Chapter 1

INTRODUCTION

1.1 Indian Agriculture and Vegetable Industry

Agriculture is the dominant sector of Indian economy and contributes to the sustainable growth. During the 11th Five Year Plan (2007-12), it has done comparatively well in terms of output growth and the gross domestic product GDP, got a high marked contribution of agriculture in the achieving the growth of 3.6 per cent. The 12th Five Year Plan has estimated the growth target to be 4 per cent for agriculture. Indian agriculture is getting positive support from rising external demand and the participation in the liberalized, privatized and globalized (LPG) economy. The foreign direct investment (FDI) by the Government of India has allowed 100 per cent in storage and warehousing including cold storages to boost investments for agriculture. The responsibility for agricultural development is with the ministry of agriculture as the nodal agency and the department of agriculture is responsible for execution of all the development activities of the agriculture sector in India. Now horticulture has proved its position as one of the potential agricultural enterprise in accelerating the growth of economy. It is playing very important role in the securing nutritional needs, reducing poverty and employment generation programs for the country. It is offering a wide range of options to the farmers for produce cultivation and providing ample scope for sustaining large number of agro industries which generate huge employment opportunities.

To fulfill the increasing national and international demand for vegetables, India needs to pick up the pace in vegetable production that can take it on a long way of success in vegetable sector growth. India is committed to reach a higher yield with the target by 2020 with 225 million tons and by 2030 ending, 350 million tons of vegetable production, making an incredible journey of agricultural development. The India’s climatic condition has huge existence of adequate eco-diversity that enables to grow more than 60 vegetable crops. More than this the efforts are taken with almost 30 lesser-known and underutilized vegetable crops are getting promoted for research in these suitable climatic conditions. The major research is done on the vegetable crops, which are mostly under the specific care;
comprises of 30 crops are tomato, cauliflower, chili, eggplant, bitter gourd, okra, bottle gourd, peas and melon etc.

In vegetable production India plays leading role among the competitive countries of the world. The possibility to grow the more than hundred different types of vegetables is due to the blessing of nature to the country with diverse climate and distinct seasons. As per the statistics of govt. of India 2009-2010, potato is being the staple food and widely used in the kitchen of every household without the difference of rich or poor ranks first (26.6%), whereas tomato (8.6%), brinjal (8.0%), onion (10.5%), Cauliflower (5.1%) and cabbage (5.3%) vividly follow their share trend in the kitchen in the main food course. There is mismatch in area available and productivity of vegetables throughout the country from northern states like UP, West Bengal, Bihar and Odisha to southern states like Tamil Nadu and Karnataka, who are the leading vegetable producing states in India. During the preceding decades vegetable cultivation has shown considerable development.

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![Figure 1.1: Production Share of Major Crops in India (2009-2010)](image)

India is contributing to fulfill the world demand by exporting huge quantity of fruits and vegetables to the whole world and is being the fruit and vegetable basket of the world.
The seed production, storage and processing sector has developed a new platform and increasing business opportunities. The increasing demand for quality seed production have been already taken as opportunity by many private enterprises and are increasing their capacity for quality seed production. Since, India is a developing country, the conventional refrigerated storage systems are getting used, but there is a strong need to develop and adopt the modern system that can economize energy consumption as well as to ensure better quality of stored produce. The increasing demand for refrigerated vegetables with a long shelf life has led to opportunities for entrepreneurs in the area of post-harvest processing and storage of vegetables and having high potential for development. India is being more attractive to many multinational companies for the establishment of links with the Indian counterparts to get the support for vegetables. The vegetable sector itself has ample opportunity for business and it is increasing year-on-year basis including the allied supports like consultancy, contract farming, mechanization, crop insurance, retailing, packaging, high-tech farming and procurement would be favored in vegetable industry. About seventy five (75%) of vegetables continue to be sold in traditional chains where traders dominate and control the bulk of produce transaction in between farmer and consumer by sitting in the markets. On the other hand, twenty five percent (25%) of the vegetable produce get sold through the modern chain where the major role get played by malls, fresh vegetable stores, fast food chains and restaurants. This share is expected to increase as consumers demand for convenience and ready-to-cook vegetable is increasing day by day. The flow of vegetables with the different features of conservative and modern chain has been discussed.

1.2 Vegetable Supply Chain Systems

The characteristics of agriculture like orientation for growth, optimism and personal control on activities gives a farmer entrepreneurial identity stated by the research of Vesala, K., M.,Peura,J., McElwee, G. (2007) and says agriculture is the most entrepreneurial activity. The transition has taken it from entrepreneurial activity to intrapreneurial activity (Asef, Iraj et al. 2011). The food security has been a challenging assignment for the world, so agriculture is getting linked with food processing and expected to be a major step for global food security. Every country of the world needs to participate in the game of food security. In this era of globalization only the control over subsidies and import policies for
food market is not enough. For the expansion of agriculture as an industry, it must get backed by industrialization and agricultural marketing as the model (Asef, Iraj et al. 2011) is one way to implement this. Marketing is a bigger issue for the new agricultural farms is the conclusion of the research by McElwee, G., Anderson, A., Vesala, K. (2006). Furthermore the research of McElwee, G., Anderson, A., Vesala, K. (2006) emphasis on various factors important for agricultural marketing are situational factors, entrepreneurial skills and attitudes of the farmer. As for any business entrepreneurial and managerial expertise is need, so the same with the agricultural sector as well. We can say them two different dimensions that give strong reasons for the success or failure of any farming enterprise.

Fig. 1.2: Conservative Chain vs. Modern Chain

Furthermore the research of McElwee, G., Anderson, A., Vesala, K. (2006) emphasis on various factors important for agricultural marketing are situational factors, entrepreneurial skills and attitudes of the farmer. As for any business entrepreneurial and managerial expertise is need, so the same with the agricultural sector as well. We can say them two different dimensions that give strong reasons for the success or failure of any farming enterprise. The organization follows a designed network for production and distribution from inception to its consumption called a supply chain. The main goal of supply chain is to maximizing values (Sparling and Duren 1998), by coordination and control of all activities within a supply chain that can lower down the transaction costs and
with increasing margins (Roekel, et al 2002). To improve the performance the dimensions like time, quality, flexibility, cost, and environment should get improved (Trienekens, et al 2002).

![Diagram of Agribusiness Entrepreneurial Model]

**Source:** Adapted from Asef and Iraj (2011)

**Fig. 1.3: Agribusiness Entrepreneurial Model**

![Diagram of World Food Distribution]

**Source:** Adopted from Loader, R. (1997)

**Fig. 1.4: World Food Distribution**
There is another parallel view by Boselie (2002) referred to the low cost strategy as chain optimization where satisfying and segmenting the markets are most important for the innovation and optimization called the integral chain care and chain differentiation.
1.3 Supply Chain Problems

Information is one of the most important aspects for the growth of agricultural sector and very essential to develop an appropriate agricultural information system that can support both the agricultural information and the development and training of agricultural information specialists. Discussion of the paper of Thapisa, A.P.N. (1997) gives an insight of the need of program that can provide the necessary professional training. The stability in agricultural development can get done systematically only on stressing the development of existing agricultural libraries and it is needed to be empowered. The importance and need of a regional network also cannot get ignored for the speedy delivery of information to all the needy users. The method of communication of agricultural information by Oduwole, A. A., Okorie C. N., (2010) is also expected to go through the research and is crucial to enabling farmers make informed and decisive decision. In order to make agricultural extension much more effective the information providers such as librarians, agricultural extension workers and village heads/chiefs and the Commission should also emphasize the importance of functional agricultural extension services covering in-service training, continuing education, on-farm adaptive research, evaluation and monitoring of extension services and the establishment of media resource and communication centers (Oduwole, A.)
A., Okorie C. N., 2010). The ability of the nation to get the higher yield of produce completely depends on the ability of the country to explore and sharing of the updated information with the community. Research of Kiplang’at, J. (1999) says that the rural populations of developing economies suffer from poverty and the agricultural advancement can help them to eradicate poverty. At the same time information distribution system must work very aptly. By 2020 Kenya is being a highly industrialized country and this can get achieved only by the development of agriculture and rural sector. There is strong need to explore the different ways of communication development to support agriculture (Kiplang’at, J. 1999).

The findings of the study (Lwoga, E.T., Stilwell, Christine, S. and Ngulube P. 2011) demonstrate the importance and degree of need for knowledge and information moreover reveals the farmer’s tendency for the information seeking patterns though much of research done and paper published and availed as print materials has very negligible use due to their unavailability and illiteracy. As per the research study by Lwoga, E.T., Stilwell, Christine, S. and Ngulube P. (2011), Radio and cell phones have been a good source of information sharing compared to advanced technologies (i.e. internet and e-mail) having less importance for farmers. Farmers also believe that they should come forward to access agricultural information and knowledge available at different sources. The paper (Ocran, M. K., Biekpe, N., 2008) has tackled the problem of developing an effective market information system. Policy makers should consider the provision of agricultural extension services and the susceptibility of food output to rainfall should get addressed by both government and producers. Kalusopa, T. (2005) says that utilization of information is necessary for agricultural development activities, but effective information has to be systematically collected, organized and repackaged and must be available in easily accessible source as and when needed. As the study shows, the information in the agricultural sector is scattered, poorly developed and unfocused. In order to improved agriculture, it is needed to have a well-organized and functional integrated information delivery system to provide information that must be timely available with relevancy, accuracy, and reliability with in desired usable forms (Kalusopa, T. 2005). There is a need to redesign the information support system for agricultural development. There can be much of possibility for creating small-scale irrigation systems and development in losses due to heavy rainfall with support of government can get explored. Authors Ocran, M. K.,
Biekpe, N. (2008) suggests tackling all the problems together will help in reducing the transaction cost of producers and can make the produce cheaper for the end market and consumers.

The research carried by Zhang, G., Lane, D. M. (2001) has given a huge source for the agricultural research to get the secondary data available globally for a wider and deeper understanding of the subject. The websites are with the information of past and current scenario of horticulture, farming, agronomy, agricultural production, agricultural development, agricultural policy and sustainable agriculture. The very informative websites are available with full of information (Zhang, G., Lane, D. M. 2001) and the information is in English and really it is of high importance. In agriculture, it is very difficult to say (Laoubi, K and Yamao, M. 2009) a single correct answer for any of the problem, the reason is, it depends on many variables and most of them are uncontrollable. Agricultural produce supply chain facing many of the challenges in Sub-Saharan Africa and Ghana but the research of Ocran, M. K., Biekpe, N. (2008) exclusively talks about the need of the improvement in the reduction of transportation cost and can get done by improving the quality of roads reaching to farms and agricultural producing areas. The observation concludes that since agriculture is the science of locality so approach should be very justified. Long term strategies are needed to account the heterogeneity of agriculture.

To offer solution to all the farmers said by Laoubi, K and Yamao, M. (2009) a farm typology can be a useful tool since it helps in identifying and characterizing the diversity of the farm. For the better understanding and recognizing the diversity, one need to understand the barriers to modernization, the cost of development activities and what the support needed to achieve sustainable modernization. For the successful modernization and development of agriculture in Algeria, it is needed that all the different entities have compatible objectives. Laoubi, K and Yamao, M. (2009) identifies a better approach is to accepting and supporting diversity for the future than concentrating on uniformity. To establish stronger partnerships between farmers and operators only the key objective should get catered i.e. increasing integration of local production by agribusiness. Gunderson, M. A., Detre, J. D., Briggeman, B. C., Wilson, C. A. (2011) says opportunities in the agricultural financial services sector has much of opportunity to in finance skills rather to non-finance skills. The focus is on agricultural business and management of financial risk might be helpful in increasing the sustainability for the firm. At the same moment authors
emphasize that though non-financial skills training program is also very important for the contributors of agribusiness management.

Menexes, G., Angelopoulos, S. (2008) has presented a methodology for the development of a typology for agricultural farms that can constitute criteria for inclusion in funding programs. This typology allows for the determination of a flexible development and funding policy for agricultural farms. Manufacturers and distributors are therefore advised to develop marketing strategies that will give potential new customers experience of their product offerings and market their current offerings to existing customers. The example of an experiential type marketing strategy is the on-farm demonstrations that some manufacturers and dealers already undertake (Walley, K., Custance, P., Taylor, S., Lindgreen, A., Hingley, M., 2007). By Tamilia, R., D., Charlebois, S. (2007), the Canadian economy shows monopoly powers of supply marketing boards are unparalleled relative to other sectors. Farmers must realize that they are part of the economy and the farm management is also the same as managing any other business enterprise (Tamilia, R., D., Charlebois, S. 2007). Agriculture requiring government intervention and support does not have a monopoly on unique market conditions. Canada needs to implement free market reforms in the agricultural sector and needs to assess effectiveness of supply management (Tamilia, R., D., Charlebois, S. 2007).

Supply management is one of the most important factors causes more harm to consumers and economy. This study of Cadilhon, J., J., Fearne, et al. (2003) has shown that it was difficult to place a country and its food market structure in development levels by the evolutionary approach to market studies. Fresh food market segments still use public retail markets and hawkers are contributing to economic development in Vietnam (Cadilhon, J., J., Fearne, et al. 2003). The uncertainty of the wholesale function in diverse market is due to traditional retailers and caterers may heavily depend on it but others (supermarkets, speciality shops) prefer to get direct supply from the producer. Systems approach to the analysis of urban food supply and distribution must be taken in consideration to understand the existing marketing system and the viewpoint of all its stakeholders.

White, J. B. (1997) describes that agricultural co-operatives get most difficult problem arises during making a sound investment decisions. Agricultural co-operatives are one of the successful models of organized agricultural scenario are not depending on
discounted capital budgeting techniques in the process of capital investment decision making as the profit making businesses do. The correlation found (White, J. B. 1997) between the utilization of IRR and NPV shows that they use a multi-method approach in planning of capital investments by most of the co-operatives. It is needed to apply more planned capital budgeting techniques (White, J. B. 1997) to improve the overall effectiveness and efficiency of agricultural co-operatives in fulfilling their needs of marketing and production. A well planned capital budgeting will help co-operatives to allocate the scarce resources more efficiently. The study (Miles, M., P., White, J., B., Munilla, L., S. 1997) shows that there is much similarity between larger cooperatives and smaller agricultural cooperatives adoption of strategic planning tools. The utilization of strategic planning techniques is not considered as the core of management function. Findings support that many of the agribusinesses firms have adopted strategic planning as a source of competitive advantage. As per study strategic planning has become an important function in the non-profit, agricultural co-operatives. More sophisticated methods for strategic planning are needed to explore in order to survive due to the evolvement of society with increasing population, environmental, and social pressures.

The increasing food demand and globalization has aligned agriculture sector with the production and service sector in Iran (Asef, Iraj et al. 2011). Lebanon is trying overcome the challenge of agro-industrial integration (Karimi, A. and Malekmohamadi, I, 2011). In South Africa agricultural information programme is facing many problems with the establishment and implementation of activities (Thapisa, A.P.N. 1997). The Nigerian government, to combat with the food problem (Oduwole, A. A., Okorie C. N., 2010), established 18 Agricultural Research Institutes (ARI) in 1979 with the objective of conducting research for food crops production and agriculture. Libraries established to support the effort of agricultural research. The statement of Lwoga, E.T., Stilwell, Christine, S. and Ngulube P. (2011) reveals that rural areas in African countries need to improve agricultural performances and livelihoods and this can be only having relevant information and knowledge. The farming community of Kenya (Kiplangat, J. 1999) also depends upon information facility provided by the govt. organizations of the nation. Loader, R. (1997) study shows the status of Egyptian potato marketing system. At one side in the absence of exposure to technology small scale farms are having low yield with a high operating cost. Other side numerous consumers in Egypt are consuming a very small
segment of the produce. To get a broader consumer base, many companies are operationalizing retail stores are expanding with supermarkets (Loader, R. 1997). This has lead to much competition among (Loader, R. (1997) producers and intermediaries to cater the consumer demands in the best way. As the outcome only option left is vertical integration of the whole supply chain system to reduce the uncertainty in the system for intermediaries of produce perishability. The vertical integration is a way to reduce the wastage of produce and can bridge the demand supply gap stated by Loader, R. (1997).

The study of Du, X., F., Leung, S. et. al. (2009) says that Complexities in supply chains of products often result in economically unviable cost structures in industries manufacturing products from agricultural resources. The current competitive positioning is the major concern for the companies involved in agriculture related industries due the lowest profits of agricultural products. One reason is that agricultural products vegetables and fruits deteriorate easily and their shelf life is often very short (Du, X., F., Leung, S. et. al. 2009). The price decreases dramatically as the shelf life of the product comes to an end, these prices of agricultural products are time-sensitive. On the other hand, at any given point of time may result in significant loss of revenue due to a shortage of saleable agricultural products because the demand is not carried forward. So it is crucial to efficient management of inventories of agricultural produce to reduce bottlenecks in profitable marketing of agricultural produce (Du, X., F., Leung, S. et. al. 2009). Instead of older conventional procurement systems, it is need of implementation of newer technical mode of operation. Result of the research (Velev, M., S., Marinov, I., T. (2004) displays several serious problems in the marketing effectiveness of some Bulgarian enterprises. These problems evolve mainly due to the lack of knowledge and skills for market economy conditions. It is visible that process of most Bulgarian enterprises adaptation to the new market conditions is incomplete. These firms should work on their competitiveness in national and international sense.

As Karimi, A. and Malekmohamadi, I (2011) have observed that most of the countries are transforming with farming industry and base principle used is vertical integration and simultaneously the coordination with retail industry has supported the concept of improved supply chain for agricultural produce. Their observation says that vertical integration in agricultural supply chain or farming sector is not been easy task, then also it is requisite of agricultural sector in order to direct production towards the
requirements of the processing industry to bridge the supply side gap and ultimately to fill the demand of the final consumer. The research by Baourakis, G., Kourgiantakis, M., et al. (2002) contributes that agro food sector has observed much of impact from e-commerce. Agro food firms should adopt e-commerce practices in order to benefit from the technology offers. It lowers down the transaction cost and easily reaches to international markets (Baourakis, G., Kourgiantakis, M., et al. 2002). It is observed that slowly e-commerce is taking place in the agro-food sector, though they have not realized the full potential of e-commerce. The research by Renko, N., Nikolasevic, S., Pavicic, J., (2002) says that most important feature of all markets is to market of all the agricultural produce and their involvement in the participation directly or indirectly in the transaction process chain from production to consumption (Renko, N., Nikolasevic, S., Pavicic, J., (2002).

The research is talking that whenever market of agricultural produce get talked often it talked about the participants of the transactions significance of the accompanying institutional and infrastructural support. The cost effective supply chain in Belgium (Baecke, E., Rogiers, G., Cock, L. D., Huylenbroeck, G., V. (2002) is very essential since demand is much higher than the supply. It is needed to setup strong marketing channels with farmers and organizations outside Belgium. Belgium farmers have marketing problem even if the demand is higher than the supply (Baecke, E., Rogiers, G., Cock, L. D., Huylenbroeck, G., V. 2002). It can be effective only by minimizing negotiation costs in the supply chain and working on a more systematic approach that will reduce the transaction costs and will create cost effective supply chain. The study of Gong, W., Parton, K., Cox, R., J., Zhou, Z. (2006) shows that transaction costs are significant in affecting farmer’s marketing channel selections. It concentrates on measurement of various transaction cost variables. It shows the significant relationships between economic and social variables of farming (Gong, W., Parton, K., Cox, R., J., Zhou, Z. (2006). Transaction costs are the most important variable that affects importantly farmer’s choices of spot market sale or forward contract with processors.

1.4 Research Problem

There are a number of challenges involved in marketing of agricultural produce. The first and the most difficult challenge is of very limited reach to the market information, farmers having low literacy level, high number of participants with multiple levels in
distribution channels. This is affecting the prices and impact goes on both the producers and consumers. The government funding for farmers is still at nascent stage and the implementation of bank funding schemes are also not very fruitful for vegetable farmers. The credit dependency of the small farmers is on the local moneylenders and forced to pay high rate of interest. There are too many reasons responsible for eating away the benefits that the farmers are supposed to get. Although studies say that technology has improved but in reality it has not reached the rural levels and confined only to urban areas. There are numerous loop holes in the present regulations of the government like there is lack in organized and regulated marketing system for marketing the vegetables. Farmers are forced to face so many challenges to overcome several these hurdles to get fair price for their sweat.

The most difficult challenge is of very limited reach to the market information, farmers having low literacy level, high number of participants with multiple levels in distribution channels (Cadilhon, J., J., Fearne, A., P., Moustier, P. & Poole, N., D. 2003). The credit dependency of the small farmers is on the local moneylenders and forced to pay high rate of interest (Ahuja, V., George, V. S., Ray, K.E., McConnell, M.G.P., Kurup, V., Gandhi, D., Deininger, U., &Haan, C. 2000). The knowledge deficit and infrastructure deficit are two most serious issues that plague Indian agriculture at presently in rural areas (Thapisa, A.P.N. 1997). Problems related to irrigation facilities, market infrastructure and transport infrastructure adding significant cost to farmer’s operations (Gunderson, M. A., Detre, J. D., Briggeman, B. C. & Wilson, C. A. 2011). Another issue is the lack of very sound vegetable delivery mechanisms in terms of either increasing productivity or decreasing cost or real price realization (Chengappa, P.G., Achoth, L., Mukherjee, A., Ramachandra Reddy, B. M. & Ravi, P. C. 2003). There is a lack of information on marketing particularly on the demand and supply in market by Lwoga, E.T., Stilwell, Christine, S. &Ngulube P. (2011). During the study most of the farmers complained about insufficient farm-to-market roads facility leading to wastage and inaccessibility (Vesala, K., M., Peura, J. &McElwee, G. 2007). Most of the farm does not have access to irrigation facilities making them handicapped for cultivation of vegetables (Tamilia, R., D. &Charlebois, S. 2007). Being heavily dependent on rail and road transport, industry is saddled and the costly cold chain supply system also increasing the cost for vegetables (Loader, R. 1997).
The high cost due to post-harvest losses in vegetables significantly lowers down the farmer's income by Vesala, K., M., Peura, J. & McElwee, G. (2007). Farmers do not have the access to very open system to support on the existing regulation for their benefit rather they get victimized by all the other players in the system (Renko, N., Nikolasevic, S. & Pavicic, J. 2002). The many hidden costs like the cost of the carry vans, their drivers, loaders and fuel are added and eventually passed on to the consumers being a higher cost (Karimi, A. & Malekmohamadi, I. (2011). The credit facility system now days too is only in the books but not in practice and continuing to be a major concern for the credit support Gunderson, M. A., Detre, J. D., Briggeman, B. C. & Wilson, C. A. (2011). The vegetable passes on too many hands before they reach the markets, where clustering concept is not implemented, farmers completely depend on traders and agents by Ocran, M. K. & Biekpe, N. (2008). The cost of inputs becomes much higher for the farmer when it is locked in with credit provided by traders (Kan, S.R. & Singh, G. (2003).

Issue with the lack of very sound vegetable delivery mechanisms though many schemes implemented meant to develop vegetable cultivation then too we do not have effective delivery mechanisms to transform it into effective facilitation at the ground of reality, in terms of either increasing productivity and decreasing cost or real price realization. Diminishing agricultural growth is a concern for policymakers as some two-thirds of India’s population depends on rural employment for living. In India current vegetable cultivation practices are neither economically nor environmentally sustainable on that the production of vegetable decreasing day by day. Farmer’s markets access is getting hampered by poor roads, elementary market infrastructure, and unnecessary regulations. There is a strong need of reassessment of vegetable industry to know the preference of the market on traditional way of supply chain of vegetable industry. It will be a great help for policy makers having the actual information on the impact of traditional supply chain and vertically coordinated vegetable supply chain. Agriculture industry is getting vertical linkage in supply chain of vegetables with the support of new research outcomes in this emerging area of supply chain. Studies on vertical integration and vertical coordination have given a wide range of solutions around the world for agricultural industry. The major challenges cited by many authors are with system transparency, price fluctuation, wastage reduction, support to technology, perishability reduction, quantity control, grade and standards, variety, yield increase, non-seasonal availability, demand security and producers.
benefit. These are the variables which can get controlled with the implementation of the concept of vertical coordination. After having much more studies on past literatures it was found that there are no such significant research studies undertaken in the state of odisha on the benefits and effects of vertical coordination in vegetable supply chain. In this context, the basic statement of research problem of this study is “gathering information about the simple bottlenecks in the vegetable supply chain creating less price realization for farmers although consumers pay more at the end point, identifying value adding factors to enable the intermediaries to have an efficient supply chain and analyzing the impact & role of vertical coordination in the market distribution channel system to achieve the effective result”.

1.5 Research Questions

- What are the components of vertical coordination in Agricultural marketing?
- What is the importance of vertical coordination in supply chain of vegetables?
- Can coordination in supply chain minimize the wastage due to perishibility of vegetables?
- Does vertical coordination in supply chain stimulate the higher yield that assures the security for the demand of vegetables?
- Does vertical coordination in supply chain assure the non-seasonal availability of vegetables?
- Can vertical coordination in supply chain reduce the market price of vegetables for end consumer?
- Does vertical coordination in supply chain reduce the transaction cost of vegetables?
- Does vertical coordination in supply chain reduce the produce cost of vegetables?
- Does vertical coordination in supply chain provide input facilities for farming of vegetables?
- Can vertical coordination in supply chain support the price benefit for vegetables?
- Can green vegetable growers get benefitted due to vertical coordination in supply chain of vegetables?
• Can vertical coordination in supply chain attract entrepreneurs to venture in vegetable production?

1.6 Research Objectives

• To evaluate the significance of monetary factors associated in supply chains for vegetables.
• To assess the need of vertical coordination and the involvement of farmers and intermediaries in supply chain of vegetables.
• To determine the impact of vertical co-ordination on supply chain of vegetables industry.

1.7 Conceptual Model
1.8 Formulated Hypotheses

H1: Vertical coordination variables significantly affect the vertical coordination effect variables in vertically coordinated vegetable supply chain in expert survey.

H2: Market and selling has the significantly positive relationship with the vertical coordination variables in vertically coordinated vegetable supply chain in producer survey.

H3: Constraints are significantly important for the vertical coordination variables in vertically coordinated vegetable supply chain in producer survey.

H4: Credit and stock significantly impacts the vertical coordination variables in vertically coordinated vegetable supply chain in producer survey.

H5: Prices and transaction cost is the significant factor for the vertical coordination variables in vertically coordinated vegetable supply chain in producer survey.

H6: Vertical coordination variables significantly affect the vertical coordination effect variables in vertically coordinated vegetable supply chain in producer survey.

H7: Volumes and flows significantly impact the vertical coordination variables in vertically coordinated vegetable supply chain in intermediary survey.

H8: Constraints are significantly important for the vertical coordination variables in vertically coordinated vegetable supply chain in intermediary survey.

H9: Credit and stock significantly impacts the vertical coordination variables in vertically coordinated vegetable supply chain in intermediary survey.

H10: Prices and transaction cost is the significant factor for the vertical coordination variables in vertically coordinated vegetable supply chain in intermediary survey.

H11: Vertical coordination variables significantly affect the vertical coordination effect variables in vertically coordinated vegetable supply chain in intermediary survey.
1.9 Methodology Used

1.9.1 Sources of Data

Exploratory research design selected for this study as some new relationships explored based on the primary data collected and tested. The purpose of the study had been well defined and to accomplish this, two different sources of data had been used i.e. primary source of data and secondary source of data. Firstly the secondary data got collected to build sound conceptual base having extensive literature review considering all existing theories in India and abroad. Hard and soft materials were also got used as printed published journals, published and unpublished articles from libraries, books and online libraries. The data gathered from secondary sources were firstly filtered and then got used with references. Secondly the primary data got collected using three different structured survey questionnaire for the three different segments of respondents; they were experts of vegetable industry, intermediaries involved in the business of vegetables and farmers engaged in vegetable cultivation. The main conclusion of the research was drawn on the basis of data collected from primary sources by survey, on the basis of above said three types of questionnaire over three types of respondents to visit the real field.

1.9.2 Sampling Plan

Cluster sampling method of probability sampling had been used to select the respondent from the whole population, a cluster of green vegetable growers, out of which respondents were selected randomly. The same was done for intermediaries also but for experts judgmental sampling of non-probability sampling method was used. It helped to draw inferences about specific subgroups. The cluster of green vegetable growers, cluster of intermediaries and selection of experts was done with the consideration of geographical and resource limitations. The sample size for the experts was 107, the intermediary was 757 and the farmer was 757.

1.9.3 Methods of Data Collection

The data collection process was segregated in two stages for better understanding and making the theory more evident on conceptual ground. The research plan for the first phase is triggering to collect qualitative data i.e. secondary information and interviews to
get the sufficient literature support to establish the concept. Further the second phase was about the primary data collection done in two segments as firstly using the Delphi technique to validate the acceptance of variables in this particular study using interview schedules and secondly the usage of structured survey questionnaire administration to collect the data from specified sample. Qualitative data had been very useful for the study that drew the road map for the whole study in differentiating the variables for this specific purpose of the vertical coordination in supply chain of vegetable industry.

1.9.4 Instruments Used

A self-prepared structured survey questionnaire prepared for three different segment of respondents including questions about socio-economics, organizational characteristics, farm production, marketing, monetary factors, constraints, importance of vertical coordination for vegetable industry and the effect of vertical coordination on vegetable industry. The survey questionnaire got tested for validity. In the questionnaire two different scales had been used of SPSS for the purpose of measurement of variables are nominal and scales. Most of the items having a five-point Likert scale from 1 to 5, where "1" accounted for the minimum agree value and "5" for the maximum agree value for the convenience of respondents. Some items are used open ended where respondents are getting freedom to put their responses as per their understanding and experience.

1.9.5 Dimensions Considered

The study was centered to gather the information about the status of variable involved with support system from production to reaching the customer of vegetables. So the dimensions were:

(1) **PSCV**-Producer Supply Chain Variables (Market and Selling, Constraints, Credit and Stock Strategy, Prices and Transaction Cost)

(2) **ISCV**- Intermediary Supply Chain Variables (Volumes and Flows, Constraints, Credit and Stock Strategy, Prices and Transaction Cost)

(3) **VCV**-Vertical Coordination Variables (Perishability, Wastage, Yield, Demand, Security, Non Seasonal Availability, Price Fluctuation, Produce Variety, Quality Variety, Quantity Variety, Risk, System Transparency, Grade & Standard, Technology Cope up, Vegetable Growers Benefit)
(4) VCEV-Vertical Coordination Effect Variables (Mutual Interest, Long term Relationship, Shared Benefit, Open Information, Stability, Interdependence)

1.9.6 Statistical Tools for Analysis

All the qualitative information were broadly explained with structured statements maintaining the crisp of the conceptual thought of each and every literature. Quantitative data collected through the administered structured questionnaire interpreted and presented descriptively with explanation of happenings for the primary understanding. The major part of the analysis of data is done with SPSS using different quantitative techniques suitable for the study. The mostly used techniques were multivariate data analysis techniques named as T-test, Paired T-test, ANOVA, correlation and regression. Every analysis was carried keeping the research objectives on uttermost priority.

1.10 Relevance of the Study

The recent research carried out by Paul Artiuch and Samuel Kornstein of MIT Sloan School of Management in a revealed that Delhi, capital of India running Azadpur Mandi is turning out to be the largest wholesale produce market in all of Asia (http://mitpsc.mit.edu/blog/2012/06/18/azadpur-mandi-delhis-wholesale-produce-market/). Talking about the capacity of the market they said, the market is covering 80 acres in North Delhi. Though being significantly over capacity, chaotic, and messy, but it all seemed to work even Azadpur mandi. Many contract farming schemes have in-built provision of credits to small producers to ease their capital constraints and some critics argue that by doing so the firm may make producers excessively dependent on it for credit and thus keep them in perpetual indebtedness (Watts 1994; Runsten and Key 1996). The challenges with the access to a distribution facility, grading, sorting, packaging of vegetables and directly supply to the supermarket chains are the major bottleneck for the farmers. To averse the risk farmers sometimes get ready to pay a premium (lower product prices) for guaranteed income schemes (Binswanger 1980; Hazell 1982). Some large domestic business groups such as Tatas (Westside), RPG (FoodWorld), Rahejas (Shopper’s Stop) and Piramal (Pyramids and Crossroads) into food retail trade are sourcing raw materials directly from the farmers through vertical coordination (Chengappa et al. 2003). Some institutions are coordinating with the farmers in production and marketing of vegetables (Asokan and
Singh 2003). The public extension system has been under criticism for its inefficiency in delivery of services and rising burden on public exchequer (Ahuja et al. 2000; Sulaiman and Sadamate 2000), and governments are, in fact, looking for alternative cost-effective extension models. This study can support the vegetable industry and increasing consumer demand in many ways by Singh, S. (2013):

1. The open market transactions are the beginning of business transactions in vertical coordination continuum of supply chain having the possibilities to develop a mechanism for the full vertical coordination in the vegetable supply chain that can provide scope to the managers to control the flow of produces at several stages of supply chain.

2. The developing vertical coordination arrangements are formulating new methods to serve the different market needs with the shift from the concepts of marketing channels, agricultural markets and transaction cost economics.

3. The vertical coordination may support in improving the efficiencies of potential market to cope up with competitiveness in industry that can move towards the outside of the demand curve to fulfill the needs of all the segments of the existing market.

4. The collective bargaining processes can play an important role in this facilitation. Observing the social development many players are presenting the business offers for producers in processing and retailing.

5. Producers may be benefited and can use the information many ways accessing the the information with the fast developing electronic communication system in agricultural industry.

1.11 Research Scope and Limitation

The study is aimed at the Odisha state of India as geographical boundary. Odisha is the state coming up with rapid development, attracting human capital and being the biggest educational hub in eastern India is in need of more vegetables. Government is also concerned for this and contributing its part to develop vegetable cluster in different districts by the projects of NVI (National Vegetable Initiative). For the study five vegetables considered are Potato, Brinjal, Cabbage, Cauliflower and Okra. The reason behind the
selection of these vegetables is the high yield, maximum utilization and scope for value addition with the vegetables.

The study is limited within the geographical boundary of state of Odisha due to time factor and availability of opportunity to explore the answers for the research questions. Though the sampling technique applied here then also the data collected are not from the whole population but just representing the population. Most of the data collected is qualitative in nature where interpretation is within the limitation of my experience.

1.12 Organization of the Thesis

The complete thesis is consisting seven chapters where each chapter has its own value in the presentation. The second chapter provides an extensive study about the existing status of vegetable supply chain in India. More over this chapter discusses about the existing studies on importance and challenges with vegetable supply chain systems, studies on driving factors to change the vegetable supply chain system like agricultural industrialization process, globalization and vegetable industry, changes in technology, trade liberalization and policies, consumer demands with environmental concerns. Lastly discusses on reasons of shifting from traditional agriculture to technical agriculture and about the different types of vertical coordination.

In the third chapter main theories supporting to this study is incorporated systematically and sequentially. The main topics covered are the need of the theoretical framework, theories of the firm, transaction costs and participation in the vertical coordinated vegetable supply chain, collective action and participation in the vertical coordinated vegetable supply chain, production to consumption concept and the empirical evidence for the main research hypotheses.

The fourth chapter is all about the data analysis and methodology used for study. The exploratory study with the sampling design used an overview on stages of qualitative or quantitative data collection, survey design and steps involved in instrument design. Applied methods of analysis with mean difference and relationship analyses, regression analyses, and detailed description of variables used in regression analysis.
The fifth chapter is the analysis of all the data collected using the structured instrument. The data analysis is done based on different statistical techniques, keeping the research objectives in mind. The four different segments have been taken in this as first for the analysis of expert opinion, second the analysis of producer opinion, third the analysis of intermediary opinion and last is the comparative analysis of producer and intermediary.

Sixth chapter is broad outcome of the study where gets the information regarding the role of farmers and intermediaries in the vertical coordinated vegetable supply chain. An overview of the country and the supply chain for vegetables, advantages and challenges associated with the vertical coordinated vegetable supply chains, characteristics of farmers and intermediaries participating in vertical coordinated vegetable supply chains, opportunities and threats with vertical coordinated vegetable supply chains. The It talks about the determinant factors associated with participation in the vertical coordinated vegetable supply chains, marketing preferences of farmers, marketing preferences of intermediaries, organization services and market channels used by farmers and intermediaries, impacts of participating in the vertical coordinated vegetable supply chains.

This seventh is the last chapter here concludes the whole study gives the snap view on assessment of objectives, assessment of the hypotheses, major contributions, and limitations of the study, recommendations and scope for further research.
Reference


[34] www.iivr.org.in