

Vertical Integration in Bangladesh Agriculture: The Case of Contract Farming for High Value Food Products¹

M.A.Sattar Mandal*
Shubir Kanti Bairagi
Md. Saidur Rahman

I. Introduction

In Bangladesh, contract farming is a recent form of production organization, which integrates the producers of high value farm products with the domestic as well as international marketing outlets. Bangladeshi farmers, especially small and marginal farmers, generally face problems relating to inadequate input supplies, low technological adoption, poor yield and falling output prices at harvest. The problem becomes more acute for highly perishable products. Contract farming is seen as one feasible solution, which may integrate production by small farmers with assured marketing outlets and product prices and thus encourages the farmers to adopt high value enterprises. Also, the contract farming system may greatly circumvent the rapidly declining farmsize and increasing land fragmentation through integration of production, input supplies and marketing functions in a more cost-effective manner. It is also claimed that a properly functioning contract farming has the potential to generate huge employment, especially for the women and farm income in general (Chadha and Gulati, 2003).

The contract farming has been in operation in different forms in different countries for a very long time. Hindustan Levers Ltd. for tomato, and Pepsico for potato and chillies in Indian Punjab and Haryana, Maxworth Fruits in Andhra

¹ This paper is a descriptive reflection on contract farming, awaiting more rigorous analysis as a part of an on-going research study. The contents on the contract broiler farming are based on the second author's master's thesis, while the materials for contract production of milk and vegetables are derived from various sources including personal interviews and field observations.

* The authors are respectively a Professor, a post-graduate research student and an Assistant Professor in the Department of Agricultural Economics, Bangladesh Agricultural University, Mymensingh.

Pradesh, Karnataka and Tamil Nadu, VST Natural Products Ltd. in Andhra Pradesh, Nijjer Agro Foods for tomato and Cadbury for milk products in Karnataka are a few notable examples. In Bangladesh also, contract farming for some products exists in some forms for ages. The notable ones include sugarcane production in mill zone areas, banana and flower production in recent years.

In more recent years, contract farming has been introduced more intensively by a number of private companies and NGOs as a part of their agribusiness ventures. Their primary focus is on high value agricultural products to cater to the needs of increasing urbanization and expanding international markets. BRAC has introduced contract growing of vegetables and fruits for export market and poultry and milk production for domestic market. PRAN has been promoting production of high value fruits and vegetables for domestic as well as export market. Aftab Bahumukhi Farm Ltd. (ABFL) is one of the commercial breeding farms that has introduced contract farming for broiler and layers production and integrated it with a supply chain to serve the urban consumers. Proshika has introduced contract farming for organic vegetable and fruit production mostly for the urban consumers.

Although the contract farming has been in practice for quite some time, there are issues that have not been adequately analyzed or understood. Some of the key questions that need to be addressed are as follows: Who are the contract growers and what are the contractual arrangements? To what extent the contract farming benefits the contract growers? Has the contract farming contributed to a reduction of price spread between the producers and the consumers? What needs to be done to improve the performance of contract farming in the changing nature of trade liberalization?

The present paper can not address the above issues in any greater detail precisely because it is a part of an on-going study and more empirical data need to be collected. The modest attempt of the paper is to give a reflection on contract farming with respect to three high value commodities such as contract broiler production, contract milk production and contract vegetable production.

II. Concept of Contract Farming

Contract farming involves contractual arrangements, written or verbal, between farmers and companies, specifying one or more conditions of production and/or marketing of an agricultural product. Contracting may be horizontal and vertical. If two or more different stages are tied together, this is 'vertical contracting'. If two or more parts are tied into one at the same stage of operation, this is

'horizontal contracting'. If both vertical and horizontal operations are tied together, this is 'circular contracting' (Roy, 1963).

For example, in the broiler chicken industry there are various stages of operation, such as: hatching egg flocks, hatcheries, feed mills, feed stores, broiler production, processing, wholesaling, retailing and finally, the consumer of chickens. Contracting on any one of these stages is 'horizontal,' while contracting between any two of these stages is 'vertical'. Contracting involving both horizontal and vertical operations is called 'circular'.

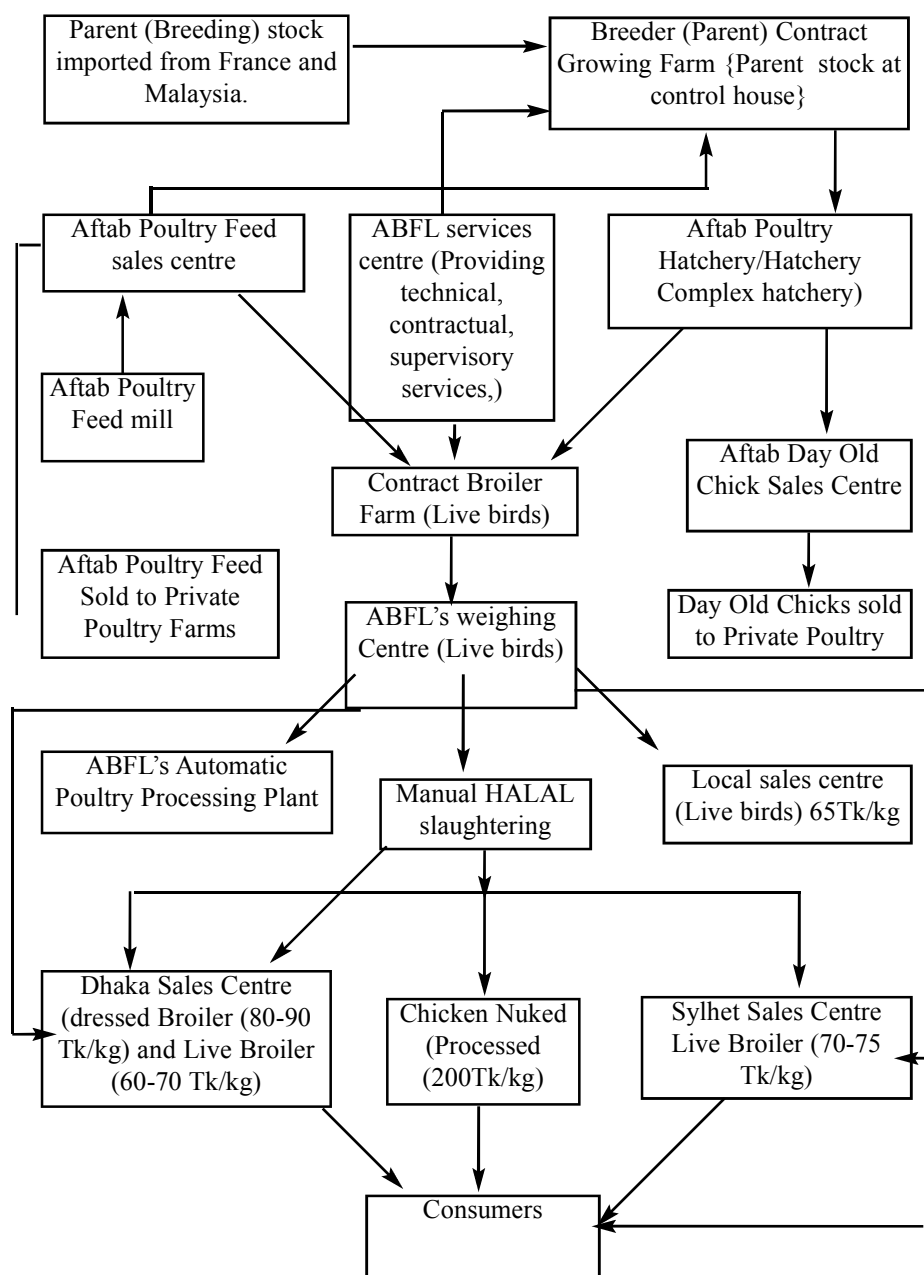
Conceptually, contract farming envisages five elements: (i) product specification in response to national or international markets; (ii) market specification, ensuring product delivery at agreed upon prices; (iii) resource supplies, including quality inputs, capital, credit and services; (iv) technical support, relating to production, harvesting and processing; and (v) risk sharing, specifying insurance against natural and market risks.

III. Case Study 1

3.1 Contract broiler farming

Aftab Bahumukhi Farm Ltd. (ABFL) introduced contract growing of poultry broilers and layers in 1994 in vast areas of Bhagalpur, Bajitpur in Kishoregonj district. By 2003, ABFL established 850 contract broiler farms, raising over 800,000 birds per month. The company has also 50 contract layer farms, rearing a flock size of 500 each. There is a simple agreement between a farmer (contract grower) and ABFL. According to the Agreements ABFL extends a full credit facility to the farmer, supply of day old chicks (DOC), all vaccines, medicines, feed along with expert supervision on regular basis. ABFL also undertakes the responsibilities for marketing their products and insurance coverage.

Apart from labour (nursing), a farmer (contract grower) builds a covered shed at his own cost ensuring congenial and healthy environment for proper growth of the birds under the direct supervision of the ABFL experts. The credit liability of a contract grower is adjusted against price of their products. On successful farming of layer birds through contract grower, the program was extended to the production of broiler. Subsequently, on the same terms and conditions, the programme was widened for taking up in groups and in batches of 1000 to 2000 DOC day old chicks. The birds eventually mature in 6 to 7 weeks time. ABFL buys back the broiler at fixed rate from the contract growers and markets live as well as dressed broilers through ABFL sales centres in Dhaka and Sylhet.

Figure 1: Poultry Supply Chain of ABFL

Source: Developed based on Field Survey, 2004

3.2 Main features of broiler chain

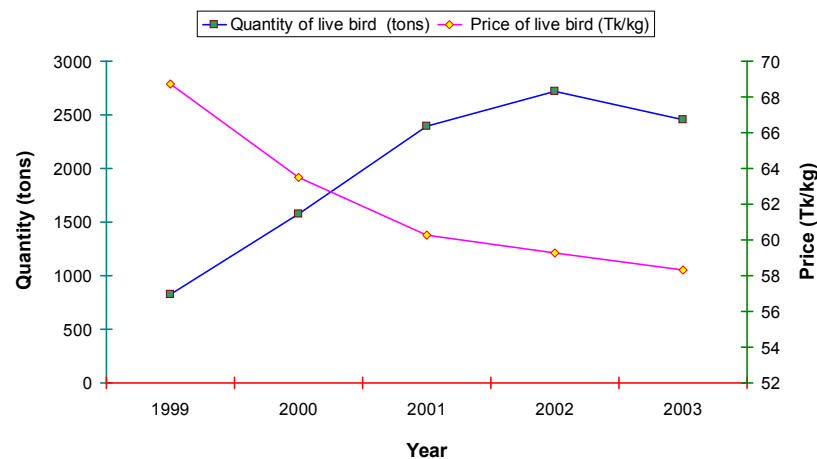
The broiler chain of ABFL primarily focuses on the production of broiler meat for the domestic market. The parent stocks are imported from overseas. The day-old broiler chicks are reared by broiler growers through contracts. The birds are then slaughtered and undergo handling, packing and processing using automatic machine. The final product is distributed to markets through own sales centre, which then sell the chicken meat to consumers or restaurants. Two different retail channels were explored- the market and own sales centre channels. The relationship with the local market is an open market sales centre arrangement, where the own sales centre assure delivery of product in terms of high quality and food safety. The main features of the broiler chain are depicted in Fig.1.

Indemnity and security: Insurance companies are reluctant to cover the risk of small poultry farms. To cover the risk of loss and safeguard the interest of the contract broiler growers in case of immature death of chicks by diseases or other cogent reasons, ABFL operates a contributory security fund. Farmers contribute Tk. 1 per chick to the fund. Payment out of the fund is made to the farmer at the rate of Tk. 20 per dead chick if the mortality rate is more than 10 percent, and if the mortality is less than 3 percent, 80 percent of farmers' contribution is refunded.

3.3 Sales quantity and price of broiler products of ABFL

The production and sales of broilers under ABFL contract farming increased from 823 tons in 1999 to 2719 tons in 2002 and then decreased to 2457 tons in 2003. Sales quantity of live bird exhibited a strong negative correlation ($r = -0.97$) with

Fig. 2: Year wise price and sale volume of live broiler



the price of live bird. Figure 2 shows that during 1999 to 2003, the lowest price of live bird were observed in 2003 and lowest sales observed in 1999, but the highest sale quantity and highest price of live bird was observed in 2002 and 1999 respectively. In 2003 both price and quantity decreased because broiler production throughout the country was badly affected by the scare of bird flue. Despite falling price per unit, ABFL continued to increase its volume of production because larger volume with smaller profit margins still gave larger aggregate profits.

Sales quantity of whole dressed broiler exhibited a strong negative correlation ($r = -0.78$) with the price of whole dressed broiler. Figure 3 shows that during 1999 to 2003, the lowest price of whole dressed broiler was observed in 1999 and lowest sales observed in 2003, but the highest sale quantity and highest price of whole dressed broiler was observed in 2000 and 1999, respectively

Fig. 3: Year wise price and sale volume of whole dressed broiler



3.4 Land holding status of the contract broiler farmers

The contract broiler farmers came by and large from the small and medium farmsize categories. Table 1 shows that 12 out of 30 farmers surveyed had land up to 1 hectare; another 12 farmers had land between 1 and 2 hectares, while the remainder 6 had above 2 hectares of land. So, in terms of farm size, small and medium farmers accounted for four-fifths of all the contract growers under the survey. Since broiler farming needs some capital to begin with and also requires at least some land to construct broiler sheds, landless or very marginal farmers could not enter into this business. But many of the landless and marginal household members benefitted from extra employment generated through backward and forward linkages of extensive broiler farming in the area. Many of

the contract farmers had also other sources of income such as crop farming, part-time jobs, petty trades, etc

Table 1: Average land area per contract broiler farmer

Size of land area (decimals)	No. of farmer	Average land area per farm (decimal)					Total land
		Broiler Farm	Operated	Homestead	Pond	Garden	
50-100	2	12.20 (13.72)	30.00 (44.99)	22.50 (25.32)	6.00 (6.75)	8.20 (9.22)	88.90 (100)
101-249	10	13.90 (7.54)	115.00 (62.40)	28.90 (15.68)	8.16 (4.43)	18.33 (9.95)	184.29 (100)
250-500	12	10.25 (2.94)	233.33 (66.91)	41.79 (11.98)	30.00 (8.60)	33.33 (9.56)	348.7 (100)
501-749	3	20.50 (20.5)	346.67 (58.38)	73.00 (12.30)	83.33 (14.03)	70.33 (11.84)	593.83 (100)
above 750	3	33.50 (4.26)	516.67 (65.68)	83.33 (10.59)	90.50 (11.50)	62.66 (7.97)	786.66 (100)

Source: Field survey, 2004. Figures in the parentheses indicate percentages

3.5 Gross margin

The contract farmers under the study reared an average of 5 batches of broilers per farm per year, average number of birds being 1936 per batch. Table 2 shows that the average gross margins were estimated at Tk. 105,977 per farm per year. Gross margins were calculated by deducting variable costs from gross return earned from the enterprise. The estimated costs and returns as well as an intensive case study of a typical broiler farmer showed that broiler farming under the contract system is profitable in a normal year, but the extent of profits can be diminished due to incidence of diseases or abrupt fall in broiler prices.

Table 2 : Gross margin, net return and benefit-cost ratio for broiler farms

Items	Unit	All farms
Gross return	Tk	540,738
Variable cost	Tk	434,761
Total cost	Tk	490,422
Gross margin		
Net return	Tk	50,316
BCR (undiscounted)	-	1.10

Source: Field Survey, 2004

IV. Case Study 2

4.1 Contract growing of milk

BRAC sponsored milk cow rearing as a profitable enterprise under its livestock development programme since 1984. This helped increase milk production by the farmers but the major problem was the absence of enough facilities for marketing of all of the milk that were available at the local level. This prompted BRAC to establish a modern dairy plant in Gazipur in 1998. To feed the plant BRAC has so far established about 20 milk chilling plants more or less following the milk producers' cooperatives model of Amul Dairy in India and Milk-Vita in Bangladesh.

BRAC dairy has so far organized a network of about 20,000 contract milk growers listed with about 50 milk producers' society (MPS) in different locations of the country. Each MPS has 20-25 cow rearers / milk producers. About a half of the milk producers rear 1 cow each, 30 percent have 2-3 cows each, while another 20 percent rear 3-5 cows. BRAC as contractor provides essential services like artificial insemination, veterinary health care and medicines, quality feeds, improved animal husbandry training, and above all an ensured purchasing of milk from the farmers at a pre-determined price. Average milk production is 1.5-2 litres per cow per day. Milk produced by the individual cow rearers in the village is collected through designated milk collectors and assembled at the local chilling centres within one hour of milking to maintain cool chain. The MPS appoint the local milk collector who measure fat contents and also check adulteration. The individual producers are paid according to fat contents of their milk. The usual price paid in 2004 was at the rate of Taka 16.5 per litre of milk containing 4.5 percent fat. The collected milk is then transported from chilling plants to BRAC dairy plant at Gazipur by road milk trucker for processing, pasteurizing, packaging and so on.

Total production of processed milk per day rose from about 10,000 litres in 1998 to about 35,000 litres per day. The Arong (Brand name) dairy products include low fat fresh milk, chocolate milk, mango milk, butter, ghee, sweet yogurt, sour yogurt, UHT fresh milk, UHT chocolate milk, UHT mango juice, UHT strawberry yogurt, UHT orange yogurt, UHT mango milk and few others. These are marketed through a network of dealers.

The main features of BRAC contract growing of milk are that it facilitates quick collection of milk and reduces wastage, integrates small and dispersed milk producers with the main urban centre of demand, ensures higher milk prices than

usual at the growers level and supports expansion of milk production through micro-credit, technical support and quick marketing arrangements. However, the contract system is yet to gain full efficiency and improve productivity. For this it needs more investment in improvement of animal breed, increase in milk yield per cow, establishment of more chilling centres, upscaling of credit support, more favourable contracts with the farmers, and appropriate insurance policy for cow rearers.

V. Case Study 3

5.1 Contract farming for exportable vegetables

In 1997-98, BRAC started its contract farming for production of vegetables that can be grown in Bangladesh and have high demand in the European markets. Vegetable production is skill intensive, requires intensive care and management and is highly susceptible to weather variation. BRAC provides modern agricultural inputs, and technical training on vegetable production, harvesting, processing, packaging and handling. The contract growers are also advised and monitored so that they strictly adhere to the international standards of using chemicals in vegetable production. BRAC maintains their own modern vegetable pack house in Tongi.

Hortex Foundation assisted BRAC in developing a model zone at Chandina, Comilla for export oriented production and marketing of vegetables. By December 2002, BRAC integrated 0.16 million contract vegetable growers who grew export quality vegetables on over 27 thousand hectares of land. The major vegetables that are produced through the contract growers include French beans, Broccoli and Green chilli, Potato, etc. In 2002, BRAC has exported 621 tons of fresh vegetables and 350 tons of potatoes to the wholesalers and supermarkets in England, France, Germany, the Netherlands, Belgium and Italy in Europe, and the UAE, Bahrain, Singapore, Malaysia and Hong Kong in Asia. Total national export of vegetables stood at 12,761 metric tons in 2001-02.

The main features of vegetable contract farming are that it links the small Bangladeshi vegetable growers with international consumers and thus integrates the local producers with the international markets. At the operational level, once the contract is established good quality seeds and inputs are supplied to the farmers. As per advice from BRAC workers, vegetables are harvested and brought to the local assemblage point by the farmers. They are paid according to the grades and quality of produce but the average prices paid are usually little higher

than the local market price. Fresh vegetables are then cleaned, graded, packed, stored, cooled and transported in refri- truck to the central pack house for onward transmission to air cargo for export market. At the local level, the vegetable growing has created enormous backward and forward linkages in supply chain management and created direct employment especially for women and girls in harvesting and processing of vegetables.

VI. Conclusions

6.1 Observations

The contract farming developed farmers' capacity and confidence in taking up high value- high risk capital intensive agricultural enterprises. It also demonstrated high potential of poverty reduction through creating self-employment as well as paid employment for rural labour force, especially rural women and unemployed youth. The strongly upstream oriented supply chain of products allows a greater and better control of all the productive processes and improves the communication and decision-making among the chain's partners. The product supply chains have proved to be reasonably successful in integrating numerous small producers with a chain linked to input supplies, food safety, hygienic standards and ultimately consumer's preference. It has also been successful to some degree to protect the contract growers from unusual fall in prices by paying the guaranteed prices. Vegetable contract farming has also opened up opportunities for linking Bangladeshi small farm producers to broader international markets and began to increase export earnings through agricultural export diversification.

Agribusiness companies that we have discussed above have passed through a transition phase of establishing a new mode of production (i.e. high value product supply chain through contract farming). Now the main challenge for the companies is to consolidate their experience and bring about more dynamic elements of commercialization through upgradation of contract farmers' business skills and also upscaling of their support in farmers' training, capital supply and marketing services.

6.2 Prerequisites for Contract Farming

In a land scarce country like Bangladesh where distributivist land reform is not implementable, contract farming can be seen as a step towards integrating millions of small and marginal farmers with agricultural diversification with high

value products. For successful contract farming with high value products, Mandal (2004) identifies the following prerequisites. Firstly, in a particular locality there has to be a good number of farmers agreeing to operate under contract farming system, otherwise the private sector may not be interested to invest. As a matter of fact PRAN company investing a fruit processing plant in one northern district location faced serious resistance and hostility from the local farmers. Secondly, contracts have to be proper and legally structured so that any breach of contract can be challenged in legal way by either side. Thirdly, there has to be good infrastructure, roads, suitable transports, electricity supplies, etc. Fourthly, there is a need for legal system to protect the rights of the small producers and improve their bargaining power. There are allegations that if there is fall in market prices the guaranteed prices of produce are not always paid or paid with hassles. Fifthly, for linking contract growing of high value crops with international supply chain adequate provision for air- freight and cargo handling facilities have to be in place.

References

- Bairagi, Shubir Kanti (2004): *An Economic Study of Contract Broiler Farming with Reference to Supply Chain Management*. M.S. in Agricultural Economics thesis, Department of Agricultural Economics, Bangladesh Agricultural University, Mymensingh.
- BRAC (2003): *BRAC Annual Report, 2003*.
- BRAC (2004): BRAC website.
- Chadha, G.K. and Gulati, A. (2004): "Farm- firm linkages in India: rationale, working experience and policy choices". A paper presented at the International workshop on Agricultural Diversification and Vertical Integration in South Asia. 5-6 November 2003. New Delhi, India.
- Hortex : *Hortex Newsletter*, various issues.
- Mandal, M.A.S. (2004): "Contract farming for vegetables and poultry." *Science & Technology E- Forum* run by NRI, University of Greenwich, UK. 3 June 2004.
- Singh, S. (2000): 'Contract farming for agricultural diversification in the Indian Punjab: a study of performance and problems.' *Indian Journal of Agricultural Economics*, 55:3, pp.283-94.