On the other hand, if the contracting firm heavily depends on the smallholder growers to supply raw materials, growers tend to get favourable prices. The other aspects in pricing relate to price formulas and how to stabilise prices. The pricing formulas offer different protection from various risks and they include administered prices, growers' fixed prices, contractors' price fixed, revenue sharing prices and free bargaining prices (Baumann, 2000).

Key and Runsten (1999) also note that the bargaining power of both the contracting firm and farmer will depend on the specificity of productive assets. Tree crops, such as tea, tie farmers to such productive processes and do encourage farmers in engaging in contract farming. Such specificity limits alternative and production possibilities for smallholder farmers. On the other hand, high asset specificity for firms tends to discourage them to enter into contract farming.

The other aspect in contract farming relates to enforcement mechanisms and enforcement costs, and the reward-penalty systems under the contract. It is argued that the utility that contracting parties receive from abiding by the contract must be greater than the benefits from reneging the contract (Key and Runsten, 1999). In many contracts, firms do reward growers for good behaviour by promising market access and services and penalise them for bad behaviour through the threat of legal action or termination of services. Key and Runsten (1999) observe that enforcement costs are low where there is a functioning legal system or where firms have monopsonistic power.

The relative merits of contract farming to the growers and contracting firms are well-known in the literature.¹ The advantages to growers include breaking barriers to entry, facilitating access to credit and capital, reduction in marketing risks, stabilisation of incomes and increases in profit opportunities. However, contract farming may also put growers at a disadvantage through loss of autonomy, increased production risks due to specialisation and sunk costs, limiting market choices, land degradation due to high land-use intensity and exploitation of cheap family labour. Singh (2002) notes that contract farm production tends to shift farm production towards export-oriented cash crops at the expense of food production. According to Kirsten and Sartorius (2002) contracting firms benefit through reduced costs, elimination of production risks while the disadvantages include high transaction costs due to administering and enforcement of a large number of contracts particularly where there are no intermediary institutions. Singh (2002) also notes that contract farming leads to increases in incomes in agricultural backward regions. Kirsten and Sartorius (2002) argue that contract farming can become an important institution for empowering the poor smallholder farmers in developing countries and can improve their access to technology and high value markets.

Questions have been raised about the role of contract farming on productivity and power relations. Baumann (2000) notes that

¹ See Kirsten and Sartorius (2002) for a detailed discussion of advantages and disadvantages of contract farming to growers and contracting firms.

although contract farming facilitates transfer of technology, farmers do not seem to maximise production; as a result yields are below smallholder potential. Some of the factors that have been disincentives to higher productivity include declining prices, delays in payments, delays in input provision and overcharging of services provided to smallholder farmers. Others such as Key and Runsten (1999) argue that contract farming disrupts power relations within farming households and leads to the dependency syndrome. Singh (2002) notes that others have argued that contract farming serves to self-exploit farmers.

The literature suggests that contract farming has in practice generated mixed results. Kirsten and Sartorius (2002) observe that contract farming has yielded some successes and many failures. Singh (2002) notes that studies on contract farming show that farmers become better farmers, tend to have more reliable incomes, acquire new skills, although farmers tend to find contracts biased against them in terms of the distribution of benefits and penalties for renegeing. Others have argued that contract farming has had some effect on gender in terms of boosting women's self-esteem and self-confidence and balancing power relations within the household. Singh (2002) finds evidence that contract farming leads to more and better employment opportunity for women.

3.0 Contractual Arrangements in Smallholder Tea in Malawi

Smallholder tea farming in Malawi started through state intervention in the early 1960s on a customary land as out-growers selling green leaves to commercial estates. However, the response from smallholder farmers to switch from maize to participate in tea farming was rather disappointing, such that by 1966 only 30.8 hectares of land, mainly in Mulanje, were under smallholder tea cultivation (TAML, 1974). The Government of Malawi purchased land for the introduction of tea to smallholder farmers, and this led to an increase in demand from farmers to cultivate tea on customary land. In order to support the development of smallholder tea the government established the Smallholder Tea Authority (STA) in 1967, as a quasi-commercial statutory corporation under the Special Crops Act of Parliament, to oversee the development of the smallholder tea sub-sector (STA, 1998). STA was charged with the responsibility of fostering and promoting the growing and marketing of tea by smallholder indigenous Malawians. Smallholder farmers were introduced to clonal variety of tea which is of better quality than seedling tea on commercial estates. In order to reduce transaction costs of dealing with individual smallholder farmers for

various services, the smallholder tea growers were organised into area (blocks) and district committees consisting of five members in each committee elected by growers. The committees were responsible for selecting potential growers, informing smallholder farmers of policy decisions of the STA and advising and assisting the STA in management through their representation on the STA Board (TAML, 1974).

The STA was initially funded by the Government of Malawi, which provided extension services and field staff on secondment while the Commonwealth Development Corporation financed, through a loan agreement, the planting of 760 hectares of smallholder tea between 1967 in Phase I and 1971 and a further 1,660 hectares in Phase II (TAML, 1974). The STA was accountable to the Government of Malawi as one of the statutory corporations and smallholder growers did not have any influencing voice on policies affecting smallholder farmers. The interest in tea production among smallholder farmers was reflected in the increase in land under tea cultivation by the smallholder farmers from 287 hectares in 1970 to 2,902 hectares in 2002 (Chirwa and Kydd, 2005). In recent times, there have only been marginal increases in area under tea cultivation among smallholder farmers although there remains scope for further expansion. Chirwa and Kydd (2005) note that smallholder tea farmers have land that they devote to maize production which could be productively used for tea cultivation.

Commercial estates, with large plantations and tea factories, remain dominant players in the tea industry in Malawi. Tea as a high fixed investment farming activity has potential to exclude smallholder farmers from profitable agricultural production due to market failures. Since the introduction of tea to smallholder farmers, smallholder participation has been based on contractual arrangements with commercial estates, directly or through intermediary institutions such as state enterprises and farmer organisations. There have been two phases of the development of the smallholder tea sector with respect to the nature and quality of contracts.

3.1 Smallholders under Contracting Crop Authority

Smallholder farmers during this phase entered into contractual agreement with the state-owned crop authority, STA, as a contractor. STA in turn had contractual arrangements with commercial estates that own processing factories and subsequently with a processing company in which STA had some ownership interest. The former covers the period between 1967 and 1975 and the latter covers the period between 1976 and 2002. Smallholder

farmers had ‘statutory’ production contracts with the STA, which in turn had contracts to supply green leaves to tea estates that owned factories.² All smallholder tea farmers were required by statute to register with STA as part of its mandate to develop the smallholder tea sector. Under such a contract, the STA provided land under a loan agreement to smallholder farmers, free tea seedlings financed by the government sponsored development programme under the European Union STABEX facility, input credit, extension services and marketing services to smallholder farmers. In addition, STA provided maize to smallholder farmers on loan (Chirwa and Kydd, 2005). In turn smallholder farmers supplied their green leaves to STA in designated weighing and collection points in smallholder tea blocks. STA provided transport services for collection of green leaves from the farm gate to the processing factories of commercial estates. STA collected tea sales from the commercial estates and paid farmers at an agreed initial (pre-determined) price and a bonus based on the actual sales of green leaves. The performance of the ‘statutory’ contract was quite impressive, with STA being able to pay smallholder farmers their proceeds timely with generous bonus payments at the end of the peak marketing season. This motivated farmers into smallholder tea production, such that the capacity of tea processing factories to handle smallholder tea leaves was being stretched (TAML, 1991).

In 1975, the government established the Malawi Tea Factory Company (MATECO) Limited as a joint venture activity of the STA and the Agricultural Development and Marketing Corporation (ADMARC), in which ADMARC owned 40 percent of the share capital. MATECO was conceived as a commercially viable enterprise responsible for purchasing green leaf from smallholder farmers and marketing of processed smallholder tea. Owing to the high variety of smallholder tea and the modern technology, MATECO ably achieved prices well above the average prices for the industry (TAML, 1991). The nature of contract between smallholder farmers and STA did not change, only that with a few exception of smallholder farmers far from MATECO, all smallholder tea was sold to MATECO. During

² There was no formal contract between STA and smallholder growers and the contractual arrangements were embedded in the statutes that established the Smallholder Tea Authority which required smallholder farmers to register under the scheme. The term ‘statutory’ contract is used to describe this loose institutional arrangement. The ‘statutory’ contract was essentially a marketing contract in which smallholder farmers sold green leaf to STA at specified prices, with the farmer retaining full autonomy on production decisions although the buyer provided inputs on credit and other incentive services.

the first part of this phase, between 1975 and 1985, the performance of STA was satisfactory in the development of the smallholder tea sector with efficient delivery of services under the 'statutory contract', with some smallholder farmers attributing this to the management of STA led by an expatriate (Chirwa and Kydd, 2005).

3.2 State Failure and Emerging Contractual Arrangements

Malawian management took over the running of STA in 1986, and the state-owned enterprise began experiencing difficulties that affected its delivery of services under the statutory contract. Chirwa and Kydd (2005) note that the STA had never shown convincing evidence that it had achieved the status of a sustainable organisation in terms of its financial performance. The performance of STA in terms of profits has been erratic and had mainly incurred losses especially in the 1980s with some intermittent recovery in the early 1990s. The financial position worsened in the late 1990s with a loss of US\$0.53 million. The worsening financial position led to massive debt accumulation by the STA. In 2002 the STA owed the Malawi Government US\$16,000 and US\$14,700 million in arrears on loan interest payments and principal, respectively (Chirwa and Kydd, 2005). Some of the factors that contributed to poor performance include conflicting objectives (Kaluwa, 1989; Lawson and Kaluwa, 1996); overstaffing and mismanagement; growing political intervention in operational issues of STA with the appointment of politicians on the Boards of STA and MATECO;³ the labour crisis and disputes in 1992 that led to the introduction of a multiparty political system with smallholder farmers demanding higher prices for tea; and increasing costs of fuel leading to high transport costs of collecting the green leaf. There was also neglect of equipment at the factory, while MATECO and smallholder farmers had no legal mandate to influence the management of STA (Chirwa and Kydd, 2005).

The inefficiency of STA and MATECO led to the neglect of smallholder farmers and a crisis in the organisation of smallholder farmers. The STA failed to honour its statutory obligation of paying smallholder farmers in time for their green leaf, but farmers were powerless to enforce the 'statutory' contract. According to Chirwa and Kydd (2005) some farmers could go as much as six months

³ This political pressure was more damaging in a less repressive multiparty political culture of the late 1990s. For instance, the vehicles of the company were increasingly being used for political activities without compensation while smallholder plucked green leaf was left wilting at the collection points.

without receiving their proceeds from STA although the factories had paid STA in time. The input credit programme that operated in the 1980s and 1990s collapsed due to the financial problems that led to the failure of STA to pay its debts. Although loans were recovered from growers, the loan was not repaid to financing company because funds were diverted to bonus payments in spite of losses MATECO made in the 1995/96 financial year (STA, 1997). As a result, in 1998, the financing company only financed 350.5 tonnes of fertilizers out of the requirement of 616 tonnes. There was also an erosion of services that STA was offering to smallholder farmers including input and maize credit and extension services, transport services.⁴ Smallholder plucked green leaf wilted due to delays in transport. With deteriorating access to inputs and extension services, smallholder productivity slumped to 810 kilograms per hectare in 2002 compared to 2,129 kilograms per hectare in estates (GOM, 2004).

The crisis in state enterprises, STA and MATECO, with accompanying erosion of services by state institutions under the statutory contract led to third phase of contractual arrangements among smallholder farmers. Most growers lost faith in the STA and MATECO and started demanding changes in the 'statutory' contract with the state-owned enterprises. Smallholder growers began to seek alternative marketing and marketing relationships with other factors especially commercial estates.⁵ Initially, estates were allowed to purchase green leaf from smallholder farmers around their estates but proceeds were paid to STA. Although commercial estates were paying STA regularly, smallholder farmers continued to experience delays in receiving proceeds from green leaf sales. This further strengthened the resolve of smallholder farmers to completely detach from their 'statutory' contract with STA and MATECO. MATECO lost most of the smallholder farmers to commercial estates, such that by 2002, of about 8,000 smallholder growers only 800 were still selling green leaf to MATECO (Chirwa and Kydd, 2005). With a reduction in the supply of green leaf, MATECO was only using 30 percent of its installed capacity. Its financial performance deteriorated further and it had accumulated a debt of US\$0.6 million, the factory equipment was rarely maintained, vehicles and tractors that were donated by the European Union had worn out and were poorly maintained. STA/MATECO in the 2002 financial year

⁴ According to STA (1997), frontline extension workers were removed in the 1993/94 season and the extension service was virtually non-existent in the 1996/97 season. The transport facilities become wanting – most frequently breaking down and not being maintained or replaced.

⁵ The estates, though willing, only accepted to deal with smallholders with the authorisation of STA.

had a combined operating loss of US\$1.3 million after farmers were paid their arrears.

The crisis in the management and the operational inefficiency of the STA and MATECO initiated the reform process by the Government through the Privatisation Commission, in preparation of the eventual privatisation of STA and MATECO (Privatisation Commission, 2002 and 2003). The STA was merged with MATECO. A trust, the Smallholder Tea Growers Trust (STGT), was registered in April 2002 as a holding company of MATECO.⁶ Under the restructuring, all smallholder tea growers were designated members of STGT, re-stating the 'statutory' contract. In June 2002, the tea factory, MATECO, underwent and completed a rationalisation programme in which excess employees of STA and MATECO were laid off. MATECO became known as the Smallholder Tea Company (STECO) as a government enterprise within a transitional arrangement and was entrusted to the STGT.⁷ The STGT is responsible for managing STECO through the appointment of the Board which includes growers, and effectively STECO became a quasi-farmer-operated processing factory. Chirwa and Kydd (2005) note that with new management for STECO the reforms have brought substantial improvements in the performance of STECO, within an environment without access to finance from the banking system. The number of farmers selling green leaf to STECO has increased from 800 growers in 2002 to 2,500 growers by 2004 mainly due to improvements in payments of proceeds to farmers and timely provision of inputs. As a result of improvements in service delivery to farmers, factory capacity increased from 30 percent in 2002 to 62 percent in 2004.⁸

These improvements notwithstanding, some of the smallholder farmers, especially large scale, educated and powerful ones, were unhappy about the restructuring and the privatisation process and saw the creation of STGT as the maintenance of a *status quo* in

⁶ The Trust has seven trustees three of which are growers, two traditional chiefs, two from professional bodies - the Society of Certified Accountants of Malawi and the Law Society of Malawi.

⁷ The creation of the STGT and its mandate to manage STECO is a three-year transitional arrangement pending the eventual privatisation in which smallholder farmers will have ownership stake in the factory. According to the Privatisation Commission (2003) the shares of STECO are held by the Trust for ultimate disposal to growers, management and staff.

⁸ STECO has also managed to secure forward contracts with buyers in Malawi, providing the necessary working capital. STECO has managed to pay part of the debt inherited from MATECO to the tune of US\$0.16 million from tea proceeds and has invested in upgrading factory equipment, and managed to pay growers' bonus payments (Chirwa and Kydd, 2005).

which smallholder farmers were forced into an association not of their own making. Smallholder farmers started forming their own association while maintaining the club and business centre structures of the STGT. Three other associations have emerged as breakaways from the STGT. Some of the smallholder farmers have maintained their loyalty to STECO despite the difficulties the company has experienced. Others that used to sell to estates have resumed selling the green leaf to STECO. While STGT has remained with 2,500 growers, one of the new associations has 4,807 growers and is leasing a small tea factory (with a processing capacity of 40 tonnes per day of green leaf) from the Tea Research Foundation assuming responsibility for provision of input credit and other services. The liberalisation of the marketing of smallholder green leaf has widened the choice of market channels for smallholder farmers. Farmers are able to switch between different market places based on the quality of services offered by factories.

In addition to the 'statutory' contract that smallholder farmers have with STECO, two other contractual arrangements have emerged in the smallholder tea sector. First, commercial estates sign private contracts with smallholder associations whose nature is similar to the 'statutory' contract with STECO or STGT. Commercial estates provide the following services to the smallholder tea farmers under the contract: input credit (fertilizers including high yielding fertilizers and seedlings for infilling); market access through direct contracts with respective smallholder associations; leaf collection and transport facilities; extension services with commercial estates employing dedicated officers to guide smallholder farmers in farm management. Some commercial farmers are also providing seedlings to smallholder farmers for infilling at costs. This is a particularly important service with implications on the medium-term and long term productivity in the smallholder sector. According to the NSTDC (2005) the population of tea bushes on smallholder plots is less than optimal, with a lot of gaps requiring an intensive infilling programme.

Under the private contract, the smallholder associations commit business centres (farmer groups) to sell their green leaf to the respective estates as a way of facilitating credit repayments and estates guarantee to purchase smallholder green leaf and to pay farmers in good time. The commercial estates are also providing an array of services to the surrounding communities, including social development work such as providing access to health care, education and other social services to smallholder growers and the community.⁹ The performance of the contractual arrangements

⁹ Commercial estates are also active in construction and rehabilitation of

between smallholder farmers and commercial estates has been good with both parties respecting the terms of the contract. Chirwa and Kydd (2005) find that smallholder farmers under the ‘statutory’ contract earned less profit than those under private contracts with estates.

Secondly, some of the farmers of the new smallholder farmer associations have leased a tea factory from the Tea Research Foundation, Mbozi Tea Factory. The factory has the capacity of handling 40 tonnes of green leaves. Some of the groups belonging to this new association sell their tea to this leased factory managed by smallholder farmers. This leased factory provides transport services for tea collection, provides inputs to smallholder growers on credit, but does not offer extension services under the contract. In turn, the smallholder farmers commit to sell their green leaves to the factory. However, under this contract smallholder farmers still experience delays in payment of proceeds and the company does not have adequate transport facilities for timely collection of tea leaves.

4.0 Factors Influencing Productivity: Empirical Evidence

This study uses farm-level data among smallholder tea out-growers in Malawi collected by Chirwa and Kydd (2005). The data was obtained through a smallholder questionnaire on the socio-economic characteristics of households, the characteristics of smallholder tea growers, the production systems and cost structure of smallholder tea farming, contractual arrangements and marketing of smallholder tea. Data from 184 smallholder farmers with contractual arrangements with the state-owned processor, commercial estates and grower-leased tea processing factory are used in this analysis. The first part of the analysis focuses on the bivariate relationship between farmer characteristics and performance using analysis of variance. The second part provides multivariate analysis on the determinants of productivity among smallholder tea growers.

4.1 Bivariate Analysis

Table 1 shows differences in productivity and profitability among smallholder farmers by socio-economic characteristics and marketing channels. There are no significant gender differences in productivity by gender of the farmer. This contrasts with findings in Udry et al.

education facilities, provision of clean water and provision of health services. One commercial estate has an HIV clinic for the community while the other has extended its water supply to the communities and also provides transport facilities to the hospital.

(1995) and Udry (1996) in which women's plots were used more productively than men's plots although plot sizes among women are much smaller compared to those controlled by men. In terms of profitability of tea farming, male farmers make significantly higher profits than do female farmers, with male farmers earning 66 percent more profits than do female growers. With respect to education, there are significant relationships between performance indicators and the level of farmer's education. These relationships are statistically significant at the 5 percent level with respect to productivity and at the 1 percent level with respect to profitability. Farmers that have no education, tend to be less productive and earn less profits than farmers with at least some education. Farmers that completed senior primary education (standard 5 – 8) tend to be more productive while those with post-secondary education earn twice as much as those that completed senior secondary education (Form 3 – 4).

Table 1 Analysis of variance of productivity and profitability

Variable	Category	Productivity (Tonnes per Hectare)		Profitability (Malawi Kwacha)	
		Mean	F-statistic	Mean	F-statistic
Gender	Female	5.3066	0.25	21,641.91	3.14 ^c
	Male	5.7021		35,796.92	
Education	None	3.5305	2.37 ^b	19,290.33	3.43 ^a
	Std 1 – 4	5.5244		24,527.36	
	Std 5 – 8	6.9972		24,369.23	
	Form 1 – 2	6.1486		42,375.52	
	Form 3 – 4	6.0273		46,555.61	
	Post-secondary	5.8501		108,433.00	
Market	STECO	4.7908	4.79 ^a	19,962.80	4.58 ^b
	Grower-leased	4.1964		31,010.04	
	Estates	6.9718		44,359.73	

Note: Superscripts *a*, *b* and *c* represent significance at 1 percent, 5 percent and 10 percent levels, respectively.

The analysis of variance also shows that the type of market channel through which smallholder farmers sell their green tea leaves is important in explaining variations in productivity and profitability. The relationships are statistically significant at the 1 percent and 5 percent levels with respect to productivity and profitability, respectively. Smallholder farmers that sell to

commercial estates are more productive while those that sell to the grower-leased factory are less productive. The differences in the productivity can be attributed to the service packages embodied in the contractual arrangements between processors and smallholder growers. Commercial estates do offer extension services to farmers with timely input provisions and in some cases provision of high yielding fertilizers. On the other hand, there are no extension services for farmers that sell to the grower-leased factory and STECO and both have problems in providing inputs timely. These factors dampen productivity among smallholder farmers.

With respect to profitability, farmers that sell to commercial estates registered higher profits, twice as much as those earned by those that sell to STECO and 43 percent more than those that sell to the grower-leased factory. Apart from high productivity among smallholder farmers with contractual arrangements with commercial estates, smallholder farmers also benefit from cheaper inputs resulting from bulk purchases by estates. These inputs are offered to smallholder farmers under contractual arrangements at cost. These economies of mass purchases do not arise in STECO and the grower-leased factory. Nonetheless, one contributing factor that is resulting in higher profitability for farmers selling to the grower-leased factory is the higher price offered to farmers as first payment compared to prices offered by commercial estates and STECO.

4.2 *Econometric Evidence*

The bivariate analysis assumes that only a single factor explains variations in farm-level productivity. We therefore estimate a multivariate model of determinants of productivity to evaluate the importance of contractual arrangements while controlling for other factors similar to Udry et al. (1995). The following model is estimated:

$$Y_i = \beta_0 + \sum_{j=1}^8 \beta_j FC_i + \sum_{j=9}^{12} \beta_j L_i + \sum_{j=13}^{15} \beta_j I_i + \sum_{j=16}^{17} \beta_j MC_i + \varepsilon_i \quad (1)$$

where for each farmer i , Y is the yield of tea per hectare; FC is a vector of farmer characteristics; L is a vector of land size categories, I is a vector of input intensity; MC is the vector of contractual arrangements (market channels); and ε is the error term. Yield of tea is measured as tonnes of green tea leaves per hectare. The vector of farmer characteristics include the gender of the farmer (male = 1), the age and age squared of the farmer and dummy variables representing various categories of education completed by the

farmer. With respect to age, we expect a curve linear relationship in which there is initially a positive relationship between age and productivity but as farmers get older productivity also falls. Education is expected to be positively associated with farm level productivity – as educated farmers are likely to assimilate farm management techniques and are likely to be early adopters of innovative techniques compared to farmers without any education. Land sizes are represented by land size dummy variables to capture the productivity-land size relationship. In a labour-constraint environment, larger plots may yield lower outputs, hence the negative relationship between productivity and land size.

Three variables are included to control for variations in input intensity among smallholder farmers: quantity of fertilizers per hectares, quantity of family labour in man-days and use of hired labour represented by a dummy variable. Tea requires adequate fertilizers and is labour intensive, and we expect productivity to increase with increasing quantities of fertilizers and family labour. Owing to the high labour requirement in the production processes of tea, family labour may not be adequate and some smallholder farmers engage hired labour to augment household labour supply.

Smallholder tea is sold through three channels under contractual arrangements in which growers commit to supply to the tea processors in return for provision of inputs and extension services. The first channel is the state-owned tea factory, STECO, which provides inputs to its contract farmers but does not offer extension services. The second channel is the commercial estates that provide inputs and extension services to their contracted farmers. Finally, the grower-leased tea factory provides inputs to its contract farmers but without extension services. We expect farmers who sell to commercial estates to be more productive, due to the additional service such extension services and crop management that farmers receive but are not available to farmers that sell to STECO or the grower-leased factory.

Table 2 presents the description of variables and descriptive statistics of the variables used in the model. Output per hectare averaged 5.6 tonnes, almost half of the 12 tonnes in commercial estates. The average age of farmers is 52 years and 66 percent of farmers are male. About 25 percent of farmers have no education and only 12 percent have senior secondary and post-secondary education.

Table 2 Descriptive Statistics of Model Variables

Description of variables	Mean	S.D	Min	Max
Tea output per hectare	5.57	5.11	0.11	30.86
Dummy = 1 if farmer is male	0.66	0.48	0.00	1.00
Age of farmer	51.55	16.02	19.00	91.00
Age squared	2913.24	1720.09	361.0	8281.00
Dummy = 1 for no education	0.25	0.43	0.00	1.00
Dummy = 1 for junior primary education	0.18	0.38	0.00	1.00
Dummy = 1 for senior primary education	0.24	0.43	0.00	1.00
Dummy = 1 for junior secondary education	0.21	0.41	0.00	1.00
Dummy = 1 for senior secondary education	0.10	0.30	0.00	1.00
Dummy = 1 for post-secondary education	0.02	0.15	0.00	1.00
Dummy = 1 for land size less than 0.5 ha	0.42	0.49	0.00	1.00
Dummy = 1 for land size 0.5 – 0.99 ha	0.26	0.44	0.00	1.00
Dummy = 1 for land size 1.0 – 1.49 ha	0.10	0.31	0.00	1.00
Dummy = 1 for land size 1.50 – 1.99 ha	0.07	0.25	0.00	1.00
Dummy = 1 for land size > 1.99 ha	0.15	0.36	0.00	1.00
Quantity of fertilizer per hectare	210.03	229.64	0.00	1562.50
Family labour per hectare	464.16	765.03	13.57	7560.00
Dummy = 1 if farmer used hired labour	0.70	0.46	0.00	1.00
Dummy = 1 if market channel is estates	0.39	0.49	0.00	1.00
Dummy = 1 if market channel is STECO	0.48	0.50	0.00	1.00

A large proportion of smallholder farmers, 42 percent, cultivate tea on less than 0.5 hectares and only 32 percent cultivate on more than a hectare of land. The average quantity of fertilizers applied on tea farms is 210 kilograms and on average household use 464 man-days of family labour in tea production. The variations in input use across smallholder farmers are substantial, with the standard deviations being much larger than the means. Hired labour is used to augment family labour among 70 percent of smallholder farmers, reflecting the relative labour requirements of tea production.

Table 3 reports results of the ordinary least squares regression model. The variables explain about 44.2 percent of the variations in productivity. The F-statistics shows that the null hypothesis of no relationship between productivity and explanatory variables is rejected at the 1 percent level. With respect to farmer characteristics, only farmers' education is statistically significant. We find no statistical evidence of gender differences in productivity, although male farmers tend to be less productive than female farmers. The age of the farmer is also not an important variable in explaining productivity among smallholder farmers.

Table 3 Factors affecting tea productivity (*Dependent variable: output per hectare*)

Variable	coefficient	std error	t ratio
<i>Farmer characteristics</i>			
Male	-0.2186	0.559	-0.39
Age	-0.0208	0.098	-0.21
Age squared	0.0006	0.001	0.62
Junior primary education	2.0730	0.770	2.69 ^a
Senior primary education	2.6317	0.895	2.94 ^a
Junior secondary education	1.9728	0.865	2.28 ^b
Senior secondary education	3.7220	1.108	3.36 ^a
Post-secondary education	2.0946	1.386	1.51
<i>Plot size</i>			
Land size 0.50 – 0.99 hectares	-0.2176	0.718	-0.30
Land size 1.00 – 1.49 hectares	-0.7708	1.055	-0.73
Land size 1.50 – 1.99 hectares	0.7229	2.135	0.34
Land size > 1.99 hectares	-2.5408	0.784	-3.24 ^a
<i>Input intensity</i>			
Quantity of fertilizer per hectare	0.0065	0.002	3.26 ^a
Quantity of family labour per hectare	0.0020	0.000	5.59 ^a
Farmer used hired labour	1.4075	0.626	2.25 ^b
<i>Market channels</i>			
Estates	1.9390	0.818	2.37 ^b
STECO	0.7145	0.853	0.84
Constant	-0.6820	2.500	-0.27
R-Squared	0.442		
F (16,167)	15.18		
Probability >F	0.000		
Number of observations	184		

Notes: Superscripts *a*, *b* and *c* represent significance at 1 percent, 5 percent and 10 percent levels, respectively. The elasticity is computed at the means.

The education of the farmers plays a significant role in determining productivity. All education class dummies, except for post-secondary education, are statistically significant at conventional significance levels. The highest productivity is among smallholder farmers that completed senior secondary school and produce 3.7 tonnes per hectare more than smallholder farmers with no education (base category). This is followed by completion of senior primary education, in which farmers that completed senior primary education produce 2.63 tonnes per hectare more than those without education.

The relationship between productivity and land sizes is generally negative, confirming the inverse productivity-size hypothesis. Only the coefficient of the land size category of more than 1.99 hectares is statistically significant at the 1 percent level. The negative relationship implies that smallholder farmers that cultivate on larger plots of more than 1.99 hectares are less efficient than those that cultivate on less than 0.50 hectares (the base category). One explanation for the inefficiency of large smallholder farmers may be labour constraints, given the reliance on family labour among smallholder farmers.

With respect to input intensity, we find evidence that the quantity of fertilizer, quantity of family labour and hired labour may be some of the binding constraints on productivity among smallholder farmers. The coefficients of fertilizer and family labour intensity are statistically significant at the 1 percent level while the coefficient of the dummy for use of hired labour is statistically significant at the 5 percent level. Productivity is quite inelastic to fertilizer and family labour intensity, with computed elasticities for fertilizer and family labour intensity at the means being 0.247 and 0.163, respectively. Smallholder farmers that supplement family labour with hired labour also tend to be more productive and produce 1.4 tonnes per hectare more than those that only use family labour. Most of the hired labour used in tea production is short-term piece work in which the reward system is output based and more efficient than long-term employment.

Tea as a high fixed farming investment requires efficient processing facilities. The capital investment for processing facilities is beyond the reach of resource poor smallholder farmers. Participation of smallholder farmers in such high value farming activities has usually been facilitated by institutional arrangements between the processors and smallholder growers. Contracts between processors and smallholder farmers vary widely. The results in this study show that smallholder farmers that have contractual arrangements with commercial estates tend to be more productive than those that sell to the grower-leased factory and those that sell to the state-owned enterprise. The coefficient of the dummy for commercial estates is statistically significant at the 5 percent level. Smallholder farmers that sell to commercial estates produce 1.94 tonnes per hectare more than those that sell to the grower-leased factory (base category). On the other hand, smallholder farmers that sell to STECO do not statistically produce more output per hectare than those that sell to the grower-leased factory. There are several explanations for the differences in the impact of contractual arrangements on productivity. First, although all the three types of market channels provide inputs to contracted smallholder farmers,

farmers contracted by commercial estates have access to higher quality (high yielding) fertilizers. The provision of these fertilizers is also provided more timely by estates compared to STECO and the grower-leased factory. Secondly, extension services and farm management services are only provided by commercial estates to their contracted smallholder farmers. Chirwa and Kydd (2005) note that state failure led to the collapse of the extension service system which STECO and the grower-leased factory have not been able to replace. Given the importance of farm management and input regimes in tea production, farmers that do not have access to extension services are likely to produce inefficiently. Thirdly, delays in the payment of proceeds to smallholder farmers exist, particularly among smallholder farmers that sell to the grower-leased factory. The imperfect enforcement of the contract creates disincentives to productivity among smallholder farmers.

5.0 Conclusions

Contract farming has been hailed as one of the institutional arrangement that can facilitate the development of the agricultural sector among smallholder farmers where there are substantial market failures. Contract farming becomes particularly attractive in agricultural production processes that require high investments and high switching costs and in products in which further processing requires high capital investments such as tree crops. Contract farming facilitates smallholder farmers' access to technology, extension services, farm implements, input credit and market for produce, and in some cases, it facilitates access to export markets. The structure of contract farming varies from state authority to private contracts and from informal to formal contracts. There are also variations in the terms and conditions of the contracts with respect to the obligations of the contracting parties, the reward-penalty systems and the enforcement mechanisms.

In Malawi contract farming is not wide-spread and has mainly been introduced under special crop authorities created by the government. The government established crop authorities in tea, coffee and sugarcane to promote the production of these high value export crops among smallholder farmers. The state contracting authorities have a hybrid of a production and marketing contract in which they help farmers in the production process and market farmers' produce to private or state-owned companies that have processing facilities. With the problem of state-owned enterprises in the late 1980s and 1990s, most of these state contracting crop authorities have not been performing as expected and the government is actively privatising the activities.

In the tea sector, we have observed that due to state failure in facilitating contract farming, the institutional arrangements have changed from an exclusive 'statutory' contract to private contracts in which some of the smallholder farmers' groups are dealing directly with commercial estates and a grower-leased factory. The state contracting authority reneged on the delivery of services to smallholder farmers resulting in the erosion of extension services, lack of access to farm inputs, constraints in the transportation of tea and delays in the payment of farmers' proceeds. These problems motivated some farmers to break away from the smallholder association under the auspices of the state to form their own associations. These farmers have sought contractual arrangements directly with commercial estates and some have also been innovative by leasing a tea processing factory. The commercial estates are just replicating the contractual arrangements that smallholder farmers had with the state contracting authority. The only difference is that those farmers that are directly dealing with commercial estates have better services compared to those that have remained aligned to the state factory, STECO.

Farmers under private contracts have access to extension service provided by commercial estates, access to low cost and high quality inputs and receive their proceeds timely compared to farmers that have contractual arrangements with STECO. The findings in this study show that the service package in contractual arrangements in smallholder tea farming matters. Farmers that have private contracts with commercial estates tend to be more productive and more profitable than farmers that have contractual arrangements with the state factory. Smallholder farmers that sell to commercial estates are 1.7 times more productive than those that sell to STECO. These differences are due to differential services offered to smallholder farmers under the contracts. STECO does not provide extension and farm management services to smallholder farmers. On the other hand, commercial estates provide extension and farm management services to smallholder farmers and there is also a demonstration effect since most of the farmers are on the margins of commercial estates that contracts them.

Apart from the differences in contractual arrangements, we also find that farmers' education and input intensity are important determinants of productivity among smallholder tea farmers. Productivity, though not linear, increases with the level of education and is particularly high for farmers that had completed senior secondary school level compared to those with no education. Farmers that had access to more fertilizer input also tend to be more productive and those that had family labour resources also tend to be more productive. Farmers that complemented family labour with

hired labour are 1.4 times more productive than those that only used family labour.

The results suggest that better contractual arrangements for smallholder farmers have the potential to improve productivity in the smallholder tea sub-sector. Farm management and input regimes in tea are critical, and given the high illiteracy levels among smallholder farmers, extension and farm management services are important services that can contribute to high productivity in tea production. In the medium and long term, improvements in the productivity among smallholder farmers are likely to emerge from an active programme of infilling smallholder plots. This is a capital investment for farmers requiring financing through contractual arrangements with commercial farmers or through a programme managed by smallholder farmers. It is important, therefore, for either contracting firms or the government to provide extension services, seedlings for infilling and to ensure that inputs are provided timely to smallholder tea farmers if smallholder tea productivity is to match that of estates.

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