

## **Contract Farming and Technology Transfer in Ghana**

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### **Abstract**

Increasingly, agricultural firms rely upon smallholder farmers in developing countries, under contract, to meet consumer demands for greater quantities and improved qualities of agricultural products. Introducing technology transfer mechanisms that ensure the success of contract farming systems is thus essential. While the level of technology required for oil palm production is simple, this research proves that traditional farmers can cope with increasing levels of technology. The research found that oil palm outgrowers in Ghana received tangible benefits from contract farming, such as increased farming incomes, useful skill development and increased business acumen. The skills developed in oil palm cultivation were frequently utilised cultivating other tree crops, thus assisting farmers in their overall farming enterprises. The acquired knowledge and experience of living under contract led to economic benefits including farmers' conversion from subsistence to commercial farming and their investing in or owning other non-farming businesses in their local villages. There is a need, however, for outgrowers and their sponsors to improve their respective understanding of each other's needs, in order to resolve potential differences of opinion. The research found that the adaptability of technology transfer is an important consideration when designing and implementing outgrower schemes.

### **Introduction**

Given its potential to ensure food security and reduce rural poverty, biotechnology or the 'commercialisation of life sciences' is a fast growing technology.<sup>1</sup> In agricultural industries or 'agro-industry,' biotechnology advances have dramatically affected farm-input industries and the distribution channels that support them. Improvements in transport, storage and packaging technologies have fashioned a new growth of capital-intensive agro-industries in the wholesale and retail sectors. Meanwhile, the use of sophisticated equipment that improves product quality reduces labour demand and ensures that consistency in quality has expanded significantly, to such an extent that the implications

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<sup>1</sup> Rajendran A. Nair, *Principles of Biotechnology* (New Delhi: Swastik Publishers and Distributors, 2010), 290.

for the small farmer in developing countries should not be underestimated.<sup>2</sup> As Mayer noted, “one of the main opportunities, which globalization is said to offer to developing countries, is that they would have better access to the technological advances in developed countries.”<sup>3</sup>

In order to meet domestic and export agricultural targets, developing countries need improved technologies within the entire commodity chain from production to processing and distribution. Reardon and Barrett observed, “the necessity of agro-industrialization is almost indisputable... a plethora of questions remains as to how to get the right kind of agro-industrialization...to yield broad-based environmentally sustainable growth that creates wealth and improves human well-being.”<sup>4</sup> They argued that environmental sustainability must be the final judgment of any agricultural scheme, even in the face of a successful transfer of technology.<sup>5</sup> Noting the evidence that increasing the share of processed products in the agro-food sector implies an increase in capital to labour ratios, which could result in small farmers losing out to larger or corporate farms, Ehui and Delgado also observed that technology need not crowd out smallholders through the substitution of capital for labour.<sup>6</sup> In cases where the level of technology is appropriate to their resource base and constraints, Narayanan and Gulati emphasised that the speed of adoption is not significantly different between small and large farmers.<sup>7</sup> The issue, therefore, becomes the degree of access to technology rather than the technology *per se*.

The transfer of technology is frequently viewed as being a critical aspect in the relationship between the outgrower and the processor. The

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<sup>2</sup> Sudha Narayanan and Ashok Gulati, *Globalization and the Smallholders: A Review of Issues, Approaches and Implications*, Market and Structural Studies Division (MSSD) Discussion Paper 50 (Washington, DC: International Food Policy Research Institute, World Bank, 2002).

<sup>3</sup> Jorg Mayer, “Globalization, technology transfer and skill accumulation in low-income countries,” in *Globalization, Marginalization and Development*, ed. S. Mansoob Murshed (London: Routledge, 2002), 62.

<sup>4</sup> Thomas Reardon and Christopher B. Barrett, “Agro Industrialization, Globalization, and International Development: An Overview of Issues, Patterns and Determinants,” *Agricultural Economics* 23 (2000): 195-205.

<sup>5</sup> Reardon and Barrett, “Agro Industrialization, Globalization and International Development,” 5.

<sup>6</sup> Simeon Ehui and Christopher Delgado, *Economy-Wide Impacts of Technological Change in the Agro-food Production and Processing Sectors of Sub-Saharan Africa*, MSSD Discussion Paper 38 (Washington, DC: International Food Policy Research Institute, World Bank, 1999).

<sup>7</sup> Narayanan and Gulati, *Globalization and the Smallholders*, 50.

introduction of agricultural inputs subject to the guidelines and rules prescribed in the contract and overseen by sponsors' technicians determines the relationship between outgrowers and their sponsors.<sup>8</sup> Beyond the biological suitability of the introduction of a contracted crop into an area, the relationship forged between the outgrower and the contractor is a key factor in the determination of economic results and the subsequent general influence on local and regional socio-economic development.<sup>9</sup>

The technology used in oil palm cultivation is relatively basic when compared to other crops farmed under contract. Nevertheless, it is a viable strategy for increasing the productivity of smallholders, as it includes the transfer of both technical and managerial processes. The objective of the present study was to analyse the view held by proponents of contract farming systems that the transfer of technology is a strategy for increasing the productivity of smallholder agriculture. With this in mind, the study focused on the transfer of technology and training processes to oil palm outgrowers in Ghana. The research examined the variations in technology used by the interviewed outgrowers before and after entering into contract with their respective processors, along with the benefits that accrued to the outgrowers, including improvements in their farming systems and agricultural practices. The research variables included access to technology, credit, soil and nutrient sampling, agricultural inputs, agricultural extension and the use of mechanisation before and after entering into contract. Finally, the study assessed the implications of technology transfer under contract as perceived and articulated by the outgrowers, along with the specific training related to land care and land conservation that they received.

### **Research Methods**

The Kwaebirem District of the Eastern Region of Ghana provided the focus for this research. Following a broad and extensive review, the research fieldwork focused on contract farming in the oil palm sector in Ghana. The interviewed outgrowers associated with the Ghana Oil Palm Development Corporation (GOPDC) are from the villages of Asuom,

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<sup>8</sup> Seitz Vellema, *Society and Technology in Philippine Transnational Agribusiness* (Maastricht, Netherlands: Shaker Publishing, 2002), 3.

<sup>9</sup> Judith A. Carney, "Contracting a Food Staple in the Gambia," in *Living Under Contract: Contract Farming and Agrarian Transformation in Sub-Saharan Africa*, eds. Peter D. Little and Michael J. Watts (Madison, Wisconsin: University of Wisconsin Press, 1994), 5.

Akokoaso and Otumi. The Kwaebibirem district meets or exceeds the regional and national averages for key welfare indicators. Of particular interest to this research was the fact that both the unemployment and underemployment rates in the district are very low. The low unemployment rates in the district have a direct impact upon oil palm production, a crop heavily reliant upon the availability of labour. This affects the ability of outgrowers to plant further farm plots with palm oil in the face of real labour shortages and given their inability to stretch their own family's labour resources. The unemployment rate at the regional level is lower than the national level (3.7% versus 5.4%). Kwaebibirem's unemployment rate was 2.0% with the female rate higher than that of males (2.9% versus 1.0%). The underemployment rate was 16.4% at the regional level, compared to 9.1% at the district level and 13.6% nationally.<sup>10</sup> Structured and semi-structured interviews were conducted among: a) farmers under contract to produce oil palm for GOPDC; b) management personnel of GOPDC, particularly those who interface with the contracted farmers; and c) management personnel of the other three main oil palm producers in Ghana. In addition, focus group discussions with selected strata of farmers under contract were undertaken. The research also involved unstructured interviews with local and national non-governmental institutions, tertiary institutions and governmental departments and agencies, along with the collection of secondary data. The interviews took place over a three-month period between August and October 2004. Those interviewed were selected from a listing of all existing outgrowers (4487) under contract to GOPDC, who cultivated oil palm on 6,337 separate farm holdings. In total, the outgrowers farmed 1,772,255 oil palm trees on 12,659 hectares of land (139 trees/hectare). Most of the outgrowers farmed multiple non-contiguous plots of oil palm and, frequently, other crops as well. As such, the individual average plot or farm size does not always represent the farmer's total oil palm holdings or even the total area that he/she farms.<sup>11</sup> A decision was taken to concentrate the interviews in three of GOPDC's 12 districts after consultations with the GOPDC Outgrowers' Manager. The outgrowers in these three districts were representative of typical oil palm producers under contract with GOPDC. The three districts, Akokoaso, Asuom and Otumi, also made up close to 40% of the total number of GOPDC outgrowers. The randomly selected interviewees from Akokoaso had an average of 3.01 hectares of oil palm, while hectarage in Asuom and

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<sup>10</sup> Government of Ghana, *Ghana 2003: Core Welfare Indicators Questionnaire Survey* (Accra, Ghana: Ghana Statistical Service, 2004).

<sup>11</sup> Both the Ghanaian outgrowers and the GOPDC often used the terms "plot" and "farm" interchangeably.

Otumi averaged 4.11 hectares and 5.41 hectares, respectively. Table 1 shows the generated sample.

**Table 1: Selection of Interviewees amongst GOPDC Outgrowers**

District	Number of Outgrowers	Proportion to Total	Interval Size	Number of Interviewees
Akokoaso	572	30.4	64	9
Asuom	791	42.0	61	13
Otumi	521	27.6	65	8
Total	1,884			30

### **Contract Farming and Technology**

The industrialisation of agriculture has resulted in significant and widespread institutional, technological and social changes to agricultural production at a global level. These changes are largely the result of advances in biological and information technologies, along with general economic growth, the increasing scale of organisation and the relative modernisation of production, processing and distribution systems.<sup>12</sup> With Drabenstott's observation that there are two forces driving the process of agro-industrialisation—a new consumer and a new producer—the focus of the present discussion is on the new producers who are utilising new technological and managerial processes.<sup>13</sup> These technologies allow processors to produce customised products to meet the changing lifestyle and food safety concerns of the consumer. The harnessing of technology ensures that the consumer gets the quality, consistency, value and other product characteristics they demand.<sup>14</sup> The resultant increased levels of technology utilised in the manufacture and processing of agricultural commodities has resulted in the expansion of product uses and in the development of additional products.<sup>15</sup>

The rise of contract farming systems are quickly replacing spot markets for domestic agricultural crops, export agricultural crops and other agricultural products, and has heralded an increase in product quality and

<sup>12</sup> Lee F. Schrader, "Responses to Forces Shaping Agricultural Marketing: Contracting," *American Journal of Agricultural Economics* 68:5 (1986): 1161-1167.

<sup>13</sup> Mark Drabenstott, "Agricultural Industrialization: Implications for Economic Development and Public Policy," *Journal of Agricultural and Applied Economics* 27:1 (1995): 13-20.

<sup>14</sup> Drabenstott, "Agricultural Industrialization," 14.

<sup>15</sup> Joachim Von Braun and Eileen T. Kennedy, *Agricultural Commercialization, Economic Development, and Nutrition*(Baltimore: Johns Hopkins Uni Press, 1994), 1.

safety along with the use of more consistent technology.<sup>16</sup> Production contracts are increasingly linking small, medium and large-scale farmers in developing countries more directly to consumers in both domestic and foreign markets. These linkages are made possible by the increased vertical coordination of agricultural firms or retail distributors, as represented by both transnational corporations and indigenous bodies - national corporations - that cater for the changing demands of society.<sup>17</sup> At the heart of these changes are the technological advances and processes that allow for the increased industrialisation of the agricultural sector. Nevertheless, Kirsten and Sartorius cautioned, “although this sounds like an ideal situation, traditional markets do not handle these circumstances well.”<sup>18</sup> Indeed, changes in agricultural systems throughout the world are resulting in social, cultural and economic impacts. There is considerable debate on the positive and negative impacts of technology transfer by agribusiness to the developing world.<sup>19</sup> In this regard, some researchers have questioned the appropriateness of technology transfer by multinational corporations to developing economies, citing unspecified adverse effects on the social and political environment.<sup>20</sup>

Notwithstanding these concerns, the use of contract farming systems is rapidly increasing in developing countries.<sup>21</sup> The global sourcing of agricultural products in the developing world is resulting in the rapid replacement of more traditional forms of agriculture, along with the social interrelationships that supported them. Efficient agricultural production requires contracted farmers to have timely crop cultivation techniques, and considerations such as how and when to fertilise, weed, water, and

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<sup>16</sup> Vellema, *Society and Technology*, 4.

<sup>17</sup> Johann Kirsten and Kurt Sartorius, “Linking Agribusiness and Small-Scale Farmers in Developing Countries: Is There a New Role for Contract Farming?” *Development Southern Africa* 19:4 (2002): 503-529.

<sup>18</sup> Kirsten and Sartorius, “Linking Agribusiness,” 506.

<sup>19</sup> See, for example, Peter Dicken, *Global Shift: Industrial Change in a Turbulent World* (London, University of Manchester, 1986); Colin Poulton et al., “A New Institutional Economics Perspective on Current Policy Debates,” in *Smallholder Cash Crop Production under Market Liberalization: A New Institutional Economics Perspective*, eds. Andrew Dorward, Jonathan Kydd and Colin Poulton (Oxon, UK: CAB International, 1998), 1.

<sup>20</sup> See, for example, Dicken, *Global Shift: Industrial Change in a Turbulent World*.

<sup>21</sup> It is worth noting, however, that in Oya’s review of literature on contract farming in Sub-Saharan Africa, he concluded that “there is still no substantiation that CF is a dominant form of production ... [in view of] the lack of consistent statistics on CF’s incidence in African agriculture. See Carlos Oya, “Contract Farming in Sub-Saharan Africa: A Survey of Approaches, Debates and Issues,” *Journal of Agrarian Change*, 12 (January 2012), 1-33.

apply pesticides and fungicides are crucial to this process. It also requires that outgrowers have information on the product requirements of the processor, such as export standards related to chemical use.<sup>22</sup> This is of particular importance since the cultivation regime varies considerably in accordance with the technological requirements of the specific crop.

The contracted crop is frequently an important determinant of the socio-economic characteristics of the outgrower sought by processors.<sup>23</sup> Larger farmers have a distinct advantage over smaller farmers if processors rely on the contracted farmers to acquire technological and production information on their own. This is because larger producers are frequently better educated and can spread the fixed costs of acquiring knowledge over a broader revenue base. In the case of labour-intensive crops, such as oil palm, the small farmer has an advantage in that he/she can access labour from the extended family structure. The processor, however, must ensure that they mount an effective extension program to transfer both the optimal cultivation techniques to their small-scale outgrowers and to ensure that the contracted farmers are fully aware of their product requirements. As Poulton et al. observed, “efficiency of input use and farmers’ demand for inputs can be encouraged by the strengthening of technical knowledge and their use.”<sup>24</sup> None of this negates the frequently reported rationale of farmers in developing countries that they enter into production contracts to gain access to technology, technical skills and managerial processes.<sup>25</sup> To realise these benefits, farmers are prepared to surrender some of their independence in order to acquire new facets of production.<sup>26</sup> Through the application of new technology and the use of

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<sup>22</sup> Nigel Key and David Runsten, “Contract Farming, Smallholders, and Rural Development in Latin America: The Organization of Agro processing Firms and the Scale of Outgrower Production,” *World Development* 27:2 (1999): 381-401.

<sup>23</sup> David J. Glover, “Increasing the Benefits to Smallholders from Contract Farming: Problems for Farmers’ Organizations and Policy Makers,” *World Development* 15:4 (1987): 441-448.

<sup>24</sup> Colin Poulton, Andrew Dorward and Jonathan Kydd, “The Future of Small Farms: New Directions for Services, Institutions, and Intermediation,” *World Development* 38:10 (2010): 1413-1428.

<sup>25</sup> Cost reduction, access to information, market, credit, capital, plant and equipment would be the other reasons farmers are willing to enter into contract.

<sup>26</sup> For example, see Roger A. Clapp, “The Moral Economy of the Contract,” in *Living Under Contract: Contract Farming and Agrarian Transformation in Sub-Saharan Africa*, eds. Peter D. Little and Michael J. Watts (Madison, Wisconsin: University of Wisconsin Press, 1994), 2; David J. Glover, “Contract Farming and Commercialization of Agriculture in Developing Countries,” in *Agricultural Commercialization, Economic Development, and Nutrition*, eds. Joachim von Braun and Eileen T. Kennedy (Baltimore: Johns Hopkins University Press, 1994), 10; Erkan

modern managerial systems, outgrowers can increase production, reduce costs and augment their incomes.<sup>27</sup>

While contract farming schemes are increasingly being developed within the context of an agro-industrial environment characterised by increasing vertical coordination, the attempt to control production through the introduction of new technology rarely involves a standardisation of social relations in production. This is important because it affirms that there is no established ‘outgrower technology’ program that can be universally applied. As Vellema indicated, “... the institutional and organizational configurations of contract farming are extremely varied. There are many ways in which companies [...] organize production, both technically and socially.”<sup>28</sup>

The economic liberalisation and institutional reform that has taken place in the agricultural sector has occurred alongside a decline in the role of government in the provision of agricultural services and the dissemination of agricultural research via their extension services. Within this new economic order, the private sector has to assume the responsibility for the provision of agricultural research, extension, production and marketing services via outgrower contracts.<sup>29</sup> As a direct result, the institutional absorption and integration of farmers into new production systems has taken place. Watts argued that contract farming leads to the “deskilling of labour.”<sup>30</sup> While agreeing that this could be the case in highly regulated

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Rehber, *Vertical Coordination in the Agro-Food Industry and Contract Farming: A Comparative Study of Turkey and the USA*, Research Report 52 (Connecticut: Food Marketing Policy Center, 2000); and Kirsten and Sartorius, “Linking Agribusiness.”

<sup>27</sup> Roger A. Clapp, “Representing Reciprocity, Reproducing Domination: Ideology and the Labour Process in Latin American Contract Farming,” *Journal of Peasant Studies* 16 (1988): 5-39; Michael J. Watts, “Epilogue: Contracting, Social Labour, and Agrarian Transitions,” in *Living Under Contract: Contract Farming and Agrarian Transformation in Sub-Saharan Africa*, eds. Peter D. Little and Michael J. Watts (Madison, Wisconsin: University of Wisconsin Press, 1994b); and Pari Baumann, *Equity and Efficiency in Contract Farming Schemes: The Experience of Agricultural Tree Crops*, ODI Working Paper 139 (London: Overseas Development Institute, 2000).

<sup>28</sup> Vellema, *Society and Technology*, 3.

<sup>29</sup> Jonathan Coulter et al., *Marrying Farmer Cooperation and Contract Farming for Agricultural Service Provision in Sub-Saharan Africa*, ODI Natural Resources Perspectives 48 (London: Overseas Development Institute, 1999); and World Bank, *Building Institutions for Markets* (Washington, DC: World Bank, 2001).

<sup>30</sup> Michael J. Watts, “Life under Contract: Contract Farming, Agrarian Restructuring, and Flexible Accumulation,” in *Living Under Contract: Contract Farming and Agrarian Transformation in Sub-Saharan Africa*, eds. Peter D. Little and Michael J. Watts (Madison, Wisconsin: University of Wisconsin Press, 1994a), 1.



schemes, Grossman indicated that it is by no means a certainty, postulating that "... in many cases, peasants modify technical packages to suit local needs...."<sup>31</sup>

The success of liberalisation and institutional reform in the agricultural sector is contingent upon the willingness of the farmers to learn new technologies.<sup>32</sup> While recognising some of contract farming's negative features, Glover nevertheless pointed out that, "... one of contract farming's most promising features is its effectiveness in transferring technology to small farmers. To exclude small farmers from contract farming involving technologically dynamic crops is to exclude them from one of their few opportunities for exposure to new techniques."<sup>33</sup> Glover and Kusterer also observed that improvements to the farming and management skills of small farmers are possible over relatively short periods.<sup>34</sup>

### **Perspectives on Technology Transfer under Contract**

In theory, contractors can provide a better extension program than government because they have a more direct financial interest in the success of their outgrower programs. Baumann noted, however, that the variety of technology transfer arrangements under contract, both in their quality and sustainability, would affect overall success and sustainability. There was more likelihood of both success and sustainability where a contract farming scheme's implementation was not subject to a constant reinvention of its technology, its means of dissemination to outgrowers or the cropping procedures involved.<sup>35</sup> The continuity, quality and sustainability of extension services are other questions that arise during the analysis of contract farming schemes. There is a rapid transfer of technology upon the initial introduction of a new crop into an area.<sup>36</sup> Attention given to the new outgrowers is more intense at these times, but tends to fade away over time as the contractors direct their attention to more recently recruited outgrowers. Instructional written memoranda to

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<sup>31</sup> Lawrence Grossman, "Book Review - Living Under Contract: Contract Farming and Agrarian Transformation in Sub-Saharan Africa," *Annals of the Association of American Geographers* 85:1 (1995): 204-206.

<sup>32</sup> Vincent Benziger, "Small Fields, Big Money: Two Successful Programs in Helping Small Farmers Make the Transition to High Value-added Crops," *World Development* 24:11 (1996): 1681-1693.

<sup>33</sup> Glover, "Increasing the Benefits," 446.

<sup>34</sup> David Glover and Ken Kusterer, *Small Farmers, Big Business: Contract Farming and Rural Development* (London: MacMillan Press, 1990), 152.

<sup>35</sup> Baumann, *Equity and Efficiency*, 22.

<sup>36</sup> Glover and Kusterer, *Small Farmers, Big Business*, 1.

the outgrowers replace direct farm-level assistance and this can lead to feelings of abandonment amongst less secure outgrowers.<sup>37</sup> The training itself can vary from formal to informal, but usually consists of general orientations, on-farm demonstrations in planting, weeding and harvesting, on-farm inspections, and skills training on managerial systems such as record keeping of costs and sales. Nevertheless, there are benefits to outgrowers beyond the training associated with the transfer of technology.<sup>38</sup> Glover pointed out that outgrowers, through a direct association with the contractor's staff, learn about the business environment beyond their farm fields, including a better understanding of how the market works or how to run their farms as a business. Glover indicated that even if there are less than successful contractual results, outgrowers still apply the knowledge and experience gained under contract to other future situations.<sup>39</sup>

In his study of the relationship between technology transfer and organisational change in agriculture in the Philippines, Vellema postulated that institutional and cultural fundamentals were the basic ingredients in the success of any contract farming scheme. Vellema saw the transfer of technology as being the "... central element mediating the relationship between the contract grower and the company."<sup>40</sup> The provision of agricultural inputs, instructions and rules prescribed under the contract or emanating from technicians hired by processors, were essential for creating an environment in which the relationship between the parties can be nurtured, evolve and finally mature into a successful scheme. Vellema pointed out that the management of this knowledge and technology is transient because the entire process is "... imperfect and firm and commodity specific."<sup>41</sup> As such, decision-making related to the introduction and use of technology is institutionally removed from the farm level.<sup>42</sup> In spite of the fact that processors dominate the process, Vellema noted that "... success or failure in growers' fields not only

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<sup>37</sup> This was frequently reported during interviews with outgrowers in Ghana (Outgrower Interviews, 2004). It was also confirmed as being an issue during interviews with the outgrower program manager (Michael Kemeh-Mensah, 2004).

<sup>38</sup> Glover, "Increasing the Benefits to Smallholders from Contract Farming: Problems for Farmers' Organizations and Policy Makers," *World Development* 15:4 (1987): 441-8.

<sup>39</sup> Glover, "Contract Farming and Commercialization of Agriculture," 441.

<sup>40</sup> Vellema, *Society and Technology*, 3.

<sup>41</sup> Vellema, *Society and Technology*, 14.

<sup>42</sup> For example, see: Clapp, "The Moral Economy," 2; and David Burch et al., *Globalization and Agri-food Restructuring: Perspectives from the Australasia Region* (Singapore: Avebury, 1996).

depends on individual crop management but is interrelated to the design of cropping systems and the selection of (new) technologies inside the company.”<sup>43</sup>

### **Technology Transfer and Training in Ghana**

In Ghana, the transfer of technology to oil palm outgrowers was undertaken using informal training methodologies. No structured training materials for the transfer of either general or specific information on the cultivation or management of the crop were utilised. The identification of potential outgrowers took place at ‘outgrower information workshops’ organised by GOPDC. These farmer orientation meetings were, in reality, an occasion for the processor to ascertain whether the interested farmers met the criteria established for the selection of outgrowers. As observed by Barrett et al., contracts were offered to “farmers for whom the firm’s expected profits are the greatest ... based on readily observable indicators.”<sup>44</sup>

Family size was the focus of early recruitment of outgrowers in Ghana, with farmers having large immediate and/or extended families favoured by GOPDC. As a rule, GOPDC actively discouraged outgrowers from hiring paid casual labour as it directly influenced the outgrower’s net profit from oil palm. This lends support to the contention of Hazell et al., that when labour costs are an important component of agricultural costs, “small farms have significant advantage.”<sup>45</sup> When the outgrower program commenced in 1975, land ownership and access to finances were not key issues and almost all of the outgrowers contracted within the 30-kilometre radius of GOPDC’s processing mill were small tenant farmers.<sup>46</sup> All of the financial requirements of the outgrowers for seedlings, fertiliser and other requirements including tools and boots were financed by GOPDC on a loan basis.<sup>47</sup> This situation continued up until 1998 when GOPDC, by then under private sector ownership since 1995, cancelled the

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<sup>43</sup> Vellema, *Society and Technology*, 15.

<sup>44</sup> Christopher B. Barrett et al., “Smallholder Participation in Contract Farming: Comparative Evidence from Five Countries,” *World Development* 40:4 (2012), 718.

<sup>45</sup> Peter Hazell et al., “The Future of Small Farms: Trajectories and Policy Priorities,” *World Development* 38:10 (2010), 1352.

<sup>46</sup> A 30-kilometre radius was considered the maximum distance from the oil palm processing mill that the oil palm fruits (FFB) could be collected without losing their freshness and palm oil content.

<sup>47</sup> J. Sam Addo, *A Study of the Oil Palm Industry in Ghana* (Accra, Ghana: Ghana Oil Palm Development Association, 2000); Chet Aeschliman, *Case Study in Long Term Financing in Agriculture: GOPDC's Outgrower Program* (Accra, Ghana: Food and Agricultural Organization, 2001); and Inkumsah, interview by Paul Huddleston, 2004.

outgrowers' farm credit program. Following the selection of outgrowers, initial group meetings introduced the smallholders to oil palm cultivation and to basic on-farm management techniques. These oral presentations had limited structure and contained no written 'course material' for the outgrowers to retain and review later. Following group training sessions, on-farm oral instructions were subsequently provided to the outgrowers by the processor's extension agents on matters such as seedling spacing, weeding, harvesting, pruning and land conservation techniques.<sup>48</sup> Once again, there was no provision of any written materials for use by the outgrowers.

The participation of GOPDC in these on-site activities varied from activity to activity and over time. During the period before GOPDC changed to organic oil palm production, 'fertiliser teams' employed by GOPDC would go into outgrower farms to fertilise the oil palms themselves, charging a fee to the outgrowers for the service. The outgrowers in Ghana also received instructions in land care and land conservation. Once the outgrowers had completed the full cycle of training related to the key functions involved in oil palm cultivation, they continued to receive on-site visits and instructions from the processor's agricultural demonstrators. This field training waned over time, replaced by written memoranda sent to the outgrowers with instructions on when to undertake cyclical tasks such as brush or circle weeding and pruning.

### **Changes in the Use of Technology**

Among the issues concerning the appropriateness of technology transfer via contract farming schemes in developing countries are the cultural, social and economic costs to the host country. These can arise from problems associated with the imposition of an agribusiness corporate system based on profit, to rural societies cultivating land under traditional and frequently communal modes of production.<sup>49</sup> Contract farming schemes are designed on the basis of crops that are most appropriate in terms of their chances of agronomic success, market acceptance and their ease of adaptation in order to diversify farmers' cash crop bases.<sup>50</sup> These introduced innovations may include technological changes involving both managerial processes and new production processes, including the use of

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<sup>48</sup> Kemeh-Mensah, interview by Paul Huddleston, 2004.

<sup>49</sup> Charles Eaton, *Adaption Performance and Production Constraints of Contract Farming in China* (PhD thesis, Department of Geography, University of Western Australia, Perth, 1997).

<sup>50</sup> Charles Eaton and Andres Shepherd, *Contract Farming: Partnerships for Growth* (Rome: Food and Agriculture Organization of the United Nations, 2001).

fertilisers, new cultivars and pesticides. Material inputs may require additional finance on the part of farmers and agribusiness and may be the source of, not only innovative technical change, but also the farm credit required by the outgrowers. According to Harvey, smallholder farmer's gain access to technology, agricultural inputs, farm credit and management processes in this manner.<sup>51</sup> In this sense, contract farming systems can foster agricultural development. The main perception of the interviewed Ghanaian farmers was that their overall use of technology had not increased because of their exposure to the technology inherent in oil palm cultivation. When requested to indicate the level of use of 'technology' after entering into contract, 60% of the interviewed outgrowers indicated that their use of technology had remained the same. Thirty-two per cent, however, indicated a subsequent increase in technology use. Clearly, the adaptation of new technology was not the primary benefit sought by outgrowers in the study area.

Table 2 presents the responses of the outgrowers to specific questions on their changing use of farm inputs, credit, soil and leaf nutrient sampling, agricultural machinery and extension services. In terms of agricultural credit, entering into contract did change the source of the outgrower's funds. While 97% of the interviewed outgrowers self-financed their agricultural operations before entering into contract, only 36% did so after signing contracts. Sixty-four per cent of these farmers received agricultural credit via GOPDC. Moneylenders ceased to be a source of farm credit following the commencement of the oil palm contract farming scheme. There was a significant improvement in the utilisation of agricultural extension services under contract. Previously, 97% of the outgrowers had not or could not avail themselves of these services, and only 3% benefited from the services of the Ministry of Agriculture. After entering into contract, 100% of the outgrowers indicated that they now benefited from agricultural advisory services provided by the processor.

Outgrowers' use of fertiliser did not change following their entry into oil palm production contracts, as the use of fertiliser before contract farming was already high in any case. The source of the fertiliser did change as they reduced their open local market purchases from 97% to 19%, with GOPDC supplying the difference.<sup>52</sup> Nutrient sampling of both soils and vegetation increased significantly after the farmers became oil palm

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<sup>51</sup> Charles Harvey, *Rural Development and Administration in the Third World: Development Methods and Alternate Strategies* (Hampshire, Eng.: Aldershot, 1985).

<sup>52</sup> These figures reflect the situation before GOPDC adopted organic oil palm production in 1998.

**Table 2: Responses of Outgrowers on Sources of Funds, Services and Supplies Before and After Contract**

	Before Contract (per cent of Respondents)	After Contract (per cent of Respondents)
<b>Financing</b>		
Self-financed	97.0	36.0
Institutional	0.0	0.0
Local Money Lender	3.0	0.0
Oil Palm Processor	0.0	64.0
<b>Extension Services</b>		
Not Availed	97.0	0.0
Ministry of Agriculture	3.0	0.0
Other Sources	0.0	0.0
Oil Palm Processor	0.0	100.0
<b>Fertiliser Source</b>		
Not Used	0.0	0.0
Ministry of Agriculture	3.0	0.0
Local Market	97.0	19.0
Other Sources	0.0	0.0
Oil Palm Processor	0.0	81.0
<b>Soil/Leaf Sampling</b>		
Not Done	97.0	39.0
Ministry of Agriculture	3.0	0.0
Commercial Laboratories	0.0	0.0
Oil Palm Processor	0.0	61.0
<b>Machinery Use</b>		
Not Used	100.0	97.0
Rented	0.0	0.0
Owned	0.0	3.0

(Data Source: Interviews undertaken by authors in 2004)

outgrowers. Previously, 97% of the outgrowers indicated that they had never had their soil or plants tested for nutrients. After entering into outgrower contracts, the number who still did not test for nutrients declined to 39%. Sixty-one per cent of the outgrowers have availed themselves of GOPDC nutrient testing services. GOPDC indicated that

they provide this service on an ‘as required’ basis.<sup>53</sup> The extent of machinery use by the outgrowers has not changed following the establishment of the outgrower scheme.

### **Perceived Benefits from the Transfer of Technology**

Forty-three per cent of the outgrowers felt that the major benefit from the technology transfer was the training itself, while 46% believed that the benefit was in the transferability of the technical and managerial lessons to their farming in general.<sup>54</sup> This ‘transferability’ benefit increased to 82% when outgrowers provided a secondary response. In general, little difference exists between ‘training’ and ‘transferability.’ The outgrowers saw being a contract farmer as an opportunity to improve both their cultivation and managerial processes, resulting in an opportunity to improve their farming and increase their profits. When questioned on whether they had benefited overall from becoming contract farmers, outgrowers responded positively at 96%. They felt that their entry into oil palm contract farming had provided them with enhanced farming skills and that they had benefited overall. In addition, 100% of the farmers indicated that their farming generally had improved since becoming oil palm outgrowers. When asked, specifically, whether their agriculture had improved since becoming oil palm contractors, 54% indicated that the primary improvement to their agriculture rested in the fact that they now knew how to produce a crop that they were not familiar with before. The Ghanaian outgrowers (73%) indicated that they used the techniques that they acquired from the GOPDC extension agents to improve the husbandry of their other tree crops. This is contrary to the observation that while “... extension services are valued by those who receive them, only a small minority do.”<sup>55</sup>

### **Land Conservation and the Transfer of Technology**

Environmental protection plays a critical role in contract farming systems.<sup>56</sup> Deforestation, the depletion of water resources and soil

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<sup>53</sup> Kemeh-Mensah, interview by Paul Huddleston, 2004.

<sup>54</sup> Transferability is defined, in this case, to be the application of the cultivation and management practices acquired as oil palm outgrowers to other crops that they cultivate, e.g., cocoa, citrus, rubber or coffee.

<sup>55</sup> Poulton, “The Future of Small Farms: New Directions,” 1422.

<sup>56</sup> See David Burch, Roy Rickson and Ross Annels, “The Growth of Agribusiness: Environmental and Social Implications of Contract Farming,” in *Agriculture, Environment and Society: Contemporary Issues for Australia*, eds. Geoffrey Lawrence, Frank Vanclay and Brian Furze (Melbourne: MacMillan Company of Australia Pty. Ltd, 1992), 15; Peter D. Little, “Contract Farming and the Developmental Question,” in *Living Under Contract: Contract Farming and*

degradation are frequently major ecological concerns that accompany agricultural development. The nature of the crop produced and the physical environment determine the degree of environmental problems that can be associated with a contract farming scheme. While the economic rationale for the development of contract farming schemes can be quite well understood, physical and biological environmental degeneration may become a major economic threat to rural societies.<sup>57</sup> In the case of GOPDC in Ghana, it was evident that land care formed a specific focus of their ‘transfer of technology.’

In view of national and global concerns related to environmental protection, it is ethically and economically crucial that sponsors, their extension staff and the outgrowers themselves address environmental issues during the implementation of outgrower schemes. The most practical way sponsors can ensure ecological compatibility within contracts is to ensure that the selection of projected outgrower areas is undertaken in consultation with the farmer and qualified extension staff. From Eaton’s perspective, a farmer’s knowledge of the local historical and production performance of his land, including local micro-environmental factors, should ultimately form a considerable part of the decision-making process on agronomic and land care issues.<sup>58</sup> The willingness by outgrower scheme managers to incorporate local knowledge is imperative for the success of the outgrower system, although sponsors are not always astute enough to follow this advice.<sup>59</sup>

During the interviews, outgrowers indicated that the processor (GOPDC) was concerned about the long-term viability of their land and that the processor shared their concern for land conservation through the pertinent transfer of technical knowledge, through training, on land care techniques. Ninety-seven per cent of the outgrowers indicated that they had received specific training in land care and conservation. Interviews with GOPDC management indicated that the preservation of the environment and the outgrowers’ farms was of paramount importance to

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*Agrarian Transformation in Sub-Saharan Africa*, eds. Peter D. Little and Michael J. Watts (Madison, Wisconsin: University of Wisconsin Press, 1994), 7; and Leigh Miller, “Agribusiness, Contract Farmers and Land-use Sustainability in North-West Tasmania,” *Australian Geographer* 26:2 (1995): 104-111.

<sup>57</sup> Eaton, *Adaption Performance*, 299.

<sup>58</sup> Eaton, *Adaption Performance*, 300.

<sup>59</sup> Inkumsah, interview by Paul Huddleston, 2004.



them and GOPDC's own future profitability, as they now produce only organic oil palm in the GOPDC mill.

On the question of what training they had received from GOPDC, 47% of interviewees identified training related to methodologies on how to construct terraces and drainage canals to prevent slope erosion. The second most prevalent training received was on the use of the pruned palm fronds to construct 'banks' (33%), again with the intent of preventing rapid runoff and soil erosion. This was followed up by 20% of the outgrowers who received training on the planting of nitrogen fixing cover crops to decrease erosion while, at the same time, nourishing the oil palms.

### **Conclusion**

Contract farming is increasing rapidly in developing countries, affecting traditional agricultural practices and the supporting social interrelationships. The fact remains that contract farming in developing countries will increase in the future in response to the globalisation of agricultural systems. As such, there is a need to ensure that introduction of new technology is undertaken within a well-organised and effective development framework. It must involve proper transfer mechanisms in conjunction with technical and managerial processes that directly benefit outgrowers.

Outgrower contracts allow contract farming scheme sponsors to maintain a desired level of quantity and quality of production. In turn, the sponsors of contract farming schemes must provide technical advice to farmers on all facets of the production, transportation and handling of the crop that they market. These improved techniques are required to upgrade and promote agricultural commodities in markets that demand high quality standards. Inherent in this system is the requirement that outgrowers be provided with information on the product requirements of the processor, such as export standards related to chemical use and other crop characteristics.<sup>60</sup> This is of particular importance since the cultivation regime varies considerably in accordance with the technological requirements of each specific crop. These introduced agronomic adaptations, production techniques and managerial and financial processes may actually increase productivity and quality. In order to achieve these increases, private sector companies may offer more focused technological advisory services than government agricultural extension

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<sup>60</sup> Key and Runsten, "Contract Farming, Smallholders, and Rural Development," 386.

services have in the past, as they have a direct financial interest in improving farmers' production in terms of both quantity and quality.<sup>61</sup>

With the exception of the oil palm seedlings, a product of extensive hybridisation, the transfer of knowledge required for the production of oil palms represents the transfer of a relatively low level of technology. GOPDC outgrowers have readily accepted the technology tendered as part of the outgrower scheme. The data collected during the course of this research has provided little evidence to support the cautionary advice of Kirsten and Sartorius on the capacity of traditional systems to cope with increasing levels of technology.<sup>62</sup> Similarly, there was no evidence of any of the adverse effects on the social and political environments postulated by Dicken or Little and Watts. The production of oil palm under contract in Ghana does not lend itself to the situation portrayed by Ehui and Delgado, wherein small rural farmers have difficulty coping with the transfer of technology necessitated by agro-industrialisation that mandates an increase in the capital to labour ratio.<sup>63</sup> In the study area, it has been more a question of the access to technology rather than the technology *per se*, as suggested by Narayanan and Gulati.<sup>64</sup>

As indicated in the literature, research into outgrower schemes has revealed considerable conflict between sponsors and outgrowers; but in the study area investigated as part of this research, the outgrowers were prepared to surrender some of their independence to gain access to technology. Virtually all (96%) of the outgrowers felt that they had benefited from being under contract and that they had improved as farmers (100%). These findings were supported by Baumann, in his analysis of outgrower schemes and outgrower crops.<sup>65</sup> It is important, however, to bear in mind that the benefits derived from being under contract will vary depending upon the specific crop and the technology associated with it. However, it is interesting to point out that, even within a specific crop, differences in terms of the outgrower scheme and programs adopted by the company as part of their corporate social responsibility have a bearing on its relative success.<sup>66</sup> In the case of the oil palm, while only the pruning and harvesting functions are unique to it,

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<sup>61</sup> Glover and Kusterer, *Small Farmers, Big Business*, 9.

<sup>62</sup> Kirsten and Sartorius, "Linking Agribusiness," 506.

<sup>63</sup> Simeon Ehui and Christopher Delgado. *Economy-Wide Impacts*

<sup>64</sup> Narayanan and Gulati, *Globalization and the Smallholders*, 50.

<sup>65</sup> Baumann, *Equity and Efficiency*.

<sup>66</sup> Niels Fold, "Transnational Sourcing Practices in Ghana's Perennial Crop Sectors," *Journal of Agrarian Change* 8 (January 2008): 108-109.

the managerial, financial and weeding systems, and tree planting schematic layouts, have proven useful to the outgrowers in their production of other tree cash crops.

The present research found that the transfer of technology, simple as it is in the case of oil palm cultivation, was frequently a central issue in the determination of the relationship between the processor and the outgrower. For example, outgrowers frequently cited the frequency and intensity of weeding as a valid cause for questioning the processors' understanding of the local agricultural environment. This lack of understanding was also evident in the understanding of cultural norms and was not restricted to technological aspects of oil palm production. Oil palm processors contractually require the outgrowers to maintain the oil palms for 25 years, while the outgrowers argue that the peak production of the oil palm falls off by its 18th year. This difference of opinion has influenced the relationship between the processor and the outgrower in Ghana. In reality, the issue is partly a cultural one in a society that places a high premium on the production of palm wine produced, for cultural and religious requirements, in the felled trunks of the old oil palm trees.<sup>67</sup> Hence, the Ghanaian outgrower sees greater value in an earlier termination of the oil palm, in both economic and cultural terms, than does the processor.

Contract farming systems can introduce adverse consequences to the environment.<sup>68</sup> Variations, dependent upon the crop that is under production, do occur, and it is imperative that the views of the extension staff, coupled with those of the outgrowers, be taken into consideration during the design and implementation of outgrower schemes.<sup>69</sup> Based upon interviews with the outgrower scheme managers at GOPDC and the interviews held with their outgrowers, it was apparent that GOPDC thoroughly integrates land conservation training into their outgrower-training program. As Fold noted, environmentally friendly cultivation of organic oil palms characterised GOPDC plantation areas before 2000.<sup>70</sup> These results are interesting given that outgrowers in Ghana are virtually all tenant farmers, i.e., they do not own the land that they farm. One might therefore expect the focus on environmental land care training to be of reduced interest to the Ghanaian outgrower.

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<sup>67</sup> Edwin A. Gyasi, interview by Paul Huddleston, 2004.

<sup>68</sup> See Miller, "Agribusiness, Contract Farmers and Land-use Sustainability," 110.

<sup>69</sup> Eaton and Sheppard, *Contract Farming: Partnerships for Growth*, 233.

<sup>70</sup> Fold, "Transnational Sourcing Practices," 109.

Contract farming has received the endorsement of multilateral and bilateral donors in part because the proponents (contractors or processors) of outgrower schemes in developing countries work closely with and transfer agricultural technology to smallholder farmers. Their actions are not entirely altruistic, as these transnational or national corporations have considerable self-interest involved in ensuring outgrowers' success in achieving product quality, quantity and the timeliness of product delivery. Outgrower success also presents an opportunity for the processor to attract additional farmers into the scheme. The significance of the transfer of knowledge involved in the oil palm industry in Ghana is that it allows for its general adaptability and transferability into the outgrowers' farming businesses. This willingness to adopt new technology, as Benziger noted, determines the success of an outgrower scheme.<sup>71</sup> This has certainly taken place in the GOPDC outgrower scheme investigated as part of this research. The outgrowers' acceptance of new technology has resulted in their increased self-confidence and improved business acumen, allowing them to transfer this knowledge into other facets of their lives and into other business ventures. The evidence reported here supports Glover's contention that outgrowers benefit beyond the actual content of the technology transferred to them, and that outgrowers use the knowledge and experience of living under contract in other situations.<sup>72</sup> As such, the introduction of new technology, as part of a contract farming scheme, can open up new markets and create economic benefits for smallholder farmers.

In conclusion, the development and transfer of technology remains a central component of all contract farming schemes. While outgrowers may resent not being included in the deliberations on the application of technology in their own fields, their contributions and their fine-tuning of the technology use could make the difference between a scheme's success and failure. Contract farming should be seen as integral to the developmental process since, as Kirsten and Sartorius noted, "... the educational experience of interacting with an agricultural partner can provide a platform for farmers in developing countries ... to convert from subsistence to commercial farming."<sup>73</sup> The value of contract farming, at least in part, rests in the benefits derived from the transfer of new technology and farm management processes.

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<sup>71</sup> Benziger, "Small Fields, Big Money," 1686.

<sup>72</sup> Glover, "Contract Farming and Commercialization of Agriculture," 173.

<sup>73</sup> Kirsten and Sartorius, "Linking Agribusiness," 516.

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