

The interlinks between agricultural export diversification, food security and livelihood of farm households in southern Ghana

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Abstract

Policy makers in developing countries have been concerned with the economic and political risks associated with heavy dependence on few specialized raw materials as main sources of government revenue and foreign exchange. Development partners and donor agencies have equally extolled the need for these countries to diversify their export base as a poverty reduction strategy. As a result, several African countries have tended to focus on non-traditional agricultural exports (NTEs) which reflect their comparative advantage and for many countries the export of horticultural crops has been favored.

This study focuses on a household survey undertaken in the forest and coastal savannah transition zones of Ghana, where the farming system has undergone a remarkable transition from an established system of food crop farming for sale to urban consumers to an intensive production of fruits and vegetable crops for export to European consumers. Econometric analysis shows that though export horticulture has a positive impact on the wellbeing of the majority of households, the chronically poor households are structurally impeded from seizing the available opportunities due to poor resource endowment and liquidity constraints.

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Background information

Ghana is relatively better endowed with natural resources than most other countries in Africa. It is predominantly an export led economy having about twice the per capita output of the poorer countries in West Africa. Even so, it remains heavily dependent on international financial and technical assistance. Gold, Timber and Cocoa are traditionally the major sources of foreign exchange. The domestic economy continuous to revolve around subsistence agriculture, which accounts for about two-fifth of GDP and employs 60% of the work force, constituting mainly of small scale farmers. Between the early 1980's and late 1990's, the country made mixed progress under separate Structural Adjustment Programs (SAP) in co-operation with the IMF. As part of the SAP, Ghana decided to diversify her export base through the introduction and promotion of Non-traditional exports in 1983. These involved developments and discovery of new export commodities of agricultural products, processed and semi-processed products, and handicrafts. Political uncertainty and a depressed cocoa market led to disappointing growth and a huge debt quotient ratio in 2000 leading to its decision to opt for the Highly Indebted Poor Countries (HIPC)¹ Initiative in 2001.

The current national policy thrust focuses on tighter monetary and fiscal policies, accelerated privatization, and improvement of social services. Substantial benefits in terms of debt relief and improvement of basic macroeconomic indicators were accrued from the HIPC Initiative by its completion point in July 2004. On the minus side, recent increases in fuel prices and the accompanying rises in utility tariffs, public sector wage increases, increasing youth unemployment, and refugee admittance commitments have led to rising public discontent with the country's austerity measures albeit improved political stability. In 2004, the agricultural sector comprising mainly of Cocoa, Timber and Non-traditionals accounted for 37.9% of the total GDP whereas industry, services and indirect taxes were represented by 24.7% and 28.6% and 8.8% respectively (GSS, 2005).

Problem statement

Policy makers in developing countries have been concerned with the economic and political risks associated with heavy dependence on specialized raw materials as main sources of government revenue and foreign exchange. Development partners and donor agencies have equally extolled the need for these countries to diversify their export base as a poverty reduction strategy. To this end, several African countries have tended to focus on non-traditional exports which reflect their comparative advantage and for many countries the export of non-traditional horticultural crops has been favored. Consequently, several reasons have been advanced for the recent boom in horticultural exports from Africa (Jaffee, 1995; Barrett et al., 1997; Dixie, 1999; Malter et al., 1999). In Ghana, crops such as pineapple, papaya and mangoes appear promising because of their high labor intensity and the expanding demand for fruits in industrialized nations, most especially during the winter months. Various studies have shown that countries can improve their welfare by opening up their borders to freer trade. Moreover, there is a worldwide move toward economic integration, the EU being the most prominent example. Not only is it foreseen that this movement will improve welfare of a country but it's competitiveness could also improve by generating foreign exchange earnings and fiscal revenues to increase the income of smallholders and to provide employment for the rural poor. In response to a liberalized trade regime, horticultural exports have grown dramatically in many Sub-Saharan African countries while many other traditional agricultural commodities have faced stagnation and declining world prices. Undoubtedly, the horticultural industry provides an important source of foreign exchange, generates substantial employment and has contributed to the upgrading of agricultural production skills. But has the growth in export horticulture contributed significantly to smallholder food security and general livelihood? A number of studies have raised concerns about the microeconomic performance of non-traditional exports in developing economies. Most of such concerns are related to the trade-offs between food and export cash cropping systems due to the possibility of competition for

resources between export crops and food crops resulting from a potential re-allocation of resources from one to the other and their effect on household caloric availability. Indeed potential synergy effects have been identified between cash-crop investment and food productivity, whereby positive spillover benefits of increased input are made possible for food crops through cash crop delivery channels (Dione 1989; Goetz 1993; Goverah and Jayne 2003; Von Braun 1995). Consequently, there are critics of such policies that advocate cash crop production (Von Braun and Kennedy 1986; Weber et al. 1988). They argue that the benefits have never materialized with the premise that, in areas where cash crop production has increased, food consumption and the nutritional status of the poorest households have deteriorated.

Within the Ghanaian context, the main effects of the introduction of export cropping in the has been the significant deterioration in access to land as smallholder food crop farms are being consolidated into larger scale export crop farms. The increased pressure on arable lands for human settlement resulting from population explosion and increasing spread of urban activities from the capital city of Accra towards surrounding villages are the pressing underlying concerns that need the immediate attention of researchers. So far the major concern of the Ghanaian government and donor institutions has been macroeconomic growth in terms of physical output and export earnings of these new crops. At the microeconomic level, the short and long-term impacts of the booming non-traditional exports vis-à-vis their distributional effects in terms of household resource allocation patterns, food security and livelihood linkages still remain under-investigated. In an attempt to fill this void, this paper emphasizes on the linkages between export diversification policies and the microeconomic performance of some horticultural export crop producing communities in southern Ghana. Based on an analysis of the pattern and dynamics of resource allocation for various household categories, this paper attempts to assess the determinants and trade-offs of land and labor resource allocation for food

and horticultural export crop production in southern Ghana and indicate the implications for agricultural trade policy and research.

Methodology

The analysis presented in this paper is based on a primary data set collected by a survey of 200 farm households in southern Ghana. The survey was carried out from May to October 2004, covering the 2003/2004 cropping season. In accordance with the importance of the various horticultural crops to total export earnings, 7 villages with 20 households each within the pineapple cultivated based communities of the *Akwapim south* district and 3 villages with 20 households each from the mango cultivated based communities of the *Dangme west* district were selected for the survey using the stratified random sampling approach.

Descriptive statistic tools were initially used to categorize the sampled farm households into three main groups based on the type of crops grown and other socio-economic characteristics. On the basis of this typology, the respondents comprised of 44 Non-Horticultural households, 118 Horticultural and Staple households, and 38 Horticultural households. The major differences and similarities among the three household categories have been outlined based on the extent of participation in export horticulture. An overview of the specific characteristics and constraints encountered in the marketing of horticultural export crops is further enumerated. Secondly, econometric techniques involving standard Probit and Logistic regression models were used to estimate the determinants of household participation in export horticulture and food availability respectively.

Results from the field survey gave an initial indication that participation in export horticulture, primarily appears to increase the average per capita income of the household. However, as explained by McCULLOCH and OTA (2002), such descriptive statistics do not take account of

other possible differences in the characteristics of adopters and non-adopters and it may be these differences that are giving rise to the disparities in income rather than their participation in export horticulture. To account for this, the traditional Log-linear mincerian wage equation was used to construct a model of income determination to analyze the incomes of households producing only horticultural export crops with those producing mainly food crops vis-à-vis those indulged in the combined scenario, while making use of the same explanatory variables employed in the participation determination model. Based on the assumption that households typically distribute their labor and capital resources over a set of productive activities, a reduced form expression for income Y , as a function of the explanatory variables is specified and accordingly estimated as:

$$\ln(Y) = \beta_0 + \beta_1 HHCrop + \beta_2 Demog + \beta_3 Educ + \beta_4 Employ + \beta_5 Asset + \beta_6 Misc + \beta_7 IntNTE + \varepsilon$$

Where, *HHCrop* is a vector of dummy variables indicating categories of non-horticultural export crops grown by the household; *Demog* is a vector of demographic characteristics; *Educ* is a variable indicating the educational level attained by the household head; *Employ* is a vector of dummy variables indicating whether at least one household member participates in a specific off-farm occupation; *Asset* is a vector of asset and access variables; *Misc* is dummy variable indicating miscellaneous income receipt; *IntNTE* is a vector of variables indicating the intensity of cultivation of non-traditional export crops and ε is an error term.

Results and Discussion

Descriptive statistics

The field study results indicate which households decide whether or not to participate in the cultivation of horticultural export crops based on perceived benefits, opportunities and constraints considering the risks and probabilities of occurrence. Generally, Horticultural

households have the highest land resource in terms of endowment, total cultivated farm size, farm size per capita and fallow land area. This is followed by Horticultural and Staple households and finally Non-horticultural households in chronological order. The Kruskal-Wallis test in Table 1 shows statistically significant differences for the landholding characteristics of the household categories except for the fallow land area. This might be expected because land ownership status of some households in the various categories are based on traditional inheritance patterns or asset symbolization status of land as a result of which some households possess parcels of land that are not necessarily under current cultivation. Per capita income is also highest for Horticultural households, followed by Horticultural and Staple households with Non-horticultural households having the lowest income (Afari-Sefa, forthcoming).

Participation in export horticulture is driven by a diversity of expectations, many of which are an indication of how the people concerned understand the opportunities and challenges facing them. It was observed that 78% of the 200 sampled households are cultivators of horticultural export crops. This is an obvious reflection of the magnificent role these crops play in the daily lives of most households in the study area. The pooled results of the analysis indicate that pineapple cultivation is the most widely adopted crop by indigenous small scale farmers, whereas the cultivation of crops such as mangoes required a longer investment period and hence mostly adopted by immigrant large-scale commercial farmers.

It is clear from Table 2a that slightly above half the adopter respondents (50.7%) are engaged in cultivation of export crops primarily because of monetary gains to increase their capital assets, as they perceive that it is more profitable than cultivating the traditional staple crops. Perceptions of such monetary gains from NTEs came from seeing what their neighbors were doing or as a result of visits from exporters who were looking for people to contract as out-growers. This is followed by 37.5% of households who indicated that they adopted these NTE

crops because they were introduced to them by other contact or innovative farmers within their neighborhood and farmer associations. The results also confirm the inadequate provision of extension services as represented by 5.3% of Non-horticultural households who advertently reported that their adoption decisions were based on the efforts of their change agents. This observation is not quite surprising as the extension service of the Ministry of Food and Agriculture (MoFA) is constrained by numerous organizational and resource availability bottlenecks that obviously affect the quantity and quality of their service delivery. In addition, six respondents who had become full-time horticultural growers were once engaged off-farm but had come to prefer growing for the export market as their main source of income. However, five households reported that they started growing for the export market as a matter of tradition. Many of these were young household heads that had inherited the cultivation of export crops from parents while others joined because of the transformations that they had witnessed from neighbors who were already engaged in growing for the export market.

While the driven forces of horticultural export crop adoption seems quite clear and understandable, diverse reasons were stated by non-adopters as summarized in Table 2b. The majority of non-adopter households unanimously responded that they are not into horticultural export crop production because they do not have the money to engage in production for export. There is reason to be suspicious of such responses when they come in reply to questions put by a perceived “supposedly lucky and wealthy” fellow native studying abroad or enumerators employed by him. Nevertheless, the claim has merits in its own right. Successful cultivation of most horticultural export crops, especially pineapples and mangoes demands far more intensive use of purchased inputs, including planting materials, chemicals, and labor and perhaps land than does the cultivation of alternative crops. Moreover, Goldstein and Udry (1999) noted that exporters purchase entire plots of pineapples for export, and will not deal with plots below a certain minimum size. Consequently, results obtained from interviewing exporters confirm that

such an option was aimed at minimizing the serious problems of non-uniformity in quality of exported fruits to meet the demands of importing agents. Specifically, 31.8% of Non-horticultural households stated that both land and cash constraints were their major reasons for not participating in the sector. They further claimed that they could only afford committing the little available resources for the cultivation of staples to feed their farm family. This category of respondents are mostly very poor subsistence households who cannot afford the initial capital needed for leasing land and procuring expensive agrochemicals only to expect returns after 18 months as pertains in the case for pineapples. For mango cultivating households within this category, it is virtually impossible for them to engage in permanent tree cultivation of lands which they had leased for just 3-5 years or even less in some cases. Other households (27.3%) are either skeptical of the marketing constraints associated with the longer payment duration by export agencies (case of pineapples) or that they are simply not in the position to commit resources for a minimum of 3 years before reaping profits as in the case of mangoes. Nine respondents stated that they were not into export crop production because in addition to the high initial capital requirements, they are not in the position to risk into the cultivation of crops which require rapidly changing technological know-how in terms of agrochemical application and extreme stringent cultural practices.

As would be noted from the agronomic point of view, it is not all fruits which are considered exportable. Depending on a farmers' level of experience, between 50-90% of matured fruits may satisfy requirements for export². The remaining fruits may be rejected because they do not meet the requisite size, weight, and shape specifications. The risk of fruit rejection does not even only end at the farm gate level but continues through the marketing chain to the national ports through till arrival at importing destination countries, where large proportions of consignments shipped may sometimes be rejected for failing to meet the requisite quality standards. The rejection of fruits also occurs at the premises of local export processing

companies, where in addition to accepted pre-selected weight ranges, a refractometre is used to test fruit sweetness and acidity. The majority of respondents that do not cultivate horticultural export crops within this risk-prone category were found to be older household heads that have been used to the practice of cultivating staple crops for a minimum of 20 years.

An equally major hindrance to participation within the horticultural export sector stems from the excessive labor demands for these crops. Pineapple is in particular less forgiving to the slightest neglect in terms of cultural practices during its 18-month life cycle. Arguably, the emerging developmental trends in labor demand and supply resulting from the export boom in the study area is making it pretty difficult to enforce hired labor contracts with individuals. The only means of realizing that the work contracted to hired labor is fully accomplished is either by ensuring constant physical supervision or matching a specific quantified task with a pre-determined wage since the traditional practice of matching payment with working hours seems no longer practical.

It was evident from the field survey, that agricultural laborers would prefer to engage in several different short tasks to maximize income in the course of a single working manday than get committed to working on only one person's farm. This tends to increase the transaction costs for labor especially for new entrants, who usually lack experience in the industry. Four out of the 44 households also do not cultivate horticultural export crops because they prefer to concentrate mainly on their paid non-farm occupation and are hitherto only interested to obtain staples to feed their family. These respondents were of the view that with the complex distortions in the food crop market arising from the export boom, they deem it very necessary to be self sufficient in staple production.

Study findings further show that, the number of years that these farmers had spent growing crops for the export market did vary markedly for different crops within the various agro-ecological zones (Figure 1). Mango is generally a recent introduction within the Ghanaian

horticultural industry with the oldest plantations being about 12 years old on the average as compared to pineapples which date back to the early 1980's. Prior to the introduction of the former within the *Dangme west* district, most households were engaged in the cultivation of chilies for both the export and the local market.

Marketing of Horticultural Export Crop Produce

Several marketing constraints tend to reduce the competitiveness of Ghana's horticultural export crops on international markets. Figure 2 shows a general overview of the sequence of marketing channels available to the smallholder whereas Figure 3 presents the major farm gate direct marketing options for exportable horticultural fruits of the smallholder. The trend from the Figure 3 is a revelation of the dominance of private exporters in the purchase of fresh fruits from farm households as represented by 70.3 % of the 145 respondents who had sold products in the survey season. These private exporters include to a large-scale producer cum exporter farms who are sometimes faced with the need for outsourcing fresh fruits from smallholders in order to meet the demanded export volumes of their European importers. Unfortunately, the nature of marketing arrangement is such that farm households would have to wait for a period of 2-3 months in order to receive payment for their produce. This is on account of the nature of the terms of international trade payments, whereby exporters would also have to wait until their importing partners in the European Union acknowledge receipt and acceptance of shipped consignments and other documentation before claiming payments.

Meanwhile, the difficulties in enforcing contractual agreements with importers within the framework of international trade create a lot of risk for exporters who also find it difficult to honor their payment obligations to smallholders in case of *force majeure* or when the unexpected happens. In the course of the field survey, some respondents confirmed having had terrible past experiences with exporters to the extent where, payments for whole plots of

harvested fruits have still been outstanding for periods ranging from few months to as many as 7 years.

On the contrary, members of the *Farmapine Ghana Limited*, a Farmer Ownership Model Co-operative³ are under contractual obligation to sell their exportable fruits to the company. They constitute 13.8% of the respondents. At the commencement of the company's operations in September 1999, members used to receive payments for their produce two weeks after fruit submission. Changing competitive trends and ever increasing emphasis on quality standards in international markets coupled with internal management problems have necessitated an increase in the payment duration for farmer shareholders than originally foreseen. As at the peak of the field study in mid 2004, the company was in management crisis and payment to members for produce submitted for the past 5 months were still outstanding.

A further 4.8% of the households, who are engaged in official outgrower schemes with exporting companies, received payments for their produce 2 months after fruit submission to their contract partners. Ten respondents in all sold their produce mainly to the *Blue Sky Company Ltd.*, a Joint Ghanaian-British export processing firm situated in the "heart" of the survey zone. Depending on the prevailing market situation, most mango farmers receive instant payment whereas pineapple farmers received their payment 2 weeks after fruit submission to the company, an indication of the fact that establishing more processing companies would improve the payment situation for smallholders. Indeed, problems of risk in contract enforcement and quality control of sliced fresh fruits to overseas importers could be reduced to the barest minimum at the factory level compared to the rather long marketing chain associated with the export of raw fresh fruits abroad. In principle, almost all producing households sell smaller fruits which are not selected for export on the local market to manufacturers of local soft drinks and consumers of fresh fruits at reduced prices. In the course of the survey however,

it was observed that six households were forced under circumstances beyond their control to sell their whole plots of exportable and non-exportable fruits to local market women at cutthroat prices. These were mainly new entrants of pineapple cultivators who had not established relationships with known exporters not forgetting the gradual eroding preference for the traditional smooth cayenne pineapple variety by European consumers.

Determinants of Participation in Horticultural Export Crop Production

In accordance with the major objective of this study, the explanatory variables have been chosen from factors and characteristics related to profitability of the crop or resource requirements for production and exogenous factors (locational and institutional) that are closely associated with input and market access for horticultural export crop produce. Participation in export horticulture was defined in terms of a dichotomous variable that takes the value of 1, if households cultivated a horticultural export crop and 0, otherwise. As expected the estimated coefficients of the hypothesized explanatory variables have the *priori* expected signs and most of the coefficients are statistically significant at the 10 percent (or better) probability level. The likelihood ratio statistic was used to test the significance of the entire Probit model. The model chi-square value of 79.44 at 11 degrees of freedom was found significant at the 1% level implying that the independent variables, taken together, significantly influences a household's decision to cultivate a horticultural export crop (Table 3). The pseudo-R² value, a measure of the goodness of fit implies that 60.3% of the original variation of the dependent variable is explained by the fitted model and still there are other determinants of participation in export horticulture that are not included in the model. Nevertheless, the model correctly predicted 82% of participation status in horticultural exports for the sampled households. Age, participation in non-farm occupation, land endowment, nature of road network, access to capital inputs and cultivation of local cash crops significantly influences the household's decision to cultivate horticultural export crops.

The results show that the age of head has a strong negative effect on cultivation of horticultural export crops, implying that households with older heads are unlikely to cultivate NTEs. This is anticipated because the cultivation of export crops requires much care and risk in terms of new technology and precision in the application of various cultural practices that may not be of paramount interest to older farmers. Moreover, the existence of a large cohort of younger farmers in the sample could have attributed to this observation. These were mostly resident natives, city returnee natives and other immigrants, who have basically opted into farming mainly because of the perceived lucrative nature of export horticulture coupled with the lack of equal alternative income earning opportunities compared with the older farmers, who have been engaged in the cultivation of traditional crops as their means of livelihood long before the introduction of export horticulture in the study area. Participation in off-farm occupation has a significant positive effect on the likelihood of cultivating horticultural export crops at the 10 percent probability level. Thus variables indicating participation in other economic activities (wage employment and the operation of a non-farm enterprise) appear to be positively associated with being a horticultural smallholder. This relationship could be explained by the fact that households with off-farm occupation would easily overcome liquidity constraints and make provisions for the initial investment in capital inputs required for producing the labor intensive horticultural export crops. On the other hand it is also possible that the lucrative nature of the export horticulture industry provides households originally not engaged off-farm with sufficient income to diversify their income sources as a surety for their livelihood needs.

The total land endowment of households is highly significant and positively related to the probability of cultivating horticultural export crops. This seems to indicate that a decision-maker with a higher land access usually cultivates horticultural export crops. Thus households who have more hectares of land could easily afford allocating separate land parcels for cultivating both staples and horticultural export crops. The positive relationship with land endowment could be justified because households with more access to land can also afford

fallowing already harvested fields for some years and shift to cultivating other land parcels while allowing sufficient time for nutrient regeneration on the temporarily fallowed fields. The same could not be likened to households with a comparatively smaller endowed land more so if permanent tree crops are to be cultivated.

The nature of the road network from farms to major marketing centers has a negative significant relationship. This seems to indicate that bad roads increase the likelihood of adopting NTEs. However, taking cognizance of the fact that, responses to this variable constituted an ordinal subjective evaluation of households, the interpretation of this rather surprising observation must be done with extreme caution. On a comparative basis, fields where NTEs are cultivated generally have a bad road network than for alternative crops in the study area. Moreover, by the nature of the marketing arrangement for NTEs, transportation of produce is solely the responsibility of exporters and other subsidiary buyers and hence it is rational for farmers to locate staple and other crops on plots closer to their abode where road motorability is comparatively better than for the NTEs. Furthermore, the cultivation of some NTEs such as pineapples usually requires bringing new land under cultivation (partly due to the extensive root feeding system of crop) as compared to the cultivation of other alternative annual crops, most of which could be easily cultivated on continuously cropped fields. In addition, the observed distant location of export crops such as pineapple might reflect household perception of cropping choices by matching crops with appropriate soils as confirmed by Goldstein and Udry (1999). Such a development constitutes one of the major bottlenecks confronting exporters who are sometimes saddled with spending a whole day with their tractors in trying to meander their way through to their warehouses after purchasing produce from farmers' fields. This is usually the case during the rainy season when most feeder roads become unmotorable. Access to capital inputs has a positive effect on the probability of adopting NTEs at the 10% level. This means that households with better access to capital inputs or credit access to

purchase the requisite inputs for cultivating NTEs are more likely to participate in the sector than those who have relatively poor access to capital inputs and credit. Typically, the cultivation of NTEs requires a higher initial capital outlay in terms of planting material and agrochemicals which cannot be afforded by marginal farmers. Therefore, good access to credit either in the form of inputs or cash for paying hired labor costs or both would increase a household's probability of cultivating horticultural export crops. Finally, cultivating of other local cash crops has a highly significant negative effect on the adoption of NTEs. This means that households cultivating local cash crops of insignificant export value are unlikely to indulge in NTE cultivation. This might be on account of fact that some households rather opt for cultivating these local cash crops which have a lower profit returns compared to the NTEs but at the same time have a lower marketing risks in terms of produce rejection and payment duration. Since these local cash crops are also equally labor intensive, there is the possibility for them to compete for similar production resources with perceived changes in the comparative advantages for different households.

Determinants of Household Income

Three different empirical proxies of the influence of human capital are used as explanatory variables. The dependency ratio has a statistically significant negative influence (Table 4) on total household income. This means that the higher the number of children and elderly household members in relation to the number of active adult work force, the lower the household income. An increase in the ratio by one unit increases income by 18.1%. Contrary to the findings of the model of participation in export horticulture, the age of household head has a positive, non-significant relationship with household income, emphasizing the role played by other productive activities outside export horticulture in the income earning power of the sampled households.

The residential status of households, though negatively related to household income is not statistically significant. This somehow confirms that, with regards to residential status, there is the potential for immigrants to be more market-oriented than resident natives. Households involved in the production of local cash crop have the propensity to increase their income by 30.1% whereas production of staple crops increases household income by 3.18%, although not statistically significant. This confirms the lower incomes of Non-horticultural households, many of whom earn their major incomes from staple crop production. This observation may also explain the observed trend of the food security status of the different household categories. It was noted (Afari-Sefa, Forthcoming) that the proportion of food households is higher among Horticultural households (78.9%) than among Horticultural and Staple households (69.5%) and Non-horticultural households (52.3%).

The impact of education on household income within the agricultural sector is a subject of intense debate within the literature. Nevertheless, the results are consistent with that of Jolliffe (1998), who reports specifically for Ghana that, schooling has a negative influence on income from agricultural self-employment, whereas it has a positive impact on total and off-farm income. Generally, variables related to household physical capital endowment turned out to be important determinants influencing agricultural activity choice, with an additional hectare of land raising household income by 4.1% while an additional livestock unit increases it by 1.4%. As might be expected, the index of welfare facilities has a positive and statistically significant but very small influence on income. Unsurprisingly, the more assets a household has the higher its income, but the dummy variable related to credit access is neither strongly nor statistically significantly associated with higher income. This is a reflection of the inadequate levels of credit required to realize higher incomes from the various productive activities in the study area, a fact that was evident with our respondents. Generally, hiring out of labor is expected to increase household income. Indeed, incomes from agricultural wage labor are very low, in

comparism with other “hard to find” alternatives, thereby leaving most households with the only rational option of utilizing family labor for their own managed productive activities. This is justified by the high positive and significant relationship between family labor capacity for agricultural production and total household income. Consequently, households with the ability to hire-in labor also tend to have higher incomes and returns from crop production. Different occupations have statistically significant implications for income as households engaged in paid public employment and other self employed activities tend to have substantially higher incomes. Not surprisingly, receipt of miscellaneous income (transfers and remittances) is associated with a lower income. Finally, the explanatory variables that are related to the intensity cultivation of horticultural exports play a very significant role in determining household incomes with a unit increase in the ratio of the area cultivated by horticultural export crops to total farm size, in percentage terms increasing household income by 1.6%. Similarly, an additional year of experience in the cultivation of horticultural export crops increases household income by 4.2%.

Conclusions

The field study and results of the econometric estimations taken together show that, export diversification has created better livelihood opportunities for smallholders. I find evidence that the horticultural export sector has increased the opportunity for higher earnings for smallholders and that the much higher land sizes owned by horticultural smallholders are indeed a cause or a consequence of their participation in the sector. The results of the model of income determination also support the findings from the field survey. Clearly, households cultivating horticultural export crops are on the average better off than those that do not. However, an analysis of and model of participation in horticultural export sector also confirm that, though the contribution of horticultural exports to macro-economic growth as an insulator from sharp and unexpected changes in the terms of trade of Ghana’s traditional exports (Cocoa, Timber

and Gold) has been quite appreciable, the micro level distributional effects has not favored some chronically poor households who are structurally impeded from seizing the existing opportunities of the export boom by virtue of their poor resource endowment and liquidity constraints. These marked differences in resource base between the various household categories further accentuate the imperfections within rural markets.

The majority of households are particularly exposed to the risk of inadequate technological know-how in meeting the ever increasing quality standards and health control traceability requirements by European consumers, price collapse on the export market and a break down of local marketing institutions. The findings of the study therefore calls for an integrated policy framework approach aimed at improving rural market imperfections. Efforts to achieve the desired impacts requires the strong need for investment in infrastructure and a shift towards value-added export oriented production, whereby small farm households are progressively integrated into the global food chain. Specific recommendations to improve the livelihood status of smallholders include; establishment of more export-oriented agro-processing industries to improve payment duration for smallholder's produce and improve total export earnings, integrating smallholders with export and processing industries, promotion of an urban-rural migration policy for specialization in export horticulture, improving infrastructure to enhance input and market access, and encouraging formation of farmer groups and strengthening of exporter-producer associations.

Footnotes

¹ Under the HIPC Initiative, the World Bank and IMF Boards first decide in a decision point document, whether or not a country is eligible for debt relief. In a second step, all creditors (multilateral, bilateral, and commercial) commit debt relief to be delivered at a "floating"

completion point. In between those steps, the country tries to implement the policies determined at the decision point (which are triggers to reaching the completion point).

² The empirical work of the study focuses on profits rather than yields similar to work by other authors (Goldstein and Udry 1999 and McCulloch and Ota 2002) because quality variation in the output of most horticultural export crops implies there is no natural unit in which yield can be measured. In addition, the cost of other inputs most importantly labor should be deducted from the value of output.

³ Cooperative company was established with the assistance of the World Bank and the Government of Ghana in 1999 based on the farmer ownership model. By creating farmer ownership through acquisition of shares, the company aims to provide smallholders with commercial access to working capital, production inputs, and output markets.

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Table 1: Landholding Characteristics per Sampled Household Category

Household type		Total land endowment (ha)	Total farm size (ha)	Farm size per capita (ha)	Fallow land area (ha)
Horticultural households (N=38)	Mean	5.61	3.56	0.94	2.05
	SD ^a	5.83	4.24	1.12	2.29
Horticultural and Staple households (N=118)	Mean	4.87	2.98	0.54	1.89
	SD	5.52	4.07	0.55	2.61
Non-horticultural households (N=44)	Mean	2.61	1.52	0.35	1.09
	SD	2.40	1.47	0.44	1.42
Total (N=200)	Mean	4.52	2.77	0.57	1.75
	SD	5.16	3.75	0.70	2.35
Kruskal-Wallis test	χ^2	16.28 ***	20.24 ***	18.03 ***	4.32

Note: ^a. SD denotes standard deviation of corresponding variable; *** denotes significance at 1% probability

level.

Table 2A: Reasons Mentioned for Having Cultivated Horticultural Export Crops

Reasons mentioned	(N=156)	Percentage of households
Perceived it is more profitable than staple crops	79	50.7
Introduced by other farmers	58	37.5
Introduced by extension agent	8	5.3
Very lucrative venture for new entrants in farming	6	3.9
Traditional/Inherited	5	2.6

Table 2B: Reasons Mentioned for Having not Cultivated Horticultural Export Crops

Reasons mentioned	(N=44)	Percentage of households
Capital and land acquisition constraints	14	31.8
Delay in payment for produce/Long investment period	12	27.3
Lack of initial capital and technology constraints	9	20.5
High transaction cost of labor and labor supervision	5	11.3
Household only interested in obtaining staples for family	4	9.1

Figure 1: Number of Years Engaged in Export Horticulture by Agro-Ecological Zone

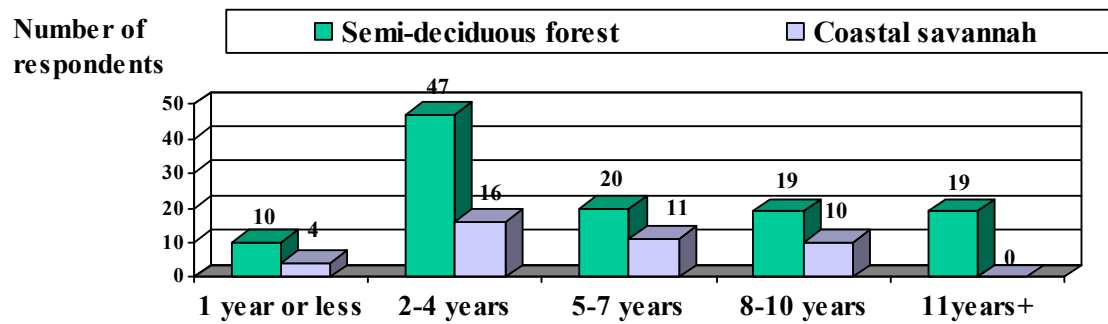
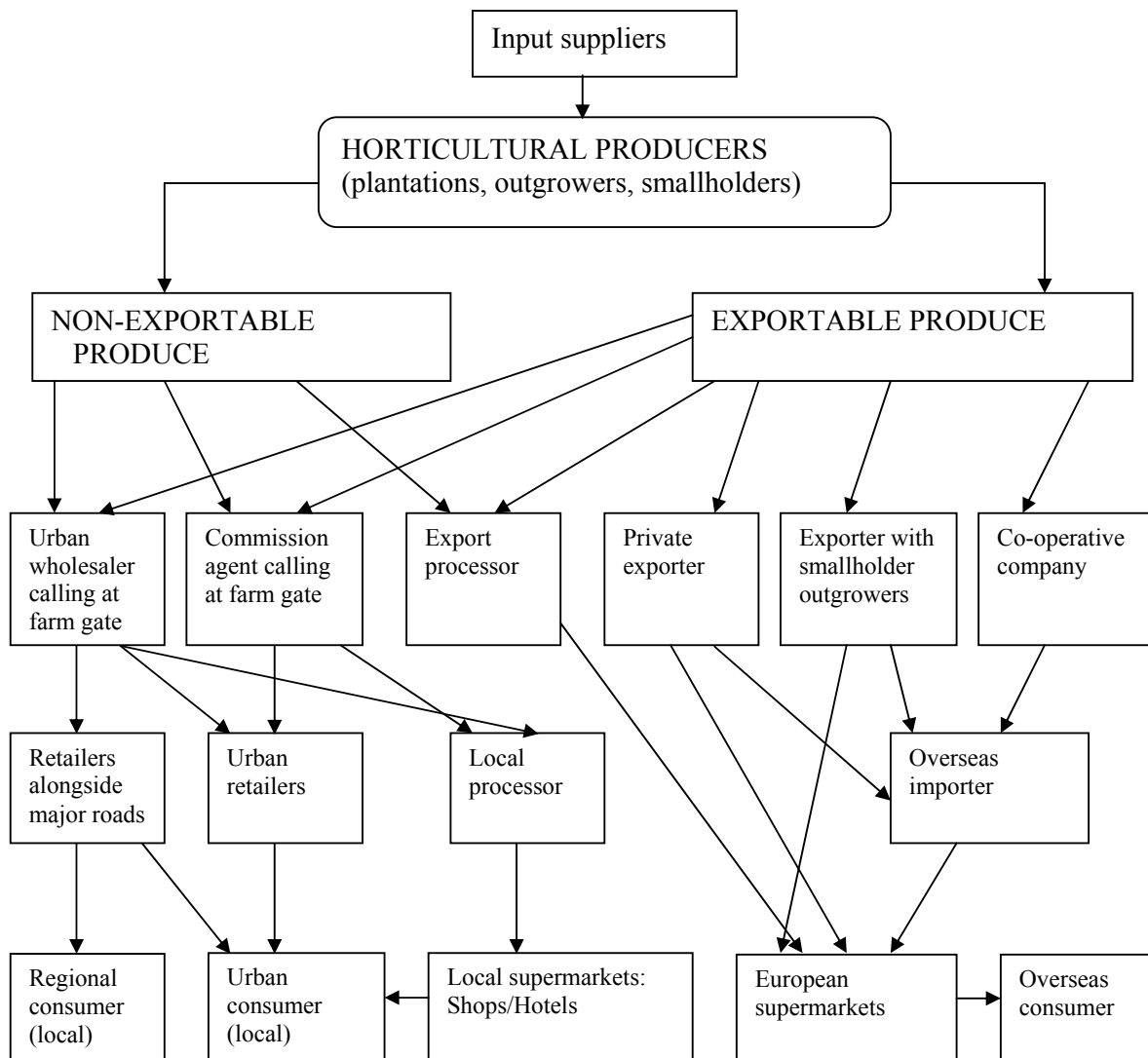


Figure 2: Overview of Horticultural Marketing Channels in Ghana



Source: Author's own conception

Figure 3: Direct Marketing Channels for Households Producing Horticultural Exports

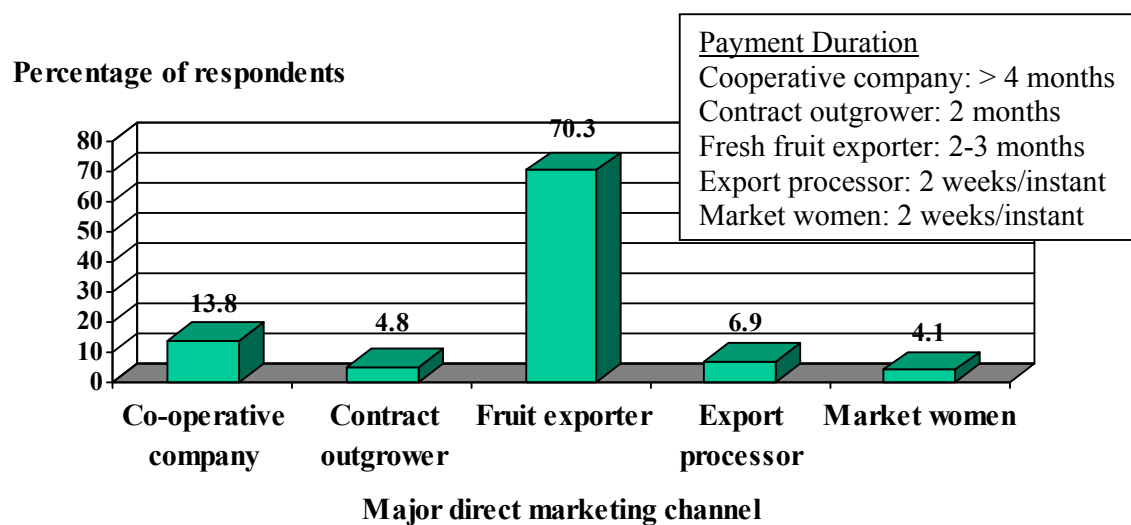


Table 3: Probit function for the Likelihood of Participation in Export Horticulture

Variable	Marginal effect	Standard error	T-statistics
Intercept	0.479***	0.149	3.205
Age of head	-0.009***	0.002	-3.734
Educational level of head	0.000	0.006	0.063
Residential status (dummy)	-0.034	0.052	-0.658
Household size	0.002	0.009	0.211
Non-farm occupation (dummy)	0.104*	0.062	1.674
Land endowment	0.050***	0.009	5.472
Nature of road network	-0.049**	0.024	-2.069
Capital input access (dummy)	0.092*	0.055	1.689
TLUs	0.001	0.003	0.515
Cultivate local cash crops (dummy)	-0.286***	0.060	-4.803
Frequency of extension visits	-0.005	0.014	-0.387
Dependent variable: Adoption of Horticultural Export Crop Model Chi-Square=79.44*** ; Log Likelihood function=-70.49; Pseudo R²=0.603 Households correctly predicted: 82% ; Number of observations= 200 ; *, ** and *** denotes significance at 10%, 5% and 1% levels respectively.			

Table 4: Parameter Estimates of the Determinants of Total Household Income

Variable	Coefficient	Standard error	T-statistics
Intercept	14.7535***	0.3661	40.2996
Land endowment	0.0411**	0.0186	2.2134
Food crop cultivation (dummy)	0.0313	0.1612	0.1931
Other local cash crop (dummy)	0.2625**	0.1040	2.5628
Age of head	0.0014	0.0042	0.3413
Education of head	0.0276**	0.0133	2.0731
Residential status (dummy)	-0.1555	0.1122	-1.3855
Years of cultivating export crop	0.0420***	0.0135	3.1096
Dependency ratio	-0.1810***	0.0644	-2.8116
On-farm family labor capacity	0.0007***	0.0002	3.1588
Labour hired out (dummy)	0.1697	0.1256	1.3511
Credit/Input access (dummy)	0.0367	0.0989	0.3714
Tropical livestock units	0.0141***	0.0047	2.9732
Public paid employment (dummy)	0.4405***	0.1082	4.0727
Trade and services (dummy)	0.2671***	0.0911	2.9311
Miscellaneous income (dummy)	-0.2363*	0.1402	-1.6855
Facilities welfare index	0.0397*	0.0229	1.7348
Ratio of NTEs area to total farm size	1.5941***	0.2299	6.9353
Dependent variable: Natural log of Total household income F=26.31; R²=0.711; Adjusted R²=0.684; N=200 ; Probability>F= 0.00; Breusch-Pagan chi-squared for heteroscedasticity correction =98.70 *, ** and *** denotes significance at 10%, 5% and 1% levels respectively.			