CHAPTER 1
INTRODUCTION

1.1 RESEARCH BACKGROUND

India supports about one sixth of the global population. Its population is expanding rapidly, with an annual growth rate of 1.4 percent. To meet the needs of an additional 18 million people every year, India has to focus on enhancing agricultural production (GoI 2014). The land area of India constitutes about 2.3 percent of the total global land mass. Agriculture plays a crucial role in Indian economy; over 65 percent of rural Indians depend on farming and allied activities, which are also their vital means of livelihood. About one third of Indian GDP is being contributed by agriculture and its sub allied sectors.

The role of fertilizer in enhancing agricultural output was realized soon after success of green revolution; the contribution of the use of fertilizers to the success of green revolution was reported to be more than 50 percent by scientists. The advent of chemical fertilizers has improved the outcomes of food security missions in various countries. Therefore, it is important to understand the changing nature of fertilizer markets and farmers purchase behavior, policies and other influencing factors.

As a follow-up of Indian policy developments, India has initiated major structural policy changes from the first five-year plan. Examples include the white and green revolutions; the green revolution was aimed towards

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1Annual report, Department of Fertilizers, government of India, 2014.
increasing crop production whereas white revolution aimed to enhance milk production. Fertilizers played critical roles in the success of India’s green revolution (Bruinsma 2003, Hopper 1993, Pinstrup-Andersen & Hazell 1985). Farmers treated fertilizers as their utmost agricultural input purchase item as it enhances crop yield. Thus, the agricultural workforce is a major component of the fertilizer industry.

In India, the fertilizer industry has become well established in recent decades, due to favorable and flexible government policies. There is an exclusive ministry that functions under the Government of India to cater to the production and distribution (allocation) of fertilizers across all districts of India. The supply of fertilizer is placed under the category of “essential commodity”, and the maximum retail price (MRP) is fixed in consultation with the Government of India because fertilizers are largely subsidized for farming but not for industrial consumption.\(^2\) The business turnover of the Indian fertilizer industry was 1.75 Lakh thousand cores (INR) in 2015-16 (Appendix-1& 2), and in the pro-agrarian state of Odisha alone, it was about 3000 Cores (INR). These numbers indicate an enormous cash flow in this industry\(^3\).

Farming is not only a basic necessity but perceived and treated as a business. Consequently farmer’s expectations of agricultural inputs such as seeds, fertilizers and pesticides have also increased, because the use of better quality and optimal quantities of these materials lead to better crop yields. These expectations remain independent of climatic hurdles.

Farm size, irrigation, soil fertility and support prices are some of the factors that are beyond the control of the farmer. However, farmers have access to information and can enhance yield by timely sowing of seeds, better irrigation

\(^2\) http://www.mfms.nic.in.
\(^3\) http://mfms.nic.in/mrp_rates
plans, application of fertilizers and pesticides, adopting new technologies and products etc. (Federet al. 1985). Thus, any discussion on strategies to enhance productivity of agricultural efforts must consider factors that are within the control of the farmers. One such factor is the application of agricultural inputs.

Better agricultural output critically depends upon marketing activities that connect to the farmer directly. The farmer of present times expects better service from agricultural input suppliers, apart from ease of availability of fertilizers. Their purchasing behavior is also influenced by the value and brand image of the product. Under these circumstances it is natural that agri input manufacturers expend considerable effort to retain their farmer base by providing better agri inputs to satisfy the end user. Satisfied farmers enable repeated sales to the manufacturing firms, which generates additional revenue. As noted by researchers, the cost of acquisition of a new customer is always higher than the cost of retaining a customer.

1.2 PROBLEM STATEMENT

The measurement of farmers’ satisfaction and loyalty towards a product is considered important in marketing research. At the same time, agricultural input suppliers aim to increase their loyal customer base through different marketing strategies, due to tough competition in the market. The present work focuses on Indian fertilizer brands and assesses farmers’ preferences towards them. This study is spurred by the following facts.

a. Fertilizers are sold as subsidized products in India. There is a threat of complete withdrawal of subsidy in the near future.

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An example of the repercussion of such a withdrawal is that the price of Di-Ammonium Phosphates (DAP) fertilizer will increase from the present subsidized Rs. 1200 to Rs. 1900 or more, driven by the production cost. Earlier studies by Choudhury (2005) and Sharma & Thaker (2011) have shown that an increase in fertilizer prices resulted in a reduction in the consumption of fertilizer. Under full price (completely decontrolled situation) as mentioned above, would farmers purchase the same quantity of fertilizer as usual or, resort to low cost fertilizers or reduce the quantity of purchase. If their purchase is as usual, whether they prefer a specific fertilizer brand or cheaper brands?

b. Profitability of profit maximization of a fertilizer manufacturing firm depends on logistic expenditure: For example, the logistic expenditure depends upon the distance between the firm and the customer, the transport of bulky fertilizers contributing considerably to the cost. Ideally, maximum farmer should prefer the brand within 500 KM of the factory area. Therefore, it is essential to enhance the number of satisfied farmers within this radius to capture maximum sales. Hence better the satisfied farmer base within the stipulated factory radius, better would be the sale and margin.

c. The product type of the fertilizer affects sales. There are some intangible factors, such as adverse climatic conditions, that can disrupt the quantity of sales. Fertilizers are a unique product type and late arrival of stock in the market would adversely affect immediate sales. In such situations, the same stock would be stored until the next season, and utilized in the
next crop cycle; this leads to increases in inventory carrying costs, deterioration in quality and a decrease in expected margins.

d. There are various factors that affect fertilizer consumption potential and pattern pro-agrarian states of India. The present study focuses on Indian fertilizer brands, particularly those in the state of Odisha (India), where nearly 60 percent of people earn their livelihoods through agriculture and allied activities. Factors like good rainfall, easy availability of fertilizer, net cropped area, labour, etc. make Odisha a pro-agrarian state. There are two major fertilizer manufacturers with an annual capacity of more than 3 million MT located in the state, which assures the availability of complex fertilizers to farmers. However, the consumption of fertilizer in this state is lower (about 4 Lakh MT, 57 KG of NPK/hectare) than other states (Appendix-3&4). This indicates that there exists a large market potential and competition among suppliers, given that the consumption is low and supply is high. Under surplus supply of fertilizer, what brand would the farmers prefer?

A manufacturer with a good brand image and a large satisfied customer base will be able to achieve good sales under the above circumstances. Therefore, addressing the factors above could increase loyalty, maintain profit levels and provide better inventory turnover (Hoeffler & Keller1993, Mellenset al. 1995, Webster 2000). Thus, there is a need for a deeper understanding of farmers’ characteristics, satisfaction levels, purchase patterns and behaviour. Product-specific features also govern purchasing behavior and the purchasing behaviour governs buying practice. Hence there

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5 Agricultural Statistics at a glance 2014, Govt. of Odisha, India
6 Odisha is one of the state in India, earlier spelled as Orissa, http://www.urvrek.com
is a need for fertilizer manufacturing firms to understand farmer behaviour and loyalty patterns to conduct business (Helkkula & Kelleher, 2010).

Several factors including purchase, socio economic, and demographic characteristics influence consumer behaviour. Gender, education, age, farm size and the number of economically active members in a family also influence the involvement of farmers in purchasing agri inputs, while brand loyalty is based upon relationships with dealers and credit facility offered (Demissie & Legesse 2013, Ovwigho 2014).

The awareness of potentially large business turnover has induced the agri input industry to start evaluating customer (farmer, in this case) satisfaction. Farmer satisfaction has been recognized to induce repeat purchase and enhance reputation of the product through word-of-mouth (W-o-M) communication. In reality however, it has been challenging to understand farmer satisfaction in India, because there are hitherto, no common accepted and official standards to measure customer satisfaction and each firm has its own subjective evaluation procedure. Hence, there is a need to develop an effective and common customer satisfaction index that can be applied across the industry. If agri input suppliers objectively evaluate customer satisfaction using the common index, they would be able to measure their productivity, compare their business output to competitors and also enhance business strategies that make them stronger in the market (Fornell et al. 1996).

According to Bloemer & Kasper (1995), an objective customer satisfaction index helps in the formulation of strategic decisions based on what customers’ value most in order to maintain customer loyalty. Index scores have been reported to serve as tangible economic indicators of financial viability of companies, industries, and international trade unions (Fornell 1992).
The purpose of this study is to measure farmers’ preferences (Satisfaction and Loyalty) towards Indian fertilizer brands and factors influencing farmers’ brand loyalty.

1.3 PURPOSE OF THE STUDY

The purpose of this study is to

(a) Identify an appropriate customer satisfaction model that can measure farmers’ satisfaction and loyalty. An Agri input brand manager would replicate across other agri input industries such as tractor, seed, pesticide industries etc.

(b) Measure the efficiency of different Indian fertilizer brands based on farmers’ perception. The farmers’ perception must be empirically analyzed based on farmers’ satisfaction model.

(c) Estimate the interaction effect of farmers’ buying characteristics such as “mode of purchase” on outcome (grouping) variables (farmers’ satisfaction and Loyalty).

1.4 OBJECTIVES

The following objectives were framed the study.

(I) To develop an effective customer satisfaction index model that can explain farmers’ satisfaction and loyalty. To achieve this objective, it is required to develop a set of valid constructs that can measure farmers’ perception or judgments of their preferred brands. Another objective is to examine the goodness-of-fit of the model through tests and analysis of the interrelationships among different exogenous and endogenous
variables in the hypothesized model (farmers’ satisfaction index).

(2) To rank the Indian fertilizer brands based on their efficiency.

(3) To estimate the interaction effect of farmers’ mode of payment (Cash/Credit) on farmers’ satisfaction and loyalty.

1.5 ORIGINALITY OF THE STUDY

There have hitherto been few studies in agri input marketing domains that have considered brand satisfaction and loyalty in India. This work attempts to bridge the gap and add value to existing literature in this area. The originality of this study may be listed as follows:

1) Adoption of European Customer Satisfaction Index Model (ECSI) in agri input industry to estimate farmers’ loyalty and analysis using Smart-PLS. There has been, to the best of our knowledge and based on review of literature, this research has carried out in the domain of Indian fertilizer industry using this unique approach. Measurement of farmers’ brand loyalty towards Indian fertilizer brands using Data Envelopment Analysis (DEA). This is a pioneering effort in the context of the Indian fertilizer industry.

2) Collection of primary data across the state of Odisha (24 districts out of 30 districts) to measure farmers’ loyalty.

3) The consideration of the role of “Mode of purchase” that influence farmers’ satisfaction and loyalty is a new approach that has not been attempted so far.
1.6 STRUCTURE OF THE THESIS

The thesis is organized into seven chapters. The literature review follows this chapter of introduction. This thesis has been grouped into two parts. In the first part an evaluation of existing literature, selection of customer satisfaction model and research methodology is being evaluated (Chapters 2 and 3). The second part describes the examination and validation of the proposed study (Chapters 4 to 6). Chapter 7 concludes the thesis and its contributions are discussed.

Chapter 2: Review of Literature

This section of the thesis identifies the variables responsible for farmers’ satisfaction and loyalty through a survey of literature. Several researchers have developed various customer satisfaction index models to consider the overall view of customers’ satisfaction. Factors like firms’ image, expectation, perceived quality and perceived value are the precursors of overall satisfaction as well as a direct outcome on loyalty as per ECSI Model. This chapter highlights the evolution of customer satisfaction index model and various relationships among the exogenous and endogenous variables. The concept of each variable and how it affects farmers’ satisfaction and in turn loyalty are described. Based on the review of literature and keeping the objectives of this study, a conceptual model is proposed and hypothesis is formulated at the end.

Chapter 3: Research Methodology

In this chapter, the research approach, design and methods that have been adapted to measure farmer satisfaction and loyalty towards Indian fertilizer brands are described. The study is primarily based on primary data and other research mechanism such as target population, sampling procedure,
instrument development, pilot survey, reliability and validity of the instrument etc. along with appropriate statistical tools employed are discussed. Smart-PLS is used to test and examine the ECSI model and to understand the various cause and effect inter relationship between the constructs. Data Envelopment Analysis (DEA) is used to measure Indian fertilizer brand efficiencies. Finally, One-way MANOVA is employed to estimate the influence of “Mode of Purchase” on group of outcome variables.

Chapter 4: Data Analysis (Examining ECSI Model)

The proposed model examines the different inter relationship amongst the variables using Smart-PLS. The ECSI model consists of a set of association of cause and effect relationships among constructs that can predict a trend of association and effects within an empirical (nomological) framework (Bagozzi 1980). Perceived quality, expectation, image and perceived value are the latent or unobservable psychological variables with multiple tangible manifest variables that can indirectly measure farmers’ satisfaction and loyalty. With the help of weighted index of each manifest variable, one can measure satisfaction and loyalty. Most of the satisfaction models are estimated using PLS (Gustafsson & Johnson 1997; Steenkamp & van Trijp 1996). This is a repetitive estimation method, which incorporates PCA and MLR (Wold 1980). All the above constructs in the ECSI model have reflective indicators. PLS Algorithm “adjusts the principal component weights to maximize the forecasting power of the model”.

Chapter 5: Data Analysis (Measurement of Brand efficiency-Using DEA)

With the help of DEA (Slack based), different brand efficiencies are analyzed. Brand inefficiencies has been measured considering the firms’ image, farmer expectation, perceived quality and perceived value are used as input variables
and farmer satisfaction and loyalty are output variables. The DEA results are validated using statistical tests such as Rank pair test and KW test.

**Chapter 6: Data Analysis** (Interaction effect of “mode of purchase” on farmers’ satisfaction and loyalty using MANOVA)

This is the last section in the data analysis segment. One-way MANOVA is used to estimate the interaction effect of “mode of purchase” on farmers’ satisfaction and loyalty (SPSS-21).

**Chapter 7: Discussion and Conclusion**

This chapter provides a summary of the discussion and conclusion. It also provides theoretical & practical implications, limitations, and suggests future opportunities for research. The novel contributions, as well as the conclusions derived from the findings are also reported. This section highlights the limitations of this work, and discusses the potential for further investigation. It is concluded that the results pertaining to each test are satisfactory and can be generalized and implemented across other related agri input industries.