

THE PARTICIPATION OF MALAYSIAN FRESH FRUIT AND VEGETABLE FARMERS IN CONTRACT FARMING

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ABSTRACT

Contract Farming (CF) is seen as a means of fostering smallholder participation in new high-value product markets and improving quality standards, thus increasing and providing stability to smallholder incomes. This study aims to identify the factors related to CF as a new marketing practice among selected vegetable and fruit suppliers. The specific objectives are to identify factors influencing vegetable and fruit suppliers to engage in CF, and to suggest policy initiatives that promote CF sustainability. The factor analysis identified five factors that lead farmers in Peninsular Malaysia to participate in contract farming of fresh fruits and vegetables (FFV) in the context of the new supply chain namely market assurance, access to marketing information and technology, transfer of technology to improve farming practices, access to inputs and indirect benefit. The findings show that farmers are interested in CF because it helps them gain better knowledge in cultivation practices, get access to marketing information, market their produce and utilise farm resources. At the same time, CF or contract arrangements can be a valuable source of knowledge that can be employed to enhance their productivity.

Keywords: Contract farming, factor analysis, fresh fruits and vegetables (FFV), marketing practices, influencing factors

INTRODUCTION

Contract Farming (CF) is an arrangement between buyers and suppliers where the latter agree to produce and supply agriculture produce according to a predetermined quantity, quality, variety, grade, type of packaging, time of delivery at an agreed-on fixed or market price. Therefore, CF is seen as a tool for fostering smallholder participation in new high-value product markets and improving quality standards, thus increasing and stabilising the income of smallholders.

In general, CF can be classified as a Market Specification Contract or a future purchase agreement which determines the quantity, timing and price of commodities to be sold. Resource-Providing Contracts specify the sort of crops to be cultivated, some production practices and the quality and standardisation of the crop through the provision of technical

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packages and credits. Production Management Contracts are associated with large out-grower and nucleus-estate schemes that directly shape and regulate the production and labour processes of the grower (Baumann, 2000).

In Malaysia, CF has been identified as a system capable of stimulating agricultural production and has been given a central role in the latest strategy by the government to improve vegetable and fruit production. Contract farming in Malaysia was initiated through public farming in the 1980s beginning with poultry-based commercial broiler farms. From five in 1985, the total number of companies involved increased to 29 in 2004 (Saminathan, 2005). CF has been implemented in agricultural supply chains run not only by private companies but also by government agencies such as the Department of Agriculture (DOA) and the Federal Agricultural Marketing Authority (FAMA) (Shaffril, et al., 2010).

CF is expanding in many businesses in Malaysia. FELCRA has its contract farming scheme for cash crops and livestock involving settlers in its land and rural areas nationwide (Bernama, 2009) and Nestle (Malaysia) contracted the farming of red rice to some small village farmers in Sarawak (Borneo Post, 2010). There are ample indications of the growing acceptance of contract farming in Malaysia.

Before the establishment of hypermarkets in Malaysia, the marketing of vegetables and fruits had been carried out traditionally. In Malaysia, marketing channels are characterised by a number of market intermediaries which result in high marketing costs and, as producers have no direct link to the market, they have no access to market information. Consequently, farm production suffers from inconsistent quality and supply which, in turn, is aggravated by poor market infrastructures.

However, the growth of hypermarkets has created a new supply chain which challenges the traditional distribution network. The new structure demands fast and efficient delivery, and the properly graded, high and consistent quality of produce and consumer-centred marketing strategies.

In many cases, contract farming is used to meet the challenges. Contract farming is recognised for its merits in terms of access to markets, easy access to credit facilities, better risk management and provision of information, logistics, extension and necessary transfer of technology from agribusiness (Simmons, 2003). It brings a wide array of advantages to farmers, particularly small farm suppliers, notwithstanding some problems associated with it.

A major problem is that contract farming involving many small and medium producers is characterised by high transaction costs which serve as a huge disincentive for the system. However, it still symbolizes a better opportunity for expansion of the firm when compared to alternatives (Deitrich, 1994).

Randi (1992) observed that unfairness is one of the critical discrepancies of contract farming. Since vertical coordination is viewed as a key essence of contracted agriculture, the buyer usually possesses the power in the vertical integration setup and thus imposes

often unrealistic specifications with regard to the production and management of agricultural produce. This may include adoption of technology or adherence to timelines of production for producers to follow under minimal assistance and with inferior inputs. This strains the resources of the small farmers and challenges the perceived benefit of the contract farming scheme.

The adoption and sustenance of contract farming is dependent on some underlying essential factors for its smooth implementation. There are several factors - economic and non-economic, internal and external to the contracts – that influence the relationship between farmers and firms, and hence the performance and the sustainability of contract farming. Contract farming is exhibited in various forms depending on the type of commodity, buyers and sellers, and the socio-economic environment surrounding farmers. As such, the factors underlying performance of contract farming could be different under different production and socioeconomic environments (BIRTHAL, 2008).

The overall objective of this study is to identify the factors relating to contract farming as the new marketing practice among selected vegetable and fruit suppliers. The specific objectives are: 1) To identify the factors that influence the producers to engage in CF; and 2) To suggest policy initiatives for the sustainability of contract farming.

LITERATURE REVIEW

The literature review will present definitions and factors related to contract farming. The definition of contract farming by Eaton and Shepherd (2001) has gained wide acceptance due to its simplicity and comprehensiveness. The FAO views contract farming as “an agreement between farmers and processing and/or marketing firms for the production and supply of agricultural products under forward agreements, frequently at predetermined prices”. Contract farming may be defined as agricultural production carried out according to a prior agreement in which the farmer commits to producing a given product in a given manner and the buyer commits to purchasing it. Often, the buyer provides the farmer with technical assistance, seeds, fertiliser and other inputs on credit and offers a guaranteed price for the output (Minot, 2007).

Da Silva (2005) has identified certain factors needed for a successful contract farming undertaking and emphasised that an appropriate enabling environment is the most fundamentally important factor. No successful contracting scheme can exist or remain sustainable where the institutional and political setting is not conducive to it. Laws, regulations and policies can create advantages and disadvantages for contracting parties. They include issues such as labour relations, land tenure, taxes, foreign exchange, international trade, property rights, anti-trust measures, and commercial licensing. The importance of this normative and policy framework cannot be overemphasised. Governments wishing to promote farm-agribusiness linkages via contracts should start by assessing, streamlining and expunging the framework from restrictive features.

Writing on Thailand’s potato industry from a contractual perspective, Kosumas (2006) noted that factors inducing CF in potato production can be branched into farmers’ and

firms' perspectives. From the farmers' perspective, the author indicated that the major factors enticing farmers into CF are the attractive loan packages offered (where they lack sources of funds) due to the longer grace periods and low interest rate, lower risk from price volatility due to predetermined selling prices, benefits of technology transfer and counseling from the firm. Firms, on the other hand, enjoy lower risk of loan default or breach of contract due to close business ties with the farmers, lower price volatility risks from the pre-set buying prices, better control over quality, volume, price and other requirements as stipulated in the contract.

Karaan (2002) tabulated what he called "critical success factors", inhibiting factors, as well as those that enable them within the contractual relationship for contract farming in developing countries. The factors identified are technology determinism, pricing and payment, property rights, management, service, organisation and power relation, entry and exit conditions, finance, marketing, and livelihood.

Knowledge, attitude, and experience are forwarded as the primary factors influencing young people to be involved in contract farming in Malaysia (D'Silva et al., 2009). The factors that influence contract farming in Kenya in terms of small holder participation have been observed by Strohm and Hoeffler (2006). They noted that the criteria for involvement by small farmers include land availability and land use history, infrastructure and requirement for irrigation, staff structure, the kind of "social code" and treatment of workers, availability of labour, and lastly environmental audit (one initially and then later internal audits) that need to be done.

METHODOLOGY

This study is based on the 2007 Supply Chain Management (SCM) survey on the fruit and vegetable supply chain where 208 respondents were interviewed from seven states in Peninsular Malaysia by using structured questions, and the results of the survey were obtained using SPSS. Of the 208 respondents, 41 are practising contract farming. This study focuses on contract respondents only.

Selected production and market centres for fresh agricultural produce in Peninsular Malaysia were targeted for the purpose of data collection. The primary data for this study were collected through a market survey on vegetable and fruit producers using face to face interviews. Special focus was made on the buyer-producer relationship particularly the CF processes in terms of performance (e.g., replenishment lead time), quantity and size, supply quality, transportation, pricing terms, information coordination and supplier viability. The nature and terms of contract between farmers, buyers and suppliers were also examined.

Factor analysis was used to identify the factors relating to contract farming. The sample size for this analysis was 41 respondents practising contract farming. Factor analysis proceeded through four steps, that is: (1) computing the correlation matrix for all variables and variables that do not appear to be related to the other variables can be identified from the matrix and associated statistics. In other words, the correlation matrix can develop

a set of correlations between all identified interval-scaled variables, (2) a set of initial components is extracted from the correlation matrix to determine the data, (3) the initial components are rotated to find a final solution and make them more interpretable, and (4) the scores for each factor are computed and then used in a variety of other analysis (Hair et al., 2006).

RESULTS AND DISCUSSION

Factor analysis was used to identify key elements related to contract farming. It refers to a variety of statistical techniques whose common objective is to represent a set of variables in terms of a smaller number of hypothetical factors. The basic assumption of factor analysis is a linear combination of factors that are not actually observed. A factor analysis of the 18 statements was conducted using the principal component method. The criterion for the number of factors to be extracted was that the Eigen value of each factor had to be equal to or greater than one. Extracted factors were then rotated by the varimax method. Each of 18 statements was assigned to the factor for which it had the highest correlation.

Measure of Sampling Adequacy

Table 1 illustrates Bartlett's test for Sphericity and the Kaiser-Meyer-Olkin (KMO) test of sampling adequacy which were initially performed on the data and confirmed the appropriateness of conducting the Principle Component Analysis (PCA) (Tabachnick & Fidell, 2001). The Bartlett's test for Sphericity showed that the correlation matrix was at an appropriate level to perform factor analysis on the data for each scale, with all scales reaching a significance level of $p < 0.000$. The KMO measure provides a value between 0 and 1. Small values for the KMO indicate that a factor analysis of the variables may not be appropriate, since the correlations between variables cannot be explained by the other variables (Norusis, 1993). Values higher than 0.6 were considered satisfactory for factor analysis. The KMO test for our set of predetermined variables reached values of at least 0.689. Once the sampling adequacy was confirmed, factor analysis could be carried out.

Table 1: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy	0.689
Bartlett's Test of Sphericity	
Approx. Chi-Square	619.313
Degrees of freedom	171
Significance	0.000

In order to categorize the items in terms of smaller sets of cross-cutting themes to determine if there are any underlying latent constructs, the data were subjected to Principle Component Analysis (PCA). A total of five of the identified factors had Eigen values exceeding one, collectively accounting for 76.8% of the variations across the sample.

The factor loadings were subsequently subject to varimax rotation. Table 2 represents the results summary of factor analysis on respondents' reason for contracting. The factor

analysis addressed five broad reasons for contracting. These are described and interpreted as follows:

Factor 1: Market Assurance: The highest scores on this factor were: reduce marketing risk, secured income, gain access to markets, no need to worry about marketing of produce, improve quality of produce, and buyers normally undertake to purchase all produce, which accounted for 39.8% of the variation. *Reduce marketing risk* has the highest factor loadings (0.856). This is followed by *secure income* (0.853), *gain access to markets* (0.801), *no need to worry about marketing of produce* (0.788), *improve quality of produce* (0.749) and *buyers normally undertake to purchase all produce* (0.608). It appears that most of the farmers do not like risk; therefore contract farming gives the security in terms of a secured market for their produce. Besides that, the poor performance of traditional marketing systems and their marketing risks have made the secured income from contract farming especially appealing.

Factor 2: Access to Marketing Information and Technology: The highest scores on this factor were: easy access to marketing information, access to managerial, technical and extension services, and introduction to appropriate technology to upgrade agricultural commodities, which accounted for 14.8% of the variation. *Easy access to marketing information* had highest factor loadings (0.776). This is followed by *access to managerial, technical and extension services* (0.770) and *introduction to appropriate technology to upgrade agricultural commodities* (0.673). The farmers indicated that they could gain easy access to fresh-produce marketing information regarding price and production and marketing practices. Besides, they even received extension services from the buyer in terms of farm management. This primarily ensures proper crop production practices. Contracting was seen to provide a reliable and up-to-date source of agronomic advice.

Factor 3: Transfer of Technology to Improve Farming Practices: The highest scores on this factor, accounting for 10.0% of the variation, were: efficient use of farm resources and skill transfer such as record keeping. *Efficient use of farm resources* had the highest factor loadings (0.869) followed by *skills transfer such as record keeping* (0.862). Farmers also indicated that they were taught how to utilise farm resources and perform record keeping. Farmers indicated that participating in contract farming helped them improve farming practices which they could apply to increase their farm produce output.

Factor 4: Access to Inputs: The highest scores on this factor were: gain access to loans or credit to finance production inputs, inputs and production services are supplied by the buyers, reliable supplies of inputs, and guaranteed minimum prices, which accounted for 6.9% of the variation. *Gain access to loans or credit to finance production inputs* had the highest factor loadings (0.846). This was followed by *inputs and production services are supplied by the buyer* (0.697), *reliable supplies of inputs* (0.650) and *guaranteed minimum prices* (0.543). Farmers indicated that through contract farming they could easily access inputs such as seeds, fertilisers and pesticides.

Table 2: Summary of Factor Analysis on Respondent's Reasons for Contracting

Factors and sub-variables	Sub-variables loading	Variance (% of explained) Eigen values
Market assurance		
Reduced marketing risk	0.856	
Secure income	0.853	
Gain access to markets	0.801	
Do not have to worry about marketing of produce	0.788	39.824
Improve quality of produce	0.749	
Buyers normally undertake to purchase all produce	0.608	
Access to marketing information and technology		
Easy access to marketing information	0.776	
Access to managerial, technical and extension services	0.770	14.830
Introduction to appropriate technology to upgrade agricultural commodities	0.673	
Transfer of technology to improve farming practices		
Efficient use of farm resources	0.869	9.991
Skills transfer such as record keeping	0.862	
Access to inputs		
Gain access to loans or credit to finance production inputs	0.846	
Inputs and production services are supplied by the buyer	0.697	6.850
Reliable supplies of inputs	0.650	
Guaranteed minimum prices	0.543	
Indirect benefits		
Protects farmers from incurring losses	0.873	
Access to new market opportunities	0.684	5.324
Improve method of applying chemicals and fertilisers	0.597	

Factor 5: Indirect Benefits: The highest scores on this factor, that is, protects farmers from incurring losses, opens new markets, and improves methods of applying chemicals and fertilisers, explained 5.3% of the variations. *Protects farmers from incurring losses* has highest factor loadings (0.873). This is followed by *access to new market opportunities* (0.684) and *improves method of applying chemicals and fertilisers* (0.597). Farmers indicated that contract farming shielded them from market volatility.

Reliability Analysis

Before any conclusive discussion on the factors generated by the factor analysis, a reliability test needs to be conducted. Cronbach's alpha is an index of reliability associated with the variation accounted for by the true score of the "underlying construct." Construct is the hypothetical variable that is being measured (Hatcher, 1994).

Table 3: Internal Reliability Analysis on Factors that Engage Farmers in CF

Factor	Alpha Scores	Number of Items
Market assurance	0.896	6
Access to marketing information and technology	0.845	3
Transfer of technology to improve farming practices	0.903	2
Access to inputs	0.798	4
Indirect benefits	0.705	3

From the analysis, the internal reliability for all the five factors had been tested and the alpha scores for each factor are presented in Table 3. The reliability test for the factor shows that the final range for alpha score is more than 0.7 to 0.9. It meets both the Peter (1979) and Churchill et al. (1984) criterion where reliability levels of less than 0.5 might be acceptable in social sciences which means that those statements should be retained in the scale.

CONCLUSION

The factor analysis has identified five factors relating to farmers' participation in CF in Peninsular Malaysia particularly with reference to fresh fruits and vegetables (FFV) in the context of the new supply chain concept. These factors include market assurance, access to marketing information and technology, transfer of technology for improving farming practices, access to inputs, and indirect benefits. The data shows that contract farming can help farmers gain better knowledge in cultivation practices, facilitate enhanced access to marketing information, enable easier marketing of their produce, and allow more effective utilisation of farm resources. At the same time, contract farming or contract arrangements can be a valuable source of knowledge that helps to enhance the productivity of the farm.

The involvement of intermediaries like farmers cooperatives as collectors, packers and transporters should be encouraged. The possible link in the new supply chain is that farmers should collaborate to form an association or a cooperative and then use these organisations to establish contract agreements with hypermarkets and other middlemen. At the same time, this would also provide them with greater leverage in their negotiations with suppliers of their farm inputs.

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