

Adoption of Organic Farming: Farmers' and Consumers' Perspective

Dr. Jigna Trivedi

Associate Professor,
Shri Jairambhai Patel Institute of Business
Management and Computer Applications,
Gandhinagar, Gujarat

Dr. Bindiya Soni

Professor, Anand Institute of Management,
Anand, Gujarat

Abstract

In India, Green Revolution Technology, has led to many fold increase in food grains production but has resulted in to many grey areas such as soil degradation, water and environment pollution, decreasing soil fertility etc. It is proven that organic farming, an alternative farming system, can cure these problems of inorganic farming. The study is an attempt to explore the organic farming practices in detail. The research is an extensive one covering the supply as well as the demand side of organic farming. On supply side, the research analyses the current agriculture practices of non-organic farmers of Anand and Gandhinagar district and checks their preparedness to adopt organic farming system. On demand side, the study examines the awareness and willingness of the customers of both the district to buy organic food as compared to normal food as per the extended theory of planned behaviour (TPB). The findings suggested that the consumers of both the districts were influenced by the subjective norms, perceived control behaviour, knowledge, health consciousness, environment consciousness and have positive intentions to buy organic food over normal food.

Keywords:

Organic Farming, Agriculture, Environment, Biodynamic

JLE Classification: *Q1 and Q2*

Introduction

Farming is an independent self-employment occupation, which is either a feed or food for other sectors. Farmer is the father of the world as he produces all the items needed by society for its substantiality (Thaker and Thaker, 2006). Mother Nature has blessed India with varied types of soil and climate, which has a capacity to produce different varieties of food and non-food crops (Singh, 2014). India is a country of villages inhabited by many farmers. In the early days of Independence, there was no self-sufficiency because food for a day's square meal was not available. It was viewed very negatively in the eyes of International trade as India had to import food-grains. To overcome the sorry state of affairs, it decided to import chemical fertilizers instead of food-grains. Post-Independence was an experimental period during which different types of chemical

fertilizers were imported and used in the country. Big dams were constructed to provide water to the farmlands. This led to the birth of the green revolution and India which was a food deficit country turned out to be food exporting country. Our traditional farming practices are five thousand years old based on very scientific principles. Unfortunately, post-Independence Indian farmers have switched over to the inorganic farming under the wrong temptation of increased production. Farmers received transitory bumper production in short-time, all ancillary business dependent on agriculture also increased. Administrators and specialists started imparting knowledge to farmers (Thaker and Thaker, 2006 and Mather, Waized, Ndyetabula, Temu, and Minde, 2016). The shift has led to an increase in expenditure (Gupta and Hussain, 2014). The compound annual growth rate of expenses in farming has been 4.2% over the years (Sunder, 2018). Presently, agriculture sector employs more than 50% of the total workforce and contributes around 17-18% of the Gross Domestic Product (GDP). It is anticipated that the percentage of agricultural workers to total workers would drop to 25.7% by 2050 from 58.2% in 2001. This would be an alarming signal for the primary sector (Sunder, 2018).

Out of the total cultivable land only 5% to 10% area is under organic farming. Very few organic Self-help Group (SHGs) at district level is formed, but are slow movers in advocating organic farming. Non-government Organizations like 'PariyavaranShikshan Kendra', 'Jatan' and Society for Research and Initiatives for Sustainable Technologies and Institutions (SRISTI) have actively contributed to the movement of organic farming (Thaker and Thaker, 2006 and OFAI, n.d.).

The study based upon the farmers' and consumers' perspective attempts to understand the problems faced by the farmers related to non-organic farming and checks their awareness and preparedness to shift to organic farming. Besides, by applying extended TPB, the study tries to understand the perception of the consumers towards adoption and consumption of organic food.

Literature Review

The literature review is divided into various parts which are discussed below.

Rural Entrepreneurship

Rural entrepreneurship is a dynamic concept emerging to build enterprises at the village level in the fields such as industry, business and agriculture (Jayadatta, 2017). Farmers are treated as the biggest pillar of the rural transformation in terms of generating employment and eradication of poverty (Sharma *et al*, 2013). Farmers have to

adopt diversification, innovation etc with the changing times in order to survive (McElwee, 2006). If farmers are guided in the areas of primary agricultural techniques, the method of production, harvesting, processing, wholesaling, retailing, financial services, transport, packaging promotion, and advisory services then only farming would turn out to be a cost-effective business (Tripathi and Agarwal, 2015). The zero-based budgeting organic farming is an old concept practiced since the inception of the human civilization (Food and Agriculture Organization of the United Nations, 2016).

Inorganic Farming and Loss to the Eco-System

Rachel Carson of US in 1962 explained the disadvantages of chemical farming in his book (Silent Spring), by providing appropriate illustrations on how it harmed the people and animals. Usage of inorganic chemicals and fertilizers leads to serious health issues for farmers like dizziness when he sprinkles the medicine. Traces of DichloroDiphenylTrichloroethane (DDT) and Benzene Hexa Chloride (BHC) are noted in all edible items such as wheat, pulses, rice, groundnut, butter and ghee. With respect to the fundamental food-chain aspect it is also now identified in the milking animals. The human body faces terrible health problems such as, headache, weakness, vomiting, tremor, nausea, tension, stomach-ache, diarrhoea, perspiration, etc. Such poisonous chemical creates reproduction disorders, hormonal imbalance, affect the nervous system, cause different types of cancer and also weakens the immune system (Thaker and Thaker, 2006; Sharma and Singhvi, 2017 and Kumari, Kumar, and Rao, 2014). Inorganic farming has penalized human beings and Mother Nature in a very big way (Narayanan, 2005). Land has become saline, its fertility has decreased, spoilage of land structure, decline in land porosity, decline in humidity level, increase in soil erosion, low return on investments, increase in pest resistant mites, decrease in disease resistance in plants, death of helpful insects and small harmful bacteria eater insects, increase in pollution (land, water and air) are the negative outcomes on usage of inorganic fertilizers (Savei, 2012 and International Society of Organic Agriculture Research, 2012). It also resulted in loss of natural food taste, consistent increase in production cost, increase in labour cost, high mental stress, depletion of natural energy sources, increase in water requirement, decrease in land water-tables, reduction in the different breed of crops that required less water, increase in weeds etc (Aktar, Sengupta, and Chowdhury, 2009; Sharma and Chetani, 2017 and Food and Agriculture Organization of the United Nations, n.d.). Farmers and country both have become impoverished. Banks experienced difficulties in recovery of agriculture loans, farmers slipped in huge debt which created a sense of failure, disappointment, unrest

and violence (Thaker and Thaker, 2006; Qazi, 2017; Chahal, 2017 and Rana, 2018).

Sustainability through Organic Farming

Organic farming represents 'Gau-Seva', 'Dharti-Seva' and provides mankind with bountiful pure and fresh milk, vegetables, grains, and fresh oxygen-rich air (Kumar, 2016 and Pawar, 2012). Countries like UK, Germany, Cuba, Japan has endorsed organic farming. Bio-dynamic farming based on astrological aspect was propounded by Rudolph Steiner in Switzerland. Organic farming is known by different names such as 'Ecological Agriculture, Sustainable Agriculture, Natural Farming, and 'Rushi' Farming (Thaker and Thaker, 2006 and Hansen, 1996). Organic farming relates to treating farm, village and natural area as one, in such a way that the people including organisms dependent on the farm receive sufficient and nutritious food and other primary requirements. It is an interdependent arrangement in which the land, water, air, and plants are neither exploited nor polluted (Thaker and Thaker, 2006, Gurung, Sharma, and Dhalor, 2013 and ICAR, n.d.). It is very vital to understand that the resources which are available in plenty are to be kept at the central level, and other resources should be synchronized with the bountiful ones and it should be optimally used.

Benefits and Dissemination of Organic Farming

The traditional practices of organic farming reduces the expenses, generate savings and also improve the land quality which would increase the yield (Thaker and Thaker, 2006; Njeru, 2015; Organic Farming Research Foundation, 2012; Natturan, n.d. and Chait, 2018). Organic farming leads to a considerable reduction in usage of fertilizers (50%), water (35%), seeds (5%) and labour (20%) (Kumar, 2016 and Pawar, 2012). Farmers practicing organic farming have expressed that yield has not reduced and profits have not declined due to organic farming. It is believed that if there is rural development and villages become self-reliant then only poverty, grief, sorrow,

hunger, non-dignity could be eradicated. People would be self-employed and the country would progress in a true sense. Present day youth should also be encouraged to become farm entrepreneurs (Down to Earth, 2017). The best practices to disseminate knowledge on organic farming would be through experiments, directions, convention, seminar, travel, training, skit, local dialect ('Bhavai'), songs, publication, radio talks, exhibitions etc. Interaction with experienced and experts should also be promoted for removal of doubts (Kumar, 2016 and Pawar, 2012).

Modus Operandi for Organic Farming

Practices such as proper mulching of farm waste, intercropping, mixed cropping, crop rotation, organic manure, green manure, non-usage of inorganic fertilizers and pesticides, herbal pesticides, water conservation, usage of indigenous, disease-resistant seeds etc are the pillars of organic farming. Gobar gas, fertilizer plot etc helps in producing organic fertilizers. It is recommended that under the trees bay, crops such as jute, Moong etc is recommended. On the periphery of the farm, 'Subabul' and 'Gliricedi' biomass plants could be cultivated. In case of nutrients deficiency, cost-effective solutions such as bon-mill, tobacco dust, droppings of the rooster and poultry, residual cakes of Neem and castor, bacteria which can directly absorb nitrogen from atmosphere and transplant in land and bacteria which can provide the essential phosphorous to plants could be used in organic farming. 'Khetlavadi' could be prepared so that the rainwater percolates in the farmland itself, which replenishes the ground water table. Medicinal herbs like Aleovera, Neem etc could also be cultivated for enhancing income (Amujoyegbe, Agbedahunsi, Amujoyegbe, 2012 and Singhet *et al*, 2013).

The live illustrations of farmers who practiced organic farming and the eye-opener outcomes have been described in the Table.1.

Table 1: Learning from Lateral Community

Name of the Farmer with District	Input and Innovations	Outcome
Shri Dharmendra-Smita Soneje (Narmada)	<p>Seeds: Indigenous.</p> <p>Implements: Plough, Sickle, Axe, Thresher, Spade, Shovel, Cart, Fork, Hoe, Trowel etc.</p> <p>Fuel: Less of Diesel, More of Gobar Gas and Windmill.</p> <p>Animals: Gir Cows, Bullock, Calf.</p> <p>Fertilizer: Cow dung, Green Manure, Vermi-compost, Agro-waste compost, Compost from road-side leaves and plants, Droppings of birds and dead-bodies of bacteria and insects.</p> <p>Cropping Pattern: Mixed, Inter-Cropping, Crop Rotation, Permaculture.</p> <p>Irrigation: Small 'nicks' in the farm.</p>	<p>Independence: 90% livelihood items were served from outright cultivation.</p> <p>Yield: Output of produce increased to 150% Vs. 60% from the same farmland area.</p> <p>Income: Forward integration in food processing (squash, jam, jelly, edible oil, dal, pickle, wafer, chocolates, biscuits, medicinal powder, tooth powder etc)</p> <p>Agro Services: Workshops and service centres.</p> <p>Health: 12 hours non-tiring work, healthy body, good mental growth etc.</p>
Shri Mahendrabhai Bhatt (Narmada)	<p>Fertilizer: Organic, compost and residuals of castor oil cakes</p> <p>Welcome to Farmers Friend: Earthworm, Frog and useful bacteria.</p> <p>Water Usage: Limited and proper conservation.</p> <p>Cropping: Mixed Cropping.</p> <p>Human Excreta: Compost used in cotton cultivation.</p> <p>Practices: Sprinkled puffed rice to attract birds who after eating the same ate mites and pests.</p>	<p>Land Fertility and Yield: Increased.</p> <p>Health of Crops: Best.</p> <p>Fertilizer Cost: Zero.</p>
Shri Bhaskarbai Savae (Valsad)	<p>Main Cultivation: Horticulture crops (Coconut).</p> <p>Small Land Size (1 Acre): Paddy, Rice and Moong.</p> <p>Fertilizer: Concentrated Custard apple cakes and Neem cakes.</p> <p>Practices: Moong is cultivated as one plant of Moong transplants 5gram of nitrogen in the soil. Weeds are removed and kept near the crop for composting.</p>	<p>Output: Paddy (2,000Kgs), Wheat (660Kgs), Moong (600Kgs).</p> <p>Less Usage: Water, Farming, Fertilizer, Equipment and Capital.</p>
Shri Vinayakbhai Patel (Surat)	<p>Fertilizer: Organic, Jaggery water, 'Gaumutra', residuals of castor oil cakes.</p> <p>Implements: Spade, Tractor.</p> <p>Irrigation: Drip</p> <p>Main Crop: Banana</p> <p>Intercropping: Any winter crop or vegetable</p> <p>Practices: Weeds are removed and kept near the crop for composting.</p>	<p>Independence: Majority of the food needs are served from outright cultivation.</p> <p>Family Health: Good no yearly medical expense.</p> <p>Cultivation Cost: Reduced.</p> <p>Quality of Produce: Excellent, but not rewarded in terms of premium price by cooperatives (at par with other type of produce).</p> <p>Yield and Income: Increased.</p> <p>Farmer's Friend: Earthworm seen more.</p>

<p>Shri Sudhaben Patel (Navsari)</p>	<p>Implements: Cart, hoe, fork, tractor etc. Practices: Own seeds are produced for cultivation of paddy, Moong. Vegetable seeds are procured from market. Practices Crop rotation. Intercropping: Marigold, Tulsi, Curry leaves etc. For shining Chickoos the castor oil is mixed with ash and provided to plants. Fertilizer: Cow dung and Vermi-composting. Crop Protection: Light Pincer, Cats (to keep away rats), Boiled tobacco powder water, Animals' urine mixed in water during drip irrigation, stale butter milk, 'Gaumutra' and medicine made out of chilly, garlic and kerosene is sprinkled.</p>	<p>Farmer's Friend: Earthworm, Frog, Spider, Lizard, Snakes, Centipede is seen more. Different types of birds are seen near the orchard. Output: Excellent, attractive and in large quantity.</p>
<p>Shri Niranjan Bhatt (Bharuch)</p>	<p>Fertilizer: Used green manure, compost Gobar fertilizer, residuals of oil cakes, bone powder, vermi-compost. Practices: Mixed Cropping, Crop rotation.</p>	<p>Expense Reduction: Huge in cultivation of sugarcane. Output: Increase in yield and quality.</p>
<p>Shri Mudjibhai Bhalani (Bhavnagar)</p>	<p>Practices: Patience is required and the nature would perform its task (Paddy crops if turns yellow, the plant will absorb Nitrogen from land and automatically turn green, there is no need of using chemical fertilizer). Leaf manure, wooden sawdust sucks more water. 'Vinchodo' plants were planted. Sprinkled boiled water made from 'Ashwagandha and Tagar'. Planted trees. Fertilizer and Crop Protection: Cow dung, other animal dung, green manure, vermin-composting, 'Gaumutra'.</p>	<p>Pest Repellent: Due to sticky nature of the leaves of 'Vinchodo plant. Farmers' Friend: Sits on the trees and their droppings become manure. Owl sits on the trees and eats Rats. Output: Increase in yield and quality.</p>
<p>Shri Vijaybhai Shah (Kutch)</p>	<p>Implements: Shredder machine to cut the branches of trees for green manure making. Fertilizers: In cow dung sea algae, citrus buttermilk, Aleovera and other vegetation. Biomass from green leafy vegetables like Fenugreek, Coriander, Mustard, Spinach, Oats etc were made. Stopped using DAP and Super chemical fertilizers. Dung-cakes were used for both as fertilizer and biogas.</p>	<p>Output: Graded and branded as organic and sold in the market. Crop Combination: Thick roots and Pulses, Strong roots and Vegetables, food crops and Leafy vegetables.</p>
	<p>Crop: Variety pertaining to the district which is capable to fight-back the problems of water and disease. Followed mixed cropping and crop rotation. Water: Plants which consume less water were planted to fight the problem of huge water requirement. Drip irrigation was practiced. Pests: Planted those varieties which are pest resistant, practiced diverse planting. Built a set up to attract farmers' friend. 'Gaumutra' with cow dung was also used. Herbal medicines and believed in food-chain system to control pests. Weeds: Fertilizers were made from weeds and even sheep droppings were used to make it more fertile. Labour: Participative style was adopted, their fruitful suggestions were implemented. Birds stand: To attract birds. Grow Bajara and Jowar to attract birds.</p>	

<p>Shri RajnibhaiPatel (Sabarkantha)</p>	<p>Fertilizer: Cow dung, Bone powder and residual cakes. Green manure for castor, fennel and paddy. Cash Crops and Vegetables: residual oil cakes, bone powder etc. Ash was also be used to protect the plants. Seeds: Healthy, free from fungus and indigenous seeds were used. Weeds: For initial 45 to 60 days the plant should be free from weeds. After 60 days weeds cannot harm the plants.</p>	<p>Output: Good quality produce.</p>
<p>Shri Sarvadaman Patel (Anand)</p>	<p>Land Area and Cultivation Mix: Tress (10%), Fruit Trees (Vegetables and Green Fodder as intercropping) (20%), Banana, Papaya/Sugarcane (10%), Cereals and Pulses (20%), Vegetables (20%), Green Fodder (20%) and at least two rows of trees on the periphery of farm. Fertilizer: Compost, Green manure, vermi-compost fertilizer and cover on the open land. Fertilizer Quantity: Maize, Potato, Beet, Cabbage, Cauliflower, Sugarcane, Tomato and Banana (8-10 tons/acre); Onion, Garlic, Ginger, Wheat, Sunflower, Oats (4-6 tons/acre) and all pulses, Groundnut, Moong, Urad, Soyabean, Spinach and Coriander (2tons/acre).Vermi-compost usage of at least 2 to 3 tons per acre per year. Crop Rotation: First cultivation of deep-rooted crops (Tur), then medium-rooted (wheat), tubers (potato) and lastly leafy crops (spinach and coriander). High nutrition requirement crops should be followed by medium/low nutrition requirement crops should be cultivated. Seeds: Grown by own using organic farming only must be used. Animal Husbandry: Rearing of cow and milking animals provides lot of manure and urine. One cow per acre should be reared and its fodder should be grown in the own farmland only. Pesticides:Neem Oil, Garlic, Onion and Chilli paste mixed water, Aleovera, sour buttermilk etc.</p>	<p>Output: Promote biological varieties and curb the disease and mites nuisance. Green manure could be prepared from biomass such as jute, guvaretc.Vermi-compost increases plant's yield and it is a best alternative of urea. Tress: Curtails soil erosion and act as a shield against blowing wind. Crop Rotation: Usage of nutrients in optimal way, control on mites and diseases and weeds. Over a period of time, the problems of pests and mites would be negligible. Water Requirement: Reduces by 30% with the usage of compost manure. As time passes the water requirement would reduce to at least 40%. Organic Seeds: Crop remains healthy and disease resistant. Though production would be less but it is cheap and reduces the pesticides expenses. Animal Rearing: Provides good compost. Overall: The land will be fertile than other farmers, it will be healthy and provide more output. Birds will inhibit the farm which is a good sign as they are mite and insect eaters. Even 3-4 inch water would percolate deep in the soil due to porosity made by earthworms.</p>

(Adapted from Thaker and Thaker, 2006)

Consumers and Organic Products

There are many studies conducted in different countries that analyse the attitude of the consumers towards organic produce. A study by Lončarić (2009) reported the demand for organic food in Eastern Croatia. Consumers in Delaware and the Delmarva District, also favoured buying organic food (Byrne et al, 1992). In China, it is reported that the female and households with children are more likely to consume organic products to maintain a consistent image and impression for organic products. Health and safety were the key motivating factors for the consumers to buy organic products (Ganet al, 2014). As per the study of Consumers of Wales, motivations to purchase organic produce centred on health, taste, fewer chemicals and animal welfare (Timmins, 2010). A study conducted for European Union (EU) consumers indicated that the producers' should increase the knowledge of consumers regarding what is organic and what is not (Vukasović, 2015). Thus, all these studies highlight the fact that food safety is a major concern and the consumers are interested in buying organic food.

Further, there are many foreign studies that have applied the extended TPB model to investigate consumer behaviour towards organic food. A study by Michamet al (2017) concluded that consumers' attitude and perceived control behaviour significantly predicted consumption intention while subjective norms did not. However, the study of Tuan and Vinh (2016) indicated that all the three factors i.e. attitude, subjective norms and perceived control behaviour positively affected consumer behaviour in Vietnam. The findings of the study by Michamet al (2016)

(Thai Consumers) and Donahue (2017) (American consumers); were in line with the study by Tuan and Vinh (2016). Irianto (2015) brought out two more dimensions to TPB. The results of their research showed that health consciousness and environmental consciousness were the determinants of an individual's positive attitude to buy organic food. The study also stressed gender differences affecting consumer behaviour towards organic food.

Research Gap

The extensive literature review depicts that majority of the studies are conceptual in nature at international and national level describing the pros and cons of organic farming versus inorganic farming with respect to its impact on human life, land, and environment etc. Very few studies are empirical in nature explaining the necessity of organic farming and quantifying the benefits of the same. A couple of studies have provided illustrations of organic farming. None of the extensive studies pertains to Gujarat which describes the necessity and willingness of farmers to turn to organic farming. Further, as far as the consumers' attitude for organic food is concerned, there are many empirical studies found in international context. At national level and for Gujarat, the authors could not locate any specific study. The present paper tries to address this gap by checking the willingness of farmers to switch-over to organic farming and customers' readiness to buy organic products at a higher price. The paper also describes the sustainable model of organic farming adopted by various farmers of Gujarat. The paper highlights the importance of cultivation mix, input mix, and crop rotation.

Research Objective

Table 2: Research Questions, Context and Objectives

Research Questions	Research Context	Research Objectives
What is organic cultivation? How is it beneficial? How is it different from non-organic cultivation?	Literature Review	To understand the traditional organic farming practices for sustainable livelihood.
Are farmers willing for a makeshift from non-organic to organic farming? What are the key concerns and benefits for the same?	Empirical Analysis	To conduct an empirical analysis on the willingness of the farmers in Anand and Gandhinagar district to shift towards organic farming.
Are consumers willing to buy such organic food items? Do organic food items fit into the budget of consumers?	Empirical Analysis	To empirically identify the awareness and willingness of consumers to buy organic food items.

(Source: Authors' Compilation)

Operational Definition

As the study is based upon the extended TPB, the constructs used in the theory are explained below:

Table 3: Operational Definition for the Constructs of TPB

Construct	Explanation
Subjective Norms	Subjective norms refer to the belief that a person or a group of persons has to approve or disapprove specific behaviour. It relates to a person's beliefs about whether peers and people of importance to the person think he or she should engage in the behaviour.
Perceived Control Behaviour	This refers to a person's perception of the ease or difficulty of performing the behaviour of interest.
Knowledge	Knowledge refers to the person's existing awareness and familiarity for the specific behaviour.
Health Consciousness	It refers to the individual's ideology for health and fitness and resulting benefits from being healthy or fit.
Environment Consciousness	It means a person's belief about how his or her behaviour can harm or save the environment through a specific behaviour.
Intention to Buy Organic Food	Consumption intention is a measure of the willingness to consume the product and it is the probability that a consumer will consume a product.

(Compiled from Maichumet al,2017)

Research Methodology

It describes the roadmap to the research in table 4.

Table 4: Research Methodology

Parameter	Rural Farmers	Consumers
Research Design	Descriptive	
Sub-Type of Research Design	Single Cross Sectional	
Nature of Study	Quantitative	
Sampling Procedure	Non-Probability	
Sampling Technique	Snowball	Convenience
Sample Size	120	308
Sampling Duration	September, 2019 to November, 2019	
Sampling Extent	Charotar District	Anand and Gandhinagar
Sampling Unit	Households and Training Workshops	Households
Sampling Element	Farmer	Consumer
Research Approach	Survey	
Contact Method	Personal Visit	
Research Instrument	Questionnaire	
Nature of Survey	Conclusive	
Type of Questions	Open-Ended, Close-Ended and Multiple Choice	Close-Ended
Type of Scale	Non-Comparative	
Scale Measurements	Nominal and Ratio	Nominal, Interval and Ratio
Theme of Questions	Demographic, Cultivation, Problems, Barriers, Practices, Harmful Effects, Transformation and Support	Demographic, Purchase preference, Awareness and Planned Behaviour
Sources of Data Collection	Primary and Secondary	
Sources of Secondary Data	Online, Offline Journals and Books	

Tools for Secondary Data Collection	Internet and EBCO	
Data Processing and Management	SPSS	
Data Analysis	Frequency Table and Tabulation	
Descriptive Statistics	Percentage (%), Mean (X), Median (M) Mode (Z), Standard Deviation (SD), Minimum (Mini.) and Maximum (Maxi.)	
Inferential Statistics	Fisher's Exact Test	Independent Sample T test, One Way ANOVA

(Source: Authors' Compilation)

Data Analysis and Findings

It consists of two sections viz., Farmers and Consumer's Analysis.

Section-I Empirical Analysis on Farmers

It includes the following demographic analysis:

Table 5: Demographic and Fundamental Details Analysis

Parameters	Observed Statistics	Interpretation
Gender	Male:98% Female: 2%	Agriculture being the blue-collared activity is carried out by male.
Age (in Years)	X=48.29, M=48.50, Z=50, Mini:20, Maxi:75, SD:13.41	Youngsters as well as elders were actively involved in agriculture, which time and again proved to be major occupation of rural folks. Farming is an occupation without any condition at entry- level and is devoid of retirement.
Education	Illiterate: 9% Less than SSC:40% More than SSC:51%	Despite India being second largest in the field of agriculture, farmers are not educated in the niche area. None of the farmers was found to have any graduation level academic qualification or vocational training exclusively targeting agriculture development.
Land (in Vighas)	X=17.09, M= 10.50 and Z=10	According to the definition of Ministry of Agriculture and Farmers Welfare, based on the land holdings majority of the farmers could be categorized as small farmers who own land of 1-2 hectare.
Land Ownership	Owned:84% Leased:16%	Land being a precious source of income for farmers was owned by them. Leased farm land involved financial burden on farmers to pay rents on regular basis.
Primary Occupation	Farming:95% Non-Farming:5%	Farming being the sole source of income makes it necessary for farmers to make farming sustainable.
Farm Produce Gross Sales (Rs.)	Maxi: 30,00,000; Mini:20,000 and X=6,34,902	Variation in income was due to land-size, type of crops cultivated etc.

Animals reared	Cow: 8% Buffalo:28% Both:10% No Animals:54%	Farmers preferred to rear buffalo due to high fat content in the milk, which provided higher income. Majority of the farmers refrained from rearing animals because they considered it to be a tedious full-time work and often it was not favoured by the females of the house.
Number of Crops	Food Crops: X=1.96, M=2, Z=2, Maxi:9, SD:1.18 Non-Food Crops: X=1.50, M=2, Z=2, Maxi:4, SD:1.11	Majority of the farmers grew two food crops, which indicated non-optimum utilization of land. The way to sustainable farming was adoption of mixed cropping, crop rotation and inter-cropping technique to optimally utilize the land (Thaker and Thaker, 2006).
Organic Cultivation	Yes:8% No:92%	Organic farming being the ancient proven Indian concept was not followed by present day farmers. Majority farmers had turned to costly inorganic farming methods.
Purchase of Organic Produce	Yes:23% No:77%	Very few farmers bought organic produce. In the qualitative discussion it was understood that farmers believed organic to be costly and hence did not buy it.

(Source: SPSS Output)

Cultivation Varieties

The literature on organic farming emphasizes on sustainable farming which is a blend of cultivation of different types of food crops, vegetable crops, fruit crops, spices crops and flower crops based on the climatic and soil support of the district. It also emphasizes on mixed-cropping, inter-cropping and crop rotation for replenishment of nutrients in the soil.

Based on the on-field interaction with farmers, it was understood that farmers in the category of food and cash crop grew Paddy (19%), Tur (19%), Maize (16%), Wheat (15%), Cotton (13%), Castor (8%), Millet (5%), Sugarcane (2%) and 1% each cultivation of Kidney Beans, Urad, Soyabean and Tobacco were noted. Farmers in the category of vegetables grew Potato (22%), Elephant Yam (19%), Tomato (15%), Cluster-Beans (9%), Okra (9%), Brinjal (6%), Fenugreek (4%), Bitter-Gourd (4%) and Beans, Cabbage, Bottle-Gourd, Raw-Banana, Cow Peas, Pointed Gourd and Broad Beans were grown 2% each. In the case of fruit crop, farmers cultivated Mango (26%), Banana (21%), Chickoo (16%), Papaya (16%), 5% each grew Water-Melon, Berries, Guava and Pomegranate. 54% grew Chilly, 26% grew Mustard and 20% grew Sesame. Just two

farmers and one farmer grew Rose and Marigold respectively.

The qualitative discussion with the farmers highlighted that many farmers did not carry out multi-cropping or mixed-cropping or crop rotation. They just grew only one or two crops only and rest of the time land was kept idle. Some of the farmers did not grow any crop during the year. Under-utilization of resources led to increase in cost and as a result farmers treated farming as the most labourious and least monetary rewarding activity. In fact, this cannot be treated as a step towards sustainable farming. A farmer was noted to be not even self-sufficient in terms of fulfilling his own needs, in other words, farmer who grew food crops, bought vegetables and fruits from market.

Input Details

In response to the multiple choices question 98% farmers used Urea, 97% used Diammonium Phosphate (DAP) and 53% used other types of chemical fertilizer such as Nitrogen, Phosphorous and Potassium (NPK), Sulphur, Zinc etc. In the discussion it was noticed that all farmers also used chemical fertilizers of various brands in their fields. 87% farmers used Bacillus Thuringiensis(BT)

seeds. Thus, it may be inferred that majority of the farmers followed inorganic practices in cultivation. 92% farmers did not think of growing organic produce in their farm and 78% farmers did not even think of buying organic food in last two years.

Present Farming Problems

The analysis of affirmative response towards farming problems were; expensive farming (98%), lost land fertility

(95%), highest usage of fertilizers (93%), labour problems (98%), low return on investment (96%), shortage of funds (90%), non-immunization of plants (93%), low yield, despite more quantity usage (96%), excessive water usage (93%), exorbitant input prices (99%), non-respectable farming occupation (72%), low sales price (97%), frustration and disappointment (83%) and immunization of mites, insects etc to any pesticides (92%).

Barriers to Implement Organic Practices and Awareness on Organic Farming

The details are mentioned in table 6.

Table 6: Barriers and Awareness on Organic Farming

Barriers	Aware %	Not Aware %	Awareness	Aware %	Not Aware %
Economically not viable	46	3	Use of Cover Crops	85	8
Lower Yield	66	3	Use of green manures or animal manures	93	6
High Pest Infestation	53	3	Not using chemical fertilizers and pesticides	82	7
Increase in Work	73	5	Soil and water conservation	88	8
Non-Availability of Organic Seeds	58	4	Lower fossil fuel consumption	75	9
No Family Support	48	3	Avoidance of BT Seeds	63	10
Combination of inorganic items from lateral farms	69	3	Using mixed cropping pattern	84	8
Technically not feasible	51	3	Performing inter-cropping	63	12
Higher weeds	58	4	Not to burn the farm's agro waste	72	10
Diseases creep in plants	56	4	Use of crop rotations to fertilize the soil	82	8
High organic certification cost	62	4	Reduction of external and off-farm inputs	72	10
Lack of information	71	4	Focus on renewable resources	78	3
Non-availability of organic fertilizer in large quantity	70	4	Reduction of soil erosion	85	8
---	---	---	Less leaching of nitrate	56	9
---	---	---	Avoidance of genetically engineered seeds	74	10
---	---	---	Use of indigenous seeds only	84	9
---	---	---	Mulching of plant and agro waste	68	11
---	---	---	Using of indigenous milk cattle and farm cattle	88	6

(Source: SPSS Output)

From table 6, it may be inferred that farmers believed that turning to organic farming would increase their work-load (73%). Farmers cited the reason that they were not aware on the practices of organic farming (71%) and availability of organic fertilizer (70%) was also a big hindrance in adoption of organic farming. Proper education and training on techniques of organic farming would boost the morale of farmers to turn towards organic farming. Farmers were aware on dos' and don'ts of organic farming such as usage of animal manure or green manure (93%), using indigenous milk cattle and farm cattle (88%) and soil and water conservation etc. It is imperative to turn the awareness into willingness of adoption of organic practices for future cultivation.

Harmful Outcomes of Inorganic Farming and Adoption of Organic Farming

Saline land (82%); water, land and air pollution (95%); content of harmful inorganic chemicals in animals' milk (80%); deterioration in animal health (88%); decline in ground-water table (87%); contamination of edible items (95%); increase in health issues and cancer cases (96%)

and increase in soil-erosion and soil non-porosity (91%) were the major harmful outcomes of inorganic farming. 78% farmers affirmatively replied to turn to organic farming. 22% farmers who were not ready for organic farming expressed the worry on availability of large quantity of organic fertilizer, if they turned towards organic cultivation. A hypothesis was framed to administer the Fisher's Exact Test, H_{01} : *There is no association between rearing of animals and adoption of organic farming technique*. The test-results (P=0.38, Fisher's Exact Test) was not statistically significant, in other words there is an association between rearing of animals and adoption of organic farming technique. If animals are reared by the farmers, they may easily obtain the organic fertilizer at no cost. On other hand if the organic fertilizer is purchased from the market then it adds to the cost. Thus, it may be inferred that agriculture and animal husbandry are interdependent activity. Animals assist in practising zero-budget farming.

Source of Information and Support

The details are mentioned in table.7.

Table 7: Information Sources and Support

Sources	%	Support	%
Published Material (Books, Government Publication)	88	Availability of subsidy	96
Television	81	Local distribution system	92
Krishi Mela	88	Training for learning new innovations	90
Mobile Application	84	Liberal export policy	85
Convention	79	Remunerative prices on sale of produce	89
Radio	36	Guidance from experienced and experts	86
Newspaper	76	---	---
Workshops	82	---	---
Toll Free Talk	69	---	---

(Source: SPSS Output)

It may be inferred that Krishi Mela and published material were a lateral learning and ready reckoner source respectively, which, would serve as a best platform of sharing information and innovations in organic farming. Availability of subsidy (which would ease the cost pressure) and local distribution system (which would ensure quick supply and sale of perishable product) were

the important support expected by the farmers.

Section-II Empirical Analysis on Consumers

The analysis and the findings of the study based on consumers' preferences for consumption of organic food are presented in the following section.

Demographic Profile of the Respondents

Table 8: Demographic Profile of the Respondents

Demographic Variables	Frequency	Percentage (%)	
Gender	Male	130	42
	Female	178	58
	Total	308	100
	SSC	38	12
Education	HSC	72	23
	Graduation	147	48
	Post-Graduation	51	17
	Total	308	100
Occupation	Salaried	107	35
	Business	67	22
	Professional	54	18
	Housewives	66	22
	Retired	9	3
	Total	303	100
Age (years)	Below 20	32	10
	21-30	101	33
	31-40	96	31
	Above 40	79	26
	Total	308	100
Monthly Income (Rs.)	Less than 25000	110	38
	25001-40000	90	32
	40001-55000	53	19
	Above 55001	32	11
	Total	308	100
Eating Habits	Vegetarian	215	70
	Non-Vegetarian	79	26
	Eggitarian	14	4
	Total	308	100

(Source: Primary Output)

From table 2, it may be observed that in the present study, the female respondents were higher as compared to male. The research suggests that women are more proactive in the consumption of organic food due to the habit of eating healthy diet (Olivas and Bernabéu, 2012). As far as education is concerned, 65% of the respondents were either graduated or post graduated. The respondents with higher education are more likely to consume organic food. Their occupational profile suggested that majority of them were salaried individuals (35%), followed by business persons (22%) and housewives (22%).

The age of the respondents suggested that, majority of them were below 40 years (74%). 26% of them were above 40 years. Thus, the study has focused upon respondents of all the age categories. The distribution of the disposable income highlighted the fact that 70% of the respondents were either falling below Rs.25000 or between Rs.25001 to

Rs. 40000. Consumption of organic food is income dependent. Increase in disposable income may lead to higher consumption of organic food (Smith et al; 2009). Further, the analysis of the eating habits of the respondents suggested that 70% of them were following vegetarian diet pattern. This may prove to be a favourable condition for consumption of organic fruits and vegetables.

Buying the Vegetable/Food Items

The respondents were asked to mark the person who goes for buying vegetables/food items in the family. The analysis suggested that majority of the respondents buy the vegetables on their own (37%), followed by mother-in law (23%), spouse (19%), father-in-law (13%) and cook or maid (8%). It may be interpreted that the adult family members in the study took an active part in the process of buying the vegetables for their family requirement.

Awareness for Organic Food

The respondents were asked to rate their awareness for the organic food on a scale of 1 (Very Low) to 5 (Very High). The descriptive statistics for the same highlighted that the mean awareness of the respondents was 3.44 with the standard deviation of 0.99. Thus, the awareness of the respondents for the organic food in the Anand and Gandhinagar district was between average to high. This may be considered as an encouraging outcome for the consumption of organic food. Further, the awareness of males and females for the organic food was compared with the help of Independent sample T test. The results suggested that there was no significant difference in the awareness of Males (Mean (X)=3.38, Std. Dev (SD)=1.03) and females (X=3.48, SD=0.95) for organic food, $t(306)=-0.814$, $p=0.416$.

Further, the study compared the awareness for organic food

among the respondents of different age category with the help of One Way ANOVA test. The result revealed that there was no significant difference in the awareness of the respondents among different age groups, $F(3,304)=1.277$, $p=0.282$. The mean awareness of the respondents ranged from 3 (average) to 4 (high).

Consumers' Perception for Organic Food

The theory of Planned Behaviour (TPB) consisting of *subjective norms, perceived control behaviour, knowledge, health consciousness, environment consciousness and intention to buy organic food* was applied to examine the perceptions of consumers for organic food consumption. The respondents were asked to rate their perceptions related to the stated parameters on a scale of 1 (Strongly Disagree) to 5 (Strongly Agree). The descriptive statistics of the same are presented in table 9.

Table 9: Descriptive Statistics and T-Values of Consumer Perception for Organic Food

Statements	Mean	Std. Deviation
Subjective Norms		
Family think that organic food should be purchased than normal food.	3.85	0.96
Close friends think that organic food should be purchased than normal food.	3.55	0.95
Most important people think that organic food should be purchased than normal food.	3.57	0.98
Perceived Control Behaviour		
Resources, time and willingness to purchase organic food.	3.70	0.97
There exist plenty of opportunities to purchase organic food.	3.56	0.99
Confident that organic food can be purchased whenever wanted.	3.77	1.01
Knowledge		
Would gain substantial information before the purchase of organic food.	3.70	0.91
A deeper insight of the inputs, processes and impacts of products before purchase is required.	3.77	0.87
Prefer to check the eco-labels and certifications on organic products before purchase.	3.96	0.92
Health Consciousness		
Health problems can be minimized if organic food is consumed.	3.97	0.90
One can think of own self as a health conscious consumer.	3.84	0.93
Environment Consciousness		
One can contribute to environment if one starts buying organic food.	3.84	0.89
The harm being done to plant and animal life by pollution creates sadness.	3.90	0.88
Water resources could be saved if the organic food is bought.	3.78	0.98
Buying organic food is one way to solve the issue of global warming.	3.77	1.07
One would be willing to stop buying products from companies guilty of polluting the environment.	3.83	0.86
Intention to Buy Organic Food		
One intends to purchase organic food next time rather than normal food.	3.94	0.85
One would consider switching to eco-friendly brands for ecological reasons.	3.89	0.87

(Source: SPSS Output)

For the subjective norms, for all the given statements, the mean values were observed to be higher than 3.5, suggesting that respondents agreed to the fact that close friends, family and all the important persons think that the respondents should buy organic food. Thus, the network of the close ones would influence the intention of buying organic food. The possibility of occurrence of the given behaviour increases when an individual has the ability, information, opportunity and motivation to perform that behaviour. The fact was validated from the analysis of the perception for Perceived Control Behaviour. The mean values higher than 3.5 again reflected that the respondents believed that they have the required resources, time, willingness and opportunity to buy organic food. Further, the respondents believed that they would like to get information about the organic product before they purchase and they do so by checking the product labels and certifications (Mean values equal to and higher than 3.7). For the construct of Health and environment consciousness, the mean values were observed to be higher than 3.7 suggesting that the respondents agreed that by buying organic products they can reduce the harm to their own health as well as environment. Lastly, for the construct of intention to buy organic products, the mean values close to 4, reflected that the respondents had positive intentions to buy the organic products next time. The study also checked upon their willingness to pay higher for the organic food. As per the results, 67% of the respondents showed positive response that they are willing to pay higher price for buying organic food.

Conclusion

The study addressing the farmers' and consumers' perspective for organic farming/food in Anand and Gandhinagar district is comprehensive in nature. On the farmers' side, it has produced some useful insight for the existing farming practices and the problems related to the same. The major issues related to present farming practices relate to higher expenses, decrease in the fertility of land, labour problems, lower yield, low return on investment, shortage of funds, excess water usage, higher input cost, lower sales, farming not considered as respectable occupation etc. Further, majority of the farmers were aware about the benefits of practicing organic farming and showed their willingness to adopt organic farming provided they are properly guided. Considering this, policy makers, experts in the field of organic farming, agriculture universities etc., can take up the task of arranging seminars and workshops to spread the information about organic farming practices. Krishi Melas and Printed Brouchers could also be used. At Anand, Shri Sarvadaman Patel as discussed in the paper, is already conducting such hands on workshops for the benefit of the farmers and people at

large. The researchers were fortunate to meet the beneficiaries of this programme and they were all concerned and enthusiastic to learn organic farming and teach to their community members. Such initiatives need to be intensified on a larger scale to spread awareness and allow conversion to the organic farming practices.

On the consumers' side, application of extended TPB model to the adoption of organic food suggested that subjective norms, perceived control behaviour, knowledge, health and environment consciousness, intention to buy organic food in future were all noted to be positive. Even, majority of the respondents agreed to shell out higher price if such food is available.

At present there is a vicious cycle. Due to the lack of proper information and guidance, the farmers are not adopting organic farming practices and since such organic food is not produced on a larger scale and is not widely available; the consumers are not being able to purchase the same. To end this cycle, the study suggests that nationally the campaign for spreading the organic farming literacy should be popularised and the farmers and the consumers should be incentivised for adoption of sustainable agriculture.

Acknowledgement

We are heartily thankful to Dr. Lipsa Raval (Principal-National Institute of Cooperative Management, Gandhinagar) for extending the support for data-collection from farmers. We also express our gratitude to Shri Sarvadaman Patel, an agronomist and the owner of Bhaikaka Krishi Kendra at Anand, for giving his valuable time and explain the organic farming practices at his farm.

References

- Aktar, W., Sengupta, D., & Chowdhury, A. (2009, March). Impact of pesticides use in agriculture: their benefits and hazards. Retrieved December 21, 2018, from PMC: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2984095/>
- Amujoyegbe, B., Agbedahunsi, J., & Amujoyegbe, O. (2012, June). Cultivation of Medicinal Plants in Developing Nations: Means of Conservation and Poverty Alleviation. Retrieved December 15, 2018, from <https://pdfs.semanticscholar.org/edd1/fe94783492bbd7e1a25511f578a2ba493c4f.pdf>
- Byrne, P., Toensmeyer, U., German, C., Muller, H. (1992). Evaluation of Consumer Attitudes Towards Organic Produce in Delaware and the Delmarva District. *Journal of Food Distribution Research*. 29-44. Retrieved December 31, 2018, from <https://ageconsearch.umn.edu/bitstream/27187/1/>

23010029.pdf

- Chahal, D. (2017, April 16). Reasons for the Plight of Indian Farmers and Options to Redress the Challenge. Retrieved December 19, 2018, from Olive Greens Institute: <http://www.olivegreens.co.in/blog/reasons-for-the-plight-of-indian-farmers-and-options-to-redress-the-challenge>
- Chait, J. (2018, September 4). How Organic Farming Benefits the Environment. Retrieved December 18, 2018, from The Balance Small Business: <https://www.thebalancesmb.com/environmental-benefits-of-organic-farming-2538317>
- Down to Earth. (2017, January 25). How to inspire India's youth to take up farming? Retrieved December 26, 2018, from <https://www.downtoearth.org.in/news/agriculture/how-to-inspire-india-s-youth-to-take-up-farming-56849>
- Donahue, M. (2017). Theory of Planned Behavior Analysis and Organic Food Consumption of American Consumers. Dissertation. The Royal University of Agriculture. Retrieved January 8, 2018 from <https://scholarworks.waldenu.edu/cgi/viewcontent.cgi?article=4661&context=dissertations>
- Fact Monster. (n.d.). Early Farming. Retrieved December 26, 2018, from <https://www.factmonster.com/dk/encyclopedia/history/early-farming>
- Food and Agriculture Organization of the United Nations. (n.d.). Effects of Intensive Fertilizer Use on the Human Environment. Retrieved December 23, 2018, from Soils Bulletin: <http://www.fao.org/docrep/017/aq378e/aq378e.pdf>
- Food and Agriculture Organization of the United Nations. (2016). Zero Budget Natural Farming in India. Retrieved December 25, 2018, from Agroecology Knowledge Hub: <http://www.fao.org/agroecology/detail/en/c/443712/>
- Gan, c., Zhiyou, C., Tran, M., Cohen, D., Xiangxiang, W. (2014). Consumer attitudes toward the Purchase of Organic Products in China. Faculty of Agribusiness & Commerce. Lincoln University. Retrieved December 31, 2018 from <https://researcharchive.lincoln.ac.nz/bitstream/handle/10182/6904/FAC-wp-15%20Gan%2C%20Zhiyou%2C%20Tran%2C%20Cohen%2C%20Xiangxiang.pdf?sequence=>
- Gupta, A., & Hussain, N. (2014). A Critical Study on the Use, Application and Effectiveness. Retrieved December 26, 2018, from <http://www.icontrolpollution.com/articles/a-critical-study-on-the-use-application-and-effectiveness-191-194.pdf>
- Gurung, K., Sharma, P., & Dhalor, M. (2013). Comparative study of India's organic agriculture with the Leading Countries: Europe and U.S.A. Retrieved November 30, 2018, from <http://www.iosrjournals.org/iosr-javs/papers/vol2-issue4/F0242639.pdf>
- Hansen, J. (1996). Is Agricultural Sustainability a Useful Concept? Retrieved December 26, 2018, from <http://www.masterhdfs.org/masterHDFS/wp-content/uploads/2014/05/Hansen-Is-AgriculturalSustainability-copy.pdf>
- ICAR. (n.d.). Base Paper on Organic Farming. Retrieved December 22, 2018, from <https://www.icar.org.in/files/Base-Paper-Organic-Farming-%20Base-16-03-2015.pdf>
- International Society of Organic Agriculture Research. (2012, July). Innovative organic farming in India. Retrieved December 26, 2018, from <http://orgprints.org/24678/7/24678.pdf>
- Irianto, H. (2015). Consumers' Attitude and Intention towards Organic Food Purchase: An Extension of Theory of Planned Behavior in Gender Perspective. International Journal of Management, Economics and Social Sciences. 4 (1). 17-31. Retrieved January 8, 2018 from <http://www.ijmess.com/volumes/volume-IV-2015/issue-I-03-2015/full-2.pdf>
- Lončarić, R., Deže, J., Ranogajec, L/ (2009). Consumers' attitudes analysis regarding organic food in Eastern Croatia. 4th Aspects and Visions of Applied Economics and Informatics. 411-418. Retrieved December 31, 2018 from <https://bib.irb.hr/datoteka/397531.52.pdf>
- Maichum, K., Parichatnon, S., Peng, Ke., (2017). Developing an Extended Theory of Planned Behaviour Model to Investigate Consumers' Consumption Behaviour toward Organic Food: A Case Study in Thailand. International Journal of Scientific & Technology Research, 6 (1), 72-80. Retrieved January 8, 2018 from <https://www.ijstr.org/final-print/jan2017/Developing-An-Extended-Theory-Of-Planned-Behavior-Model-To-Investigate-Consumers-Consumption-Behavior-Toward-Organic-Food-A-Case-Study-In-Thailand.pdf>
- Maichum, K., Parichatnon, S., Peng, Ke., (2017). Application of the Extended Theory of Planned Behavior Model to Investigate Purchase

- Intention of Green Products among Thai Consumers. Retrieved January 8, 2018 from https://www.researchgate.net/publication/309396817_Application_of_the_Extended_Theory_of_Planned_Behavior_Model_to_Investigate_Purchase_Intention_of_Green_Products_among_Thai_Consumers
- Jayadatta, S. (2017, September). Major Challenges and Problems of Rural Entrepreneurship in India. Retrieved December 15, 2018, from <http://www.iosrjournals.org/iosr-jbm/papers/Vol19-issue9/Version-2/D1909023544.pdf>
- Kumar, V. (2016, December 19). Importance of Agriculture in India. Retrieved December 26, 2018, from Klient Solutech: <http://www.klientsolutech.com/agriculture-in-india/>
- Kumari, A., Kumar, K., & Rao, N. (2014). Adverse Effects of Chemical Fertilizers and Pesticides on Human Health and Environment. Retrieved December 26, 2018, from <https://www.jchps.com/specialissues/Special%20issue3/34%20jchps%20si3%20addn%20K.Anitha%20Kumari%20150-151.pdf>
- Maichum, K., Parichatnon, S., Peng, Ke., (2017). Developing an Extended Theory of Planned Behaviour Model to Investigate Consumers' Consumption Behaviour toward Organic Food: A Case Study in Thailand. *International Journal of Scientific & Technology Research*, 6 (1), 72-80. Retrieved January 8, 2018 from <https://www.ijstr.org/final-print/jan2017/Developing-An-Extended-Theory-Of-Planned-Behavior-Model-To-Investigate-Consumers-Consumption-Behavior-Toward-Organic-Food-A-Case-Study-In-Thailand.pdf>
- Mather, D., Waized, B., Ndyetabula, D., Temu, A., & Minde, I. (2016, June). The Profitability of Inorganic Fertilizer Use in Smallholder Maize Production in Tanzania: Implications for Alternative Strategies to Improve a Smallholder Maize Productivity. Retrieved December 26, 2018, from https://ageconsearch.umn.edu/bitstream/245891/2/TZ_smallholder_profitability_of_fertilizer_use_finalWP.pdf
- McElwee, G. (2006, January). The enterprising farmer: a review of entrepreneurship in agriculture. Retrieved December 25, 2018, from Research Gate: https://www.researchgate.net/publication/265245033_The_enterprising_farmer_A_review_of_entrepreneurship_in_agriculture
- Narayanan, S. (2005). Organic Farming in India: Relevance, Problems and Constraints. Retrieved December 20, 2018, from Notional Bank for Agriculture and Rural Development : <https://www.nabard.org/demo/auth/writereaddata/File/OC%2038.pdf>
- Natturan. (n.d.). The Benefits of Organic Agriculture: Review of Scientific Research & Studies. Retrieved December 17, 2018, from http://www.natturan.is/site_media/uploads/tun_benefits_of_oa.pdf
- Njeru, M. (2015, December). Challenges and Benefits of Organic Farming among Farmers in Nembure Division, Embu County-Kenya. Retrieved December 1, 2018, from *International Journal of Humanities and Social Science* : http://www.ijhssnet.com/journals/Vol_5_No_12_December_2015/7.pdf
- OFAI. (n.d.). Organic Farmers and Farms in Gujarat. Retrieved December 24, 2018, from <http://ofai.org/wp-content/uploads/2011/04/Organic-Farmers-and-Farms-of-Gujarat.pdf>
- Organic Farming Research Foundation. (2012, August). Organic Farming for Health and Prosperity. Retrieved December 18, 2018, from <https://www.ofrf.org/sites/ofrf.org/files/docs/pdf/HP-report-web.pdf>
- Pawar, V. (2012). Trends of Organic Farming in Dhule District. Retrieved December 15, 2018, from https://shodhgangotri.inflibnet.ac.in/bitstream/123456789/330/2/02_introduction.pdf
- Qazi, M. (2017, February 8). India's Bitter Seeds: The Plight of Small Farmers. Retrieved December 24, 2018, from *The Pulse*: <https://thediplomat.com/2017/02/indias-bitter-seeds-the-plight-of-small-farmers/>
- Rana, R. (2018, February 1). Plight of farmers in India. Retrieved December 19, 2018, from *State*: <http://news.statetimes.in/plight-of-farmers-in-india/>
- Savei, S. (2012, February). An Agricultural Pollutant: Chemical Fertilizer. Retrieved December 23, 2018, from <http://www.ijesd.org/papers/191-X30004.pdf>
- Sharma, A., & Chetani, R. (2017, February). A Review on the Effect of Organic and Chemical Fertilizers on Plants. Retrieved December 26, 2018, from *International Journal for Research in Applied Science & Engineering Technology (IJRASET)*: <https://www.ijraset.com/files/serve.php?FID=6329>

- Sharma, M., Chaudhary, V., Bala, R., & Chauhan, R. (2013). Rural Entrepreneurship in Developing Countries: Challenges, Problems and Performance Appraisal. Retrieved December 20, 2018, from Global Journal of Management and Business Studies: https://www.ripublication.com/gjmbv3n9_16.pdf
- Sharma, N., & Singhvi, R. (2017, December). Effects of Chemical Fertilizers and Pesticides on Human Health and Environment: A Review. Retrieved December 25, 2018, from International Journal of Agriculture, Environment and Biotechnology: <http://ndpublisher.in/admin/issues/IJAEBv10n6f.pdf>
- Singh, K., Kumar, A., Singh, R., & Kumar, U. (2013, October 11). Medicinal and Aromatic Plants for Enhancing Farm Income: The Case of Bihar. Retrieved December 19, 2018, from Munich Personal RePEc Archive: https://mpra.ub.uni-muenchen.de/50571/1/MPRA_paper_50571.pdf
- Singh, P. (2014). Population and Agro Climatic Zone in India: An Analytical Analysis. Retrieved December 26, 2018, from <https://core.ac.uk/download/pdf/81121640.pdf>
- Smith, T., Huang, C., Lin, B. (2009). Does price or income affect organic choice? Analysis of US fresh produce users. *Journal of Agricultural and Applied Economics* 41(3), 731-744, Retrieved January, 2019 from <https://pdfs.semanticscholar.org/816c/142e6d87f747d3aa0660515239e0fc1bf0ce.pdf>
- Sunder, S. (2018, January 29). India economic survey 2018: Farmers gain as agriculture mechanisation speeds up, but more R&D needed. Retrieved December 24, 2018, from Financial Express: <https://www.financialexpress.com/budget/india-economic-survey-2018-for-farmers-agriculture-gdp-msp/1034266/>
- Thaker, K., & Thaker, R. (2006). *Healthful Farming and Organic Crop Production ('Poskah Kheti ane Sajiv Pak Utpadan')*. Gandhinagar: Shri Naryan Printing Press.
- Timmins, C. (2010). Consumer Attitudes towards Organic Food. Retrieved December 31, 2018 from http://www.organiccentrewales.org.uk/uploads/ca_survey_br_phase_2_report.pdf
- Tripathi, R., & Agarwal, S. (2015, February 28). Rural development through Agripreneurship: A study of farmers in Uttar Pradesh. Retrieved December 14, 2018, from Global Journal of Advanced Reserach: file:///C:/Users/Jigna_2/Downloads/Agripreneurs hipinup.pdf
- Tuan, T., Vinh, T. (2016). An Exploration in the Theory of Planned Behavior: a Case of Organic Food in Vietnam. *IJABER*, 14(6), 4951-4972. Retrieved January 8, 2018 from https://www.researchgate.net/profile/Tuan_Tran77/publication/309060874_An_exploration_in_the_theory_of_planned_behavior_A_case_of_organic_food_in_Vietnam/links/5be021944585150b2b9fae88/An-exploration-in-the-theory-of-planned-behavior-A-case-of-organic-food-in-Vietnam.pdf?origin=publication_detail
- Vukasovič, T. (2015). Attitudes towards organic fruits and vegetables. *Agricultural Economics Review*. 16(1). 20-34. Retrieved December 31, 2018 from https://www.eng.auth.gr/mattas/16_1_2.pdf.