

Environmental Implications of Contract Farming: The Case of Cotton Cultivation in Odisha

Presented by:

Dr. Narayan Sethi

Dept. of Humanities and Social Sciences,
NIT, Rourkela.

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Introduction

- Agricultural sector plays a crucial role in economic development of developing countries and provides the main source for livelihood, income and employment to the rural population.
- According to Food and Agriculture Organization (FAO), an economy able to promote *sustainable economic growth* through agriculture.
- To achieve rapid development in agriculture along with high productivity, the Indian economy invites various multinational companies to make intervention in the *traditional agricultural* system:
- Underdeveloped agricultural *marketing*, poor agricultural *credit facilities* and inadequate *infrastructure*
- Contract farming affects the environment in different ways like over exploitation of ground water, excess use of fertiliser and pesticides leading to health hazard and mono-cropping leading to decline of soil fertility.
- Under such system the agribusiness firms used to recommend overuse of pesticides which is not environmentally friendly.
- **Economic Competition verses Environment?**

- In this context, Central Government, State Government, Reserve Bank of India, Food and Agricultural Organization (FAO), visualize contract farming as an alternative policy intervention for economic development through agricultural development.
- The private sectors like Satyam, ITC Limited, Agro-industry, Rallis, and PepsiCo are doing different types of contract farming with small farmers in agriculture.
- Mechanisms like Public Private Partnership (PPP), Contract Farming (CF), retailing and whole-selling have been introduced.

Meaning of Contract Farming

- *Contract Farming* as an alternative policy intervention for economic development through agricultural development.
- Introduction of *corporate business* interest in agriculture.
 - Example: Satyam, ITC Limited, Agro-industry, Rallis, and PepsiCo etc.
- Goldsmith (1985), Glover (1987), Baumann (2000), FAO (2001), Singh (2002): *Contract Farming* is a “core-satellite” model, where corporate food processors link up with small farmers through model of production on contracts with exchanging agricultural inputs and services for assured deliveries of produces.

Objective of the Study

- The study broadly examines the problems and benefits of contract farming in cotton and paddy cultivation in Odisha.
- To analyse the environmental impact of contract farming on ground water and land quality.

Review of Literature

- Indian studies in the context of the problems and prospects of contract farming reveals both successes and failures with mixed impacts on livelihood, nature and economy (Swain, 2011; Herring J, Rao, 2012; Kumar and Kumar K. 2008; Parmod, 2006; Kumar 2008; Singh, 2002; and Singh, 2000).
- State-wise studies reveal that in *Maharashtra*, the contract company decides to work through intermediaries to manage the relation between smallholders and company.
- There are informal associations of farmers in *Karnataka* who manage the local operations like seed distribution, supply of crops and so among themselves
- In Punjab, the contract farming scheme smoothly functioning without participation of the state, due to the nature of crops, clear commitment of the company, perfect contract, assured returns to the farmers by reasonable prices, and so on. (Singh, 2007, 2008).

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- Studies by Dhillon and Singh (2006), Golait (2007), Sindhu (2011), Chand et al (2011), Prasanna (2011), Singh (2012), Sarkar (2012), and Vyas (2004) on the context of acceptance of contract farming and credit facilities reveals that small farmers are not keen interest to adopt contract farming among them.
- Some set of international studies in the context of contract farming system like Barrett, et. al. (2012), Suryandary and Buang (2010), Singh (2011), Glover (1994), D'Silva et al. (2009), Coulter, et al (1999), Bellemare (2012), Miyata, et. al (2009), Huh et al (2012) have focused on the contract process between smallholders and agribusiness firms and its impact on livelihood as well as environment.
- There is an excess use of agro-chemicals for the contract crop compared to non-contract ones and there is differences in the characteristics of contract and non-contract farm households like 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 (Swain, 2011).

Contract Farming in Odisha

- The government has decided to encourage contract farming in cotton and has fixed a target of covering 60,000 hectares under such contract farming during 2007-08.
- To ensure remunerative price for cotton growers, it is decided to set up two additional *Mandi* (market yards for cotton) in Ganjam and Gajapati districts.
- With floriculture having tremendous potential in the state, the government has planned a *Mandi* at Bhubaneswar.
- The 2006-07 reports suggested that measures to train farmers had been stepped up, over 23,000 farmers were trained and another 3.32 lakh farmers were targeted to be trained over the next four years under contract farming.
- Cashew, mango and banana were to be promoted and targets for such plantations were fixed for 2007-08.
- According to the *RCDC report 2011*, about 21,000 farmers from 30 districts have shown their interest to get involved in the arrangement.
- The state government had also requested CCI to get involved in contract farming in 2,000 hectares of land in Rayagada and Kesinga areas of Kalahandi district.

Problems and Prospects of Contract Farming in Odisha

- As in any other form of contractual relationship, there are some disadvantages and risks associated with contract farming.
- Common contractual problems include *farmer sales to different buyer* (side selling or extra-contractual marketing), *a company's refusal to buy products at the agreed prices*, or the *downgrading of produce quality by the buyer*. Side selling by farmers to competing buyers is perhaps the greatest problem constraining the growth of contract farming.
- Contractors also may *default by failing to pay agreed prices* or by buying less than the pre-agreed quantities.
- Another concern about contract farming arrangements is the *potential for buyers to take advantage of farmers*.
- Buying firms, which are invariably more powerful than farmers, may use their *bargaining clout to their financial advantage*.

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- The major issues and concerns characterised by the contract farming system in terms of both long term and short term impacts are:
- *Soil fertility concerns:* Repeated cultural operations like ploughing, weeding and watering leads to over exploitation of land and soil erosion ultimately occurs. Soil erosion again leads to depletion in soil fertility.
- *Environmental issues:* Due to over use of inorganic fertilizers and pesticides in the fields under contract cultivation of crops the environment gets disturbed which ultimately leads to air-, soil- and water pollution.
- *Bio-diversity issues:* Despite being the mainstay of the economy and the main source of livelihood for the people, agriculture has failed to meet the economic requirement of the people depending upon it.
- *Food security concerns:* Most of the crops grown under contract arrangements are cash crops which give more income to farmers but at the same time due to this profit motive food crops are being neglected.

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- *Seed problems:* The seeds of generally modified crops to tackle pests, diseases and to get maximum output are sold by the MNCs. The seeds once used cannot be regenerated as is the case of BT cotton.
- *Labour problems:* Gender based exploitation of labour persists in many areas. Some technically demanding crops are handled by young girls under the age of fourteen, like in the case of cross pollination in cotton cultivation.
- *Contract disputes:* There are no standard legal procedures in resolving the disputes arising under contract agreements.
- *Sub-contractor's influence:* Most of the firms involved in contract arrangement with farmers have fixed middle men to procure the produce from the farmers.

Environmental Implications

- Common contractual problems include farmer sales to different buyer, a company's refusal to buy products at the agreed prices, or the downgrading of produce quality by the buyer.
- The quality is set high for these products and to comply with high standards and to maximize output *heavy dose of fertilizers, pesticides and insecticides* are applied in the field which leads to deterioration in soil quality.
- Due to over use of *inorganic fertilizers and pesticides* in the fields under contract cultivation of crops the environment gets disturbed which ultimately leads to air-, soil- and water pollution.
- Unsustainable shift in the agriculture sector can be attributed to development of a perspective that considers conservation of agricultural biodiversity that lays emphasis on *short term maximization of returns* from agriculture at the cost of the rich agro biodiversity.

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- *Mindless privatization* empowers the private companies to control and manage the agriculture sector is a threat for the already fragile agriculture biodiversity in the state.
- The farmers under contract cultivation of genetically modified crops like BT cotton are *dependent on MNCs* for seeds and planting materials and avoiding the natural crops.
- *Excess use of ground water* for the contract crop has depleted the water level significantly.
- So the contract farmers those having more financial stability used to bore private wells near their fields which a marginal or poor non-contract farmer cannot do due to lack of money.
- For growing cotton around seven to eight times pesticide has to be sprayed in a season and four to five times for rice seed.

Impact of Contract Farming on Environment

- Contract farming affects the environment in different ways like over exploitation of ground water, excess use of fertiliser and pesticides leading to health hazard and mono-cropping leading to decline of soil quality.
- To protect cotton crop from insects, the agribusiness firms recommended overuse of pesticides which were not environmentally friendly.

(I) Use and Abuse of Water: The state Odisha has cultivable land of 61.65 lakh ha. It has been assessed that 49.90 lakh ha can be brought under irrigation through major, medium and minor (lift and flow) irrigation projects.

Status of Irrigation Potential Created and Utilised in Odisha (in 000' ha)

Year	Irrigation Potential Created (ha.)			Potential Utilised (ha.)			Percentage of Utilisation
	Khariff	Rabi	Total	Khariff	Rabi	Total	
2000-01	2533.83	1071.99	3605.82	1589.88	535.84	2125.72	58.95
2005-06	2731.5	1294.92	4026.42	1922.7	1042.79	2965.49	73.65
2006-07	2720.46	1318.52	4038.98	2001.98	1147.47	3149.45	77.98
2007-08	2765.73	1342.06	4107.79	2027	1281.46	3308.46	80.54
2008-09	2867.01	1407.18	4274.19	2081.13	1096.03	3177.16	74.33
2009-10	2962.21	1476.81	4439.02	2058.85	979.67	3038.52	68.45

Source: Directorate of Economics and Statistics, Odisha

(ii) Use and Abuse of Agrochemical

- Agrochemical refers to the use of fertilisers, pesticides, and herbicides in agriculture.
- The use of agrochemicals 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.

Fertiliser Consumption (Kg/ ha) in Major States of India

State / Year	2001-02	2002-03	2003-04	2004-05	2006-07	2007-08	2008-09
<i>Odisha</i>	<i>41</i>	<i>39</i>	<i>39</i>	<i>43</i>	<i>47</i>	<i>53.2</i>	<i>62</i>
Maharashtra	78.24	73.8	64.2	77.7	84.52	103.11	113.69
Assam	38.81	42.73	47.5	41.6	49.26	57.34	62.09
Karnataka	101.48	90.91	78.8	110.8	117.34	115.71	147.28
<i>Andhra Pradesh</i>	<i>143.47</i>	<i>128.44</i>	<i>145.3</i>	<i>155.8</i>	<i>203.61</i>	<i>199.64</i>	<i>239.71</i>
Tamil Nadu	141.55	114	114.5	152.9	183.67	178.29	156.31
Madhya Pradesh	39.96	36.4	51.6	56	47.13	66.39	70.77
Gujarat	85.52	77.76	94.7	106.8	111.07	143.6	140.71
Rajasthan	38.88	28.54	67.4	36.6	36.29	45.47	48.85
Uttar Pradesh	130.44	126.51	125.7	125.5	140.37	149.61	156.31
<i>Haryana</i>	<i>155.69</i>	<i>152.79</i>	<i>161.7</i>	<i>166.2</i>	<i>166.72</i>	<i>187.63</i>	<i>201.62</i>
<i>Punjab</i>	<i>173.38</i>	<i>174.99</i>	<i>190.1</i>	<i>192.5</i>	<i>210.06</i>	<i>209.99</i>	<i>221.42</i>
West Bengal	126.82	122.23	114.1	129	127.5	144.21	157.69
Kerala	60.72	68.17	64.2	67.4	57	69.76	89.41
Bihar	87.39	87.15	81	85.7	152.32	162.81	178.98
All India	90.12	84.82	88.2	96.6	104.5	117.07	128.58

Source: Directorate of Agriculture and Food Production, Odisha

Fertiliser Consumption in Odisha (in thousand MT)

Year	Nitrogen (N)	Phosphates (P)	Potash (K)	Total	Kg. / ha.
1961-62	4.38	0.49	NA	4.87	0.76
1971-72	37.43	8.38	4.01	49.82	7.25
1981-82	54.16	17.92	9.91	81.99	9.68
1991-92	126.22	41.52	28.29	196.03	19.96
2001-02	221.17	71.94	51.55	344.66	41
2002-03	185.41	62.86	42.29	290.56	39
2003-04	210.07	66.64	40.5	317.21	39
2004-05	223.54	77.99	53.77	355.3	43
2005-06	243.21	91.05	60.63	394.89	46
2006-07	256.54	92.77	53.57	402.88	47
2007-08	272.1	116.77	63.03	451.9	53.2
2008-09	297.77	147.93	89.17	534.87	62
2009-10	292.29	148.59	78.46	519.34	59.78
2010-11	293.43	149.85	78.52	521.8	62.8

Source: Directorate of Agriculture and Food Production, Odisha

The high consuming districts include Bargarh, Balasore, Ganjam, Kalahandi and Bhadrak and the low consuming districts are Kandhamal, Deogarh and Gajapati. According to the report total consumption of pesticides in Odisha was 1.18 TMT in 2010-11 compared to 1.22 TMT in 2009-10. On the other hand, per ha consumption of pesticide has increased in 2010-11 to 151.50 gm/ha from 140.06 gm/ha in 2009-10

Area under HYV Paddy (in 000' ha)

Year	Autumn		Winter		Summer	Total	
	Irrigated	Un-irrigated	Irrigated	Un-irrigated	Irrigated	Irrigated	Un-irrigated
2000-01	32.03	367.48	866.08	1155.97	206.74	1104.85	1523.45
2001-02	30	395	852	1301	272	1154	1696
2002-03	20.99	382.66	859.63	1225.75	177.55	1058.17	1608.41
2003-04	15.22	434.64	839.09	1345.94	253.47	1107.78	1780.58
2004-05	28	406	925	1351	293	1246	1757
2005-06	24.05	411.57	913.31	1427.9	325.49	1262.85	1839.47
2006-07	28.28	411.34	941.75	1466.62	314.6	1284.63	1877.96
2007-08	30.05	420.55	969.18	1518.62	333.74	1332.97	1939.17
2008-09	27.77	437.15	1039.71	1594.81	330.97	1398.45	2031.96
2009-10	25.87	449.11	1099.86	1611.82	264.81	1390.54	2060.93
2010-11	22.72	452.42	1032.76	1606.81	292.96	1348.44	2059.23

Source: Directorate of Economics and Statistics, Odisha

*Note: *There is no data on un-irrigated area during summer*

Conclusion and Policy Implications

- Better environmental agreement can be undertaken by the contract farming agencies by adopting procedural justice perspective instead of higher levels of monitoring.
- Ecological concerns should be given priority in contract farming programs and policies.
- Through a sustained land use planning based on soil depth, soil quality, land slope and suitable water availability this can be achieved.
- There must be other suitable environment friendly systems other than contract farming system. If there is a high acceptance of contract farming then at first it should look into the environmental aspect not on competition.
- All incentives given for agricultural development should be for those working for farmers not for the agencies or private individuals.

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Thank You