

Contract Farming in Andhra Pradesh: A Case of Rice Seed and Gherkin Cultivation

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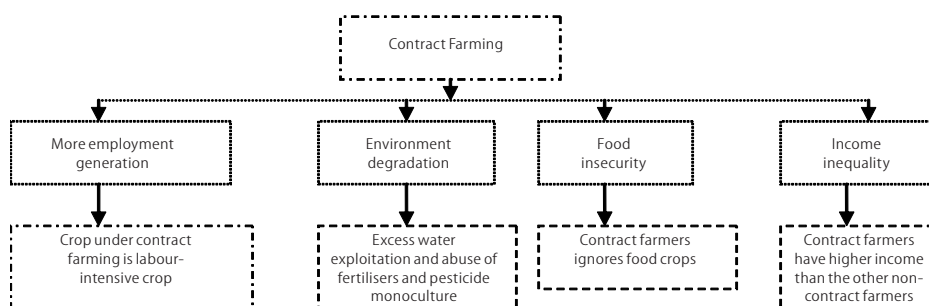
This paper discusses the performance of contract farming in Mahbubnagar and Karimnagar districts of Andhra Pradesh. It compares contract farming in gherkin and rice seed with non-contract farming. It shows the difference in the characteristics of contract and non-contract farm households. Delayed payment, lack of credit, scarcity of water, and difficulty in meeting quality requirements are found to be the major constraints faced by contract farmers. Whenever there is a decline in productivity, the concerned contracting company has a tendency to shift production to other farmers and also to other regions.

Since the past decade contract farming has emerged as an alternative institutional innovation in Indian agriculture to reduce the uncertainties faced by both the farmer and the firm. The logic behind promoting contract farming is the expected increase in agricultural productivity, employment and income for the farmer. Contract farming is an intermediate form of industrial organisation, standing between the spot market and vertical integration in the degree of authority relationships between the grower and user of the crop (Grosh 1994). In spot markets, growers and processors meet at a time and agree on price and delivery immediately. At the other extreme is vertical integration, where the growers and the users of the crop are within the same firm. Hence, crop production is fully coordinated with processing and marketing. Contract farming is a situation where growers and users of the crop are different. It is a way of organising agricultural production whereby farmers are obliged to supply their produce to agro-enterprises in accordance with conditions specified in written or oral agreement. In the strict sense, it refers to “an alternative market, which establishes an agreement (formal or informal) between grower(s) and firm(s) (exporters, processors, retail outlets, or shippers, for example) to produce and to supply an agricultural commodity under forward contract”.¹ The contract basically includes four things – pre-agreed price, quality, quantity or acreage (maximum and minimum) and time (Singh 2002; Eaton and Shepherd 2001).

A review of literature in the context of the outcome of contract farming in many developing countries reveals a mixed performance with some successes and some failures (Little and Watts 1994; Opondo 2000; Morvaridi 1995; Baumann 2000; Key and Rusten 1999; Glover and Kusterer 1990; Goldsmith 1985; Glover 1984; Simmons et al 2005; Porter and Howard 1997). Proponents of contract farming analyse it by looking at the income and employment it generates (Glover and Kusterer 1990; Key and Rusten 1999; Goldsmith 1985; Glover 1984) and they observe that contracting helps the farmer to improve her/his situation by providing reliable incomes and generating employment for the rural poor. On the other hand, opponents analyse it by looking at the environment, the welfare of farmers and the power structure involved (Opondo 2000; Morvaridi 1995; Little and Watts 1994). They argue that though a contracting firm takes the decision on production and land management, it does not look after the long-term impact on land and environment.² Figure 1 (p 61) demonstrates the positive and negative outcomes of contract farming.

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Figure 1: The Impact of Contract Farming on Local Economy



A set of Indian studies like Dev and Rao (2005), Nagraj et al (2008), Kumar J and P K Kumar (2008), Kumar (2006) and Dileep et al (2002) reveal that contract production gives much higher (almost three times) gross returns compared to the traditional crops like wheat and paddy because of higher yield and assured price. Though the crop under contract farming is labour-intensive and perishable in nature, it generates more employment in the economy. The classic examples are gherkin cultivation in India (Dev and Rao 2005; Nagraj et al 2008; Kumar et al 2008) and tomato cultivation in Punjab (Singh 2002; Dileep et al 2002). The trend of higher income under contract farming may not last long as the firm has monopsony power as reflected in tomato and potato cultivation in India. In this instance producers end up making losses, while processors make substantial profits from the same crop (Singh 2002).

This paper examines the benefits and problems of contract farming in gherkin and rice seed cultivation in Andhra Pradesh. There are many reasons for taking up a study of contract farming in Andhra Pradesh including the state government's efforts to promote contract farming in the wake of the agrarian crisis, spread of contract farming across different crops and regions, and absence of a comprehensive study of it in Andhra Pradesh. Thus, this study will provide insights on the performance of contract farming in Andhra Pradesh.

The paper is divided into seven sections. Section 1 explains the sampling method used for the selection of farm households. The nature of contract environment between firm and farmer is elaborated in Section 2. Section 3 explores the characteristics of contract and non-contract farm households. Section 4 examines the income and employment generation in contract farming. The environmental implication of contract farming is discussed in Section 5. Section 6 deals with the performance of contract agreement between farmer and firm. Section 7 concludes.

1 Selection of Sample Households

A survey was conducted among rice seed, non-rice seed, and gherkin and non-gherkin farm households in Mahbubnagar and Karimnagar districts of Andhra Pradesh during 2008. The survey comprised 295 farm households of which 159 were contract farm households and 136 were non-contract farm households. Among the 159 contract farm households 86 were rice seed and 73 were gherkin contract farm households. For gherkin, the households with Global Green were selected whereas for rice seed, households with Pioneer Seeds (HR-3), UPL and Pro-Gro were selected.

Gherkin and rice seed are chosen for the study because the contracting schemes for these crops have been in practice since last one decade and also have export potential. Only 15 to 20 farm households engaged in contract farming in a village, hence we selected eight villages in two districts. A two-stage sampling method was adopted. In the first stage, eight villages (selected four villages for each crop)

of two districts were selected purposefully based on the area, where contract farming was in operation. The second stage involved a stratified random sampling method. After selection of villages, the survey identified contract and non-contract farm households. Non-contract farm households were selected in the peripheral areas with similar cropping pattern as that of contract farms. Different size classes were given proportionate representation, while selecting the sample for non-contract farms. From each village 15 to 20 contract and non-contract farms were surveyed. Data were collected through a well-structured questionnaire designed for collecting information on socio-economic characteristics of farm households and production strategies (use pattern of chemicals and water).

2 Nature of Contract Agreement

An enquiry into the implementation of the contract has revealed wide deviation from the original contract and the one actually implemented. This can be seen in the provision of technical services, inputs and credit allocation. Simmons et al (2005), Singh (2002) and Eaton and Shepherd (2001) noted that contract design varies across production regimes – each production regime follows a particular form of arrangement. It is observed from our analysis that the implementation of contract varied across two crops, namely, gherkin and rice seed (Table 1).

Table 1: Design of Contract in Gherkin and Rice Seed Contracting

Particulars	Gherkin Crop	Hybrid Rice Seed
Nature of contract	Formal (written)	Formal (confusing)
Kind of contract	Direct	Indirect (through intermediary)
Language	Not local language	Not local language
Categories of farmer	Small, medium and large	Small, medium and large
Nature of price	Pre-fixed price	Pre-fixed price but it could change upon the market price
Mode of payment	Payment after end of the season	2/3rd payment after harvest +1/3rd after 'OK' report
Market intricacy	Free from both input and output markets	Input supply (seed and some amount of pesticide and buyback output)
Compensation for crop damage	Nil	Rs 18,000-20,000 per acre if crop damage is because of natural calamities
Arbitration mechanism	No	Yes
Credit facilities	No	Yes (sometimes credit facilitated by service provider)
Production decision	Dictates of firm prevail	Both farmer and firm

Source: Based on our survey (2008).

2.1 Gherkin

Gherkin is an exotic crop, which is known as pickle cucumber. Though India is a traditional producer of cucumber, the export potential of this crop was realised in the late 1980s (Kumar et al 2008). This particular type of cucumber production in India is concentrated in southern states of Karnataka, Tamil Nadu and Andhra Pradesh. Among these states Karnataka accounts for 60% and both Tamil Nadu and Andhra Pradesh contribute 20% each of total production (Anonymous 2005). Around four processors are currently involved in gherkin cultivation in Andhra Pradesh. Among them, the Global Green Company is the prominent one. It is operating³ in Medak, Gadwal and Jadcharla in Mahbubnagar and Vikarabad in Ranga Reddy district. The company has followed a centralised model.⁴ The contract agreement between farmer and the Global Green Company is written and formal. Terms of contract include the supply of inputs like seeds, fertiliser, plant protection chemicals and new techniques of production⁵ by the company to farmer. Further, the farmer supplies the harvest to the company at a pre-agreed price. To maintain the contract agreement, farmers are provided with “passbooks”, which record the amount of crop purchased by the company and the amount of fertiliser and plant protection chemicals sold to the farmer. Farmers are also provided with high-yielding and disease-resistant plant materials, which are procured from top international companies.⁶ The costs of these inputs are deducted from post-harvest payment for the crop.

Farmers are paid on the basis of grades and weights of crop recorded at the first procurement centre. Payment is made 20 to 30 days after procurement through the bank to the respective farmer's account. The company sets the price on the basis of cost of cultivation. As per the company record, the price offered is about 50% to 60% more than the cost of cultivation. The price of gherkin is linked to its grade. Generally, there are five grades – third, second, single, stacker and new.⁷ The pricing of different grades is demonstrated in Table 2. Average third grade crop fetches the highest price (Rs 3.50 per kg) and stacker grade and single grade fetch the lowest price (Rs 2 per kg). Third grade with crop size 18.5 mm fetches the highest price – Rs 6.5 per kg.

2.2 Rice Seed

The production of the usual rice seed is fairly straightforward and requires no special equipment beyond a seed cleaner. Since certified seed production requires cross-fertilisation between male and female plants, crop management is more complicated than the usual rice production. Rice seed production requires separation from standard seed plants to avoid cross-pollination. Further, since rice seed is not treated with chemicals, unsold seed can be taken back to the grain market.

The processors follow a subcontracting approach⁸ to deal with the contract agreement. In the subcontracting agreement, the service provider or the organiser plays an important role to facilitate the contract. The service provider identifies the farmers and secures their commitment to the respective processor for production of seed during the season. To avoid cross-pollination, the service provider makes contracts with geographically-based communities and requires cultivation of only rice seed.

After the selection of farmers, the organiser informs the processor about the extent of area and the number of farmers willing to take over the crop.

The contractual environments between the farmer and the firm are relatively simple. Farmers are provided with free foundation seed and extension advice and must deliver all female rice to the respective firms. Quality is an important issue in seed production and although different varieties are grown, only one quality standard is used for procurement. All the male rice produced is retained for the farmers' own use or sold in the open market. All the female corn seeds are delivered to test the quality.

Table 2: Price of Gherkin across Grades

Grade Name	Size of Fruits (mm)	No of Fruits per kg	Price per kg (Rs)	Average Price (Rs)
3rd grade (every day procurement)	18.5	80-160	6.50	3.50
	26	30-80	3.50	
	39	10-20	0.50	
2nd grade (every day procurement)	26	30-80	4.50	2.50
	29	20-30	2.50	
	39	10-20	0.50	
Single grade (every day procurement)	<39	10-20	3.00	2.00
	39-45	5-15	0.50	
Stacker grade (every day procurement)	33-45	5-15	3.00	2.00
	< 30	15-30	0.50	
New grade (alternative day procurement)	26	30-80	4.50	2.50
	33	15-30	1.50	
	48	5-10	1.50	

Source: Company.

The organiser arranges a number of technical staff for conducting periodic field inspections at various stages of the growth of seed. It is the duty of the organiser to ensure field inspections by seed certification staff. The performance of these technical staff is assessed on the basis of the success of the contract. Farms are usually visited four times by the technical staff and they are paid by the processor to undertake the advisory and monitoring role. The technical staff visits farms during land preparation, 30 days after sowing, then between 40 and 60 days during the pre-flowering stage and then a week prior to the harvest. The service provider arranges for the completion of all formalities to get the seed certified from the concerned processor.

The farmer bears the cost of cultivation, quality monitoring cost, grading and packaging, excluding the cost of parent/foundation seed and some pesticide, which is provided by the processor. In addition, the farmer also bears the risks arising out of low germination, low yield, poor quality and seed rejections. It is reported that companies insure against weather uncertainty. If the minimum output (six quintal per acre) could not be achieved due to bad weather, the firm provides cash compensation. Compensation varies from processor to processor ranging between Rs 18,000 and Rs 20,000 per acre. The price paid to the contracted farmers is around four times more than the prevailing spot price for consumption rice. Payments are made through commercial banks and in some cases directly. They are paid the pre-agreed price only after testing the quality of seed and for only that quantity which passes those tests. Fifty per cent of the total value of seeds is paid immediately after procurement, and the rest is paid after the certification of the seed. Normally, it takes around 60 to 90 days to receive the total payment.

3 Comparison between Contract and Non-Contract Farmers

Though growing contract crops need a higher investment, generally wealthier and progressive farmers participate in contract farming. Little (1994) argued that contract farming typically involves wealthier farmers, who already have significant amounts of capital and non-farm investment. In addition, most studies observed that contract farmers are from better segments of the rural population. Table 3 presents the differences in characteristics between contract and non-contract farm households. The average family size of contract farm households is higher than the non-contract ones in rice-growing region, however, no such differences are seen in the gherkin-growing region. Though some difference is observed in the education of the farmer, no difference is observed in the age between contract and non-contract farmers in rice seed growing region.

The average landholding size of contract farm households is around 7.42 acres, whereas it is only 4.93 acres for non-contract farm households in the gherkin-growing region. In the rice seed growing regions, average landholding size of contract farm households is 5.54 acres and 4.13 acres for non-contract ones. Further, there is a large difference in case of irrigated land between contract and non-contract farm households. These results support the findings of Singh (2002) and Kumar (2006), that the average landholding size of contract farmers is higher than the non-contract ones. If one looks at the level of investment, there is a big difference between contract and non-contract farm households. Though, there is no difference between contract and non-contract farms in accessing credit (formal/informal), there is a difference in accessing the formal credit. The result on technology adoption suggests that some difference is in the source of technology adopted by contract and non-contract farmers in the rice seed-growing region, but no difference is seen in the gherkin-growing region. On the whole, contract farmers are better off in terms of education, production strategy and access to the market compared to non-contract ones.

4 Income, Employment and Contract Farming

4.1 Income

The farmer's satisfaction with contracts may be measured by the level of income earned from a contract crop and its distribution. Farm gross income (barring income from livestock) and off-farm income of contract and non-contract farmers are presented in Table 4. It is evident that the mean difference between per acre gross income and annual gross income of contract and non-contract farmers is significant at 1% level.

Table 3: Differences in Characteristics between Contract and Non-contract Farm Households

Farm and Farmer's Characteristics	Mean of Responses			Separate Variance Estimated	
	Total	CF	Non-CF	t-value	P-value
Sample farm households in gherkin growing region					
No of farm households	140	73	67		
Age of farmer**	46.03	44.16	48.06	-1.98	0.02
Year of schooling of farmer***	3.19	2.64	2.69	1.32	0.09
Family size	5.02	5.08	4.95	0.57	0.28
Family size (14-65 years)	3.99	4.07	3.90	0.69	0.25
Non-farm income**	22,320	17,737	27,313	-2.11	0.02
Land* (areas in acres)	6.23	7.42	4.93	3.94	0.00
Irrigated land* (area in acres)	1.65	2.49	0.75	6.53	0.00
Livestock use for farming purpose* (number)	1.63	1.93	1.29	3.31	0.00
Total investment for agriculture* (Rs)	42,367	65,524	17,136	9.77	0.00
Access to credit market (yes = 1, no = 0)	0.97	0.98	0.95	1.07	0.14
Access to formal credit* (yes = 1, no = 0)	0.61	0.79	0.42	4.88	0.00
Technology adoption (own only = 1, other = 0)	0.58	0.57	0.58	-0.08	0.46
Sample farm households in rice seed growing region					
No of households	155	86	69		
Age of farmer	43.72	43.55	43.94	0.21	0.41
Year of schooling of farmer**	5.39	5.99	4.65	1.64	0.05
Total member in household	4.17	4.19	4.14	0.21	0.41
Total members in household** (14-65 years)	3.23	3.36	3.03	1.60	0.05
Non-farm income	25,130	28,465	20,974	0.84	0.20
Agricultural land** (area in acres)	4.91	5.54	4.13	4.06	0.00
Irrigated land owned** (area in acres)	4.04	5.11	2.71	7.22	0.00
Livestock use for farming purpose** (number)	1.43	1.62	1.20	2.76	0.01
Total value of agricultural instruments** (Rs)	1,27,142	1,52,912	52,023	2.99	0.00
Access to credit market (yes = 1, no = 0)	0.80	0.79	0.81	-0.81	0.37
Access to formal credit (yes = 1, no = 0)	0.79	0.79	0.80	-0.01	0.46
Technology adoption** (own = 1, other = 0)	0.89	0.84	0.96	-2.53	0.01

CF = Contract Farmer, Non-CF = Non-Contract Farmer.

***, **, * Statistically significant difference in means at the 10%, 5% and 1% level.

Source: Field Survey.

The average on-farm gross income is higher among contract farmers than the non-contract ones by about 106% in the rice seed-growing region and it is higher by 110% in the gherkin-growing region. Further, per acre gross income is higher for contract farmers than for the non-contract ones. Non-farm income is higher among non-contract farmers compared to contract farmers in the gherkin-growing region, however, the opposite is in the rice seed-growing region. The total income from all sources is higher for contract farmers than non-contract ones by 93.65% in the rice seed-growing region and by 64.78% in the gherkin-growing region.

Table 4: Average Annual Gross Farm and Non-Farm Income of Contract and Non-contract Farmers

Particulars	Contract Farmers	Non-contract Farmers	Change over Non-contract Farmers
Rice seed: On-farm gross income			
Per year*	1,89,708 (86.95)	91,689.57 (81.38)	98018.43 (106.90)
Per acre*	23,950.23	20,052	3,898 (19.44)
Non-farm gross income			
	28,465 (13.05)	20,974 (18.62)	7,491 (35.72)
Total*	2,18,173.21 (100)	1,12,663.5 (100)	1,05,509 (93.65)
Gherkin: On-farm gross income			
Per year*	1,24,407 (87.52)	59,106 (68.39)	65,301 (110.48)
Per acre*	16,308	11,851	4,457 (37.61)
Non-farm gross income**			
	17,737 (12.48)	27,313 (31.61)	-9,576 (-35.06)
Total**	1,42,144.4 (100)	86,419.85 (100)	55,724.55 (64.78)

*, **, indicates significance at 1% and 5% level.

Figures within the parentheses indicate the percentage to total farm household's income and italic figures within the parentheses indicate the percentage change over non-contract farms.

The crops grown under contract farming are not being grown generally by non-contract farmers. So it is worthwhile to compare per acre gross income from non-contract crop commonly grown by both contract and non-contract farmers. The per acre gross incomes from various crops under contract and non-contract farmers are reported in Table 5. It reveals that, the gross value of the rice seed is higher (Rs 36,399) compared to that of the gherkin (Rs 30,829).

Table 5: Per Acre Gross Income from Different Crops between Contract and Non-contract Farmer

Crop	Contract Farmers	Non-contract Farmers	Change over Non-Contract Farmers
Rice seed contract			
Rice seed	36,399		
Rice**	13,389	14,210	-821 (-5.78)
Maize**	20,213.3	21,592	-1,378.7 (-6.39)
Cotton***	25,740	24,231.5	1,508.5 (6.23)
Gherkin contract			
Gherkin	30,829.52		
Rice	11,316.53	9,711.4	1,605 (16.53)
Maize*	9,034	10,756	-1,722 (-16.01)
Cotton***	18,543	14,604	3,939 (26.97)

*, **, *** indicate significance at 1%, 5%, 10% level.

Figures within the parentheses indicate the percentages change over non-contract farmers. The income from other crops was not considered for analysis.

In the rice seed-growing region, cotton has contributed the maximum income (Rs 25,740) followed by maize and rice among non-contract crops. Interestingly, non-contract farmers are earning more income per acre from non-contract crops except cotton. The mean differences of income from rice, maize and cotton between the contract and non-contract farmers are statistically significant at 1%, 5% and 10% level. In the gherkin-growing region, cotton contributed the maximum income followed by rice and maize. Non-contract farmers are able to earn more income only from maize. The results indicate that in the case of some non-contract crops, non-contract farmers are better off than contract farmers.

4.2 Employment

Table 6 presents the labour demanded per acre for contract and non-contract crops. The results indicate that more labour is employed in contract crop cultivation relative to non-contract crops. It is argued that generally firms promote the cultivation of high value crops (fruits and vegetables), which require more labour to standardise the production that cannot be met by mechanical methods. The results show that the labour concentration is higher in contract crops compared to non-contract ones – 95.37 mandays per acre for rice seed, 171.55 mandays for gherkin against 28.45 mandays for rice and 25.85 mandays for maize. Further, it could be noticed that more labour is acquired to grow gherkin compared to rice seed. In this regard, Dev and Rao (2005) recorded that 100% of farmers have reported that gherkin has potential for higher employment. Gherkin is a labour-intensive and short duration crop, so it demands higher labour resulting in a rise in wage rate. Most farmers reported that during the gherkin-growing period, the wage rate increases by 40% to 50%.

It is observed that the rice seed demands more hired labour than the non-contract crops but this is not so in the case of gherkin. Large farmers hired more labour followed by medium and small farmers in the case of rice seed. Thus, it could be argued that

small farmers are better equipped for growing contract crop as they have higher levels of own family labour, which they can easily monitor during the production process (Eaton and Shepherd 2001). There is no such difference in the demand for hired labour across farmer groups in the case of gherkin. Rice seed cultivation was also found to use more women labour (86.56%) compared to gherkin (47%). This is so because rice seed cultivation involves planting and weeding which are done by women.

5 Environmental Implications of Contract Farming

Contract farming affects the environment in different ways like over-exploitation of groundwater, excess use of fertiliser and pesticides leading to health hazard and monocropping leading to decline of soil quality (Opondo 2000). In the following sub-section we have analysed hypothetical argument on the impact of contract farming on groundwater and land quality in the study region.

5.1 Water Use Pattern

Water is the major input for agriculture. However, misuse and excess use of water raise the question of sustainability. The key water source in the study regions are rainfall and groundwater. Although, a few small dams exist in the region, they are insufficient to meet domestic, agricultural and industrial demands. Groundwater reserves, therefore, becomes the main water source for farmers. Reddy and Kumari (2008) observe that indiscriminate tapping of groundwater has led to decline in the water level by 2.97 m within four years in this region.

It is observed that in both the study regions farmers growing contract crop are more dependent on groundwater for irrigation. Further, the Global Green Company (which deals with gherkin) allows farmers to grow the crop only if the farmer has access to bore irrigation facilities. The irrigation intensity for contract crop like gherkin and rice seed is higher than that of non-contract crop like maize and rice. It is observed that gherkin needs 9 to 10 times of irrigation within two months, whereas maize needs only three to four times of irrigation. Thus, excess use of groundwater for the contract crop has depleted the water level drastically

Table 6: Per Acre Own and Hired Labour Employed in Contract and Non-contract Crop across Farm Size

	Small	Medium	Large	Total
Gherkin contract farmer				
Contract crop (gherkin)				
Own labour	101.26 (59.42)	107.40 (57.26)	98.38 (57.47)	97.69 (56.95)
Hired labour	69.16 (40.58)	80.15 (42.74)	72.81 (42.53)	73.86 (43.05)
Total	170.42 (100)	187.55 (100.00)	171.19 (100.00)	171.55 (171.02)
Non-contract crop (maize)				
Own labour	25.23 (66.34)	22.12 (68.87)	13.87 (59.48)	20.55 (65.99)
Hired labour	12.8 (33.66)	10 (31.13)	9.45 (40.52)	10.59 (34.01)
Total	38.02 (100.00)	32.12 (100.00)	23.32 (100.00)	31.14 (100.00)
Rice seed contract farmer				
Contract crop (rice seed)				
Own labour	17.64 (19.52)	12.03 (12.61)	10.67 (11.15)	12.25 (12.82)
Hired labour	72.72 (80.48)	83.39 (87.39)	85.04 (88.85)	83.3 (87.18)
Total	90.36 (100.00)	95.42 (100.00)	95.71 (100.00)	95.55 (100.00)
Non-contract crop (rice)				
Own labour	4.4 (17.07)	3.15 (11.64)	1.88 (6.70)	3.12 (11.56)
Hired labour	21.38 (82.93)	23.91 (88.36)	26.19 (93.30)	23.86 (88.44)
Total	25.78 (100.00)	27.06 (100.00)	28.07 (100.00)	26.98 (100.00)

Figures within the parentheses indicate the percentage.

raising the concern of sustainability. The apprehension is that exploitation of groundwater will deteriorate its quality especially aggravating the fluoride⁹ problem. The report of the State Groundwater Department (SGWD) has pointed out that, fluoride concentration in groundwater is higher in this region. Over-exploitation of groundwater, thus, has caused a decline in soil fertility and an increase in health problems.

5.2 Use and Abuse of Agrochemicals

The use of agrochemicals (fertilisers, pesticides, herbicides and fungicides) in India has increased rapidly since 2000. This is seen in states like Punjab, Andhra Pradesh and Karnataka, where rapid commercialisation of agriculture has taken place. There are two types of consequences of the use of agrochemicals. First, it increases agricultural productivity. Second, it adversely affects human health and environment in a number of ways.¹⁰ Indeed, there is substantial evidence that intensification of fertiliser and pesticide use has deteriorated land quality, and increased health risks.

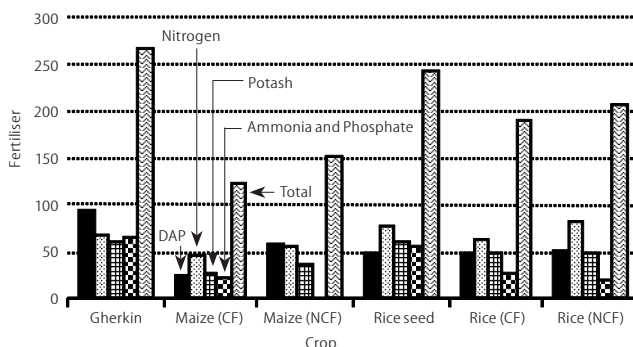
Generally, firms promote high value crops that need more chemicals. It is observed that to protect the crop (gherkin) from insects, the firm recommended the use of pesticides which were not environmentally-friendly. In addition, major food importing countries¹¹ specify the use of certain pesticides for crops, which determine whether food imports can be accepted into their food chains or not. It is thus argued that most of the new pesticides used in the crop cultivation precede a range of pests rather than specific target organism and destroy the natural in-built protection of the ecosystem.

Large differences in pesticide use are observed between contract and non-contract crops. For growing gherkin, around seven to eight times pesticide has to be sprayed in a season and four to five times for rice seed. In addition, five types of pesticides, namely, Chloropicrin, Confidor, Zinc, AP Loud and Antrocol are used for rice seed. On the other hand, little/no pesticide is used for growing non-contract crops. To protect gherkin (contract crop) from insects, the company recommends using pesticide one day before plucking the gherkin. Farmers do not protect their hands while doing so. This has a negative impact on human health. In this regard, Gandhi and Patel (1997) have argued that where the farmer is not aware of the negative effects of pesticide use on the environment, it will have a higher negative impact on the economy.

Figure 2 shows the level of fertiliser consumption across crops. The results indicate that the consumption of fertiliser is higher for contract crops than for non-contract crops. For instance, the fertiliser consumption for gherkin is 50% higher (266 kg per acre) than the non-contract crop like maize (121 kg). The same trend is observed also from the rice seed farmers. It is observed to be 243 kg per acre for rice seed, whereas it is only 188 kg per acre for rice. If one compares crops grown both by contract and non-contract farmer, gherkin contract farmers are using more fertiliser compared to non-contract farmers. The contrary trend is observed in the case of rice seed farmers. For instance, fertiliser consumption is higher (151 kg per acre) for maize grown by non-contract farmers when it is compared to contract ones (121 kg per acre). The level

of fertilisers used by small farmers is higher (281 kg per acre) compared to the large ones (259 kg per acre). In the case of rice seed, large farmers use more fertilisers (233 kg per acre) compared to smaller ones (227 kg per acre). It could be argued that smaller farmers are more risk averse, and, since fertilisers increase risk, these farmers would tend to use less of that input per acre.

Figure 2: Per Acre Fertiliser Consumption (kg) across Crops



CF = Contract farmer, NCF = Non-contract farmer.
Source: Field Survey.

6 Performance of Contract Agreement

It is common for the firm to supply inputs under contract farming. However, the intensity of supply depends upon the nature of the contract. The fact is that once production begins, the firm uses its monopoly power over the provision of specialised inputs as markets are missing for these inputs. By rationing these inputs, firms restrict the supply of inputs below the required quantity and quality. Based on the information furnished by sample farmers, the performance and problems in practising contract farming are presented in Table 7 (p 66). Gherkin farmers do not appreciate the company's behaviour in supplying inputs. Both rice seed and gherkin farmers find generally that the seed and pesticide supplied by the company are inadequate for the area to be sown. About 21% of gherkin farmers report that the fertiliser supplied is insufficient for the area to be sown. As farmers are not able to sell and they lack information on the price of inputs, the company can increase the price of inputs. Around 17.3% of gherkin farmers reported that the company supplies inputs at a higher rate than the market rate. For instance, the company charges Rs 70 in excess of the market rate for fertiliser and Rs 110 for pesticide.

Generally, processing firms promote high value crops and new crops which are not grown in a particular local economy. There is a chance of crop failure even if adequate technology is supplied by the company. More than three-fourths of gherkin and 6% of rice seed farmers are affected by crop failure (lower yield, poor quality). The main reasons for gherkin crop failure are diseases (pest attack), bad weather, lack of information and poor quality seed respectively. About 17.81% of gherkin farmers and only 3.43% of rice seed farmers are facing the problem of poor quality of seed which leads to crop failure. Some gherkin farmers noted that the company provides poor quality seeds. In addition, 52%, 43% and 21% of gherkin farmers reported crop diseases, bad weather and lack of knowledge, respectively as reasons for crop failure. However, no compensation is made for

these crop failures. Problems of disease and low yield are not reported by the rice seed farmers.

6.1 Procurement and Default

Farmer satisfaction in contract farming could be observed from the income earned, efficiency of payments, input supply and market assurance for the harvest. There is no doubt that contract farming is profitable and beneficial for farmers. A majority of contract farmers interviewed want to continue contract agreement and some others (around 60% non-contract farmers interviewed) want to get into contract production. Around 96% of gherkin and 97% of rice seed farmers reported that contract farming is beneficial. However, only 54% of gherkin and 89% of rice seed farmers are happy with the prevailing contract agreement. This may be explained with reference to the monopsonistic¹² behaviour of the firm.

The company's default in procuring output and manipulation of quality differs across crops due to differences in the nature of crop. For instance, the default rate would be higher for a perishable crop compared to a non-perishable one. Around 63% of gherkin farmers and 30% of rice seed farmers reported that the company did not procure contracted output. Company's default rate (procurement failure) was higher for small farmers compared to medium and large farmers. This could be explained in terms of bargaining power – because of the lower bargaining power of small farmers, the company may have tried to exploit them. About 57.53% of gherkin and 29.07% of rice seed farmers have observed that quality is the major problem for the crop not being procured. Most of the gherkin farmers observe that if the crop is slightly longer the company does not procure it at the contract price. The company also forces farmers to sell the crops at a low price (50 paisa per kg), when the market price would be Re 1 per kg.

Table 7: Constraint and Problems Faced by Contract Farmer's in Practising Contract Farming

Constraints and Problems	Gherkin Farmers	Rice Seed Farmers
Not procured output as per contract agreement	46 (63.01)	26 (30.23)
Because of quality differentiation company did not procure output	42 (57.53)	25 (29.07)
Difficulty in meeting quality requirements	20 (27.40)	
Less seed	1 (1.37)	2 (2.33)
Less fertiliser	15 (20.55)	
Less pesticide	21 (28.77)	8 (9.30)
No proper transportation	2 (2.74)	4 (4.65)
Lack of quality inputs	38 (52.05)	
Inputs at higher price	13 (17.81)	
Poor extension service	17 (23.29)	14 (16.28)
Crop failure	64 (87.67)	5 (5.81)
Crop failure because of diseases	38 (52.05)	
Crop failure/bad weather	31 (42.47)	
Crop failure because of bad seed	13 (17.81)	3 (3.49)
Crop failure because of lack of information and own negligence	15 (20.55)	
Because of higher production firm increased quality	11 (15.07)	
Rejected after procurement		23 (26.74)
Low price	19 (26.03)	
Delay payment	31 (42.47)	54 (62.79)
Labour problem	41 (56.16)	

Figures within the parentheses indicate the percentage.
Source: Filed Survey.

In this regard, Glover and Kusterer (1990) argued that the default on quantity and/or quality has been one of the most common problems in contract farming.

It is not that only the farmer faces the problem in contract farming. Agribusiness firms also face different problems when opting for contractual arrangement as a governance mode in their supply chain. Like the firm, a farmer may break a contract agreement in different ways. Sometimes, a farmer can sell output of his/her production to a third party, when prices are perceived to be higher outside the contractual bond. The particular type of problem prevails where alternative markets are easily accessible for the crop under contract. However, the crops (gherkin and rice seed) under the present study have no alternative market, thus, it is difficult for the farmer to renege on a contract by not supplying the output to the company. But, around 24% and 28% of gherkin farmers fail to meet the quantity and quality prescribed in the contract. It is argued that in resource provision contracts, a known problem is the potential use of the distributed inputs in alternative crop. Farmers may use fertilisers in their subsistence crops. Around 15% of gherkin farmers used the supplied inputs for non-contract crop.

6.2 Problems and Remedies

The benefits of contract farming may not last long because of the monopsonic behaviour of the firms and the practice of agribusiness normalisation¹³ by the contracting firm. More than half (52.05%) of gherkin and 80% of rice seed farmers have not faced any major problem so far in contracting. Other farmers report problems like poor coordination of activities, poor technical assistance, delay in payments and cheating even after procurement of output. More than one-fourth of rice seed farmers reported that the company has rejected the seed even after procurement. The same problems are faced by gherkin farmers. Crop damage on the way to factory is cited as the reason. Farmers note that the company cheats in different ways by taking advantage of their illiteracy. It could be that dependency on a prescribed technology makes farmers vulnerable to output and productivity manipulation by agribusiness firms. Manipulation, in this process, can be seen as an indirect, sophisticated means to control payments to farmers (Silva 2005).

In the long run, contract farming may lead to a gradual fall in the real prices received by farmers. As asset specificity is built in the farm operation, firms may use this constraint as a way to establish and reinforce monopsonic power, and thus, gradually impose lower prices on farmers. More than one-fourth of gherkin farmers complained about lower prices – as the company is providing a lower price compare to their cost of cultivation. Most farmers report that though the cost of inputs like fertiliser, pesticide and labour has been increased, gherkin price has not been increased for the past five years. The question may arise, why do the farmers not exit gherkin cultivation. The answer is that, though the firm provides a low price, the profit is higher compared to other crops. Another explanation could be that though the farmer depends on the firm for inputs, to repay the cost of inputs, the farmer keeps the contract for a long time. Little (1994) argues that a farmer cannot move out after entering into contract even if the expected benefits

do not materialise due to low price or crop rejection or crop failure. For sustaining the contract, the price should be increased from the prevailing Rs 5 per kg to Rs 8 to Rs 10 per kg. However, the price problem is not observed in case of rice seed. The company paid more than the agreed price.

Delay in payment is a disguised form of mistreatment of farmers by firms. It is argued that delay in payment may confuse the quantity and quality of output that was transacted between the farmers and the firm. One result of this is that the firm tries to maximise its benefit by manipulating the contract¹⁴ through increasing the required quality of output. The study found that delay in payment is the major problem in the contract agreement. An agreement is made for payment to be made within 30 days from the date of delivery for gherkin and 60 days for rice seed. However, around 43% of gherkin farmers and 63% of rice seed farmers face the problem of delay in payment. Further, the majority of gherkin farmers (small) and rice seed farmers (large) are paid late. Due to delays in payment, most of the gherkin farmers are forced to sell their assets and take non-institutional credit to pay wages to the labour employed for the contract crop. In the absence of effective enforcement mechanisms, there is little that a farmer can do to avoid the negative impact of contract farming. In this regard, around three-fourths of gherkin farmers and 44% of rice seed farmers demand a legal contract enforcement. Further, about 77% of gherkin and 61% of rice seed-growers seek government intervention for institutionalising the contract agreement. Labour problem is reported to be another major constraint for practising contract farming. About 56% of gherkin farmers face labour problems during cultivation.¹⁵ Shortage of labour has become more pronounced after the implementation of the National Rural Employment Guarantee Scheme (NREGS)¹⁶ as most gherkin farmers reported. Most of the farmers have reported that it is difficult to get labour at the normal wage rate and when it is needed.

Problems faced by the non-contract farmers in adopting contract farming are presented in Table 8. The information gap remains the major problem. In the poverty literature it is argued that people are

Table 8: Constraints Faced by Non-contract Farmers in Adopting Contract Farming

Constraints	Gherkin Region	Rice Seed Region
Not aware about contract crop (gherkin/rice seed)	29 (42.0.3)	9 (13.43)
Not aware about contract farming	49 (73.13)	27 (39.13)
Participated in contract farming before	8 (11.94)	5 (7.25)
Moved out from contract farming because of higher labour and risk	6 (9.00)	4 (5.80)
Credit constraint	30 (44.78)	35 (50.72)
Irrigation problem	35 (52.24)	18 (26.09)
Need for government intervention	40 (59.70)	42 (60.87)

Figures within the parentheses indicate the percentage.

poor because they lack information regarding the income-earning opportunities available in the economy. It is observed that about 42% of sample non-contract farmers in gherkin-growing region and 13.43% of sample non-contract farmers in rice seed growing region are not aware of the contract crops. Further, nearly three-fourths of non-contract farmers in the gherkin-growing region and 40% of non-contract farmers in the rice seed-growing region are not aware of contract farming. Therefore, the role of information and communication technology is important

for promoting contract farming. The benefits and problems of contract farming can be disseminated through radio, tv or through newspapers.

Among the sample of non-contract farmers, about 12% were in the gherkin-growing region and 6% were in rice seed-growing region and had participated in contract farming previously, but due to the higher labour need and risks involved in these crops, they moved out. Credit constraints and problems of irrigation were also major constraints. To improve farmers' participation in contract farming, around 60% of sample non-contract farmers in both the regions demand an active government intervention.

7 Conclusions

To sum up, contract farming in Andhra Pradesh has had both positive and negative outcomes. By and large, firms initiate the contract and so the farmer's participation in contract farming depends more on the firm's criteria than the farmer's choice. It is observed that in most cases firms entered into contracts with farmers having higher landholding size and also better irrigation facilities. Further, farm households with high family size, better education, younger farmers and higher agricultural investment are participating in contract farming.

An attempt has been carried out to ascertain if contract farming has increased income and employment. The total income earned by contract farmers is found to be higher than, almost double, that of the non-contract ones, except in the case of live-stock income. Labour demanded by contract crops is also found to be higher, almost twice that of the non-contract ones. Further, more employment is recorded for women per acre in the case of rice seed cultivation compared to the gherkin crop. The environmental aspect of contract farming shows that when productivity declines, the company tries to shift the production relation to other farmers and also to other regions. Further, there is an excess use of agro-chemicals for the contract crop compared to non-contract ones. Thus, it raises the question of sustainability.

The firm's monopsonic behaviour makes it unlikely that the contract will be sustained. Most farmers faced the problems of crop rejection by the firm. It is noticed that the company is reluctant to procure the contracted output because of differences in the quality of crop. The company also tries to re-grade the crop without informing farmers, which reduces the expected income. Delayed payment, lack of credit, scarcity of water and difficulty in meeting quality requirements are found to be the major constraints faced by contract farmers. Lack of credit and water scarcity is the major constraint for non-contract farmers.

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NOTES

- 1 This is a contract where the price is agreed upon for commodities and securities to be delivered at a future date. It may be used for hedging, to decrease risk, or as a speculation, taking on risk for the sake of an expected profit.
- 2 Monoculture in contract farming leads to soil erosion and heavy use of chemicals (pesticide and fertiliser) has harmful impact on natural resources, environment, human beings and animals (Opondo 2000). Further, contract farming also has led to over-exploitation of groundwater, salination of soil, decline in soil fertility and increase of pollution.
- 3 The Global Green Company is an industrial unit owned by Thapar group, which has operations in different industries like paper, cotton and electrical instrument. With the advantages of agroclimatic diversity of India over the years, the company has grown asparagus, baby corn, papaya, pickling cucumbers, and peppers (coloured bell-peppers, jalapenos, paprika, sweet banana peppers).
- 4 For better understanding see Eaton and Shepherd (2001).
- 5 Company has extension team in each crop-growing region to provide new methods of cultivation. The team consists of senior managers, area managers, area extension officers and village level workers (who are mostly the leading cultivators). Village level workers maintain contact with farmers and provide necessary advice like how to manage crop, use of pesticides and post-harvesting techniques. For capacity-building, frequent Farmer to Farmer (F2F) programmes are also conducted, where specific training is given on how to ensure freshness and quality.
- 6 For more details see <http://www.globalgreencompany.com>
- 7 Grading is done based on the size and the quality of the crop. To get different variety of grades, the firm asks farmer in an area to grow a particular variety. After the harvest, the field officer grades the crop at the buying point.
- 8 In subcontracting agreement, the processor procures crops from an intermediary (production organisation or service provider) and contract is signed with farmer only by the service providers not by the processor directly. The service provider is generally a farmer who has a minimum of intermediate level of education. He would be selected on his past organisational experience. Further, the service providers are those who have a licence to do this business.
- 9 Certainly, there has been more litigation on alleged damage to agriculture by fluoride than all other pollutants combined. It reduces agricultural productivity, lessen the growth rate of plants as well as bring down the soil fertility within a relatively short time. Moreover, it also shows many perilous effects on human health. Intake of fluoride water causes many fluoride-related diseases like periodontal disease.
- 10 Pesticides that are toxic for man and other forms of life may be harmful if not used properly. In some instances, their application often extends to other areas not intended for their use. For example, they may find their way into aquatic ecosystems and contaminate the life therein. Further, among all plant nutrients, mismanagement of two nutrients such as nitrogen (N) creates environmental problems. These include the eutrophication of lakes, bays and non-flowing water bodies. The symptoms are algal blooms, heavy growths of aquatic plants and deoxygenating.
- 11 The major importing countries of gherkin are Germany, Australia, France, Japan, UK, US, etc (www.globalgreencompany.com).
- 12 This is a situation where a single buyer buys produce of hundreds and thousands of farmers. A typical agreement in contract farming involves two unequal parties – one is a highly mechanised sponsoring company, and on the other side, is a large number of illiterate farmers. In this situation, the bargaining power of farmer's remains low compared to that of the company.

- 13 Agribusiness normalisation refers to a process wherein agribusiness firms, in their start-up stage, offer promotional policies such as high prices, low quality standards, and generous input and credit support to contract growers which exceed what they expect to maintain over the long run. But the firm may find it impossible to sustain these costs beyond one or two years. So to maximise profit, firms have to increase the quality standard and lower the procurement price (Singh 2002). As a whole, agribusiness normalisation process means lower producer prices and this along with higher input costs for farmers may lead to a growing discontent among them.
- 14 In the long run, farmer may forget the quantity and quality of crop supplied to company. In this situation firm may manipulate the records.
- 15 It is argued that agriculture is a seasonal activity and the extension of agricultural activities increases the labour demand in a particular period.
- 16 NREGS is a pro-poor scheme. It promises Rs 90 per day for 100 days of employment a year to one member of every rural unemployed family, especially rural family, coming under the poverty line. It started from September 2005. Most of the farmers reported that after the implementation of NREGS, the wage rate has increased and they are able to get labour at lower wage rate (Rs 50 per day). The question here is at what wage rate contract farming generates employment.

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