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INTEGRATED CONTRACT BROILER FARMING: AN EVALUATION CASE STUDY IN INDIA

A MEAS Evaluation Report

June 2015

Authors: P.V.K. Sasidhar and Murari Suvedi

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Integrated Contract Broiler Farming: An Evaluation Case Study in India

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213 Mumford Hall, MC 710
1301 W. Gregory Drive, Urbana, IL 61801-3605, USA

By

P.V.K. Sasidhar

Associate Professor

School of Extension and Development Studies

Indira Gandhi National Open University

New Delhi - 110068, India

pvksasidhar@yahoo.com

And

Murari Suvedi

Professor

Department of Community Sustainability

Michigan State University

East Lansing, MI - 48824, USA

suvedi@anr.msu.edu

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Front cover photographs:

Left: Mr. P. Linga Reddy, contract broiler farmer with farm workers, Narayanagiri Village, Warangal District, Telangana.

Right: Mr. Jakaulla, non- contract broiler farmer, Bilichodu Village, Davanagire District, Karnataka.

Back cover photographs:

Left: Mr. O. Venkataiah working in contract broiler farm, Narayanagiri Village, Warangal District, Telangana.

Right: Mr. Sudhir, best performing contract broiler farmer, Nendragunta Village, Chittoor District, Karnataka.

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ACRONYMS

AICRP	All India Coordinated Research Project
CARI	Central Avian Research Institute
CBF	Contract broiler farming
DCP	Digestible crude protein
DPR	Directorate of Poultry Research
EAS	Extension advisory services
FCR	Feed conversion ratio
FGD	Focus group discussion
GDP	Gross domestic product
ICAR	Indian Council of Agricultural Research
IVRI	Indian Veterinary Research Institute
KASA	Knowledge, attitudes, skills and aspirations
MEAS	Modernizing Extension and Advisory Services
NCBF	Non-contract broiler farming
NSSO	National Sample Survey Organization
RC	Rearing charge
SAPPLPP	South Asia Pro-Poor Livestock Policy Programme
SAUs	State agricultural universities
SPC	Standard production cost
SPSS	Statistical Package for Social Sciences
SVUs	State veterinary universities
SWOT	Strengths, weaknesses, opportunities and threats
TDN	Total digestible nutrients
UNDP	United Nations Development Programme
USAID	United States Agency for International Development

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EXECUTIVE SUMMARY

This USAID-funded MEAS project evaluated integrated contract and non-contract broiler farming systems in India's Karnataka, Telangana and Andhra Pradesh states with the following research questions:

- Do contract and non-contract farmers incur significantly different production and marketing costs and earn different marketing margins?
- Does the provision of extension advisory services (EAS) by private companies enable contract farmers to make better profits than non-contract farmers?
- Have assured markets, competitive price and guarantee against risk resulted in successful value chain development through contract broiler farming (CBF)?
- Are the value chain development and provision of EAS by private CBF companies really win-win situations for both integrators and farmers, or are these a socially acceptable way of exploiting the farmers?

The study applied Bennett's hierarchy of evaluation model by adapting sets of methods. Through individual surveys, this hierarchy evaluates CBF and non-contract broiler farming (NCBF) systems, beginning at the bottom step with inputs and progressing to the top-end results. The study employs strengths, weaknesses, opportunities and threats (SWOT) analysis and focus group discussion (FGD) to supplement the survey data. The data, collected in 2014 from the three states, came from in-depth personal interviews with 120 contract and 120 non-contract broiler farmers and the focus group discussion with stakeholders. The key findings and differences between CBF and NCBF systems are:

- Demographics of contract and non-contract farmers were comparable except that non-contract farmers had significantly greater experience. Women were participating only as laborers, not owners, in both systems. Also, ownership lay with socially affluent members, with the exclusion of disadvantaged communities in both systems. Basic economic resources were required in the form of fixed (for CBF and NCBF) and working capital (for NCBF) to participate, which the marginally poor farmers cannot afford.
- Contract farmers had more broiler sheds, produced fewer batches per year, and used less family labor and more hired labor than non-contract farmers.
- Flock size, mortality (numbers) and number of birds sold were higher, but bird lifting days and sale rate were significantly lower in CBF.
- Mortality (percent), birds sold (kg) and feed consumed (kg) were higher, and birds' sale weight (kg) was significantly higher in CBF.
- The feed conversion ratio (FCR) was the same in both systems, but marketing age and weight gain (grams/day) in CBF were significantly higher.
- Among the inputs, the chick cost in CBF was significantly lower, and feed and medicine costs were slightly higher in NCBF. Among other costs, labor cost was significantly higher in CBF, whereas bedding material, electricity, EAS and miscellaneous costs were significantly higher in NCBF.

- All the outputs -- sale rate of birds, manure and feed bags -- were significantly higher in NCBF.
- Though the total cost of production was significantly lower in CBF, the total return was significantly lower than that in NCBF. In CBF, the average net return per bird was Rs.11.06, and in NCBF, it was Rs. 17.05. Overall, the contract farmers were losing a margin of Rs. 5.99 per bird to avoid marketing, production and investment risks.
- The integrating company was the sole source of EAS in CBF, which is free. In NCBF, the major sources of EAS were private poultry consultants, self-service and government veterinary doctors on payment. From the FGD and interactions with contract farmers, it was clear that the EAS providers were trained supervisors but not poultry veterinarians. Veterinarians from the contract company visited the contract farms only in case of disease outbreak or when unusual mortality was reported.
- No marketing risk, regular and quick returns, and low working capital required were the major motivational factors to participate in CBF. Regular and quick returns, high margins and ease of operation were the major factors of motivation in NCBF.
- The majority of contract farmers had not changed integrators; the majority of non-contract farmers had changed input provider(s) in the past two years.
- The contract farmers' perceptions on inputs such as chicks, feed and medicines were higher and their perceptions on EAS were significantly higher than those of non-contract farmers. Overall, contract farmers' perceptions on total inputs were significantly higher than those of non-contract farmers. Among the subcomponents of inputs, contract farmers' perceptions on cost of chicks, timely supply of chicks, and cost of feed and medicines, and understandability, frequency and timeliness of EAS were significantly higher. Non-contract farmers' perceptions on batches per year and quality of medicines were significantly higher than those of contract farmers.
- Among the outputs, the contract farmers' perceptions on payments received were significantly lower, and perceptions on broiler bird, manure and total outputs were significantly higher than those of non-contract farmers. Among the subcomponents of outputs, the contract farmers' perceptions on quantity of manure produced, method of manure disposal and economic benefits from manure were significantly higher. Non-contract farmers' perceptions on rearing charges and regularity of payments were significantly higher than those of contract farmers.
- Overall, the combined score of perceptions of contract farmers on inputs and outputs was significantly higher than that of non-contract farmers.
- The difference between contract and non-contract farmers' perceptions on the intention of EAS was significant.
- Adoption of technical advice related to housing and feeding was better in CBF; medication practices were better adopted in NCBF.
- No marketing risks, doorstep delivery of inputs and EAS, and low variable costs to the farmers were the major strengths in CBF. Comparatively higher margins, ease in changing input providers and quick returns were the major strengths perceived in NCBF.
- Low rearing charges, high investment in fixed costs and low margins, and production cost estimation favoring companies were the major weaknesses in CBF. High marketing risk, high

investment in fixed and variable costs, and high production costs were the major weaknesses in NCBF.

- Enhancing rearing charges and sharing rate incentive margins with farmers, including input standards in agreements along with outputs standards, and scope for further expansion and value chain development were the important opportunities in CBF. Assured marketing, minimum support price above production cost and agriculture status to poultry farming were the major opportunities perceived in NCBF.
- Unilateral contracts favoring integrators, lack of regulations/specifications on inputs and monopoly by a few companies were the major threats in CBF. High marketing risk and high production cost leading to withdrawal from poultry farming, volatile markets and control of markets by a few contract companies were the major threats in NCBF.

In spite of low production cost, the returns in CBF were significantly low because efficiency surplus is largely taken by companies. On the other hand, though production cost was high, farmers in NCBF were gaining a margin of Rs. 5.99 per bird produced despite facing marketing, production and investment risks. *This leads to the conclusion that contract and non-contract farmers incur significantly different production and marketing costs and earn different marketing margins.* The standard deviations on returns under both systems confirm that the net returns in CBF are guaranteed, but in NCBF they vary widely depending on the market rate. *This points to the conclusion that CBF does not enable contract farmers to make better profits than NCBFs; rather, it gives a lower but assured return.* Despite low returns, farmers are participating in CBF largely because of assured income, low working capital requirement and absence of marketing and production risks. On the other hand, through improved technology, low margins on inputs, economy of scale and stringent norms, the companies are reducing production cost, leading to lower retail chicken prices. *All these factors resulted in successful value chain development through CBF.*

Nevertheless, in the absence of a regulatory body, all privileges and rights were in the hands of contract companies. Though standards on infrastructure and outputs were fixed by companies in their favor, the contracts were silent on input standards. With meager rearing charges, stringent production cost incentives and penalties, the agreements clearly favored the contract companies. *The survey and FGD findings revealed that the value chain development and provision of inputs and EAS by large private poultry companies did not really result in a win-win situation for both integrators and farmers.* However, findings revealed that, with private sector participation, poultry EAS and other input services reached every individual commercial poultry farmer with efficiency and effectiveness. *This is an effective and successful model of modernization of EAS and related input delivery as a complete package through the private sector, which needs to be encouraged elsewhere.*

To make CBF profitable to the companies, to benefit farmers and also to address environmental and welfare issues that emerged in the study, the specific policy interventions suggested and discussed include: further promotion and regulation of CBF farming through an authoritarian body; enhancement of rearing charges and increase in rate incentive norms to transfer part of market margins to the contract farmers; increased numbers of batches per year by contract farmers; transparency in executing contract agreements; more government support to CBF and NCBF and to other small farmers for equitable and inclusive development; and replication of the EAS model of CBF/NCBF in other sectors as an example of modernization of EAS through the private sector's participation to develop entrepreneurship among farmers.

CHAPTER 1 - INTRODUCTION

Poultry farming and development are not only a matter of plans, targets, budgets, technology, material aid, EAS, experts and organizations to govern them. Rather, they are an effective use of all these mechanisms as education and entrepreneurial means in such ways that poultry farmers help themselves to attain economic and social development through poultry farming. By following this exactly, India within five decades has emerged as a global key player in the poultry sector.

1.1 DEVELOPMENT OF THE INDIAN POULTRY SECTOR

Archaeological discoveries in the Indus Valley suggest that chickens were probably domesticated from the red jungle fowl (*Gallus gallus*) as early as 5400 B.C. (West and Zhou, 1988). Poultry keeping in India was largely a backyard venture until the 1950s with native birds such as Aseel, Kadaknath and other non-descriptive breeds without much attention to scientific practices. Some exotic birds of high productivity were introduced by missionary organizations in the beginning of the 20th century. They bred exotic breeds and distributed improved chicks to local farmers for supplementary income.

On the recommendations of the Royal Commission on Agriculture in 1927, a poultry research section was established in 1939 at the Imperial (now Indian) Veterinary Research Institute (IVRI), Izatnagar, which became a full-fledged poultry research division in 1952. To fortify the endeavors of producing trained personnel, a three-month postgraduate certificate course was instituted in 1950. Subsequently, the national diploma in poultry husbandry, a nine-month program, was started at IVRI in 1960. With the help of the United Nations Development Programme (UNDP), a center of excellence in poultry was established in 1972 at IVRI to train postgraduates to strengthen research and development of poultry (Shrivastava and Sasidhar, 2006; Sasidhar, 2009). To support the progress of poultry production in the country, the Indian Council of Agricultural Research (ICAR) established the Central Avian Research Institute (CARI) in 1979 at Izatnagar and the Directorate of Poultry Research (DPR) in 1988 at Hyderabad. Over time, poultry science departments were established in veterinary colleges at state agricultural universities (SAUs) and state veterinary universities (SVUs) to offer graduate, postgraduate and doctoral programmes in poultry science. Overall, these poultry science education departments and research institutes have played an important role in the transformation and development of India's poultry sector (Table 1.1).

In the early 1940s, a vaccine against the dreaded Ranikhet disease was developed, which conferred immunity to birds and facilitated commercial farming. The next step toward commercial poultry keeping was made in India's first five-year plan (1951-56) with the launching of a pilot project in Orissa. That was transformed into the All India Poultry Development Programme during the second five-year plan (1956-61), which became the foundation of modern poultry farming in the country. During the plan period, five regional breeding farms were set up to acclimatize the genetically superior stock imported in 1956 from America under the Technical Cooperation Mission. Four multiplication farms with foreign collaboration were set up in the private sector for production of exotic chicks capable of laying 240 eggs a year. Under the Freedom from Hunger Campaign, poultry stocks were imported from Australia in 1965 for government breeding farms. Intensive poultry development projects were introduced to provide necessary inputs for profitable poultry keeping.

Table 1.1. Time line of academic poultry science in India.

Year	Development
1927	Royal Commission on Agriculture recommendations
1939	Poultry research section at IVRI
1943	Advanced training associateship of 2 years at IVRI (equivalent of master's degree qualification)
1950	3-month PG certificate course at IVRI
1952	Poultry research division at IVRI
1960	National diploma of 9 months at IVRI
1962	Poultry science department, APAU, Hyderabad
1965	Poultry science department, PAU, Ludhiana
1970	AICRP on poultry breeding
1970	Poultry science department, TNAU, Chennai
1971	Poultry science department, KAU, Mannuthy
1972	Poultry science department, GBPUAT, Pantnagar
1972	Center of excellence supported by UNDP at poultry science division of IVRI
1973	Poultry science department, HAU, Hissar
1973	Poultry science department, UAS, Bangalore
1975	Poultry science department, JNKVV, Jabalpur
1975	Poultry science department, Bombay Veterinary College, Mumbai
1976	Poultry science department, OUAT, Bhubaneswar
1979	CARI, Izatnagar
1981	Poultry science department, PDKV, Akola
1985	Poultry science department, TNAU, Namakkal
1985	Center for advanced studies in poultry science, Mannuthy
1987	Dr. B. V. Rao Institute of poultry management and technology, Pune
1988	DPR, Hyderabad

Source: Sasidhar, 2013.

These simultaneous academic, research and extension activities started in the public and private sectors led to a poultry revolution in the country within a span of four decades. The developments in the poultry sector focused on different subsectors over the past four decades (Prabakaran, 2012):

- 1970s – Spurt in egg production.
- 1980s – Entry of private sector and growth in broiler production.
- 1990s – Automation.
- 2000s – Integrated contract farming, value addition and global trade.

1.2 IMPORTANCE OF THE POULTRY SECTOR TO EMPLOYMENT AND THE NATIONAL ECONOMY

The total poultry population in India is 729.2 million, which is 12.39 percent higher than numbers in the previous census (Livestock Census, 2012). Poultry is one of the fastest growing sectors of Indian agriculture today, with annual growth rates of 5.57 percent and 11.44 percent in egg and broiler production, respectively. The sector is providing direct or indirect employment to 6.5 million people. About 80 percent of the employment is generated directly by poultry farms; the rest by the feed, pharmaceutical, equipment and other support services required by poultry. The value of output from the poultry sector was US$10 billion in 2014 (Rajendran et al., 2014). It accounts for about one percent of India's GDP and 11.70 percent of the GDP from the livestock sector. The organized poultry sector is contributing nearly 70 percent of the total output, with the rest from the unorganized sector. Within the poultry sector, two thirds of the output (about 66.7 percent) is contributed by the broiler sector, and the other third (about 33.3 percent) by egg production.

1.3 BROILER POULTRY PRODUCTION IN INDIA

Broiler production has been more vibrant than layer production within the poultry sector, with an annual growth rate of 11.44 percent, production of 3.725 million tons and employment of 4.29 million people (Index Mundi, 2015). India is the fourth largest producer of poultry meat in the world, valued at US$ 6.6 billion. Poultry production accounts for about 0.66 percent of India's GDP and 7.72 percent GDP from the livestock sector (Prabakaran, 2014; Rajendran et al., 2014). Poultry meat production increased from 0.069 million tons in 1961 to 3.725 million tons in 2014. The per capita availability of poultry meat is 2.8 kg; against recommended level of 11 kg (Table 1.2).

Table 1.2. Trends in broiler poultry production in India (1000 tons).

Year	Broiler meat production	Growth rate (percent)	Per capita availability of broiler meat (kg)
1980	179	NA	0.27
1990	412	130	0.50
1995	578	40.29	0.62
2000	980	69.50	0.82
2005	1900	93.87	1.3
2010	2650	39.47	2.2
2011	2900	9.43	2.4
2012	3160	8.97	2.5
2013	3450	9.18	2.7
2014	3725	7.97	2.8
2015 (projected)	3900	4.70	3.1

Source: Prabakaran, 2014; Rajendran et al. 2014; Index Mundi, 2015.

Major milestones in the development of Indian broiler sector are given in Table 1.3.

Table 1.3. Major milestones in the Indian broiler sector.

Year	Milestones
1962	Meat-type strains imported from Israel
1970	All India coordinated research project (AICRP)
1974	Import of Cobb strain
1980	Entry of private sector, pure line stock, multiple-batch farms, urban markets
1995	Introduction of CBF, all-in-all-out batches, rural-based production and urban marketing, improved biosecurity
2000	Growth of CBF, hatcheries, feed mills, feed additives
2010	High-capacity farms with low margins, entry of broiler breeding giants, growth performance matching world standards – 2.2 kg at 37 days with 1.6 feed conversion ratio (FCR)
2014	Institutionalization of CBF

The main reasons for improved broiler poultry production (Kalamkar, 2012; Prabakaran, 2012; SAPPLPP, 2009) are: modernization of production practices; import of pure lines/grandparent stock; least-cost feed formulation; vaccines against major diseases; provision of EAS and other input services; improved quality breeder management; developments in poultry processing; and private sector partnerships through CBF.

The leading states in broiler meat production (Table 1.4) are:

1. Andhra Pradesh (Hyderabad-Vijayawada-Chittoor belt).
2. Tamil Nadu (Coimbatore-Salem belt).
3. Maharashtra (Pune-Nasik-Mumbai belt).
4. Haryana (Gurgaon-Yamunanagar belt).

Table 1.4. Top 10 states in broiler poultry production (1000 tons).

State	2010-11	Rank	2012-13	Rank
Andhra Pradesh	400	1	446	1
Tamil Nadu	362	2	350	2
Maharashtra	334	3	146	4
Haryana	306	4	324	3
West Bengal	273	5	301	5
Uttar Pradesh	175	6	175	6
Punjab	79	7	79	7
Orissa	64	8	62	8
Bihar	37	9	37	10
Karnataka	25	10	38	9

1.4 UNDERSTANDING CONTRACT BROILER FARMING

A farmer interested in broiler poultry farming has two options:

i. *Non-contract broiler farming (NCBF):* In this set-up, the farmer has to bear all the expenses, such as EAS from private poultry consultants; procurement of chicks, feed, medicines and vaccines; overhead farm expenses (labor, electricity, water, litter material, farm disinfection, etc.); and transportation. The farmer has to admit all three risks – investment, production and market risks.

ii. *Contract broiler farming (CBF)/integration:* In this case, the integrator provides EAS and inputs such as chicks, feed, medicines and vaccines. The integrator bears the transportation cost, investment (inputs) and marketing risks. The contract farmer provides labor, shed, electricity, water, litter material, and other miscellaneous services or equipment that may be required. Because the major chunk of the expense (working capital) is borne by the integrators, they are the absolute owners of the movable stock (broiler birds) on the farm, and the farmer's role is that of caretaker who gets a predetermined price, which is listed in the contract. This payment to the farmer is linked to various parameters such as the FCR, mortality of birds, etc. A farmer is rewarded for surpassing the set standards and penalized if any of the agreed-on criteria is not met. The integrator is also relieved of his biggest threat -- disease outbreak -- as his millions of birds are reared at different locations in relatively small numbers by several small farmers.

The major differences between CBF and NCBF are summarized in Table 1.5. In the case of CBF, an integrator provides working capital and EAS, pays rearing charges and assures a market for broilers. In the case of NCBF, the farmer is responsible for all costs associated with broiler production and marketing.

Table 1.5. Major differences between CBF and NCBF.

Item	CBF	NCBF
Land provision (owned/leased)	Farmer	Farmer
Broiler shed and equipment (around Rs. 150/sq. ft., depending on automation level)	Farmer	Farmer
Costs of labor, electricity/fuel, disinfecting shed, litter material	Farmer	Farmer
Manure after liquidation (sale/own consumption), empty feed bags	Farmer	Farmer
Working capital (chicks, feed, medicines, vaccines and veterinary supplies)	Supplied by integrator	Farmer purchases from market
EAS, routine and emergency veterinary services	Provided by integrator freely	Farmer pays poultry consultants
Marketing risk	Integrator lifts the live birds and sells through own outlets/ value addition	Farmer bears the risk

Item	CBF	NCBF
Rearing charges (RC) (incentives/penalties - for efficiency/high sale rate/high mortality	Integrator pays RC to the farmer for labor, litter, electricity, equipment and shed costs, and also a part of profit	Not applicable
Returns to farmer	Almost fixed	Depend on the market sale rate

The extension advisory and input services under CBF and NCBF are described in Box 1.

Box 1 : Extension Advisory and Input Services under CBF and NCBF

Extension Advisory and Input Services under CBF

The extension advisory and input services are integrated in CBF and are provided together as per the requirement. The EAS in CBF are free and include general farm management practices and specific management practices related to chicks, feed and medication. The input services in CBF include provision of chicks, feed, medicines and vaccines. The extension advisory and input services are usually provided by line supervisors who visit the farm daily (except on Sundays and public holidays). The line supervisors are not poultry veterinarians but are graduates trained in poultry farm operations by the company for two to three months. A veterinarian from the company visits the farms only in case of disease outbreak or when unusual mortality is reported. The EAS suggested and recorded in farm records by the line supervisors should be followed by contract farmers without fail. A complete and accurate farm record-keeping system followed by all farmers as well as line supervisors is a significant feature of CBF. The individual farm performance details such as mortality, FCR, growth, feed consumption, medicines and vaccines administered, etc., are recorded daily in record books. Submission of the record book by the farmer to the company is required at the time of flock liquidation.

General EAS -- advocated, verified and recorded

- Preparation of shed, fumigation and disinfection before arrival of chicks as per company norms.
- Ventilation of shed and feed room.
- Strict biosecurity measures -- cleanliness, foot dip, dead-pit and fencing.
- Water and sanitization -- water quality, pH and water sanitizer name and dose.
- Cleaning of water tank and drinkers twice a week and water pipes once a week.
- Litter management -- racking daily, keeping litter dry (with less than 20 percent moisture level).
- Summer and winter management practices.

Specific EAS on chicks -- advocated, verified and recorded

- Supply of chicks.

- Adequate brooding management with parameters such as space per chick, litter quality, source of heat, number of brooders/feeders/drinkers and their quality, side and ceiling curtains and their height management.
- Chicks' uniformity recording -- number of chicks weighed, minimum weight, maximum weight, average weight and variation.
- Separation of small and weak chicks at the end of first week for special care with more water, feed and vitamins.
- Daily mortality of chicks/birds (number and percent) with reason(s).

Based on identified reason(s), farmers are advised on suitable management practices/medication to maintain flock uniformity and good FCR, reduce mortality and avoid delayed growth.

EAS on feed -- advocated, verified and recorded

- Supply of starter, grower and finisher feed to fulfill various needs -- environmental, age and productivity conditions.
- Feed and light restrictions.
- Feeding schedule, everyday feed intake analysis and matching with standard body weight.
- Based on sample weight of five percent of birds, weekly recording of actual mortality, feed intake, body weight and FCR to note the deviations from their corresponding standard values.

Farmers are advised suitable remedies to meet the standards.

EAS on medication -- advocated, verified and recorded

- Supply of medicines, vaccines, antibiotics and growth promoters.
- Preventive vaccination and medicine schedules as a continuous practice.
- Shed cleaning, sanitization and dosage of sanitizer.
- Storage of vaccines, vaccination schedule/timings, correct and timely medication.

In addition, the company prints and distributes EAS literature to farmers on good management practices. To motivate farmers, the company recognizes the best performing farmers every month under each contract farming branch. The company also conducts group training programmes and on-farm demonstrations, and arranges peer trainings/exposure visits to top performing farms. At the time of chick placement, the gap between two batches is noted and at the time of flock liquidation, the batch is graded on the basis of performance.

Extension Advisory and Input Services under NCBF

The extension advisory and input services are separate in NCBF. The farmer gets EAS from private poultry consultants and procures all inputs (chicks, feed, medicines and vaccines) from poultry companies/market on payment basis. The general management practices are taken care of by farmers themselves based on experience. The EAS related to specific management practices on chicks, feed and medication are provided by qualified poultry veterinarians or government veterinarian on a payment basis. The payment is either for each visit or on contract per batch as a whole. They visit the farm whenever the farmer gives a call. The traditional hand record-keeping systems continue to work well in NCBF.

1.5 RATIONALE FOR THE STUDY AND RESEARCH QUESTIONS

CBF was introduced in Tamil Nadu during the early 1990s. Later it spread mainly to Karnataka, Andhra Pradesh, Maharashtra and other states of India. The major private integrators operating in the southern and western region of the country include Venkateswara, Suguna, Pioneer, Diamond Riverdale, Star Chick, Gold Chick, Godrej Real Gold, Godrej Agro Vet, Santhi, Peninsula, Skylark and Komarla.

CBF has played a major role in the growth of the broiler sector, especially in structure, size and number of broiler farms in southern and western India. Earlier commercial broiler farms used to produce 200 to 500 chicks per cycle on average; now, units with fewer than 5,000 birds are becoming rare, and units with 5,000 to 50,000 birds per cycle are common (Mehta et al., 2003). Though commercial farming can yield substantial gains, the transition from subsistence farming to market-driven broiler production is burdened with marketing risk (von Braun and Kennedy, 1994; Ramaswami et al., 2006). It is estimated that 37 percent of broiler production in India is under contracts, and about 78 percent of those contracts are concentrated in southern India (Rajiajwani, 2012). Though CBF contributed to the rapid growth of the Indian broiler industry, the following research questions still need to be answered:

- Do contract and non-contract farmers incur significantly different production and marketing costs and earn different marketing margins?
- Does the provision of EAS by private CBF companies enable contract farmers to make better profits than non-contract farmers?
- Have assured markets, competitive price and guarantee against risk resulted in successful value chain development through CBF?
- Are the value chain development and provision of EAS by private CBF companies really win-win situations for both integrators and farmers, or are they socially acceptable ways of exploiting the farmers?

To answer the above questions, a comparative evaluation study on CBF and NCBF was conducted.

1.6 OBJECTIVES

- To assess demographics, physical and human resource inputs and EAS.
- To evaluate the technical and economic performance.
- To compare farmers' perceptions on inputs/outputs, EAS, and strengths, weaknesses, opportunities and threats (SWOT).

1.7 LIMITATIONS OF THE STUDY

Considerable care and thought were exercised in making the study as objective and systematic as possible. Though every care was taken to collect and interpret the relevant information, there could

be some distortion in the interpretation of the responses. The opinions of the respondents may not be free from individual biases and prejudices. It may be recognized that the findings of the study should not be generalized beyond the limits of the districts/states where the study was conducted. In other words, adequate care must be taken in applying the findings of the study to other areas. The generalizations of results should be applied in the broad context only where similar situations prevail.

1.8 LAYOUT OF THE REPORT

The report is organized into four chapters. The introductory chapter gives an overview of the development of the Indian poultry sector and broiler meat production in India, discusses CBF and NCBF systems, and gives the rationale for the study with research questions, objectives and limitations of the study. The second chapter describes methods used in the process of investigation with details on research design, study locale, sampling, operationalisation and measurement of variables, data collection and analysis. The third chapter focuses on the results and discussion. The conclusions and policy implications of the study are highlighted in the fourth chapter. Literature cited and the interview schedule used for data collection are appended at the end.

CHAPTER 2 - METHODOLOGY

This chapter deals with the methods and procedures followed in carrying out the study under the following headings:

2.1 Research design

2.2 Study locale and sampling

2.3 Operationalisation and measurement of variables

2.4 Data collection and analysis

2.1 RESEARCH DESIGN

The study applied Bennett's hierarchy model to conduct follow-up evaluation by adapting sets of methods (Bennett, 1976; Table 2.1). First, using data from individual surveys, this hierarchy evaluates CBF and NCBF systems, beginning at the bottom step with inputs and progressing to the top–end results. Though this model is useful for assessing inputs, activities, outputs, reactions, opinions and adoption changes (levels 1-6), it is not rigorous enough to assess the end results at level 7 (Morford et al., 2006**)**. To address that deficiency, the study employs SWOT analysis – strengths, weaknesses, opportunities and threats -- of CBF and NCBF systems. Third, one focus group discussion (FGD) was conducted to supplement the data analysis from the individual surveys.

Table 2.1. Conceptual model depicting Bennett's hierarchy applied in the study.

Evaluation hierarchy	Measurement in the study	Indicators	Empirical measurement
Level 7 (end results)	Socio-economic	• SWOT parameters	Open-ended questions

Evaluation hierarchy	Measurement in the study	Indicators	Empirical measurement
	changes and impacts	• FGD on: selection of contract farmers; terms and conditions applicable in CBF	
Level 6 (practice change)	Technical advices adoption	• Non-adoption, discontinuation, partial adoption and full adoption of technical advices	Scale on four-point continuum
Level 5 (KASA)	Farmers' perceptions	• Perceptions on inputs (chicks, feed, medicines and EAS) and outputs (broiler birds, manure value and payment system)	Scale on five-point continuum
Level 4 (reactions)	Farmers' feedback	• Factors of motivation to do CBF and NCBF • Reasons to change integrator(s) or input providers in the past two years	Open-ended questions
Level 3 (outputs)	Technical and economic performance	• Broiler birds (flock size, mortality number, birds sold, sale age, sales rate and birds lifting days) • Productivity (mortality percentage, birds sold, feed consumption and body weight) • Efficiency (FCR, sale age, weight gain/day) • Economics of inputs and outputs • EAS (frequency of information from various sources)	Technical and economic performance index
Level 2 (activities)	Activities in CBF and NCBF	• Physical and human resource activities in CBF and NCBF	Survey
Level 1 (inputs)	Personal characteristics of farmers	• Age, gender, education, social category, family and size, poultry occupation and experience	Survey

2.2 STUDY LOCALE AND SAMPLING

The evaluation study was conducted in India's Karnataka, Telangana and Andhra Pradesh states by survey in 2014. These states were selected mainly because of their contribution to the poultry revolution, the presence of big contract firms in the region and the huge presence of contract broiler farms -- about 4600 farms in Karnataka and 6000 farms in Telangana and Andhra Pradesh states. Three districts each in Karnataka (Chitradurga, Davangere and Shivamogga), two districts in Telangana (Ranga Reddy and Warangal) and one district in Andhra Pradesh (Chittoor) were selected on the basis

of the availability of both contract and non-contract broiler farms. From every district, 20 contract and 20 non-contract farmers were randomly selected to obtain a total of 240 farmers from three states.

2.3 OPERATIONALIZATION AND MEASUREMENT OF VARIABLES

2.3.1 LEVEL 1: INPUTS

2.3.1.1 Demographic characteristics: The selected demographic characteristics of farmers, their operational definitions, measurement and categorization are detailed in Table 2.2.

Table 2.2. Operationalization and measurement of demographic characteristics.

Variable	Operationalization	Measurement	Categorization
Age	Age in completed years	One score for each completed year	Young (25-35 years) Middle (36-45 years) Upper middle (46-55 years) Old (56-65 years)
Gender	Biological sex	Dichotomous	Male Female
Education	Formal education of the respondent	Open-ended	10th grade 12th pass Bachelor's degree and above
Social category	Status enjoyed in the society by belonging to a particular community	Open-ended	General Scheduled caste Scheduled tribes Other backward caste
Family type	Type of family, whether nuclear or extended	Dichotomous	Nuclear Extended
Family size	Total number of members residing together in one household and sharing common kitchen	Open-ended	3-7 8-12 13-16
Occupation of poultry	Poultry occupation as major source of income	Dichotomous	Primary Secondary
Experience	Actual number of years of experience in CBF/ NCBF	Open-ended	1 to 5 years 6 to 10 years 11 to 15 years 16 to 28 years

2.3.2 Level 2: Activities

2.3.2.1 Physical and human resource activities: These were operationalized as number of broiler poultry sheds, batches of poultry housed yearly and total labor utilized per batch (hired and family labor) in CBF and NCBF. To determine these, researchers asked open-ended questions.

2.3.3 Level 3: Outputs

2.3.3.1 Output details (per batch): The outputs in CBF and NCBF were operationalized under the following five subcategories:

i. Broiler birds
ii. Productivity
iii. Efficiency
iv. Economics
v. Extension and advisory services

Broiler birds: Chicks housed/flock size (numbers), mortality (numbers), birds sold (numbers), sales rate (rupees [Rs.]) and birds lifting days (number) in CBF and NCBF.

Productivity: Mortality of the birds (percent), birds sold (kg), feed consumption (kg) and body weight (kg) in CBF and NCBF.

Efficiency: FCR, mean age of marketing (days) and day gain (g/day) in CBF and NCBF.

Economics: Cost of inputs and returns on outputs in CBF and NCBF.

- In CBF, the input costs were operationalized as costs of labor, bedding material, electricity and miscellaneous expenses. The returns on outputs were operationalized as returns through rearing charge (RC) and sale of manure and feed bags.
- In NCBF, input costs were operationalized as costs of chicks, feed and medicines, and labor, bedding material, electricity, EAS and miscellaneous expenses. The returns on outputs were operationalized as returns through sale of birds, manure and feed bags.
- The economics of inputs and outputs were worked out per kg live chicken produced and for production of a whole bird.
- In CBF, costs of chicks, feed, medicines and EAS are not paid by farmers. However, contract companies work out a standard production cost (SPC) based on input costs and efficiency and award incentives or impose penalties at flock liquidation. To see the margins that contract farmers were losing to avoid marketing risk, economics were also separately worked out by including costs of chicks, feed, medicines and EAS on par with those of NCF.

EAS: It was operationalized as the frequency with which farmers get information from various sources – integrator, research station, public extension staff member, public veterinary doctor, private veterinary doctor and private poultry consultant.

2.3.4 Level 4: Farmers' Reactions

2.3.4.1 Farmers' feedback: It was operationalized as the factors of motivation to do CBF/NCBF, changes in integrator(s)/input provider(s) in the past two years and reasons for terminating the contract with the integrator or changing the input provider. Respondents were asked open-ended questions and responses were tabulated using frequency and percentages.

2.3.5 Level 5: KASA

2.3.5.1 Farmers' perceptions on CBF and NCBF: These were operationalized as perceptions of respondents on inputs and outputs that are either utilized or produced in CBF and NCBF. Farmers' perceptions on inputs were measured by four components: supply of chicks, supply of feed, and supply of medicines and provision of EAS. These four components were again measured by the following subcomponents:

- **(i)** **Supply of chicks** -- cost, body weight, timely supply, strain, flock size per batch, number of batches per year, growth rate and gap between two batches.
- **(ii)** **Supply of feed –** cost, quality, quantity and FCR.
- **(iii)** **Supply of medicines** -- cost, quality and quantity.
- **(iv)** **Provision of EAS** -- applicability of EAS, understandability of message (treatment), frequency, timeliness, relevance, adequacy, usefulness and technical know-how of the EAS provider.

Farmers' perceptions on outputs were measured by three components: broiler birds, manure, and payment for sale of birds. These three components were measured by the following sub-components:

- **(i) Broiler birds** -- number of birds produced/sold, and live weight at the time of sale.
- **(ii) Manure -**- quantity produced, method of disposal and economic benefit.
- **(iii) Payment for sale of birds –** remuneration, regularity and pricing method.

The above components and sub-components were measured by a five-point Likert scale, and the total score of inputs and outputs represented the perceptions of farmers on CBF and NCBF.

2.3.5.2 Farmers' perceptions on the intention of EAS: It was operationalized as perceptions of farmers on the intention of EAS on four aspects: information only; information + knowledge; information + knowledge + skill; and information + knowledge + skill + attitude change. The Pearson chi-square value was worked out to see the difference.

2.3.6 Level 6: Practice Change

2.3.6.1 Adoption of technical advice: Adoption was operationally defined as the decision to adopt and implementation of the decision to use the technical advice in CBF and NCBF. To measure the extent of adoption of technical advice on chicks, housing, feeding practices and medications, responses were obtained in a four-point continuum -- "not adopted", "discontinued", "partially adopted" and "fully adopted". Pearson chi-square values were worked out to see the differences between contract and non-contract farmers in adoption of technical advice on the four aspects.

2.3.7 LEVEL 7: FURTHER CHANGES REQUIRED

2.3.7.1 SWOT analysis: The perceptions of the respondents were utilized to identify, rank and describe SWOT issues in CBF and NCBF. The survey contained open-ended questions that asked respondents to list the most important four SWOT issues in CBF and NCBF. The responses were ranked on the basis of frequency.

2.3.7.2 Focus group discussion: To get qualitative responses, one FGD was conducted at the veterinary college, Shivamogga, with stakeholders – two integrators, 14 farmers, three field veterinarians, four poultry academicians/researchers and three extension staff members. The focus of the FGD was on what criteria integrators use to select contract farmers, what the major contract conditions were, and what terms and conditions were applicable. The key FGD questions were:

- Method of identifying potential contract farmers.
- Details to be submitted by farmers to the integrating company for contract agreement – personal, business and farm particulars.
- Farm appraisal criteria by the contract company.
- Terms and conditions applicable in CBF – SPC, RC, rate incentives and penalties.

The responses were cross-checked with the farm appraisal forms submitted by farmers to the integrators for CBF and personal observations/interactions during primary data collection.

2.4 DATA COLLECTION AND ANALYSIS

The interview schedule covering all the variables was developed and pretested with 15 contract and 15 non-contract farmers from a non-sample district in Karnataka state. On the basis of the pre-testing experience, the interview schedule was modified and duplicated for data collection. In all the districts, the respondents were interviewed personally at their respective poultry farms. Interviewers made sure that the respondents correctly understood the questions by repeating the questions whenever necessary. The data obtained was coded, entered into a computer spreadsheet and analyzed using the Statistical Package for Social Sciences, version 17.0 (SPSS, 2008).

CHAPTER 3 - RESULTS AND DISCUSSION

The findings of the study are presented in this chapter following the seven levels of Bennett's hierarchy.

3.1 LEVEL 1: INPUTS

3.1.1 DEMOGRAPHIC CHARACTERISTICS: This section deals with the distribution of contract and non-contract farmers into categories on the basis of their demographic characteristics (Table 3.1).

3.1.1.1 Age: A large number of contract farmers (68.3 percent) were in the young age category (25-35), followed by the middle age category (36-45) (20 percent), with an average age of 36.6 years. An equal percentage of non-contract farmers (38.3 percent) were in the young and middle age groups, with an average age of 38.4 years. The presence of a considerable percentage of old (10 percent) and upper middle age (21.7 percent) farmers in both categories indicate that age is no barrier in broiler

poultry farming. Easy management practices, less physical labor compared with other farming activities and a good source of income could be the reasons for broiler farming being practiced by all age groups.

3.1.1.2 Gender: The majority of the owners of contract (95 percent) and non-contract (94.17 percent) farms were male respondents, indicating the dominance of male farmers in commercial broiler farming. However, investigators observed at the time of data collection female laborers or family laborers in almost all broiler farms, both CBF and NCBF.

3.1.1.3 Education: About 25.83 percent, 44.17 percent and 30 percent of contract farmers had education up to the 10th grade, 12th grade and bachelor's degree and more, respectively, whereas 10.83 percent, 44.1 percent and 45 percent of non-contract farmers had education up to the 10th grade, 12th grade and bachelor's degree and more, respectively. This finding was also in tune with previous studies (Thamizhselvi and Rao, 2010) that found that the contractors usually selected low to medium literate farmers. In this study, 70 percent of the farmers under CBF were in the category of up to 12^{th} class. It is also a fact that commercial broiler farming involves a lot of scientific management practices whose adoption requires some educational background among farmers for improved efficiency.

3.1.1.4 Social category: In CBF and NCBF, the majority of the respondents belong to general (36.67 percent and 58.33 percent, respectively) and other backward caste (46.66 percent and 31.67 percent) categories, indicating little presence of scheduled caste and scheduled tribes' caste categories.

3.1.1.5 Family type and family size: The majority of the contract (96.67 percent) and non-contract (90.83 percent) farmers belong to extended families with an average family size of 6.1 and 6.5, respectively.

3.1.1.6 Poultry occupation: Poultry as the primary occupation was reported by only 35 percent of contract farmers -- 65 per cent of them reported poultry as a secondary occupation. Among the non-contract farmers, these figures were 43.33 percent and 56.67 percent, respectively.

3.1.1.7 Experience: The majority of contract farmers (78.3 percent) had one to five years of experience, followed by six to 10 years (18.3 percent), for a mean experience of 5.1 years. The largest share of non-contract farmers (45.8 percent) had one to five years of experience, followed by six to 10 years (29.2 percent), for a mean experience of 8.1 years.

Table 3.1. Demographic characteristics of farmers in CBF and NCBF.

Demographics	Categories	CBF (n=120)	NCBF (n=120)
		Frequency (Percentage)	
Age (in years)	Young (25-35)	82 (68.3)	46 (38.3)
	Middle (36-45)	24 (20)	46 (38.3)
	Upper middle (46-55)	2 (1.7)	26 (21.7)
	Old (56-65)	12 (10)	2 (1.7)
	Mean / Range / SD	36.6 / 25-65 / 9.2	38.4 / 25-60 / 9.0
Gender	Male	114 (95)	113 (94.17)

Demographics	Categories	CBF (n=120)	NCBF (n=120)
		Frequency (Percentage)	
	Female	6 (5)	7 (5.83)
Education	10th grade	31 (25.83)	13 (10.83)
	12th pass	53 (44.17)	53 (44.17)
	Bachelor's degree and above	36 (30)	54 (45)
Social category	General	44 (36.67)	70 (58.33)
	Scheduled caste	8 (6.67)	7 (5.83)
	Scheduled tribes	12 (10)	5 (4.17)
	Other backward caste	56 (46.66)	38 (31.67)
Family type	Nuclear	4 (3.33)	11 (9.17)
	Extended	116 (96.67)	109 (90.83)
Family size	3-7	106 (88.33)	96 (80.0)
	8-12	8 (6.67)	19 (15.83)
	13-16	6 (5)	5 (4.17)
	Mean /SD	6.1 / 2.4	6.5 / 2.9
Poultry occupation	Primary	42 (35)	52 (43.33)
	Secondary	78 (65)	68 (56.67)
Experience	1 to 5 years	94 (78.3)	55 (45.8)
	6 to 10 years	22 (18.3)	35 (29.2)
	11 to 15 years	2 (1.7)	20 (16.7)
	16 to 28 years	2 (1.7)	10 (8.3)
	Mean / Range / SD	5.1 / 2-24 / 3.4	8.1 / 1-28 / 5.8
	t value (sig. (2-tailed)	4.919 (0.000)	

These results were similar to those of earlier reports (Ramaswami et al., 2006; Thamizhselvi and Rao, 2010), which reported that the contract farmers had less experience in poultry farming and that, for most of their respondents, it was a secondary occupation, thereby suggesting that CBF supplements income from other sources**. I**ntegrators prefer to offer contracts to farmers who are less experienced in poultry production and thus likely to have lower bargaining power (Kumar and Anand, 2007). The findings on demographics indicate that equity and social inclusion are the missing links in both CBF and NCBF. Women are participating only as laborers, not owners, in both systems. Also, ownership excluded disadvantaged communities in both systems. For those who want an affirmative policy that favors the poor and socially disadvantaged, both the systems studied may not be the answer.

3.2. LEVEL 2: ACTIVITIES

3.2.1. PHYSICAL AND HUMAN RESOURCE ACTIVITIES**:** The mean score for number of sheds in CBF was slightly higher (2.39) than that of NCBF (2.31), and the 't' value revealed a non-significant ($p<0.598$) difference between them. The mean scores for number of batches/year (4.45) and family labor (0.78) in CBF were lower than those of NCBF (5.40 and 1.21, respectively), and the 't' values revealed significant ($p< 0.000$) difference between them. The mean score of hired labor in CBF (1.33) was higher than that of NCBF (0.83), and the 't' value revealed significant ($p<0.000$) difference between them (Table 3.2).

Comparing the results of physical and human resource inputs reveals that contract farmers have slightly more broiler sheds, produce fewer batches per year, and engage some family labor and more hired labor than non-contract farmers. Earlier studies (Thamizhselvi and Rao, 2010) also pointed out that the number of batches under CBF was fewer than five, which means loss to the farmer in terms of depreciation of the shed and equipment and underutilization of labor. The results also indicate that basic economic resources are required in the form of fixed (for CBF and NCBF) and working capital (for NCBF) to participate, which the marginally poor farmers just do not have. This raises the issue of whether CBF/NCBF would be appropriate for resource-poor and small farmers.

Table 3.2. Physical and human resource inputs in CBF and NCBF.

Parameter	CBF (n=120)		NCBF(n=120)		*t* value	Sig. (2-tailed)
	Mean	*SD*	Mean	*SD*		
Number of sheds	2.39	1.25	2.31	1.19	0.528	.598
Number of batches/year	4.45	0.63	5.40	0.88	9.577	.000
Family labor	0.78	0.68	1.21	0.55	5.437	.000
Hired labor	1.33	0.81	0.83	1.04	4.146	.000
Total labor	2.10	0.93	2.03	1.10	0.507	.612

3.3 LEVEL 3: OUTPUTS (PER BATCH)

The outputs in CBF and NCBF were presented in five subcategories: broiler birds, productivity, efficiency (Table 3.3), economics (Table 3.4 and Table 3.5) and EAS (Table 3.6).

3.3.1 BROILER BIRDS: The mean scores for number of chicks housed/flock size, mortality (number) and birds sold (number) in CBF were higher than those of NCBF, though the 't' value revealed non-significant differences between them. The mean score for bird lifting days in CBF was significantly ($p<0.006$) lower (1.98) than in NCBF (2.64). The mean score of sale rate in CBF was significantly ($p< 0.000$) lower (65.18) than in NCBF (69.20) (Table 3.3).

3.3.2 PRODUCTIVITY: The mean scores for mortality (percent), birds sold (kg) and feed consumed (kg) in CBF were higher than those in NCBF, with non-significant 't' values. The mean score for birds' sale weight (kg) in CBF was significantly ($p< 0.000$) higher (2.41) than in NCBF (2.32) (Table 3.3).

3.3.3 EFFICIENCY: The mean scores for FCR in CBF and NCBF were the same (1.81). The mean scores for marketing age (44.12) and weight gain (grams/day) (54.64) in CBF were higher than in NCBF (43.19 and 53.73), and 't' values revealed significant ($p<0.005$ and 0.001) differences between them (Table 3.3).

Table 3.3. Outputs per batch in CBF and NCBF.

Parameter	CBF (n=120)		NCBF (n=120)		*t* value	Sig. (2-tailed)
	Mean	*SD*	Mean	*SD*		
Broiler birds						
Chicks housed/flock size (no)	6645	3396	6170	3769	1.027	.305
Mortality (no)	313	265	272	246	1.249	.213
Birds sold (no)	6332	3224	5898	3580	0.988	.324
Birds lifting days (no)	1.98	1.13	2.64	2.34	2.772	.006
Sale rate (rupees/kg live weight)	65.18	4.08	69.20	3.90	7.814	.000
Productivity						
Mortality (%)	4.65	2.29	4.27	2.15	1.318	.189
Bird sold (kg)	15250	7794	13613	8048	1.600	.111
Feed consumed (kg)	27808	14839	25710	15245	1.080	.281
Birds' sale weight (kg)	2.41	0.19	2.32	0.16	4.022	.000
Efficiency						
FCR	1.81	0.09	1.81	0.12	0.123	.902
Marketing age (days)	44.12	2.44	43.19	2.59	2.844	.005
Weight gain (grams/day)	54.64	2.35	53.73	1.98	3.235	.001

The decisions on the number of chicks to be supplied, the time of lifting the birds and the number of batches rest entirely with the contractor, not the farmer, a major setback for the contract farmer in comparison with the non-contract farmer.

3.3.4 ECONOMICS: Among the input costs, the mean score for chick cost (24.13) in CBF was significantly ($p<0.000$) lower than that in NCBF (26.49). Among other costs, labor cost was significantly ($p<0.000$) higher in CBF, whereas bedding material ($p<0.000$), electricity ($p<0.000$), EAS ($p<0.000$) and miscellaneous ($p<0.002$) costs were significantly higher in NCBF. All the outputs -- sale rate of birds, manure and feed bags -- were significantly ($p<0.000$) higher in NCBF (Table 3.4).

The mean score for total cost of production in CBF (60.82) was significantly ($p<0.000$) lower than that in NCBF (63.14). On the other hand, the mean score for total returns in CBF (65.89) was significantly ($p<0.000$) lower than that in NCBF (70.68).

Overall, when input costs were included, the average net return per kg of live bird and per bird in CBF were Rs. 5.07 and Rs. 12.22; in NCBF, Rs. 7.54 and 17.49, respectively, with a significant ($p<0.000$) difference between them (Table 3.4).

Table 3.4. Economics of CBF and NCBF.

Input costs / returns (in rupees)	CBF (n=120)		NCBF (n=120)		*t* value	Sig. (2-tailed)
	Mean	*SD*	Mean	*SD*		
(A) Costs						
Chick (per chick)	24.13	3.29	26.49	2.43	6.344	.000
Chick (per kg of bird)	10.05	1.44	11.50	1.18	8.513	.000
Feed (per kg)	26.11	1.97	26.52	2.18	1.525	.129
Feed (per kg of bird)	47.35	4.97	47.79	3.54	0.797	.426
Medicine (per kg of bird)	1.71	0.75	1.82	0.74	0.592	.554
Labor cost (per kg of bird)	1.00	0.48	0.46	0.52	8.335	.000
Bedding material (per kg of bird)	0.57	0.12	0.68	0.25	4.156	.000
Electricity (per kg of bird)	0.14	0.07	0.25	0.15	7.072	.000
EAS (per kg of bird)	0.00	0.00	0.52	0.25	22.885	.000
Miscellaneous (per kg of bird)	0.20	0.09	0.31	0.38	3.153	.002
Total cost (per kg of bird)	60.82	6.09	63.14	3.96	3.490	.001
(B) Returns						
Birds sale rate (per kg of bird)	65.18	4.08	69.20	3.90	7.793	.000
Manure sale (per kg of bird)	0.60	0.13	1.30	0.61	12.304	.000
Feed bags sale (per kg of bird)	0.12	0.05	0.18	0.10	5.591	.000
Total returns (per kg of bird)	65.89	4.13	70.68	3.88	9.242	.000
Net return / profit (per kg of bird)	**5.07**	**4.14**	**7.54**	**5.09**	**4.119**	**.000**
Average body weight (kg)	2.41	0.19	2.32	0.16	4.022	.000
Net return (Rupees/bird produced)	**12.22**	**2.91**	**17.49**	**12.70**	**4.082**	**.000**

To see the margins that contract farmers were losing to avoid marketing risk, economics were also separately worked out by excluding input costs and by including rearing charges. In this scenario, the mean scores for total costs and net returns per kg live chicken production in CBF were Rs. 1.91 and Rs. 4.59, respectively; in NCBF, the corresponding values were Rs. 63.33 and Rs. 7.35. Overall in this scenario, the mean net return per bird produced in CBF was Rs.11.06 and, in NCBF, Rs. 17.05 (Table 3.5).

Table 3.5. Economics of CBF and NCBF (with rearing charges).

Parameter	CBF (n=120)		NCBF(n=120)	
	Mean	***SD***	**Mean**	***SD***
Costs				
Chick	-	-	11.50	1.18
Feed	-	-	47.79	3.54
Medicines	-	-	1.82	0.74
Labor	1.00	0.48	0.46	0.52
Bedding material	0.57	0.12	0.68	0.25
Electricity	0.14	0.07	0.25	0.15
EAS	-	-	0.52	0.25
Miscellaneous	0.20	0.09	0.31	0.38
Total costs	1.91	0.48	63.33	3.96
Returns				
Birds sale	-	-	69.20	3.90
Manure sale	0.60	0.13	1.30	0.61
Feed bags sale	0.12	0.05	0.18	0.10
Rearing charges (RC)	4.00	-	-	-
Incentives	1.78	0.80	-	-
Gross returns (RC + manure sale +feed bags sale + incentives)	6.50	0.80	70.68	3.88
Net return per kg live chicken (gross return – total costs)	4.59	0.96	7.35	5.09
Average body weight	2.41	0.19	2.32	0.16
Net return (rupees/bird produced)	11.06	2.91	17.05	12.70

The difference in net returns earned by CFs with and without variable costs indicated that they are losing a margin of Rs. 1.16 per bird produced by participating in CBF (Tables 3.4 and 3.5). However, the standard deviations on returns indicates that the net returns in CBF are assured and almost fixed, while in NCBF they vary widely depending on the market rate (Table 3.5).

3.3.5 EAS: The integrator was the sole source (100 percent) of EAS in CBF. About 31.67 and 68.33 percent of contract farmers were very frequently and frequently getting EAS from the integrator, respectively. In case of NCBF, the main source of EAS was private poultry consultants (100 percent). However, self-service (45 percent), government veterinary doctor (on payment) (25.83 percent), government research station (4.17 percent) and government veterinary doctor (free) (4.17 percent) were mentioned as other sources of EAS (Table 3.6).

Contract farmers said that, from time to time, company supervisors visited the contract farms to provide EAS services, advise on medications, check the performance/growth of the birds, and record key performance indicators such as mortality, FCR, body weight, etc. From the FGD and interactions with contract farmers, it was clear that the supervisors from the company are trained poultry technicians but not poultry veterinarians. Veterinarians from the contract company visited the farms only in case of disease outbreak or when unusual mortality was reported.

In the case of NCBF, private poultry consultants were a major source for EAS on a payment basis. From the interactions with non-contract farmers, it was observed that farmers were managing the majority of day-to-day problems using their experience but sought the advice of poultry consultants during disease outbreaks.

Table 3.6. Sources of EAS provision in CBF and NCBF.

EAS source	**Frequency of utilization -- Frequency (%)**				
	Rarely	Occasionally	Frequently	Very frequently	Total
CBF					
EAS by integrator	-	-	82 (68.33)	38 (31.67)	120 (100)
NCBF					
EAS by private poultry consultants		28 (23.33)	67 (55.83)	25 (20.83)	120 (100)
EAS by self-service (with experience)	18 (15)	10 (8.33)	26 (21.67)	-	54 (45)
EAS by govt. veterinary doctor (on payment)	6 (5)	25 (20.83)	-	-	31 (25.83)
EAS by govt. research station	5 (4.17)	-	-	-	5 (4.17)
EAS by govt. veterinary doctor (free)	5 (4.17)	-	-	-	5 (4.17)

3.4 LEVEL 4: FARMERS' REACTIONS

3.4.1 FACTORS OF MOTIVATION TO DO CBF AND NCBF:

No market risk (100 percent), regular and quick returns (86.67 percent) and less working capital required (85 percent) were the top motivations to participate in CBF. Regular and quick returns (91.67 percent), high margins (85 percent) and ease of operation (73.33 percent) were the top motivations for farmers to do NCBF (Table 3.7).

Table 3.7. Factors of motivation to do CBF and NCBF.

Motivation	**CBF Frequency (%)**	**Rank**	**NCBF Frequency (%)**	**Rank**
No market risk	120 (100)	1	38 (31.67)	9

Motivation	CBF Frequency (%)	Rank	NCBF Frequency (%)	Rank
Regular and quick returns	104 (86.67)	2	110 (91.67)	1
Less working capital required	102 (85)	3	-	-
Good market demand	98 (81.67)	4	82 (68.33)	4
Easy to operate	80 (66.67)	5	88 (73.33)	3
Good subsidiary occupation	78 (65)	6	69 (57.5)	5
Employment (self and family)	75 (62.5)	7	68 (56.67)	6
Manure for crops	53 (44.17)	8	62 (51.67)	7
High margins	36 (30)	9	102 (85)	2
Less land required	35 (29.17)	10	42 (35)	8
Chicken for home consumption	30 (25)	11	35 (29.17)	10
Alternative to less profitable agriculture	15 (12.5)	12	22 (18.33)	11

3.4.2 CHANGE OF INTEGRATOR(S)/INPUT PROVIDER(S) AND REASONS FOR CHANGE: About 43.33 percent of contract farmers and 68.33 percent of non-contract farmers had changed integrator(s) and input provider(s), respectively, in the past two years (Table 3.8).

Table 3.8. Changed integrator(s)/input provider(s) in the past two years (n=120).

Changed integrator(s)/input provider(s)	CBF Frequency (%)	NCBF Frequency (%)
Yes	52 (43.33)	82 (68.33)
No	68 (56.67)	38 (31.67)

Low RCs (88.46 percent), not providing chicks for six batches (84.62 percent) and delay in chick delivery (76.92 percent) were the top reasons for changing integrator(s) by contract farmers. Delay in chick delivery (90.24 percent), low quality feed (75.60 percent) and low FCR (70.73 percent) were the top reasons for changing input provider(s) by non-contract farmers (Table 3.9).

Table 3.9. Reasons for changing integrator(s) / input provider(s).

Reasons in CBF	Frequency (%) (n=52)	Rank	Reasons in NCBF	Frequency (%) (n=82)	Rank
Low rearing charges	46 (88.46)	1	Delay in chick delivery	74 (90.24)	1
Not providing chicks for 6 batches	44 (84.62)	2	Low quality feed	62 (75.60)	2
Delay in chick delivery	40 (76.92)	3	Low FCR	58 (70.73)	3
Delay in lifting birds (> 2 days)	36 (69.23)	4	Low sale rate	34 (41.46)	4

Reasons in CBF	Frequency (%) (n=52)	Rank	Reasons in NCBF	Frequency (%) (n=82)	Rank
Stringent production cost	30 (57.69)	5	High mortality	33 (40.24)	5
Low rate incentive	30 (57.69)	6	Payment delay	25 (30.48)	6
High penalty	28 (53.85)	7	Low quality EAS	20 (24.39)	7
Low FCR	26 (50.00)	8	High cost of EAS	20 (24.39)	8

3.5 LEVEL 5: KNOWLEDGE, ATTITUDES, SKILLS AND ASPIRATIONS (KASA)

3.5.1 FARMERS' PERCEPTION ON CBF AND NCBF: The perceptions of respondents on inputs, outputs and their subcomponents that are either utilized or produced in CBF and NCBF are presented in Table 3.10.

Among the inputs, the total mean scores on perceptions of contract farmers with respect to chicks (22.52), feed (12.62) and medicine (9.68) were slightly higher than corresponding scores (22.33, 12.52 and 9.49, respectively) of non-contract farmers, though the 't' values revealed non-significant differences between them. However, the mean perception score of contract farmers on EAS (32.05) was higher than that of non-contract farmers (30.70), and the 't' value revealed a significant ($p<0.009$) difference between them. Among the sub-components of inputs, the mean perception scores of contract farmers in cost of chicks, timely supply of chicks, cost of feed, cost of medicines, understandability of EAS, and frequency and timeliness of EAS were significantly higher than corresponding scores of non-contract farmers. Mean perception scores of non-contract farmers in batches per year and quality of medicines were significantly higher than corresponding scores of contract farmers. Overall, the mean score for perceptions of contract farmers on total inputs (76.88) was higher than that of non-contract farmers (75.05), and the 't' value revealed a significant ($p< 0.050$) difference between them.

Among the outputs, the mean score on perceptions of contract farmers with respect to payments received (2.56) was lower than that of non-contract farmers (2.86), and the 't' value revealed a significant ($p< 0.000$) difference between them. The mean scores on perceptions of contract farmers with respect to sale of broiler birds (2.98), manure (3.87) and total outputs (25.28) were higher than those of non-contract farmers (2.81, 3.43 and 24.48, respectively), and the 't' values revealed significant differences ($p< 0.030$; $p<0.000$ and $p<0.011$) between them. Among the subcomponents of outputs, the mean perception scores of contract farmers with respect to quantity of manure produced, method of manure disposal and economic benefits from manure were significantly higher than those of non-contract farmers. Mean perception scores of non-contract farmers with respect to rearing charges and regularity of payments were significantly higher than the corresponding scores of contract farmers.

Overall, the combined mean score on inputs and outputs of contract farmers (102.15) was higher than that of non-contract farmers (99.53), and the 't' value revealed a significant ($p<0.021$) difference between them (Table 3.10).

Table 3.10. Perceptions of farmers on inputs and outputs.

Inputs/ Outputs *	Contract farmers (n=120)		Non-contact farmers (n=120)		*t* value	Sig. (2-tailed)
	Mean	*SD*	Mean	*SD*		
Perceptions on inputs						
Chicks						
Cost	2.63	0.93	2.01	0.53	6.431	.000
Body weight	3.03	0.88	3.00	0.52	0.267	.789
Timely supply	2.97	0.91	2.54	0.73	3.994	.000
Strain	3.87	0.61	3.96	0.44	1.342	.181
Flock size/batch	2.72	0.87	2.93	0.49	2.305	.022
Batches per year	2.15	0.57	2.69	0.71	6.509	.000
Growth rate	2.96	0.80	2.94	0.68	0.174	.862
Gap between two batches	2.20	0.57	2.27	0.59	0.887	.376
Total perceptions on chicks	22.52	3.43	22.33	2.51	0.473	.637
Feed						
Cost	2.40	0.76	2.12	0.49	3.321	.001
Quality	3.68	0.68	3.84	0.40	2.171	.031
Quantity	3.55	0.53	3.45	0.54	1.434	.153
FCR	2.99	0.77	3.11	0.53	1.363	.174
Total perceptions on feed	12.62	1.71	12.52	1.25	0.515	.607
Medicines						
Cost	2.53	0.88	2.11	0.50	4.467	.000
Quality	3.73	0.59	3.93	0.31	3.285	.001
Quantity	3.41	0.77	4.44	0.53	0.292	.771
Total perceptions on medicines	9.68	1.53	9.49	0.89	1.178	.240
EAS						
Applicability	3.98	0.64	3.80	0.72	1.971	.050
Understandability	4.14	0.45	3.96	0.63	2.457	.015
Frequency	4.11	0.55	3.75	0.83	4.020	.000
Timeliness	4.11	0.55	3.86	0.73	2.984	.003
Relevance	4.10	0.43	3.96	0.56	2.046	.042
Adequacy	3.91	0.61	3.80	0.65	1.420	.157
Usefulness	4.04	0.43	3.85	0.72	2.468	.014

Inputs/ Outputs *	Contract farmers (n=120)		Non-contact farmers (n=120)		*t* value	Sig. (2-tailed)
	Mean	***SD***	**Mean**	***SD***		
Technical knowledge of EAS provider	3.63	0.72	3.69	0.79	0.595	.553
Total perceptions on EAS	32.05	3.42	30.70	4.49	2.617	.009
Perceptions on total inputs	76.88	8.36	75.05	5.77	1.968	.050
Perceptions on outputs						
Broiler birds	2.98	0.66	2.81	0.54	2.182	.030
Number of birds produced and sold	3.19	0.59	3.05	0.49	1.991	.048
Live weight at sale	2.77	0.92	2.57	0.71	1.876	.062
Total perceptions on broiler birds	5.96	1.32	5.62	1.08	2.182	0.30
Manure						
Quantity produced	3.95	0.21	3.48	0.50	9.338	.000
Method of disposal	3.95	0.21	3.46	0.50	9.685	.000
Economic benefit	3.71	0.63	3.33	0.63	4.650	.000
Total perceptions on manure	11.61	0.86	10.28	1.49	8.460	.000
Payment received						
Rearing charges	2.02	0.42	2.58	0.78	6.943	.000
Regularity	3.59	0.94	3.95	0.53	3.610	.000
Pricing method	2.08	0.49	2.03	0.57	0.719	.473
Total perceptions on payment received	7.69	1.44	8.56	1.18	5.132	.000
Perceptions on total outputs	25.28	2.48	24.48	2.33	2.579	.011
Overall perceptions on inputs and outputs	102.15	9.87	99.53	7.42	2.331	.021

*** Scale values:** *1 = extremely dissatisfied; 2= Dissatisfied; 3=neither satisfied nor dissatisfied; 4=Satisfied, and 5=extremely satisfied.*

3.5.2 FARMERS' PERCEPTIONS ON INTENTION OF EAS: About 55.8 percent of the contract farmers perceived the intention of EAS as provision of information and knowledge, followed by information, knowledge and skill (18.3 percent); information only (15.8 percent); and information, knowledge, skill and attitude change (10 percent), respectively. Among non-contract farmers, 38.3 percent perceived the intention of EAS as provision of information, knowledge and skill; followed by information and knowledge (31.7 percent); information only (26.7 percent); and information, knowledge, skill and attitude change (3.3 percent). The chi-square value (23.794) revealed a significant ($p<0.000$) difference between contract and non-contract farmers in their perceptions on the intention of EAS (Table 3.11).

Table 3.11. Perceptions of farmers on intention of EAS.

Intention of EAS	Frequency (%)	
	Contract farmers (n=120)	Non-contract farmers (n=120)
Provision of information only	19 (15.8)	32 (26.7)
Provision of information and knowledge	67 (55.8)	38 (31.7)
Provision of information, knowledge and skill	22 (18.3)	46 (38.3)
Provision of information, knowledge, skill and attitude change favorable to broiler farming	12 (10.0)	4 (3.3)
Chi-square value and significance	23.794 (p<.000)	

3.6 LEVEL 6: PRACTICE CHANGE

3.6.1 ADOPTION OF TECHNICAL ADVICE: The data on adoption of technical advice on chicks, housing, feeding practices and medications -- in terms of "not adopted", "discontinued", "partially adopted" and "fully adopted" -- is presented in Table 3.12. Both groups of farmers, by and large, had fully adopted the recommended technical advice related to chicks and feeding and partially adopted advice on housing practices. They were distributed between partial adoption and full adoption on medication practices. Chi-square values on housing (8.380), feeding (12.972) and medication (6.696) revealed significant differences ($p< 0.015$, $p< 0.000$ and $p< 0.10$) between contract and non-contract farmer in the adoption of technical advice on housing, feeding and medication (Table 3.12).

Table 3.12. Adoption of technical advice in CBF and NCBF.

Technical advice / Farmer type	Adoption of technical advice and technologies Frequency (%)				Pearson Chi-square	Asymp. Sig. (2-sided)
	Not adopted	Discon-tinued	Partially adopted	Fully adopted		
Chicks						
CBF	-	-	13 (10.8)	107 (89.2)	.433	.511
NCBF	-	-	10 (8.3)	110 (91.7)		
Housing						
CBF	-)	-	82 (68.3)	38 (31.7)	8.380	.015
NCBF	4 (3.3)	-	93 (77.5)	23 (19.2)		
Feeding						
CBF	-	-	10 (8.3)	110 (91.7)	12.972	.000
NCBF	-	-	31 (25.8)	89 (74.2)		
Medication		-				
CBF	-	-	66 (55)	54 (45)	6.696	.010
NCBF	-	-	46 (38.3)	74 (61.7)		

The mean adoption scores of contract farmers on recommended housing (2.32) and feeding (2.92) practices were higher than the corresponding scores of non-contract farmers (2.16 and 2.74, respectively), and the 't' values revealed significant (P<0.008 and P<0.000) differences between them. The mean adoption score of contract farmers on medication practices (2.45) was significantly (P<0.010) lower than the corresponding score of non-contract farmers (2.62) (Table 3.13). Results presented in Tables 3.12 and 3.13 indicate that technical advices related to housing and feeding were adopted more in CBF, but in NCBF advice on medication practices more often adopted.

Table 3.13. Difference in adoption of technical advice in CBF and NCBF.

Technical advice*	CBF (n=120)		NCBF (n=120)		*'t'* value	Sig. (2-tailed)
	Mean	*SD*	Mean	*SD*		
Chicks	2.89	0.31	2.92	0.28	0.656	.513
Housing	2.32	0.47	2.16	0.45	2.677	.008
Feeding	2.92	0.28	2.74	0.44	3.688	.000
Medication	2.45	0.50	2.62	0.49	2.614	.010

***Scale values:** *1=not adopted, 2=discontinued 3= partially adopted, 4=fully adopted.*

3.7 LEVEL 7: END RESULTS

3.7.1 SWOT ANALYSIS: Tables 3.14 to 3.17 show the top five SWOT issues in CBF and NCBF. No marketing risk (100 percent), doorstep delivery of inputs and EAS (90 percent), low variable costs to the farmers (85 percent), low production cost (81.66 percent) and maximum efficiency in production (66.66 percent) were perceived as the five major strengths of CBF. Comparatively higher margins (81.66 percent), easy to change input providers (63.33 percent), quick returns (58.33 percent), efficiency in production (53.33 percent) and all-in-all-out system (41.66) were the five strengths perceived in NCBF (Table 3.14).

Table 3.14. Strengths of CBF and NCBF.

CBF (n=120).			NCBF (n=120).		
Strengths	**(Frequency (%)**	**Rank**	**Strengths**	**Frequency (%)**	**Rank**
No marketing risk	120 (100)	1	Comparatively higher margins	98 (81.66)	1
Inputs and EAS doorstep delivery	108 (90.00)	2	Easy to change input providers	76 (63.33)	2
Low variable costs to the farmers	102 (85.00)	3	Quick returns	70 (58.33)	3
Low production cost	98 (81.66)	4	Efficiency in production	64 (53.33)	4
Efficiency in production	80 (66.66)	5	All-in-all-out system	50 (41.66)	5

Low RCs (91.66 percent), high investment in fixed costs (79.16 percent), low margins (66.66 percent), production cost estimation favoring companies (61.66 percent) and shortage of skilled labor (60 percent) were perceived as major weaknesses of CBF. High marketing risk (93.33 percent), high fixed and variable costs (87.5 percent), no government EAS provision (80 percent), demand fluctuations (76.66 percent) and seasonal inputs availability (74.16 percent) were perceived as major weaknesses in NCBF (Table 3.15).

Table 3.15. Weaknesses of CBF and NCBF.

CBF (n=120).			**NCBF (n=120).**		
Weaknesses	**Frequency (%)**	**Rank**	**Weaknesses**	**Frequency (%)**	**Rank**
Low rearing charges	110 (91.66)	1	High marketing risk	112 (93.33)	1
High investment in fixed costs	95 (79.16)	2	High fixed and variable costs	105 (87.5)	2
Low margins	80 (66.66)	3	No government EAS provision	96 (80.00)	3
Production cost estimation favoring companies	74 (61.66)	4	Demand fluctuations	92 (76.66)	4
Shortage of skilled labor	72 (60.00)	5	Seasonal inputs availability	89 (74.16)	5

Enhancing RCs and sharing rate incentive margins with farmers (90 percent), mentioning input standards in agreements (80 percent), scope for further expansion and value chain development (75 percent), high demand and acceptability for poultry meat (68.33 percent) and wet market to processed marketing for further value chain development (62.5 percent) were the important opportunities perceived in CBF. Assured marketing (93.33 percent), minimum support price for chicken above production cost (85 percent), agriculture status to poultry farming (74.16 percent), efficient forecasting of demand to reduce marketing risk (65.83 percent), and scope for preparing own feed and automation (65 percent) were the major opportunities perceived in NCBF (Table 3.16).

Table 3.16. Opportunities in CBF and NCBF.

CBF (n=120)			**NCBF** (n=120)		
Opportunities	**Frequency (%)**	**Rank**	**Opportunities**	**Frequency (%)**	**Rank**
Enhancing RCs and sharing rate incentive margins with farmers	108 (90.00)	1	Assured marketing	112 (93.33)	1
Input standards to include in agreements	96 (80.00)	2	Minimum support price for chicken above production cost	102 (85.00)	2

CBF (n=120)			**NCBF** (n=120)		
Opportunities	**Frequency (%)**	**Rank**	**Opportunities**	**Frequency (%)**	**Rank**
Scope for further expansion and value chain development	90 (75.00)	3	Agriculture status to poultry farming	89 (74.16)	3
High demand and acceptability for poultry meat	82 (68.33)	4	Efficient forecasting of demand to reduce marketing risk	79 (65.83)	4
Wet market to processed marketing for further value chain development	75 (62.5)	5	Scope for preparing own feed and automation	78 (65.00)	5

Unilateral contracts favoring integrators (63.33 percent), no regulations/specifications on inputs (54.16 percent), monopoly by a few companies (37.5 percent), emerging and reemerging diseases (25 percent), and environmental concerns on poultry farms (20.83 percent) were the major threats perceived in CBF. The other important threat perceived in CBF was poultry welfare issues (20 percent of respondents). High marketing risk and high production costs leading to withdrawal from NCBF (71.66 percent), volatile markets (65 percent), control of the market by a few contract companies (54.16 percent), spurious inputs (46.66 percent), and emerging and reemerging diseases (28.33 percent) were the major threats perceived in NCBF (Table 3.17).

Table 3.17. Threats to CBF and NCBF.

CBF (n=120)			**NCBF** (n=120)		
Threats	**Frequency (%)**	**Rank**	**Threats**	**Frequency (%)**	**Rank**
Unilateral contracts favoring integrators	76 (63.33)	1	High marketing risk and production costs leading to withdrawal from NCBF	86 (71.66)	1
No specifications on inputs	65 (54.16)	2	Volatile markets	78 (65.00)	2
Monopoly by a few companies	45 (37.5)	3	Control of market by a few companies	65 (54.16)	3
Emerging and reemerging diseases	30 (25.00)	4	Spurious inputs	56 (46.66)	4
Environmental concerns on poultry farms	25 (20.83)	5	Emerging and reemerging diseases	34 (28.33)	5

Factors internal to the system are strengths (S) or weaknesses (W), and those external to the system are opportunities (O) or threats (T). An analysis of the strategic environment is referred as SWOT analysis (Bradford et al., 1999). Overall, the SWOT issues that emerged in the study are helpful in

matching the resources and capabilities to the competitive environment in which CBF and NCBF systems are operating.

3.7.2 Focus Group Discussion

3.7.2.1 Criteria that integrators use to select contract broiler farmers: The criteria that integrators use to select contract farmers were worked out on the basis of FGD interactions with key stakeholders (Box 2).

Box 2: Criteria used by integrator to select contract broiler farmers

Step-1: Application by farmer to integrating company for contract broiler farming: Any farmer who is interested in rearing broilers under contract farming apply to the company with the request that "(s) he is interested to rear broilers under contract farming and will abide by the terms and conditions of the company". S(he) will also provide the details of the following personal / business and farm particulars for consideration by the company:

(a) Personal / business particulars

1. Name and residential address.
2. Gender.
3. Age.
4. Farm address.
5. Approximate distance of farm from contract company (Km).
6. Bank name, address, account type and number (latest account statement to be enclosed).

(b) Farm details

1. Ownership: Own/leased (proof of ownership/lease with no objection certificate [NOC] from owner to be enclosed).
2. Whether the farm is mortgaged. If yes, details of mortgage and NOC from financier.
3. Reference of any reputable local person (with name, address, phone number and reference letter).
4. Shed(s) details (with numbers, size, capacity, type, flooring, distance between adjacent sheds, year of construction and age of shed).
5. Total capacity.
6. Distance from nearest farm (km).
7. Distance from nearest village / habitation (km).
8. Farm history of any poultry diseases with details.
9. Utilities: (a) water source with details on bore / open well, pump capacity, single phase or double phase, water tank capacity, single / shed wise tank; (b) electricity connection type (agriculture/poultry/industrial / non-specific); (c) alternative arrangements in case of power failure (charcoal/ generator/ emergency light).
10. Equipment details:
    i. Flame gun.
    ii. Sprayer.
    iii. Type of brooding (light / gas/ *bukari)* and ratio with capacity.
    iv. Number of chick feeders (type and ratio with capacity).
    v. Number of grower feeders (type and ratio with capacity).
    vi. Number of waterers (manual / automatic, numbers and ratio with capacity).

vii. Type of vehicle owned (two-wheeler / tractor / car).

11. Type of labor (hired / own / contract with number of persons each type).
12. Previous poultry farming history:
    i. Broiler farming – own (non-contract) / contract / leased.
    ii. If own – proprietorship / partnership.
    iii. If partnership firm, enclose copy of agreement.
    iv. If contract, with whom, breed and date of liquidation of last batch.
    v. Reasons for termination of contract.
13. Declaration that above particulars are true and signature.

Step-II: Farm appraisal by contract company: After the receipt of application and farm details, the contract company assesses the suitability of the farm for contract broiler farming based on the following criteria:

1. Documentary support enclosed with application or not.
2. Location of the farm from company (suitable or not with reasons) – (approach road is mandatory for access by company vehicles to transport chicks, feed and birds).
3. Ownership details (satisfactory / not with reasons).
4. Lean on ownership (satisfactory / not with reasons).
5. Reference details (satisfactory / not with reasons).
6. Farm visit report.
    i. Shed construction (good / average / poor).
    ii. Orientation of shed (direction of sunlight and wind).
    iii. Flooring quality (good / average / poor).
    iv. Shed to shed spacing (satisfactory / not with reasons).
    v. Nearest farm distance (close / OK / comfortable).
    vi. Any other observation(s).
7. Verification report of the utilities and equipment's – claimed quantity, usability, condition and deficiency noticed to be reported.
8. Relation with neighbor (good / average / poor).
9. Access road to the farm (good / average / poor).
10. Overall assessment :
    i. Recommended / not recommended for contract broiler farming.
    ii. Recommended batch size.
    iii. Tentative supply date.

3.7.2.2 Terms and conditions applicable to contract farmers: The terms and conditions applicable to CFs were worked out on the basis of the FGD, secondary data from farm records and the RC form that the company provides to farmers at the flock liquidation (Box 3).

Box 3: Terms and conditions applicable in CBF

1. Standard production cost (SPC) calculation of live chicken: Contract company calculates the SPC with the following parameters, which may vary based on input costs from time to time:

Example:

- Batch size (No. of chicks) : 1000
- Standard rate per chick (Rs.) : 18.00
- Standard feed cost per kg (Rs.): 22.50
- Mortality allowed (%) : 5
- Standard body weight (Kg) : 2.00
- Standard FCR : 1.85
- Growing charges (Rs.) : 4.00

Item	Qty.	Rate (Rs.)	Amount (Rs.)
Chick cost	1000	18.00	18000
Less standard morality of 5%	50		
No. of birds at flock liquidation	950		
Feed cost with FCR 1.80 (No. of kgs)	3420	22.50	76950
Cost of medicine (per chick) – actual	1000	0.30	300
Cost of vaccine (per chick) – actual	1000	1.00	1000
Management charges (per chick)	1000	1.50	1500
Total cost of production			97750
Total body weight (kg)	1900		97750
SPC / kg of live chicken			51.50
Total cost of production / kg of live chicken with growing charges of Rs. 4.00			55.50

1. **Growing charges:** Growing charges applicable: Rs. 4.00 per kg of full meat broiler bird weighing above 1.80 Kg of average body weight. Additional growing charges of Rs. 0.10 per kg to be paid extra for the individual farms having more than 20,000 chick capacities / placed.
2. **Production cost incentives:** Incentive for reduction in cost of production below Rs. 51.50 per kg before grower charges of live chicken will be paid as follows:

   i. Below Rs. 47.00 : 50%

   ii. Rs. 47.00 to Rs. 48.50 : 45%

   iii. Rs. 48.50 to Rs. 50.00 : 40%

   iv. Rs. 50.00 to 51.50 : 35 %

3. **Production cost penalty:** If the production cost exceeds the SPC of Rs. 51.50 before growing charges, the penalty for higher cost of production will be deducted as follows from the applicable growing charges:

   i. Rs. 51.50 to 53.00 : 35 %

   ii. Rs. 53.01 to 54.50 : 40 %

   iii. Rs. 54.51 and above : 45 %

4. **Rate incentive:** Market rate incentive to be calculated above Rs. 65 to 70 /kg live weight of the chicken at 5 paisa per rupee earned, and from Rs. 70.01 and upwards, 10 paisa per rupee earned, with the maximum rate incentive limit of Rs. 2 per kg.

5. **Farmer loyalty and continuous performance incentive:** Farmers who produce three batches and maintain production cost of Rs. 50.50 per kg and converted FCR of 1.75 or below in all consecutive batches will be given 10 paisa per kg extra for the three batches. This incentive will be reviewed for every three batches.

6. **Feed unloading charges:** Rs. 25 per MT towards unloading charges will be paid to the farmer.

7. **Penalty for excess mortality:** A standard mortality of 5 percent on the chicks supplied will be allowed. Over and above 5 percent mortality, the cost will be recovered from the contract farmer at a rate of Rs. 18 per chick inclusive of cost of medicine, vaccine and management.

8. **Shortage of birds at recovery:** If any shortage of birds is noticed by the company at the time of liquidation, it will be recovered from the farmer at actual cost + Rs. 5 or highest rate sold + Rs. 5, whichever is higher. The amount will be recovered from the growing charges payable to the farmer.

9. **TDS:** All payments to farmers will be made with tax deduction at source as per the government norms.

10. **Service tax:** It is agreed and understood by and between the parties that the company shall be liable to pay to the farmer only the growing charges at agreed rates, and that all other liabilities – such as service tax, VAT, and other duties and charges, if any -- shall be borne and paid by the farmer.

11. If the cost of production is above Rs. 51.50 /kg, shortage of the chicks supplied is above 2 percent, or mortality is more than 15 percent and FCR is high for two consecutive batches, the contract of such farm will be terminated without prior notice to the farmer at the discretion of the company.

12. All the above terms and conditions are subject to change at the discretion of the company.

Accepted above terms and conditions

Signature of Company Representative Signature of Contract Farmer

From the findings of the FGD on criteria that integrators use to select contract farmers and the terms/conditions applicable to contract farmers (Boxes 2 and 3), we derive the following conclusions:

- All privileges and rights were in the hands of the contract companies.
- Specifications/standards on poultry sheds, equipment, utilities, biosecurity, ownership, reference, etc., were very rigorous.
- Specifications/standards on outputs to be achieved by contract farmers -- such as FCR, mortality, body weight, SPC., etc. -- were fixed by the contract companies and favor them.
- Contracts did not mention specifications/standards on inputs to be delivered by contract companies -- chick body weight, feed quality (starter, grower and finisher with total digestible nutrients [TDN]), digestible crude protein [DCP] and other nutrients), quality of medicines and vaccines, qualifications of EAS providers, etc. All these are directly related to body weight of the birds at liquidation.
- Contracts were not in the local language, and no contract farmer was given a copy of the agreement.
- With no mention of the reason for fixing Rs. 4 as the RC, and with stringent production cost incentives and penalties, the agreements clearly favored the contract companies.
- Very meager rate incentive norms in case of high market price meant that the majority of marketing margins would accrue to the contract companies.
- Tax deduction at flock liquidation is not justifiable when farmers were given only the RC.

The contractor will not come to the rescue of the farmer in case of bird mortality due to natural calamities such as cyclones, earthquakes, fire, accidents, etc. The contractors may also get cheated by some farmers who indulge in sale of birds to other parties, add extra birds with the same feed, sell feed to other parties or fail to comply with the advice of the EAS provider. Many contract farmers keep shifting from one contractor to the other because they always feel they were being underpaid for their effort. Lack of trust between the integrator and the farmer is the main reason for this. There are also many instances of farmers sticking with the same contractor for years because of trust and satisfaction between the parties.

CHAPTER 4 – CONCLUSIONS AND IMPLICATIONS FOR POLICY

The study evaluated integrated CBF and NCBF systems in India's Karnataka, Telangana and Andhra Pradesh states and addressed the following research questions:

- Do contract and non-contract farmers incur significantly different production and marketing costs and earn different marketing margins?
- Does the provision of EAS by private CBF companies enable contract farmers to make better profits than non-contract farmers?
- Have assured markets, competitive price and guarantee against risk resulted in successful value chain development through CBF?

- Are the value chain development and provision of EAS by private CBF companies really a win-win situation for both integrators and farmers, or is it a socially acceptable way of exploiting the farmers?

The findings on demographics of contract and non-contract farmers were comparable except that non-contract farmers had greater experience. Contract farmers had more broiler sheds, produced fewer batches per year and used more hired labor. Sale rate was lower, while sale weight and weight gain were higher in CBF. Among the inputs, the chick cost was lower and labor cost was higher in CBF, whereas bedding material, electricity, EAS and miscellaneous costs were higher in NCBF. In spite of low production cost, the contract farmers were losing a margin of Rs. 5.99 per bird to avoid marketing risk. The integrators were the sole source of free EAS under CBF, while private poultry consultants provide EAS on payment in NCBF. The majority of contract farmers had not changed integrators; the majority of non-contract farmers had changed input provider(s) in the past two years. The perception of contract farmers on inputs, outputs and EAS was significantly higher than that of non-contract farmers. Adoption of technical advice related to housing and feeding was better in CBF, and recommendations on medication were better adopted in NCBF. The internal strengths / weaknesses, and external opportunities / threats that emerged in the study are helpful in matching the resources and capabilities to the competitive environment in which CBF and NCBF systems are operating. The FGD indicated that all privileges and rights were in the hands of the contract companies.

The overall findings of the study indicated that production cost in CBF was significantly low because of modest input costs, which are provided by contract companies. In spite of that, the total returns in CBF were also significantly low because any efficiency surplus is largely taken by contract companies. On the other hand, though production cost was high, farmers in NCBF were gaining a margin of Rs. 5.99 per bird despite facing production and marketing risks. *This leads to the conclusion that contract and non-contract farmers incur significantly different production and marketing costs and earn different marketing margins.* The extreme standard deviations on returns under both the systems confirms that the net returns in CBF are guaranteed and predetermined, but in the case of NCBF, they vary widely depending on the market price, which is subject to seasonal fluctuations. *This points to the conclusion that CBF does not enable contract farmers to make better profits than non-contract farmers; rather, it gives a lower but assured and almost fixed return.*

Despite low returns, farmers are participating in CBF largely because of inability to bear the high investment, and the assured income, doorstep delivery of quality inputs and free EAS (i.e., low working capital), and the absence of marketing risk. On the other hand, through improved technology, low margins on inputs, economy of scale and stringent norms, the companies are reducing production cost, leading to lower retail chicken prices for consumers (Prabakaran, 2003; Landes et al., 2004). *All these factors resulted in successful value chain development through CBF.*

Nevertheless, in the absence of a regulatory body, all privileges and rights were in the hands of contract companies. Though standards on infrastructure and outputs were fixed by contract companies in their favor, the contracts were silent on standards on inputs to be delivered by contract companies. With meager rearing charges, stringent production cost incentives and penalties, the agreements clearly favored the contract companies. *The survey and FGD findings revealed that the value chain development and provision of inputs and EAS by large private poultry companies did not really result in a win-win situation for both integrators and farmers.* Though it is not a win-win situation, farmers still participate in CBF because the returns are assured and fixed, and they do not need to bear soaring input costs and

high market and production risks. Once entered into contract farming, most of the farmers cannot get away from CBF, mainly because of their investment in sheds and equipment.

Although some limitations have been identified, there is huge potential and need for further value chain development through CBF. Keeping this in view, and to address limitations, the following specific policy interventions are recommended.

Further promotion and regulation of CBF: Factors that are attracting farmers to CBF include freedom from investment, production and marketing risks; doorstep delivery of inputs such as chicks, feed, medicines, EAS, technical services and training; and close daily monitoring by contract companies. Without CBF, the poultry companies engaged in chick, feed, vaccine and medicine production would also face risks to their profitability. Therefore, CBF is an institutional arrangement that tackles risks of both farmers and companies through market linkages (Minot, 1986; Sundararajan, 2005; Ramaswami et al., 2006). Findings of the present study and other reports (Glover, 1987; Little and Watts, 1994; Thamizhselvi and Rao, 2009; Thamizhselvi and Rao, 2010), however, revealed that the value chain development and provision of EAS by large private poultry companies is not always a win-win situation for both the parties. Gulati (2008) and Kalamkar (2012) also opined that balanced contracts that benefit both the parties -- through assured markets, competitive price and guarantee against risk -- result in successful value chain development. Although some limitations have been identified, there is a huge potential and need for regulated expansion and further value chain development through CBF. On the basis of the findings of this study and other research studies, we recommend establishment of a regulatory body to balance the profits of both the integrator and the contract farmers and to address environmental and welfare issues.

Enhance rearing charges and revise rate incentive norms to transfer part of market margins to the farmers: With a meager rearing charge, stringent production cost estimation, penalties and minimal rate incentive norms in case of high market prices, the agreements favor the contract companies and exploit small farmers. In spite of this exploitation, contract farmers still prefer this system because they perceive that they benefit more by participation than non-participation. The current rearing charge is Rs. 4, and rate incentive norms are at 5 paisa per rupee earned from Rs. 65 to 70/kg live chicken and from Rs.70.01 upwards, 10 paisa per rupee earned, with a maximum rate incentive limit of Rs. 2 per kg. The low rate incentive norms in case of high market prices mean that the contract companies and consumers are benefiting more than farmers when prices of chicken go up. Hence, it is recommended that rearing charges be revised upward to at least Rs. 6 per kg live chicken. It is also recommended to revise rate incentive norms to transfer part of market margins to the farmers in case of high market prices.

Increase the number of batches per year by contract farmers: In spite of having more broiler sheds and hiring labor on an annual basis, contract farmers are raising fewer batches per year than non-contract farmers, mainly because the contractors supply not more than five batches of chicks in a year. The contract farmer will not be in a position to use his shed and labor efficiently, resulting in significantly higher costs, especially in labor. To utilize labor effectively throughout the year and to get returns on fixed cost investments, they need to rear at least six batches per year. Hence, it is recommended that contract companies provide chicks for at least six batches per year.

Transparency in executing contract agreements: Agreements mention standards on poultry sheds, equipment and outputs but are silent on inputs to be delivered by contract companies. In addition to

providing input standards, contract agreements are to be prepared in the local language and a copy provided to the contract farmers. This will aid in building trust and confidence among the partners of CBF.

Government support to promote CBF and NCBF: Taking the SWOT issues into consideration, it is recommended that the government of India take measures to assure marketing and a minimum support price over and above the production cost, according agriculture status to poultry farming (to garner the subsidy benefits on electricity and other inputs) and developing efficient market information to reduce uncertainty in poultry marketing. Recently Telangana state announced agriculture status to poultry farming. Other states also need to give agriculture status to poultry farming so farmers can get the benefits.

Equitable and inclusive development: Effective EAS, doorstep provision of inputs, technical expertise and market linkages are key factors for the success of CBF / NCBF, which are necessary for modernization and food security. However, the missing elements in both CBF and NCBF systems are equity, farmers' organization and sustainability, which are essential for socially inclusive development. The findings indicated that women are participating only as laborers, not owners, in both systems. Also, ownership lies with socially affluent members, with exclusion of disadvantaged communities and social class in both systems. Basic economic resources are required in the form of fixed (for CBF and NCBF) and working capital (for NCBF) to take up broiler farming, which the marginally poor farmers cannot afford. For those who want an affirmative policy that favors the poor and socially disadvantaged, both systems studied may not be the answer. This raises the issue of whether CBF / NCBF would be appropriate for resource-poor and small farmers. Also the components of farmers' organization and intense competition among integrators / input suppliers are missing in both the systems to protect the interests of farmers from exploitation. The contracts are reasonably loaded in favor of the integrators. Profit and sustainability are their motivation, and they should really not be faulted for that because it is part of modernization and private service delivery. But what is needed is to allow small farmers to ride in the system and not be subject to injustice and excessive exploitation. If farmers were more organized, that would give them leverage in dealing with the integrators in CBF or bargaining with input suppliers in NCBF. Farmers' organizations would also help the contractors in weeding out the unscrupulous farmers or building group pressure to adopt healthy poultry development practices. This will be complementary to the proposed government regulations.

Replication of EAS in CBF and NCBF: A survey by India's National Sample Survey Organization (NSSO, 2005) showed that only 5.1 percent of households could access livestock EAS. The corresponding figure for agriculture EAS was 40.5 percent, indicating gross neglect of livestock EAS in the country. Findings of the present study revealed that, with the participation of the private sector, poultry EAS and other input services reached every individual commercial poultry farmer with efficiency and effectiveness. Under CBF, the integrators are the sole source of free EAS as part of the agreement. Under NCBF, farmers could get the same services from private poultry consultants on payment of an EAS charge of Rs. 0.52 / kg of live chicken produced. This is an effective and successful model of modernization of EAS and related input delivery as a complete package through the private sector. This model needs to be encouraged in other sectors to develop entrepreneurship among farmers by addressing the few limitations discussed above.

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APPENDIX

INTEGRATED CONTRACT BROILER FARMING: AN EVALUATION CASE STUDY IN INDIA (Interview Schedule)

Farmers' ID (Tick one):

- Contract Broiler Farmer – Karnataka/ Telangana / Andhra Pradesh
- Non-Contract Broiler Farmer – Karnataka/ Telangana / Andhra Pradesh

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PART I. INPUTS, ACTIVITIES, OUTPUTS AND BENEFITS

1.1. Level –I: Inputs

1.1.1 Demographic Characters

a. Age: ___ years

b. Gender: Male ☐ Female ☐

c. Education:

Tenth grade or below ☐

High school pass or equivalent ☐

Bachelor's degree and above ☐

d. Social category: (Select one that apply)

1. General ☐ 2. Scheduled caste ☐

3. Scheduled tribe ☐ 4. Other Backward caste ☐

e. Family type: 1. Nuclear 2. Extended

f. Family size:

g. Poultry occupation: 1. Primary 2. Secondary

h. Experience of broiler farming (years): Contract ( ) Non-Contract ( )

1.2 Level 2: Activities

1.2.1 Physical and human resource activities

Inputs	Number
No. of sheds	
Batches of the poultry housed yearly	
Family labor working in farm per batch	
Hired labor working in farm per batch	
Total labor per batch (hired and family)	

1.3 Level 3: Outputs

1.3.1 Details of the Outputs (Per Batch)

A. Broiler Birds	
1. Chicks housed / flock size (Nos)	
2. Mortality (Nos)	
3. Birds sold (Nos)	
4. Birds lifting days (Nos)	
5. Sales rate (Rs.)	
B. Productivity	
1. Mortality %	
2. Birds sold (Kg)	
3. Feed consumed (Kg)	
4. Birds sale weight (Kg)	
C. Efficiency	
1. FCR	
2. Marketing age (days)	
3. Weight gain (grams/day)	
D. **Economics**	
(a) Inputs	
1. Chick cost (per chick)	
2. Chick cost (per kg of the bird)	
3. Feed cost (per kg)	
4. Feed cost (per kg of bird)	
5. Medicine cost (per batch	
6. Medicine cost (per.kg of bird)	
7. Labor cost (per batch	
8. Labor cost (per kg of bird)	
9. Bedding material cost	
10. Bedding cost (per.kg of bird)	
11. Electricity cost (per batch)	
12. Electricity cost (per kg of bird)	
13. EAS cost (per kg of bird)	
14. Miscellanies cost (per batch)	
15. Miscellaneous cost (per kg of bird)	
16. Total cost (per kg of bird)	
(b) Outputs	
1. Rearing charges (RC)	
2. Sale of birds (Rs./ kg live weight)	

3. Sale of manure	
4. Sale of manure (Rs./ kg live weight)	
5. Sale of feed bags	
6. Sale of feed bags (Rs./ kg live weight)	
7. Total returns	
8. Profit / loss	
9. Gross rearing charges (Standard RC +/- Incentives / Penalty	
10. Costs (–) sale (costs of labor, bedding, electricity & miscellaneous) - (sa of manure and feed bags)	
11. Net rearing charges (Gross RC - (Costs(-)Sale)	
12. Final return (Rs./ kg live weight)	
13. Final return / bird	

E. EAS: How frequently you use the following information sources for EAS

EAS Source	**Frequency of Utilization***				
	1	2	3	4	5
Integrator					
Govt. research station					
Govt. veterinary doctor (free)					
Govt. veterinary doctor (payment)					
Private veterinary doctor					
Private poultry consultants					
Any other (Please specify)					

*1- Very Rarely; 2- Rarely; 3- Occasionally; 4- Frequently; 5-Very frequently

1.4 Level 4: Farmer's Reactions

i. What factors motivated you to do CBF / NCBF?

a.

b.

c.

d.

ii. Did you change the integrator(s) / Input providers in the past two (?) years?

☐ Yes ☐ No (If no, go to next question)

iii. What were the reasons for changing the integrators / input providers?

Name of the Integrator / Inputs provider	Reasons for changing

1.5 Level 5: Perceptions

1.5.1 Farmers' Perceptions on CBF / NCBF: Following table contains the list of the inputs and outputs that are either utilized or produced. Please indicate your level of satisfaction to each of the item listed below.

S.N.	Inputs / Outputs	Degree of Perception				
A	**Inputs (Total score of (i + ii + iii + iv)**					
I	**Supply of Chicks**					
		Extremely dissatisfied	Dissatisfied	Neither satisfied nor dissatisfied	Satisfied	Extremely satisfied
1.	Cost					
2.	Body weight					
3.	Timely supply					
4.	Strain					
5.	Flock size per batch					
6.	No. of batches per year					
7.	Growth rate					
8.	Gap between batches					
II	**Supply of Feed**					
1.	Cost					
2.	Quality					
3.	Quantity					
4.	FCR					
III	**Supply of Medicines**					
1.	Cost					
2.	Quality					
3.	Quantity					
IV	**Provision of EAS**					
1.	Applicability of EAS					
2.	Understandability of message (Treatment of EAS)					
3.	Frequency of EAS					
4.	Timeliness					
5.	Relevance of EAS					
6.	Adequacy of the EAS					
7.	Usefulness of EAS					

8.	Technical know-how of EAS provider					
B	**Outputs (Total Score of I,II & III)**					
I	**Broiler bird**					
1.	No of birds produced/sold					
2.	Live wt. at the time of sale					
II	**Manure**					
1.	Quantity produced					
2.	Method of disposal					
3.	Economic benefit					
III	**Payment**					
1	Remuneration					
2	Regularity					
3	Pricing method					

1.5.2 Intention of EAS (Check any one)

a. Information only ☐
b. Information + knowledge ☐
c. Information + knowledge + skill ☐
d. Information + knowledge + skill + attitude change ☐

LEVEL 6: Practice Change

1.6.1: Adoption of Technical Advises: Please rate your level of adoption of the following technical advices (1=not adopted, 2=discontinued 3= partially adopted, 4=fully adopted.)

Technical advice related to:	**Not adopted**	**Discontinued**	**Partially adopted**	**Fully adopted**
Chicks				
Housing				
Feeding practices				
Medications				

1.6 Level 7: End Results

1.7.1 What do you think are the most important strengths, weaknesses, opportunities and threats of Contract / Non Contract Broiler Farming?

Strengths

1.

2.

3.

4.

Weaknesses

1.

2.

3.

4.

Opportunities

1.

2.

3.

4.

Threats

1.

2.

3.

4.

Thank you very much for taking part in the survey

ABOUT THIS DOCUMENT

Integrated contract broiler farming is an institutionalized production management contract that tackles risks of both small farmers and poultry companies through market linkages. The value chain development and provision of EAS by large private poultry companies do not always create a win-win situation for both the integrators and farmers, however. This USAID-funded MEAS project evaluated integrated contract and non-contract broiler farming systems in India's Karnataka, Telangana and Andhra Pradesh states. Although some limitations have been identified, including a need for regulated expansion, there is huge potential for further value chain development through integrated contract broiler farming.

Mr. O. Venkataiah working in contract broiler farm, Narayanagiri Village, Warangal District, Telangana.

Mr. Sudhir, best performing contract broiler farmer, Nendragunta Village, Chittoor District, Karnataka.

Contact Information

P.V.K. Sasidhar, Associate Professor, School of Extension and Development Studies, Indira Gandhi National Open University (IGNOU), New Delhi-110068 (India). E-mail: pvksasidhar@ ignou.ac.in

Murari Suvedi, professor, Department of Community Sustainability, Michigan State University (MSU), East Lansing, MI-48824 (USA). E-mail: suvedi@anr.msu.edu