

# Supply Chain Analysis of Organic Cotton at Chhindwara District of Madhya Pradesh

Arpan Mondal<sup>1</sup>, Saswatik Tripathy<sup>2</sup>, Payel Dinda<sup>3</sup>

<sup>1,3</sup>Dept of Agriculture Rural and Tribal Development

<sup>2</sup>Dept of Development Management

<sup>1,3</sup>Ramakrishna Mission Vivekananda Educational and Research Institute Ranchi, Jharkhand, India

<sup>2</sup>The DHAN Academy, Madurai, India

**Abstract-** This study was done basically to understand the supply chain of the organic cotton production. A supply chain starts from purchasing of inputs for a crop and ends at the consumer level. This study was done in the state of Madhya Pradesh at Chhindwara district. The study locations were selected purposively but the respondents of the study was selected by random sampling method. This paper includes the basic out line of cotton cultivation in the area and an in-depth study of different approaches of cultivating cotton, its economics and the marketing channels. This study describes about the people's practices and different seed varieties used by the local farmer. It has also discussed about basic three marketing channel. At the end of this paper some solutions to increase the farmers profit is also described in a detailed manner.

**Keywords-** Organic cotton, Supply-chain, economics of cotton, marketing channel.

## I. INTRODUCTION

Cotton, the most important fiber crop of India and plays a dominant role in its agrarian and industrial economy. Cotton is more than just an important textile crops. It is the backbone of our textile industry, accounting for 70% of total fiber consumption in textile sector, and 38% of the country's export, fetching over Rs. 42,000 crores. Area under cotton cultivation in India (8.9 million ha) is the highest in the world, i.e., 25% of the world area and employs seven million people for their living. Cotton productivity in India is quite low as compared to world standards. The modern cotton production technology relies heavily on the use of fertilisers and on chemicals to control insectpests, diseases, weeds and growth regulators. Cotton cultivated on 5% cultivable land consumes 54% of total pesticides used in Indian agriculture, and in some pockets, the rates are higher than this, leaving immense ecological and human hazards as reported by World Health Organisation. Use of chemicals at such scale causes a lot of hazards to man, i.e., environmental pollution, soil health, and agro-ecology and poor profitability in cotton farming. This has basically prompted the demand of organically cultivated, eco-

friendly or green cotton. The world's major cotton producers are China, the U.S., and India. Discussions on whether conversion to organic agriculture is a suitable option for farmers in developing countries have been controversial in the recent past extrapolating from experience in industrialized countries, some critics argue that organic farming systems cannot produce sufficient yields to ensure food security and to provide enough income for smallholder farmers in developing countries. But Tripathy and Khan (2020) stating in their paper that the model of organic farming the critics follow is a very slow working. According to them the organic farming is only the solid manures application, but organic manure is a holistic approach of balancing the soil microbial environment along with the plant nutrients. The basic of organic farming is providing the plant nutrient through increasing microbial population in the soil. The solid manures what are used in the field are very slow nutrient relishing in nature. They take atleast 3 month to be available for the plants but the life cycle of the plants don't wait for the manures to rely the nutrients. As a result when the plants need more nutrients they don't get it so the yield decreases. By using the liquid manures not only we can reach to the production of conversional farming but also cross it. While the economic and ecological impact of organic farming systems has been studied extensively in temperate little research has been done on the performance of organic farming in tropical regions. Recent case studies highlight the potential of organic farming for poverty reduction and more sustainable livelihoods in developing countries, but up to now this claims have lack of scientific evidences. Getting a clearer understanding of the productivity and profitability of tropical organic cotton farming system could thus having important implications for agricultural and development policies.

The preamble of organic farming has been aimed at conservation and optimized utilisation of all natural resources for a reasonable profitability under the guiding factors of sustainability of the farm. In order to keep a certain threshold of profit from the farms, all the farming practices have to be redesigned to undo the ill-effects that have crept in the current agricultural scenario while attempting to increase cotton

production in the prevalent cropping systems. A sense of balancing act to moderate the resource utilisation with anticipation for suspected damage to mother earth is the essence of organic farming. The organic protocols of farming could accentuate and aid in imparting improved momentum to the bio-dynamism of crop fields. Lesser stable and poor bio dynamism that has caused less-productive farms has alerted farmers on the question of long-term sustenance. At the end of this decade, it is quite satisfying to find that the above thoughts paved the way for increased adoption of non-chemical farming options. The happy marriage of conventional wisdom and rationalised modern agricultural technology has instilled sense optimism and hope to growers, especially in rain grown crops. The balancing act seems to be quite deft, but could have considerable impact on developing a better cause of modern Indian agriculture. The rain fed tract of central India, cotton is grown on three million hectare (i.e., 43% of total area) of arginal lands where production is low due to poorly distributed rainfall, and eroded undulating nature of lands and low resources investment by farmers. Such soils require low-cost and low external input production systems to minimise cost on fertiliser and pesticides for imparting stability in production. Cultivation of cotton with organic methods has helped farmers to improve sustainable productivity. The message on non-chemical and sustainable agriculture has pervaded too many parts of India and is hopefully making inroads into some of the southern cotton growing Indian states.

## II. MATERIALS AND METHODOLOGY

The study was carried out in chhindwara district of Madhya Pradesh. Study comprised 4 blocks namely Bichhua, Sausar, Mohkhed and Pandhurna. The locations of the study was selected purposively in the working areas of the host organisation. The design of the research work in the study was a cross sectional analysis, where information were collected from the beneficiaries at a single point of occasion. This design is chosen because it is economical, easy and flexible to analyse information and data. The only restriction for this framework of study was that some respondent did not respond appropriately for which the researcher had to face problems while collecting the data.

### Sampling Technique-

Random samplings as well as purposive sampling procedures were functional in the research area .Study covered total 90 respondent from 18 villages of these 4 blocks. The villages were selected purposively for the study. Villages were selected purposively because it has been reported that all villages do no practice organic non BT cotton. Only 97

villages practiced organic cotton cultivation from these 4 blocks. Selected all sampled villages were under organic cotton cultivation. Farmers were choose purposively through simple Random sampling. The state, district and blocks were purposively selected. For this study 25 samples were taken from 3 blocks namely sausar, Bichhua and Pandhurna. That means total 75 samples were selected from these 3 blocks. And 15 sample were selected from Mohkhed block due to existence of less no of organic cotton cultivated farmers and Scatteredness among them. In another hand, aggregator and ginning centre also selected through simple random sampling. Several aggregators were studied locally where farmers come to sale. Aggregator comprised small, medium and large. For the ginning centre 3 ginning was sampled for collecting information.

### Data Collection

The primary data was collected with a framework of structured Questionnaire to collect specific and general information from the selected Beneficiaries. For the preparation of the survey schedule first of all I have gone through many articles and journals about the topic and it helped me to formulate Questionnaire .After that I have checked this Questionnaire to the instructor for several times. And In this way my schedule got finalized for survey. In this Questionnaire I focused mainly marketing aspects of the raw cotton. It was mainly covered some basic info with marketing constraints and prospects. All the question was selected to draw an ultimate conclusion which will help to reach ultimate objective. Question type was both open ended and close ended. Question were selected to analyse both quantative and qualitative research The schedules included a division on background information including age, sex, educational status, marital status, Land holding, Farming experience, income, and occupation of the respondents. The Questionnaire for the organic cotton farmers were structured to collect qualitative as well as quantitative data on organic and inorganic cotton yield, cost of production, market Analysis , and income while the schedule for the Aggregator included questions on market, cost of purchasing and selling, Qualities sees during purchasing, business coverage area, channel of distribution and constraints in the business. Separately informal discussions and physical observations with the key respondents were used along with schedules to support the data of the survey.

## III. RESULTS AND DISCUSSIONS

### Overview of the farming system -

Farm land is the base of any crop production, to understand a supply chain it is very important to understand the land holding of the farmers of a particular location. So this was the first variable from where this study was stated.

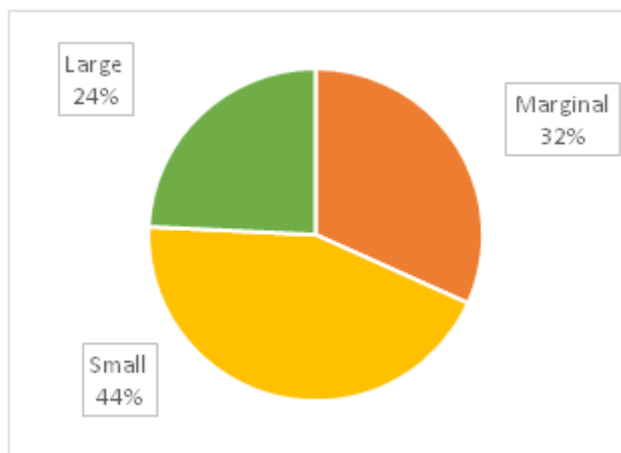


Chart 1 Details about the farm size in study location

**Size of farm-**

Farmers were asked about their farm size. It was classified into 3 major categories. The first group comprises marginal farmers those has less than 2.5 acre area. Second group called as small farmer, means those has more than 2.5 acre area but less than 5 acre. And third group called as large farmer who has more than 5 acre area. From the cart 1 it can be revealed that about 44% of the organic cotton farmers were small. And about 32% farmers were marginal. And near about 24 % farmers were large farmers. Therefore it is indicating that no of small farmers are more than others.

**Area under cotton cultivation-**

It will help to know importance of cotton in their farming practices. Total cotton cultivation area was divided into 2 major groups. One was under organic cotton cultivation area and other was inorganic cotton cultivation area. From the chart 2 it was clear that coverage area under organic cotton cultivation was only 23 % and area under inorganic cotton cultivation was 77 %. That means a greater share was occupied by inorganic cotton cultivation.

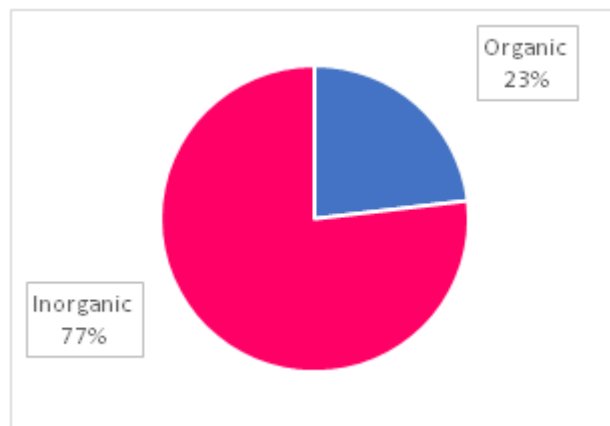


Chart 2 Details of the cotton cultivated areas

**Details about the farming approach-**

Farmers were asked about the farming approaches in the area under cotton cultivation at Sausar, Bichchua, Mokhed and Pandhurna blocks. From the survey it was found both Organic and inorganic approaches are done in the blocks. It will help to know block wise area under organic cotton in their farming practices and area under inorganic cotton in their farming practice. Chart three is describing the details about it. In Mokhed block totally organic approach is followed. But in the other blocks people mostly use the inorganic measures for the production of cotton.

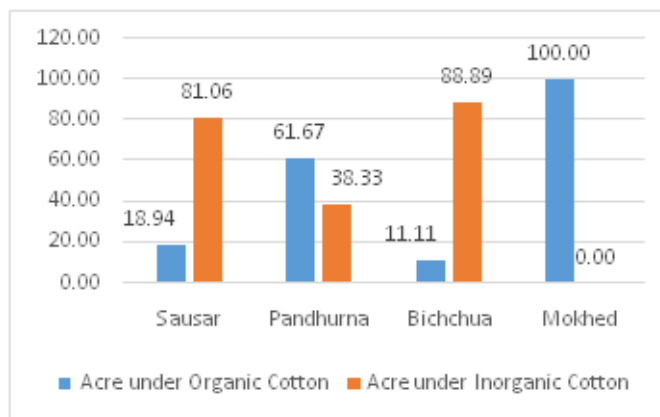


Chart 3 Details of Area distribution under different farming practices

**Variation in the seed verity –**

In the study location farmers have two different choice to be used, genetically modified and indigenous seeds. As it was known that organic approach do not bring a high yield in the genetically modified seed so the verity of the seed is a very important variable to be discussed. In this study. The cart four describes about this variable.

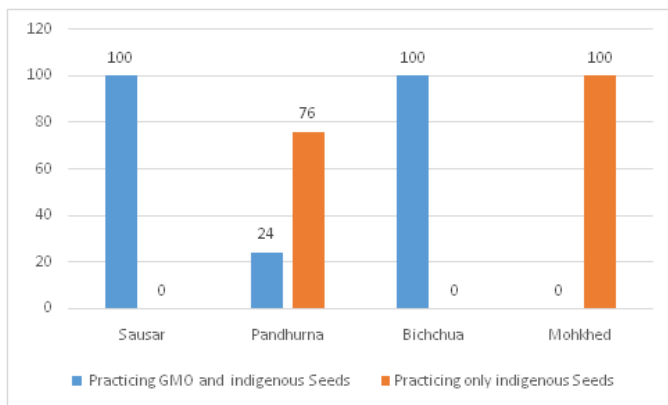


Chart 2 Variation in the plant variety

From the above chart it can be revealed that no one is there who only practicing indigenous seed cultivation in Sausar and Bichhua block. But for the Mohkded, all the farmers use only the indigenous seeds. In case of Pandhurna 24 per cent people use both the seeds and rest of the farmer only use the indigenous variety of seeds.

**Productivity analysis –**

In caparison of two types of farming approach a very important variable is the productivity. Here in this study also if we observe the productivity of the inorganic approach it pretty high than the organic approaches. The chart five describing it very clearly that in the four blocks it is high in case of inorganic approach rather than the organic.

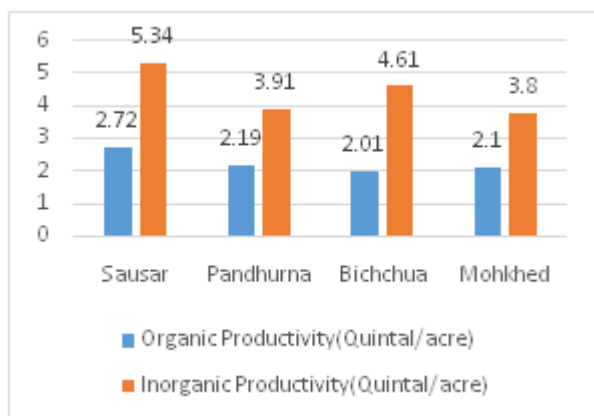


Chart 5 Details of the productivity

**Economics of the two farming systems –**

If we observe the table no 1 it can be found that the average production cost of the organic approach (Rs.1904.44) is quite low than the inorganic approach (Rs.10723.21). But the net income is very high in inorganic approach (Rs.12274.94) than the organic approach (Rs.10142.21). But if we observe the benefit cost ratio of the two approaches

organic approach is very high (6.3) than the inorganic approach (2.2). Inorganic approach may give high return but it needs also a very high investment where the organic approach brings the output almost same but with a very low input.

**Table 1 Economics of two approaches of farming for one acre land**

	Organic approach	Inorganic approach
Average Production cost (Rs.)	1904.44	10723.21
Average production (q/acre)	2.31	4.41
Average Unit Price (Rs.)	5215	5215
Gross Income (Rs.)	12046.65	22998.15
Net Income (Rs.)	10142.21	12274.94
B:C - ratio	6.3	2.2

**Market Analysis-**

Market plays an important role for agriculture activity. A market analysis studies the attractiveness and the dynamics of a special market within a special industry. It helps to learn a lot.

**Source of raw material for production-**

**a. Seed-**

Among 90 respondents 36.67 % respondent purchase seed from Money lender and 13.33 % respondent purchase seed from market . And 11 % respondent purchase seed from local seed dealer. 34 % respondent collects seed from FPC because they only practice non Bt. cultivation. During study it was recorded that those are practicing non Bt. they take seed from FPC. It also recorded that most of the small and marginal farmer always stick to same dealer. Whatever dealer will recommend to farmers, Farmers generally purchase and large farmers were always loyal to the brand and dealer. They experiment at their level and choose bet and implement that at own level.

**b. Compost and fertilizer and pesticides-**

Among 90 respondent 37 respondents means 41.11 % respondent told that they purchase Compost and fertilizer and pesticides from money- lender. 10 % respondent told that they purchase Compost and fertilizer and pesticides from market and other 10 % respondent told that they purchase Compost and fertilizer and pesticides from local dealer. 1.11 % respondent told that they purchase Compost and fertilizer and pesticides from Sevasahakari society. Generally Non Bt cultivars made Compost, fertilizer and pesticides in their home. Generally it has been seen that small and marginal farmer always stick to same dealer. Whatever dealer will recommend to farmers, Farmers generally purchase and large

farmers were always loyal to the brand and dealer. They experiment at their level and implement it.

Now it is very important to know what the reason to purchase inputs from particular individual. Reasons were listed and concluded that small and marginal farmers are resource poor. But a great amount of resource is needed to purchase inputs for production. As a results farmers goes to moneylender. He provides credit to farmer for input purchase. Some famers purchased cotton seed from market to get good quality seed. Generally these activities have shown among large farmers. Farmer generally takes inputs from society due to loan availability. Non Bt. farmers collected seed from FPC because of 100 % subsidy. And fertilizer, compost and pesticides was home made.

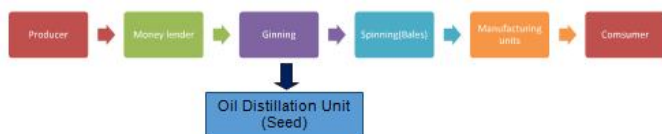
**Selling places –**

It can be revealed that 51.11 % respondent sale their produce to money lender. Here also recorded that Small and marginal farmers sale their produce to money lender specially. Some large farmer also gave produce to money lender due to no transportation cost, instant money and to save time. And 11. 11 % respondent sells their produce to ginning. It has also found that most of them are large farmers. All Non Bt cultivars sell their produce to FPC. They sell their produce to FPC because generally FPC gives premium price for that produce.

**Marketing channels Organic cotton –**

Marketing channel refers the involvement of intermediaries to transfer produce from point of production to point of consumption. Marketing channel was analysed to find intermediaries. Three marketing channel was found during analysis –

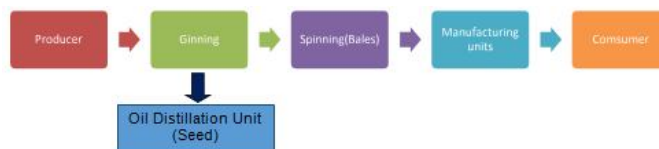
**Marketing channel-1**



The above diagram clears that producer sells produce to money lender. After that money lender sells in ginning centre. After that ginning separated seed and cotton. After that seed goes to oil distillation unit for oil preparation and cattle feed preparation. In another hand fresh cotton goes to another machine for bale preparation. There after Bale goes to spinning centre and prepare thread and thread goes to manufacture units. Ultimately different products made from it

and consume those products by consumer. This type of channel generally has shown among small and marginal farmer.

**Marketing Channel -2**



The above diagram clears that producer sells produce directly in ginning centre. After that ginning separated seed and cotton. After that seed goes to oil distillation unit for oil preparation and cattle feed preparation. In another hand fresh cotton goes to another machine for bale preparation. There after Bale goes to spinning centre and prepare thread and thread goes to manufacture units. Ultimately different products made from it and consume those products by consumer. This type of channel generally has shown among large farmer.

**Marketing Channel -3**



The above diagram clears that producer sells produce in VLCC (Village level collection centre) which is part of FPC. There after FPC sales produce to Bio Re Company. Then Bio Re company sales in ginning to separate seed and cotton. After that seed goes to oil distillation unit for oil preparation and cattle feed preparation. In another hand fresh cotton goes to another machine for bale preparation. There after Bale goes to spinning centre and prepare thread and thread goes to manufacture units. Ultimately different products made from it and consume those products by consumer. This type of channel generally has shown among non Bt cultivars.

**IV. CONCLUSION**

From the above discussion it is clear that in the study location there is a presence of two basic approaches of cotton cultivation. But it was found that though the inorganic approach gives a better productivity and profit still organic is the better option for the small and marginal farmers. Where there is a low capital in the hand investing a huge amount is

like a day dream for the farmer and very risky. Where through organic farming by investing less they can earn a benefit of nearly six times of the investment. But the problem is due to lack of grading and organic certification the organic cotton do not get the reliable price, it is also treated same as the inorganic one. If the pricing can be fixed for the organic cotton in such case the profit margin of the farmers may increase little more. Now coming to the marketing channels each channel has its specific follower. But if the number of middleman can be reduced it may increase the profit of the farmers.

## V. ACKNOWLEDGMENT –

This study was fully funded by the host organization Srijan(Self-Reliant Initiatives Through Joint Action). The researcher is expressing his deepest sense of gratitude to the concerned authority of the institute for financial assistance towards accomplishing the study. Other than that the community members of the location helped a lot during the study, the author also thanking them all.

## REFERENCES

- [1] Adams, J. A., Hamzah, Z. and Swift, R.S. (1991) Availability and uptake of boron in a group of pedogenetically-related Canterbury, New Zealand soils. *Australian Journal of Soil Research* 29, 415–423.
- [2] APEDA (2001) National Programme for Organic Production. Agricultural and Processed Foods Export Development Authority. Ministry of Commerce & Industry, Government of India. <http://www.apeda.com/organic>. Accessed 21.03.07
- [3] Baffes, J. (2004) Cotton. Market Setting, Trade Policies, and Issues. Washington: The World Bank. Bingham, F.T. (1982) Boron. In A. L. Page (ed.) *Methods of Soil Analysis, Part 2, Chemical and Microbiological Properties* (pp. 431–447).
- [4] Bhupal, D.S., 1995. Behaviour of Costs and Margins in the Marketing of Cotton over time in Haryana. *Indian Journal of Agricultural Marketing*, 9 (12): 64-65
- [5] Bhurao, J.S., 2012. Cotton Marketing and Production in India – A Study. *Golden Research Thoughts*, 2 (2)
- [6] Blaise, D., Rupa, T.R. and Bonde, A.N. (2004) Effect of organic and modern method of cotton cultivation on soil nutrient status. *Communications in Soil Science Plant Analysis* and 35, 1247–1261.
- [7] Clark, M.S., Horwath, W.R., Shennan, C. and Scow, K.M. (1998) Changes in soil chemical properties resulting from organic and low-input farming practices. *Agronomy Journal* 90, 662–671.
- [8] Day, P.R. (1965) Particle fractionation and particle-size analysis. In C.A. Black (ed.) *Methods of Soil Analysis, Part 1, Physical and Mineralogical Properties* (pp. 549–567).
- [9] Eyhorn, F., Ratter, S.G. and Ramakrishnan, M. (2005a) *Organic Cotton Crop Guide. A Manual for Practitioners in the Tropics*. Frick, Switzerland: Research Institute of Organic Agriculture FiBL.
- [10] Eyhorn, F., Ratter, S.G. and Ramakrishnan, M. (2005b) *Organic Cotton Training Manual*. Frick, Switzerland: Research Institute of Organic Agriculture FiBL. <http://www.fibl.org/english/cooperation/projects/documents/cotton-training-manual-text.pdf>.
- [11] Eyhorn, F. (2007) *Organic Farming for Sustainable Livelihoods in Developing Countries? The Case of Cotton in India*. Zurich, Switzerland: vdf Hochschulverlag AG.
- [12] FAOSTAT (2006) *FAO Statistical Database*. Food and Agriculture Organization of the United Nations. - <http://faostat.fao.org>.
- [13] Giovannucci, D. (2005) *Organic Agriculture and Poverty Reduction in Asia: China and India Focus*. Thematic evaluation. Rome: International Fund for Agricultural Development IFAD. [http://www.ifad.org/evaluation/public\\_html/eksyst/doc/thematic/organic/asia.pdf](http://www.ifad.org/evaluation/public_html/eksyst/doc/thematic/organic/asia.pdf).
- [14] Goklany, I.M. (2002) The ins and outs of organic farming. *Science* 298, 1889–1990. ICAC (2005) *Cotton: Review of the World Situation*. Washington: International Cotton Advisory Committee.
- [15] Klein, R.C. (2006) *Organic Cotton Market Report, spring 2006. An In-Depth Look at a Growing Global Market*. Market Reports. Berkeley: Organic Exchange. <http://www.organicexchange.org/marketreport.php>.
- [16] Klute, A. (1986) Water retention: Laboratory methods. In A. Klute (ed.) *Methods of Soil Analysis: Part 1– Physical and Mineralogical Methods* (pp. 597–618). Madison, WI: SSSA and ASA.
- [17] Kooistra, K. and Termorshuizen, A. (2006) *The Sustainability of Cotton. Consequences for Man and Environment*. Wageningen: Wageningen Agricultural University. <http://www.wur.nl/NR/rdonlyres/24D8701B-F547-4E5B-986E-1BD07BD2D263/21267/Rapport223binnenWEB.pdf>.
- [18] Krishnaiah, J., 1998. An Empirical Analysis of Cotton Marketing in Warangal District of Andhra Pradesh. *Indian Journal of Agricultural Marketing*, 12 (1-2): 6-15
- [19] Kulkarni, N.S., 1999. Marketing of Cotton in India. *Cotton Marketing, Handbook of cotton in India*, Indian Society for Cotton Improvement (ISCI), Mumbai.

- [20] Kumar, N.R. and et al., 1999. Performance of Market Intermediaries in Adoni Regulated Market of Kurnool District (AP). *Agricultural Marketing*, 42 (36-41).
- [21] Madison, WI: ASA. Blaise, D. (2006) Yield, boll distribution and fibre quality of hybrid cotton (*Gossypiumhirsutum* L.) as influenced byorganic and modernmethodsof cultivation. *Journal of Agronomy and Crop Science* 192, 248–256.
- [22] Pavaskar, M.G. and et al., 1970. Marketing Margins in Cotton. *Economic and Political Weekly*, 5 (13: 41-47).
- [23] Rai, K.N., 1980. Economic Aspects of Cotton Marketing in Haryana. *Agricultural Marketing*, 23 (19-25).
- [24] Ramamoorthy, K. and et al., 1999. Credit and Marketing Linkages among the Cotton Farmers of Warangal. *Indian Journal of Agricultural Marketing*, 13 (2: 85-91).
- [25] Tripathy, S., & Khan, A. (2020). Efficiency of Organic Farming to Maintain the Food Security and Doubling Farmer's Income in India. *International journal for science and advance research in technology*, 6(2), 324-327