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Sharecropping System and its supply chain Management: A Case study from Coastal Belt of Odisha

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Abstract
Agro Supply Chain System plays a vital role in sustaining farmers and strengthening nation's economy. In Coastal belt of Odisha about 70 % people depend on agriculture as their sources of livelihood. Sharecropping is a regular practice in the area. Due to appearance of more alternative profitable occupation, agriculture is being regarded as an unwanted sector.
In the input supply system, credit from bank, fertilizer and pesticide from the factory, knowledge transfer from the media and landlord etc. to the sharecroppers play an important role in their well being. Credits from bank under different schemes to the farmers are provided with the objective to increase land productivity. From the banking system the credit flows in the name of owner who is not a cultivator. As a result, the landlord instead of giving the credit to share cropper utilize it for his non-agricultural purposes. Thus, in the credit supply chain from bank to share croppers via landlord, there is many a times leakages or mismatches the usage of the credit. As a result, crop productivity declines. Also due to lack of knowledge the application of improper doses of fertilizers and pesticide not only affects crop productivity but also create health and environmental problem. As the sharecroppers are poor and uneducated, they do not have direct access to print or visual Medias for information pertaining to agricultural schemes, technology and markets and the landlords share it rarely with the sharecroppers. Thus, in the supply chain of knowledge transfer from media to sharecroppers got affected. In case of output supply system**,** share croppers are not eligible to sell the produce in the government specified *Mandis;* only the landlords are eligible. Thus, the share cropper's produce goes only to the middle man in low price.
In this study, our basic objectives are to study the dynamics of supply chain management in share cropping system and to study the factors that affect it. In this context, we have selected Coastal belt of Odisha state in India as our study area where around 60-70 % of agricultural land is being cultivated by sharecroppers. The methodology we followed is consisting of analysis of quantitative and qualitative primary survey data with a sample size 64 household (32 sharecropping households and 32 Owner-Farmer household) and secondary data. The expected result will show that there are leakages in input supply chain and constraint in the output supply chain due to which well being of sharecroppers is declining. The overall conclusion will exhibit the decline of crop productivity, which is due to practice of share cropping activities, leakages in input supply chain and constraints in output supply chain. This study will recommend some policy changes of giving conditional ownership rights to share croppers and to build formal owner–share cropper bond in order to increase crop productivity for food security and to control food inflation.

Keywords: Share Cropper, Input Supply Chain, Well being, Productivity **JEL Classification:** Q11, Q18

1. Introduction
Supply chains are complex entities that serve many functions. They are institutional arrangements that link producers, processors, marketers, distributors and consumers. In the context of Agriculture sector, supply chains mean the flow of input from different sources to the producer and the flow of outputs to the consumers. Like many others, it also allows buyers and sellers who are separated by time and distance to add and accumulate value as the produce passes from one member of chain to the next (Hughes, 1994, Fearne, 1996, Handfield and Nichols, 1999) [9, 4, 7]. Supply chains are the conduits through which the messages about the quality, quantity, demand and availability of the produce are exchanged among the producers, consumers and the interfaces. The whole system of Agro-Supply Chain is a master chain supported by a number of mini chains. The farmer or producer is placed in the key point of the master chain and any disturbance in functioning of the farming community affects the system

of chains. It is essential to assess the basic background of the farmer for smooth operation of the supply chain. Although Agriculture is the mainstay of our Economy and 60% of our people depend upon agriculture, still the contribution of agriculture to our GDP is less than 27%. In India small and marginal farmers (SMF) are the major concern in accelerating the scientific agriculture. In Odisha and particularly in coastal belts the share/tenant croppers are occupied a significant portion of the farming community. Due to many socio-economic factors the numbers of tenancy is growing in agriculture.

In the input supply system, credit from bank, fertilizer and pesticide from the factory, knowledge transfer from the media and landlord etc. to the sharecroppers play an important role in their well being. Credits from bank under different schemes to the farmers are provided with the objective to increase land productivity. But in most of the cases the land is in the name of landlord and credit is directly supplied to land lord. But landlord is not the ultimate cultivator. As a result, the landlord instead of giving the credit to share cropper utilize it for his personal purpose like construction of house, purchase of motor bike, etc. Thus, in the credit supply chain from bank to share croppers via landlord, there is many a times leakages of credit. So the credit is not reaching to the sharecroppers. In case of fertilizer, the ultimate user is sharecropper. Fertilizer is coming from factory to the sharecroppers via wholesaler and then retailer. Fertilizers are supplied with different compositions of N-P-K. Rarely, sharecroppers know its usage. As a result due to application of improper doses, the land productivity declines. In a similar fashion, pesticide is also coming from factory to the sharecroppers via wholesaler and then retailer. Sharecroppers many times do not know its usage. As a result the application of improper doses not only affects crop productivity but also create health and environmental problem. Though, in the supply chain fertilizers and pesticides are reaching to the sharecropper, its usage is not reaching to them. Neither the landlord nor the retailer from where fertilizer and pesticides are purchased is providing any training to the sharecropper. Generally, sharecroppers are poor and uneducated. They do not have direct access to media such as TV and News Paper for information pertaining to various agricultural schemes, subsidies, use of new technology for agricultural practices, application of equipments, updated scientific and forecasting information and right input application etc. The landlords have all the information and he is sharing it rarely with the sharecroppers. Thus, in the supply chain of knowledge transfer from media to sharecroppers via landlords, there is a stack in the flow due to landlords.

In the input supply frame of paddy cultivation, partners like retailers; venders and govt. operated corporations are linked with the farmers for supplying inputs like seed, fertilizer, pesticide, herbicide, storing and pest controlling tools. Similarly, The Dept. of Water resources, private resources, water supply system (canals, rivers, reservoirs, lift irrigation etc) are associated with the farmers for supplying water to the field. Mechanical inputs like tractor, power tiller, rotavator, harvester, transplanter and manpower can be hired from the community. Forecasting information, warnings, extensional schemes and up-dated application knowledge are availed from print and electronic Medias, extensional functionaries, learned and experienced peer groups. Finance for the investment is arranged from banks, cooperative societies and private money lenders. Subsides, insurances and compensations are availed through the help of administrative/ extensional/ PRI functionaries and banks.

Rational assemble of all the inputs proves a best supply system and leads for an ideal production. On the other hand any mismatch creates dull situation for the farmers and to the agricultural sector as a whole. For any form of agriculture, in general, along with seeds, land, irrigation and finance are the three most urgent inputs for cultivation. But in the system of share cropping system supply of these inputs are highly volatile in nature. Firstly, the land, the most and primary input for farming belongs to the other person, in general, who is not a partner of the chain. The tenant is not a long term or regular consumer of the land. Similarly, his profession is not secure and he does not think about the development and management of the soil or land which is a very important part of farming. Neither he has the right nor has the interest to look after all these things. On the other hand, the owner has engaged all his time, resources and attention in some other sector only with targeting the share at the end. These causes ultimately lead towards reducing land fertility. Secondly, irrigation is another important input for farming. Although, in Odisha it is mainly a Govt. operated canal system, the arrangement of other sources like bore well, pond digging etc are depend on the attitude and interest of the legal holder of the land. In some places, the provisions of *Panipanchayats* are best system of group approach water management in the field, but the operating system is run by the land holding members only. Thirdly, the financial assistance for investment is also another factor. It has deep impact on the practices and application of inputs in the right stage of the crop. As per the policy decision all banks has run their credit-flow towards the farming sector in the shape of loan for purchasing modern implements, land renovation, storage infrastructure and seeds money for regular investment but all schemes are in favor of the land holder. Even in some cases agricultural loans are being invested in non-agriculture sector. Thus, it may be said that the supply of the inputs for developing the agriculture are being deprived of its aim due to the non-formal tenancy system of agriculture.

In coastal belt of Odisha about 70 % people depend on agriculture as their sources of livelihood. Sharecropping is a regular practice in the area. Due to appearance of more alternative profitable occupation, agriculture is being regarded as an unwanted sector. However, many tributaries of Mahanadi river system cover this coastal belt; the soil is highly fertile and well irrigated which is suitable for crops like rice, sugarcane, and vegetable and betel vine. Therefore, in this backdrop we selected the coastal belt of Odisha as our study area. The study area is comprised of three coastal districts: Khurda, Puri and Cuttack where rice is the staple crop and lifeline of the farming community. Although the climate is more disaster prone, the soil and allied ingredients are fine and favorable for rice cultivation in Kharif season.

At the outset of this introduction, we touch on some background details and conceptual clarification of the supply chain management in share cropping system. The next section presents brief literature review on the study. The section three presents objectives of the study followed by methodology and data source in section four. The section five presents the result and discussion with factors affecting supply chain management of share cropping system. Findings and concluding remarks with policy implications of the study have been given in the last section.

2. Literature Review

Agriculture development to a larger extent depends on the efficient use of modern farm inputs such as chemical fertilizer, improved seeds, pesticides, machinery and veterinary services.

However, framers in developing countries like India are often denied access to modern inputs due to poor infrastructure and presence of various constraints arising from restrictive policies and regulations. The limited use of modern input is also due to lack of finance, inadequate information, and unfavorable input and output prices (Goletti & Govindan, 1995) [5]. A share cropping is optimal to deal with the land exploitation problem when a landlord is concerned about the potential damage to land quality through exhaustive use by the share cropper (Ray, 2004) [16]. But, in many situations the share cropper is essentially powerless. In cases of low harvesting the share cropper is victimized in debt by the land owner. Such debt is virtually impossible to overcome, so share cropping often created situations where farmers were locked into a life of poverty (McNamara, 2007) [11]. Share croppers face a range of problems, dominantly stemming from the lack of official recognition of tenancy and the fact that their status as actual cultivators is nowhere recorded (Rawal, 2008) [15].

Economic reforms and liberalization in the agricultural sector have emphasized the need for transforming Indian agriculture by designing a comprehensive supply chain model covering innovations at the farming level, which can help farmers regain profitability in a sustainable manner under changing conditions with proper assurance of market arrangement (Punwar, 2004) [14, 17].

In recent decades, the government has introduced a number of initiatives to strengthen market linkage and diversification in the agricultural production system (Rao and Jeromi, 2006). India has a huge opportunity to become a leading global food supplier if only it has the right marketing strategies and of course agile, adaptive and efficient supply chain (Biswanandham & Patnaik, 2006) [2]. The opportunity to strengthen growth in agriculture in India lies in value addition through agro processing, which is very low level at present. The agribusiness food processing industry is facing constraints and barriers such as: non-availability of adequate critical infrastructure facilities; lack of adequate quality control and testing infrastructure; lack of suitable varieties of farm produce for processing; seasonality of raw materials; high inventory carrying cost; and high taxation and packaging costs (Pool & Kenny, 2003) [13]. Each sub-system of the agriculture supply chain starts from the input to the consumer, with a view to integrate them in efficient and effective manner. To meet these requirements the agricultural sector needs: intensive and new farming techniques to address new challenges for sustainable production and processing practices; it also needs to promote a balanced approach to the problems of food quality, safety, and good environmental management (Ziggers & Trienkens, 1999) [18]. Knowledge and information are important factors for accelerating agricultural development by increasing agricultural production and improving marketing and distribution efficiencies (Parwez, 2014) [12]. The design of a supply chain governance system depends on an efficient flow of information on various aspects of the chain, such as numbers of participants required at each stage, i.e. selection of partners; types of goods and services required to strengthen the relationship, i.e. with supply chain activity; and level of decision taking relationship required (Handfield & Bechtel, 2004) [8]. However, lack of access to accurate technical and market information is a threat to managerial decisions (Blandon, 2005) [3]. The most obvious result of improved inputs is a larger harvest, ideally leading to a greater profit. Using a new fertilizer or a disease-resistant seed variety can dramatically increase production. However, by applying the value chain approach, inputs can be viewed as more than just a way to increase production volume. In India, the infrastructure connecting these partners is very weak. Each stake holder: farmers, wholesalers, food manufacturers, retailers all work in silos. Also, demand forecasting is totally absent and the farmers try to push what they produce in to the market (Biswanandham & Patnaik, 2006) [2]. The combination of new markets and new inputs can result in what is essentially a new product. For instance, using the right seeds and fertilizers can yield a product that can be certified organic. There is a huge variation in the agricultural practices, the type of produce, and quality of the produce due to the variation in the soil, environment, climate, irrigation facilities and energy resources that are available (Biswanandham & Patnaik, 2006) [2]. While the product itself is the same, the market perception of it is radically different. Thus, by using the right inputs, smallholders can supply demanding international markets in today's fast moving world of global trade and avoid the pitfall of production unresponsive to market demand (Guenette, 2006) [6]. Supply chain that connects the vast natural resources and farmers to both organized as well as unorganized retail is highly inefficient with the several intermediaries and manual handling. The result is lots of wastage and less remuneration for the farmers (Biswanandham & Patnaik, 2006) [2]. However, trust among channel partners, power share and interdependences are other important factors for enhancing relationships in the supply chain system (Bertolini, 1999) [1].

In the above survey we have touched maximum of literature available in the area of share cropping system. We found hardly any literature discussing particularly on dynamics of supply chain management in share cropping system. However, most of them cited above discussed various aspect of agro-supply chain, though much of them worked on India context, showing various problems pertaining to the supply chain management. We did not find any evidence on supply chain of share cropping system in the Coastal belt, neither in Odisha nor in any part of world. Thus, considered this study as a unique study, which can fill the gap in the literature of agro-supply chain management, can contribute to the literature substantially, can show the ways to do further research and can recommend some policy changes towards well-being of share croppers which can contribute to the sustainability of food security to certain extent.

3. Objective of the study

The dynamics of supply chain management plays a vital role in livelihood and occupational pattern of farming communities of share cropping system. Majority of farming communities in coastal belt of Odisha are share croppers. As discussed in the above sections, these share croppers are vulnerable in many ways basically due to leakages in input and output supply chain system. In this context, our basic objectives are:

i) to study the dynamics of supply chain management in share cropping system and
ii) to study the factors affecting supply chain management of share cropping system.

Keeping in mind the above objectives, we have designed the methodologies as given below.

4. Methodology & Data Source

In coastal belt of Odisha about 70 % people depend on agriculture as their sources of livelihood. Sharecropping is a regular practice in the area. Due to appearance of more alternative profitable occupation, agriculture is being regarded as an unwanted sector. However, many tributaries of Mahanadi river system cover this coastal belt; the soil is highly

fertile and well irrigated which is suitable for crops like rice, sugarcane, and vegetable and betel vine. Therefore, in this backdrop we selected the coastal belt of Odisha as our study area, where paddy is the major crops cultivated. The study area is comprised of three coastal districts: Khurda, Puri and Cuttack where paddy is the staple crop and lifeline of the farming community. Although the climate is more disaster prone, the soil and allied ingredients are fine and favorable for paddy cultivation in Kharif season.

Table 1: Sampling Design

Vill. No.	District	Block	Village	Share cropper	Owner cropper	FGD Arranged (1=Yes, 0= No)
1	Puri	Nimapara	Ankushpur	2	2	0
2			Kerandia	2	2	0
3		Satyabadi	Alisha	2	2	1
4			Sukala	2	2	0
5	Khurda	Balipatna	Majhihara	2	2	0
6			Nuagaon	2	2	1
7			Taradapada	2	2	0
8			Gar Panchana	2	2	0
9		Balianta	Kakarudrapur	2	2	0
10			Gandilo	2	2	0
11			Rayadpada	2	2	0
12			Khamanga	2	2	1
13	Cuttack	Niali	Nuagaon	2	2	1
14			NaktaSahi	2	2	0
15		Kantapara	Udijohala	2	2	0
16			Chheda	2	2	0
Total	3	6	16	32	32	0

Source: *Compiled from Primary Survey by author*

In regards to this study, a data collection work was conducted in the above said coastal area. Two blocks were selected from each district with 4 villages from blocks under Khurda and 2 villages each from the blocks under Puri and Cuttack randomly (see Table 1). In each village four farmers were enumerated through the questionnaire (2 share farmer and 2 owner-farmers). Besides, the farmer respondents, officials from 3 local banks, (UCO Bank, SBI and Puri Gramya Bank), 3 Farmer's Cooperative Societies were interacted under the purview of the study. Four Focus Group Discussions (FGD) were also organized in different locations in the selected villages.

In order to canvass the respondents, two types of questionnaires (one for owner croppers and another for share croppers) were prepared with help of a team of research professionals and agriculture extension experts. After visiting of 1st village the format was revised accordingly. The detail of sampling design is presented in Table 1.

5. Result and Discussion

5.1 Dynamics of Supply Chain Management in Share Cropping System

The dynamics of supply chain management in Share Cropping System can be studied taking into account both input and output management in the supply chain. The same is described below in context of coastal belt of Odisha.

5.1.1 *Input Management in the Supply Chain*

In our analysis, we have considered paddy cultivation during *Kharif* season as the major crop in the entire supply chain of share cropping system. It is seen from the Table 2 that most of the share croppers belong to the scheduled caste and other backward community. The constraints of low financial position, and lack of awareness and interest is reflected on the use of inputs and treatment practices. The application of N: P: K by the owner of the land is more or less close to the recommended standardize dose (32:16:16 kg per acre respectively) of the area. However, the same is sowing a big gap from the recommended dose of the area in case of share cropper communities.

Table 2: Variation in Primary Inputs of Paddy Cultivation

Practice	Farmer	No. of Farmers by Caste			N:P:K/kg/Acre			No of farmers by Input Management		
		SC	OBC	GEN	N	P	K	FYM*	Treating seed	Line Planting
Owner cropper	32	5	21	6	27.5	14.8	15.0	20	15	17
Share cropper	32	15	15	2	23.0	11.5	12.4	3	8	3

** Farm Yard Manure*

Source: Compiled from Primary Survey by Author

Similarly, as the best practices for enhancing productivity, seed treatment and line transplantation are being focused by the Govt., the performance of the share cropper communities is comparatively poorer than the owner cropper community. Out of 32 surveyed households, 62 % owner croppers are using farm yard manure in their field where as in case of share cropper the same stood at only 0.9% (see Table 2). It is also observed from Table 2 that there is a big gap between owner cropper and share cropper with respect to seed treatment before showing and line plantation. On an average, 47 % and 53 % of owner croppers are treating the seeds and planting in lines whereas the same are only 0.25 % and 0.09% in case of share croppers. The adoption of new or hybrid varieties of seeds, seed treating and line planting like updated practices have been more easily plasticized by the owner farmers relative to share croppers because, the formers are financially, socially and from skill point of view much more capable relative to the later.

Table 3: Variations in Credit/Compensation

		No. of Beneficiaries From				
Community	**No.**	**Bank**	**Cooperative Society**	**Money lender**	**Other**	**Compensation**
Owner cropper	32	12	8	28	6	31
Share cropper	32	00	00	19	12	2

Source: *Compiled from Primary Survey by Author*

From the credit supply point of view, the share cropper community is the most vulnerable community. It is observed from primary survey that the land record holder only avail benefits of various schemes provided by the bank and Cooperative Society. From different nationalized banks and as per Govt. policies, a lot of schemes have been provided to the farmers to strengthen the capacity, skill, resources and infrastructures. By mortgaging land records under agricultural scheme in low interest rate (interest of 7% p.a. at present) the owners are taking loans from the banks. However, they are using the loan amount in non-agricultural sectors. Thus the credit flow is bypassing agricultural development, in the other hand, for the field cultivated by share cropper. At the same time share cropper is lending money for growing crops at the interest rate of 36% to 60 % p.a. The data in Table 3 reveals that more percentage of owner-croppers are getting institutional loans than the share croppers in low interest rate. They are also getting loan relaxation at the time of government mass relaxation season/policy. Whereas the share croppers are going to the non- institutional private sources with high interest rate and conditional repayment. Although the loan providing policy has been changed now for the share croppers, however, they can avail loans through the Cooperative Societies only after forming a 10 member group under the society.

Table 4: Variation of Knowledge and Mechanization

Items	**No. of farmer**	
	Owner Farmer	**Share Cropper**
Media Exposure(Agri)	28	11
Use of Tractor	32	32
Use of Power Tiller	10	4
Use of Harvester	13	9
Use of Combine Harvester	12	2
Use of Rotavator	10	2
Use of Transplanter	2	0

Source: *Compiled from Primary Survey by Author*

Medias play vital role in disseminating scientific knowledge and updated information at the farmers' level. It works as a knowledge supply chain from the invention/ policy formulation to the micro level and again carries back the reaction and feed back to the upper level. The figures from the Table 4 shows that due to poverty and lack of infrastructure facilities only 36 % of share croppers come in contact with different agricultural programmes presented by print and electronic medias like: radio, television, News paper, peer group discussions, field worker information, where as it is 87% in case of owner farmer.

Owner croppers are capable and smart enough to use modern technology in paddy cultivation. Table 4 reveals that on around 31 % of owner croppers are using power tiller in cultivating paddy, whereas it stands at around 13 % in case of share croppers. In case of both use of tractor and harvester, the number of share croppers using it has increased substantially with 100 % in the former and 28 % in the latter case. However, number of share croppers using harvester fall much below the number of owner cropper (around 41 %) using the same technology in paddy cultivation. Similarly, the number of owner croppers using *combine harvester*, *rotavator* and *transplanter* are 38%, 31% and 6% whereas in case of share croppers, the same are 6 %, 6% and 0 % respectively. Thus the owners are more intelligent, skilled and smart farmers than the share cropper communities, which are visible from their usage of technology in paddy cultivation in Table 4. The modern and costlier technologies like using combine harvester, rotavator and transplanter are more easily adoptable by the owner farmers relative to share croppers due to the former, financially and from knowledge & skill point of view are much more capable relative to the later one.

5.1.2 *Output Management in the Supply Chain*

The flow of input supply in the entire value chain gets affected with different constraints as discussed above. The supply chain in share cropping system directly affects the productivity, which affects the welfare of the share cropper's community. The detail analysis of output variation of paddy in the value chain of sharecropping system is explained in Table 5.

Table 5: Variation in Output of Paddy (2013)

Community	**No. of Farmers**	**Area Cultivated (in acres)**	**Average Yield Rate (quintals /acre)**	**Total Production (in quintals)**
Owner cropper	32	87.6	10.21	894.396
Share cropper	32	84.7	8.90	753.83

Source: *Compiled from Primary Survey by Author*

The primary survey data presented in Table 5 revealed that the area cultivated by share croppers in comparison to owner croppers declined by around 3 % during 2013 whereas average yield rate and total production of paddy declined by 13 % and 16 % respectively. This indicates that though area under paddy cultivation declined marginally, the yield rate and total production declined substantially because of various problems discussed in input supply chain section.

Table 6: Variation in Marketing Paddy

Community	**No. of Farmers**	**No. of Farmers selling to Middle man**	**No. of Farmers selling in *Mandi***	**Average Rate/ quintal (in Rs.)**
Owner cropper	32	11	20	1240
Share cropper	32	21	00	1145

Source: *Compiled from Primary Survey by Author*

As there is no paddy procurement system for the share croppers with the minimum support price, majority of the share croppers have been selling their paddy to the middle men in a very lower price relative to price available at *Mandi* for the owner croppers. In this context Table 6, shows that on an average 34 % of the owner croppers are selling their paddy to middle men whereas this is much more higher i.e. 66 % in case of share croppers. No share croppers are selling their paddy in *Mandi* as they are not eligible for it whereas on an average 63

% of owner croppers have been selling their paddy in *Mandi*. Because of the exploitation by middle men in the supply chain of share cropping system, the share croppers with no alternative option are forced to sell their paddy to the middle men at around 8% lower rate than the rate available at *Mandi*.
Thus, share croppers have been exploited in many ways as discussed above in the input and output management of the entire supply chain in the system. The factors affecting supply chain management in share cropping system is discussed below.

5.2 Factors Affecting Supply Chain Management in Share Cropping System

The Focus Group Discussion (FGD) with share croppers and owner croppers in the Coastal belt of Odisha envisaged the following factors that affect supply chain management in share cropping system.

5.2.1 *Dual Producer System*

In the share cropping system although the land owner seems to be a passive member in the supply chain, still he is an important decision maker. All the decisions pertaining to cultivation is taken by the land owner. For instance, in case of seed selection, crop management, and use of implements, the share cropper needs the permission of the owner. Therefore, the land productivity of the share cropper is declining which is not good signal for food security.

5.2.2 *Diversion of Agricultural Credit Share to Non-Agricultural Sector*

For strengthening food security and to attaining millennium goal, many initiatives have been taken to provide facilities like subsidies, low interest rate farm-credit, post-calamity compensations etc. at field level. But due to rising number of share cropper's community the share of the same is declining in agriculture as share croppers are not eligible for it. Thus, agricultural loans are being utilized in non-agriculture sector. In this context, strict policy reforms are needed so that the benefits from various schemes can be reached to the share cropper community, which can help in strengthening food security and to attaining millennium goal.

Table 7: Natural Calamities and Compensation

Year	Major disasters	Period	Remarks/ damaged	Compensation by State Government
2008	High flood	September 3rd week	Severe damage	Compensated
2009	Seedling drought	July 2nd half	Somehow damage	No
2010	Harvest rain	October 2nd half	Severe damage	Compensated
2011	High flood	September 1st half	Severe damage	Compensated
2012	Normal	Favorable	Good harvest	Not need
2013	Cyclone (Phailin)	12th October	50-60 % damage of the rice crop *	Concentrated to highly affected area.
2014	Flood	July 1st half	50% of the survey area	Not decided.

**High flood in northern part of Odisha.*

Table 7 shows that Coastal belt of Odisha has been experiencing a regular touch of natural calamities, damaging the paddy farming very badly. All the compensations were received mostly by land record holders.

5.2.3 *Crop Selling Agreement before Harvesting*

To meet the farming expenses, in many instances, share croppers are taking loan from local money lenders/middleman with the condition that they will provide certain amount crop after harvesting as against some pre-agreed price which is always lower than the market price. Thus, in the supply chain this practice is affecting crop productivity.

5.2.4 *Irregular Irrigation*

The FGD in the Coastal belt also shows that there is irregularity in irrigation due to mismanagement of irrigation system. In this context we observed from FGD that the aim of *Panipanchayats* [1] is to systemize and rationalize the irrigation. Due to lack of regular discussions and meetings among the land owners (the legal partner of the group) and due to no proper maintenance of the channels, in-lets and out-lets, the irrigation system has become sick to feed water to the fields which is affecting crop productivity in the supply chain very badly.

6. Conclusion and Policy Implication

In our analysis, we have considered paddy cultivation during *Kharif* season as the major crop in the entire supply chain of share cropping system. Most of the share-croppers in the Coastal belt of Odisha are belong to the scheduled caste and other backward community. The application of N: P: K by the owner of the land is more or less close to the recommended standardize dose of the area. However, the same is showing a big gap from the recommended dose of the area in case of share cropper communities.
As the best practices for enhancing productivity, are being focused by the Govt., The performance of the share cropper communities in seed treatment and line transplantation is comparatively poor than the owner cropper community. There is a big gap between owner cropper and share cropper with respect to seed treatment before sowing and line plantation. The adoption of new or hybrid varieties of seeds, seed treating and line planting like updated practices have been more easily plasticized by the owner farmers relative to share croppers because, the formers are financially, socially and from skill point of view much more capable relative to the later.
From the credit supply point of view, the share cropper community is the most vulnerable community. It is observed from primary survey that the land record holder only avail benefits of various schemes provided by the bank and Cooperative Society. The credit flow is bypassing agricultural development. More percentage of owner-croppers are getting institutional loans than the share croppers in low interest rate. They are also getting loan relaxation at the time of government mass relaxation season/policy. Whereas the share croppers are going to the non- institutional private sources with high interest rate and conditional repayment.
Due to poverty and lack of infrastructure facilities very negligible percentage of share croppers come in contact with different agricultural programmes presented by print and electronic medias like where as it is significantly very high in case of owner farmer.
Owner croppers are capable and smart enough to use modern technology in paddy cultivation. The modern and costlier technologies like using combine harvester, rotavator and transplanter are more easily adoptable by the owner farmers relative to share croppers due to the former, financially and from knowledge & skill point of view are much more capable relative to the later one.

As there is no paddy procurement system for the share croppers with the minimum support price, majority of the share croppers have been selling their paddy to the middle men in a very lower price relative to price available at *Mandi* for the owner croppers. Because of the exploitation by middle men in the supply chain of share cropping system, the share croppers with no alternative option are forced to sell their paddy to the middle men at lower rate than the rate available at *Mandi*.

All the decisions pertaining to cultivation in the supply chain is taken by the land owner. Therefore, the land productivity of the share cropper is declining which is not good signal for food security. It is observed that *a*gricultural loans are being utilized in non-agriculture sector mostly by owner croppers. All the grants sanctioned towards compensation due to natural calamities were received mostly by land record holders which in many cases are being utilize for non-agriculture purpose. To meet the farming expenses, in many instances, share croppers are taking loan from local money lenders/middleman with the condition that they will provide certain amount crop after harvesting as against some pre-agreed price which is always lower than the market price. There is irregularity in irrigation in the study area due to mismanagement of irrigation system. Due to lack of regular discussions and meetings among the land owners (the legal partner of the group) and due to no proper maintenance of the irrigation channels, in-lets and out-lets, the irrigation system has become sick to feed water to the fields which is affectingl crop productivity in the supply chain very badly.

Thus, share croppers have been exploited in many ways as discussed above in the input and output management of the entire supply chain in the system. This kind of vulnerability of share croppers affects the supply chain, which as result affects the crop productivity negatively, impacting the food security to certain extent and contributing towards food inflation substantially.

In this context, strict policy reforms are needed so that the welfare of the share cropper community can be enhanced to a larger extent in order to increase crop productivity, which can help in strengthening food security and to control food inflation. The vulnerability of share croppers is a serious problem in Coastal belt of Odisha and therefore we strongly recommend bringing some policy changes, which can give conditional or full ownership rights to share croppers to increase crop productivity, meeting the rising demand and facilitating in sustainable food supply.

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Reference

1. Bertolini R. Making information and communication technologies: work for food security of Africa-2020. *Africa Conference Brief.* Washington, DC: IFPRI, 1999.
2. Biswanandham N, Patnaik N. Dynamics of Retail in India & the Indian States of Andhra Pradesh and Punjab. In N. Biswanandham, & N. Biswanandham (Ed.), *Achieving Rural & Global Supply Chain Excellence: The IndianWay* Hyderabad, Andhra Pradesh, India: Indian School of Business, 2006, 37-55.
3. Blandon JA. *Supermarket Supply Chain for Fresh Fruit and Vegetables:Opportunities and Challenges for Small Farmers.* International Development Research Centre, 2005.
4. Fearne A. "Editorial Note", Supply Chain Management 1996; 1(1):3-4.
5. Goletti F, Govindan K. *Methods for agricultural input market reform research: a tool kit of techniques.* Washington, D.C.: International Food Policy Research Institute (IFPRI), 1995.
6. Guenette P. *The Importance of Input Supply to Value Chain Performance*, 2006. http://www.acdivoca.org/.
7. Handfield RB, Nichols EL. *Introduction to Supply Chain management*. Prentice Hall, N.J, 1999.
8. Handfield R, Bechtel C. Trust, power, dependence, and economics: can SCM research borrow paradigms? *International Journal of Integrated Supply Chain Management* 2004; 1(2):15-17.
9. Hughes D. *Breaking with traditions: building partnerships and alliances in the European Food Industry*. Wye, Wye College Press, 1994.
10. Jeromi VM. *Modernising Indian agriculture: a review of critical policy issues in Indian economy since independence.* New Delhi: Academic Foundation, 2006.
11. McNamara R. *Sharecropping.* About.com 19th Century History, 2007.
12. Parwez S. Supply chain dynamics of Indian agriculture: reference to information technology and knowledge management. *Stewart Postharvest Review* 2014; 10(1):1-5.
13. Pool N, Kenny N. Agricultural market knowledge: system of delivery of private and public good. *Journal of Agricultural Education and Extension* 2003; 9(3):117-126.
14. Punwar CR. Need for refocusing role for supply chain for Indian agriculture. *Fertiliser News* 2004; 49(9):37-38.
15. Rawal D. *Flow of Credit to Agriculture Sector: With Special Reference to Tenant Farmers,Oral Lessees and Agricultural Labourers.* Mumbai: Indian Banks' Association, 2008.
16. Ray T. *Sharecropping, Land Exploitation and Land.* Clear Water Bay, Department of Economics, Hong Kong University of Science & Technology, 2004.
17. Rao CR and Punwar MP. Need for refocusing role for supply chain for Indian agriculture. Fertiliser News 2004; 49(9):37-38, 41-47.
18. Ziggers G, Trienkens J. Quality assurance in food and agribusiness supply chains: developing successful partnerships. *International Journal of Production Economics* 1999, 271-279.