IMPLICATIONS OF GEOGRAPHICAL INDICATIONS FOR RICE IN KERALA

By

RADHIKA A. M.

(2014-21-114)

THESIS

Submitted in partial fulfilment of the requirement for the degree of

Doctor of Philosophy in Agriculture

(Agricultural Economics)

Faculty of Agriculture

Kerala Agricultural University, Thrissur

DEPARTMENT OF AGRICULTURAL ECONOMICS

COLLEGE OF HORTICULTURE

VELLANIKKARA, THRISSUR – 680656

KERALA, INDIA

2019

DECLARATION

I, hereby declare that this thesis entitled **"Implications of Geographical Indications for Rice in Kerala"** is a bonafide record of the research work done by me during the course of research and that the thesis has not been previously formed the basis for the award to me of any degree, diploma, fellowship, or other similar title, of any other university or society.

Vellanikkara
16-04-2019

Radhika A.M
(2014-21-114)

CERTIFICATE

Certified that the thesis entitled **"Implications of Geographical Indications for Rice in Kerala"**is a bonafide record of research work done independently by **Ms. Radhika A. M. (2014-21-114)** under my guidance and supervision and it has not previously formed the basis for the award of any degree, diploma, fellowship, or associateship to her.

Dr. K. Jesy Thomas
(Major advisor, Advisory committee)
Professor & Head
Department of Agricultural Economics,
College of Horticulture,
Vellanikkara.

Vellanikkara
16-04-2019

CERTIFICATE

We, the undersigned members of the advisory committee of **Ms. Radhika A. M. (2014-21-114),** a candidate for the degree of **Doctor of Philosophy in Agriculture,** with major field in **Agricultural Economics**, agree that this thesis entitled **"Implications of Geographical Indications for Rice in Kerala"** may be submitted by **Ms. Radhika A. M. (2014-21-114),** in partial fulfilment of the requirement for the degree.

Dr. K. Jesy Thomas
(Chairman, Advisory committee)
Professor & Head
Department of Agricultural Economics,
College of Horticulture,
Vellanikkara.

Dr. Anil Kuruvila
(Member, Advisory Committee)
Associate Professor
Department of Agricultural Economics,
College of Horticulture, Vellanikkara

Dr. C. R. Elsy 16/4/19
(Member, Advisory Committee)
Professor & Coordinator,
IPR Cell
Kerala Agricultural University

Chith. P 16/4/19
Dr. Chithra Parayil
(Member, Advisory Committee)
Assistant Professor,
RARS,
Pattambi

Dr. C. Laly John 16/4/19
(Member, Advisory Committee)
Professor
Department of Agrl. statistics,
College of Horticulture, Vellanikkara

External Examiner

Dr. I Bhavani Devi I. Bhavani Devi 16/4/19
Professor & Head
Department of Agricultural Economics
SV College of Agriculture
Tirupaati

ACKNOWLEDGEMENT

Foremost I would bow my head before The Almighty God for being with me throughout this endeavour.

I would like to express the deepest gratitude to my major advisor Dr. K. Jesy Thomas for her patience, motivation and encouragement. Without her guidance and persistent help this thesis would not have been possible. My sincere thanks also goes to Dr. Anil Kuruvila for the continuous support of my Ph.D study and related research, for his patience, motivation, and immense knowledge. Besides my major advisor, I would like to thank rest of my thesis committee members Dr. C. Latha Bastine, Dr. C. R. Elsy, Dr. C. Laly John and Dr. Chitra Parayil for their encouragement, insightful comments and suggestions. I wish to express my sincere thanks to Dr. Indira Devi, Dr. A Prema and Dr. Vanaja for the guidance, concern and good wishes extended to me.

I thank the Inter University Centre for Intellectual Property Studies for providing me the Ph.D fellowship.

A special note of thanks to subashettan and jayasree chechi for their expert guidance during the analysis of data despite their busy schedule.

The thesis would not have come to a successful completion, without the help I received from my dearest friends Rajeshettan and Sharu.

Dear Rajeshettan, This thank you is long overdue. There are so many things I want to thank you for, but here is a small token of my gratitude for just being by my side, helping me through the countless problems and making it all worthwhile. Besides my family, you are my biggest supporter.

Dear sharu, Thank you for loving me in my difficult moments, moments where if the rest of the world saw them, they'd probably walked away. Thank you for accepting me, loving me for exactly who I am and for enlightening me and giving me all the moral support required.

I just want to drop a note of gratitude to my senior fellow Dr. Anoop for his assistance during the project. I really appreciate anoopettan for his willingness to help out outside his current position.

I do hereby acknowledge the help I received from the staff of Agricultural Economics Department. In particular, I am thankful to my dears, Jayasree chechi, Sindhuchechi and Rohu for being with me in all the hardships

I owe a great thanks to Bindhu chechi and family for being with me throughout the survey period and making my survey days lively. My task of data collection was made simple and less obstacle ridden by Mr. Haridas, Mr. Govindan, Mr. Vincent, Mr. Gopi, Mr. Chandrasekaran, Mr. Aneesh, Mr. Kaladharan and Mr. Manu . I thank them with all my heart. I would also like to thank all the participants of the survey for their cooperation.

I thank my fellow classmates Gargi chechi, Sachu, Naushad, Thasni, Irene and Silpa, for being there and bearing with me the good and bad times we have had in the last four years. I will always cherish the warmth shown by My friends Yadu, Kalai and Shemon. Together we share a great relationship as compassionate friends. Thank you for being with me and supporting me in all the hardships. My special thanks to Sreelakshmi, You've given me some of the best advices and were always around to listen, encourage and lend a helpful hand when things would get a bit discouraging. I am heartily thankful to my friends viju and Aniettan for making me smile when I was downhearted.

I would like to thank my college for supporting me with resources and encouraging me doing this project. I thank the staff of the Computer Centre and library for helping me print my reports on time. I thank the people who have assisted me in printing and photocopying works and helping me to submit the thesis on time. I appreciate binding works and finishing touch on the thesis.

I owe much to my family, who helped me at every stage of my life. I would like to thank the members of my family especially my father who accompanied me for the data collection sessions and thesis presentations. He was always there to lend a hand whenever I was in trouble. He along with my my mother (Rajeema) and middle brother Raj krishnan has taken good care of my veerus whenever I was busy with the deadlines. I deeply miss my granpa and father in law who are not with me to share this joy. My special thanks to Jithettan, Rasettan, Ammuchechi, Appuchettan, Kuttapan and Kochunni, who have been patient, supportive and caring. No amount of words is enough to express my thanks to my grandma (amma), for her patience and sacrifice will remain my inspiration throughout my life. A very special word of thanks goes to my mummy, daddy, kingili and elepan for their constant motivation and encouragement. My thanks and appreciation to my husband and in-laws for being part of this journey and making this thesis possible

I owe thanks to a very special person, my little girl Aadvika for abiding my ignorance and the patience she showed during my thesis writing. I would like to express my thanks for being such a nice girl and letting me finish my degree.

Radhika A. M

"Dedicated to the farming community of Kerala,

striving to make our lives better"

LIST OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

Introduction

1. INTRODUCTION

Over years, the agri food systems have developed new quality conventions and have moved towards product differentiation and quality specifications. Marketing concept has gradually gained importance and complexity, as specialization of activities has increasingly separated producers of goods from the potential consumers of those goods. An effective marketing system warrants remunerative prices to the producers at effective marketing costs and ensures that the commodities are delivered to the consumers at reasonable prices. . Unlike other sectors of our economy, most production variables are beyond farmer's control in the agricultural sector, and hence it is difficult to customise the production procedure according to the need of the hour due to unpredictable variables that farmers encounter from planting to harvesting. Neither can we shelve the commercial production for a later period, if the current conditions are unfavourable for our product. This challenging nature of crop production makes marketing aspect the most crucial counterpart of production. Perhaps the future trend of agriculture will be smart marketing using farm brands. Geographical Indication (GI) is a powerful tool which can be used as a tool for branding our agricultural products. The essence of branding is based on identification and differentiation both inherent in the concept of GI itself. A study conducted by UNCTAD India programme has revealed that in case of products with certified geographical origin, the price premium in India is in range of 10-15 per cent (Das, 2009).Thus the strategy of building an image of quality for a class of products made in a certain area can help our indigenous agricultural products achieve consumer acceptance quickly and can also help our resource poor farmers command premium price.

The concept of geographical indication has its origin in 19th century in Europe where there existed a tradition of associating certain products with particular regions. Thus GI was associated with the concept of terroir and has considerably evolved since then. A Geographical Indication is defined as an 'indication which identify a good as originating in the territory of a member, or a

region or locality in that territory, where a given quality, reputation or other characteristic of the good is essentially attributable to its geographical origin' (Article 22, TRIPS). The Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS) mandated member countries to provide protection for all GIs where the obligation is for members to provide the 'legal means for interested parties' to secure protection of their GIs. As a party to the TRIPS Agreement, India is obliged to protect GI and hence the Geographical Indications of Goods (Registration and Protection) Act, 1999 was enacted. Considering India's rich biodiversity, the country has high potential to benefit from GI registration. But to tap this potential, it was necessary to put in place a comprehensive legislation for registration and for providing adequate protection for GIs. Thus, the GI Act was enacted, which came into force with effect from 15th September 2003. In this regard, the Central Government has established the 'Geographical Indications Registry' with all India jurisdiction at Chennai. Since the registration of the first GI in India in 2004, 301 GIs have been registered with the GI registry of the country (GIR, 2018).

As per the directions of Indian Council of Agricultural Research (ICAR), all agricultural universities in India have to constitute an IPR Cell to facilitate protection of agriculture-related IPR (ICAR, 2006). KAU formed its IPR cell (Centre for IP Protection) way back in 2003 and the IPR cell at KAU is in the forefront of GI tag applications from Kerala. The fact that the state of Kerala has registered 26 GIs, out of which 11 are agricultural GIs, is an indication of the unexploited potential of the GI mechanism in facilitating the economic welfare of the farming community of Kerala.

Rice is the world's most popular food accounting for the dietary energy requirements of almost half of the world's population and about 90 per cent of the world's rice is produced and consumed in Asia. Thus, it is the major food crop for the people of the world in general and Asians in particular making it the symbol of cultural identity and global unity. It is the second most important crop in the world after wheat, and is grown annually on 198 Mha, with an annual production

of 984 million tonnes (Mt) and an average productivity of 4.96 t/ha (FAOSTAT, 2019)

India's production of food grains has been increasing every year, and India is among the top producers of several crops such as wheat, rice, pulses, sugarcane and cotton. As per 4th Advance Estimates for 2016-17, in India, rice is grown in 43.19 million ha, the production level is 110.15 million tonnes and the productivity is about 2550 kg/ha (GoI, 2017). Even though the production has increased considerably from 80 million tonnes in 1980 to around 110 .15 million tonnes in the year 2017, the area under cultivation has not increased much, but marginally from 40 million ha in 1980 to 43 million ha in the year 2017. India's productivity has also grown at a slower rate. Although India ranks first in area under production and second in the production of rice, its yield is lower than Brazil, China and the United States.

Paddy cultivation was a part of the proud culture of Kerala. Rice fields are slowly diminishing from Kerala, creating a threat to food security of the state. The area under paddy in Kerala has declined from 8.85 lakh ha in1975-76 to 1.71 lakh ha in 2016-17 and the decline in production during this period was from 13.65 lakh tonnes to 4.37 lakh tonnes. Also, the share of rice in net sown area of Kerala has shown a steep decline over the last six decades from 40.49 per cent to 8.5 per cent (GoK 1986; 2017). Both economic and non-economic factors have played their role in reducing the area under paddy cultivation. Economic causes responsible for the decline in area under paddy include price factors, labour problems, marketing problems and problems related to inputs. Non-economic factors also have affected the rice production scenario. Climatic changes such as unseasonable rainfall, rising temperatures and floods in recent years have worsened the situation. The south-west monsoon has become unpredictable due to which the paddy cultivation in Kerala has been badly affected. Even though the Government has introduced focussed interventions *viz.*, Special Agricultural Zones (SAZ) for focussed project based activities, assistance for fallow land and waste land cultivation, promotion of high yielding varieties and special varieties,

promotion of in-situ processing and value addition including branding and marketing for augmenting paddy cultivation during 13th Five-Year Plan, it did no41t seem to yield positive results. Today, rice occupies only the third position among Kerala's agricultural crops with respect to area under cultivation. There has been a drastic reduction in the area under rice recording a heavy decline from 1.96 lakh hectare in 2016 to 1.71 lakh in 2017 (GoK, 2017). The sharp decline in the area, production and productivity of rice can cause serious consequences on Kerala's economic and ecological development.

With the exorbitant and increasing cost of cultivation and the modest yield levels of paddy in Kerala, the price of paddy becomes an important determinant of area allocation as well as profitability earned by the farmer. To save the existing paddy cultivation and also to increase the area under cultivation, innovative marketing strategies which ensure remunerative prices for the farmers have to be developed. Due to the increasing awareness of food safety, there is a growing demand for origin guaranteed products all over the world (Lukyx and Ruth, 2007). As such, territorial origin becomes a strategic tool for differentiation in agri-food markets. Jena *et al.*, (2015) has reported that GI protection has effectively controlled the volume of supply of Basmati rice and Jasmine rice by successfully delimiting the geographical boundary of these goods which in turn, raised the price of the good and created economic benefits for producers. Hence GI protection for agricultural products is an important means by which local actors can attract revenues from non-local actors. Among the 301 GIs registered with the GI registry of the country, fourteen GI tags belong to different types of Indian rice. Jena and Grote (2010) supports the hypothesis that GI adoption enhances the welfare of the producer households. The results from the their study confirm that there has been an increment of income from GI rice cultivation and that Basmati rice is more profitable than the non-GI rice varieties. Thus branding India with GI can be a new marketing strategy. Among the different rice types of Kerala, Navara (the medicinal rice), Pokkali rice, Wayanadan rice varieties of Jeerakasala and Gandhakasala, Palakkadan Matta rice and Kaipad rice have

already found place in the GI registry. GI can act as a signalling device that help the producers to differentiate their products from the competing ones in the market and enable them to build a reputation and goodwill around their products (Barjolle, 2009). Thus farmers can use the GI certification to leverage the unique identity of their product, to assure quality and distinctiveness their produce have and can effectively prevent the adulteration in the market using existing GI legislations, which in turn helps them build a sound market for their produce.

Navara is an early maturing crop grown in Kerala which can be harvested with in a span of 60-90 days. It is an endemic rice known for its nutritional, religious and medicinal value. This rice is used in Navarakizhi, a specialty traditional Kerala treatment for neuromuscular disorders. 'Navara rice', is registered as a GI as per certificate No. 40 dated 20 November 2007 by the GI Registry, Chennai. The registration covers two varieties of Navara rice namely, black glumed and golden yellow glumed. Registered proprietor of this GI is the Navara Rice Farmers Society, Karukamanikalam, near Chittur, Kerala. As of now, Navara is grown in nine districts of Kerala namely Palakkad, Malappuram, Kozhikode, Wayanad, Kannur, Trissur, Ernakulam, Kottayam and Alappuzha

Palakadan Matta, is a popular red rice variety with a unique taste which is attributed to peculiar tropical weather and easterly winds in Palakkad area. Palakkadan Matta rice is the second product in Kerala to receive GI registration in 2007. The registered proprietor of this GI is Palakkad Matta Farmers Producer Company Ltd. There are 10 varieties covered under this GI namely, Chenkazhama, Chetadi, Aruvakkari, Aryan, Vatton, Illupapoochampan, Chittteni, Thavalakannan, Kunjukunju and Jyothi. In the registry itself it is stated that registration is flexible for the varietal component and that more rice varieties with Matta properties cultivated in Palakkad can be added to this list after detailed examinations.

Pokkali system of cultivation is a peculiar organic system of rice cultivation practiced in the waterlogged coastal regions of Alappuzha, Ernakulam and Thrissur districts of Kerala. An integrated rice-prawn sequential farming system is followed in Pokkali. Pokkali is a traditional salt resistant rice variety grown in these areas. Pokkali Land Development Agency (PLDA) and the Kerala Agricultural University (KAU) applied together for the registration of GI for Pokkali rice. The rice received GI tag in 2008.

In Wayanad, Jeerakasala and Gandhakasala are the two registered GIs. These aromatic rice varieties entered the GI list in 2010. The agro-ecological conditions of Wayanad, organic cultivation practices followed by farmers, genetic make-up of cultivars, and unique processing technologies contribute to the specific aroma and flavour of Jeerakasala and Gandhakasala. They are also cultivated by Wayanad Chetti, Kuruma and Kurichya communities. The rice is sold in the market at a price of Rs. 50-60 a kg. KAU and the Wayanad Jilla Nellulpadaka Karshaka Samithi and KAU are the joint applicants for the GI

Kaipad Rice is organically cultivated in the brackish water tracts of the three districts of northern Kerala viz. Kannur, Kasaragod, and Kozhikode. The traditional 'Kaipad' system of rice cultivation is an integrated organic farming system in which rice cultivation and aquaculture go together in coastal brackish water marshes rich in organic matter. Traditional varieties such as 'Orkayma' and 'Kuthiru' and high yielding Ezhome varieties are popularly cultivated in the 'Kaipad' fields. These rice variety's has a unique tolerance to salinity and it is grown under a unique cropping pattern of Rice-Prawn rotational system. 'Kaipad' rice has been included in the Geographical Indications (GI) registry in 2014. The application was forwarded by the Malabar Kaipad Farmers' Society (MKFS) and facilitated by KAU.

Kerala probably has many more eligible cases for IPR protection, but before moving forward and further registering GIs, it is very crucial to analyse the

current situation of registered GIs to rule out the policy challenges, debates and concerns so that we can give fresh impetus to the initiatives to promote the existing GIs and of registering new GIs. The results can also be an encouragement to the farming community to register their unique products under the GI registry.

In the above background, the proposed study would explore the scope to include institutional innovations to broaden the market prospects of speciality rice in Kerala taking advantage of the GI tags. Efforts would also be made for evolving market promotion strategies for enhancing profitability of rice cultivation in Kerala through enhancing the effectiveness of the GI mechanism.

The specific objectives of the study are

1) To assess the impact of GI rice on income and welfare of the producer households.
2) To identify the major supply chains of the registered GI rice.
3) To evaluate the institutional innovations in the supply chains of the registered GI rice.
4) To propose viable supply chain options for the registered GI rice.
5) To examine the export prospects and market access of the registered GI rice.

Limitations of the study

This is a pioneering study in Kerala to measure the implications of Geographical Indications for rice in Kerala. Post GI studies are very limited in number and so is the data on registered GI users (producers). This study is a modest attempt to fill this research gap. The study has been conducted over a limited period of time with a limited sample size and hence it is difficult to generalize our results for the whole range of GI products. The results of the study are based on farm level data collected from farmers through pretested interview schedules. The data on prices before GI registration were collected through focus group discussions with producers as there were no recorded secondary data. The chances of occurrence of recall bias was abated as the data was collected through

focus group discussions. However, the data was crosschecked with individual farmer responses to minimize the errors and misconception. The results of the study will be useful to planners to identify the bottle necks in the GI mechanism and in choosing appropriate follow up activities.

Plan of thesis

The thesis is organised into five sections. The first chapter gives a brief introduction to the topic wherein the background of the research problem, objectives, scope and limitations of the study are discussed. In the second chapter previous studies in related areas of the proposed study are reviewed. The third chapter details the study area and methodology framework followed in the study. Chapter four presents the results and discussion in detail and the summary and conclusion are presented in the fifth chapter.

Review of Literature

2. REVIEW OF LITERATURE

Review of past literature gives us an insight into the theoretical background and helps to identify the methodologies that have been used by other researchers in related studies. It also helps to identify key findings of the important past studies. In this chapter, past studies relevant to the present study have been reviewed and discussed. The reviews are arranged under the following subthemes.

2.1. History of geographical Indications and Indian GI Act.

2.2. Rice GI's of Kerala

2.3. Socio-economic impact of Geographical Indications

2.3.1 Impact of GI on consumer welfare

2.3.2 Impact of GI on improving market access

2.3.3 Impact of GI on rural development

2.3.4 Impact of GI on biodiversity conservation

2.3.5 Impacts of GI on producer income

2.4 Issues and Challenges in measuring impact of GIs

2.5 Methodologies used in the study

2.5.1 Welfare Impact analysis

2.5.2 Economics of rice cultivation

2.5.3 Efficiency analysis

2.5.4 Supply chain of GI rice

2.5.5 Institutional Analysis and Development Framework

2.1. History of Geographical Indications and Indian GI Act

Geographical Indication of Goods (Registration and Protection) Act (1999) defines "geographical indication", as an indication which identifies such goods as agricultural goods, natural goods or manufactured goods as originating, or manufactured in the territory of a country, or a region or locality in that territory, where a given quality, reputation or other characteristic

of such goods is essentially attributable to its geographical origin and in case where such goods are manufactured goods, one of the activities of either the production or of processing or preparation of the goods concerned takes place in such territory, region or locality, as the case may be.

The GI Act contains a system of registration which protects a registered product against infringement. The GI register is divided into two parts, Part A and Part B. In Part A, the particulars relating to the registration of the GIs are incorporated while in part B, the particulars relating to the registration of the authorized users are included. The initial registration is given for a period of 10 years, which can be renewed further for a period of 10 years (Section 7 of GI Act, 1999).

Any association of persons or of producers or any organization established by or under the law can be a registered proprietor of the GI. This requirement entails creation of a new 'association', thereby triggering the collective action. Any producer of the respective GI can apply to be the 'Authorized user' under the GI Act [section 20(1), section 23(1) section 18(1) of GI act, 1999].

Madrid Agreement strictly prohibited the use of geographical indications by member states and also prohibited the use of a geographical indicator name to be used as a generic characteristic for a product such as Parma-style ham. This agreement includes 31 signatories excluding USA (Murphy, 2004).

A protective definition for geographic indicators was put forward in the Lisbon agreement. The agreement established that the registration of geographic indicators should be centered in WIPO. It also emphasized that goods which "receive protection under the national laws of their country of origin are eligible for registration". United states did not sign this agreement (Murphy,2004).

In WTO Doha Round negotiations, the European Union (EU) representatives sought to enhance the level of protection for eligible products by extending the level of protection currently available for wines and spirits to other goods, and by creating a multilateral registration system for GIs (Kerr, 2006).

The Central Government of India established the Geographical Indications Registry with all India jurisdiction in Chennai under the purview of the GI act, which came into force, along with the GI Rules, with effect from 15 September 2003. The Controller General of Patents, Designs and Trade Marks who is the Registrar of Geographical Indications administers the GI Act (Ravindran and Mathew, 2008).

Das (2008) reported that even though India had in its possession a number of products that could qualify as geographical designators, the initiatives to exploit this potential of GI mechanism began very recently, when the country established a sui generis system of GI protection with the enactment of "The Geographical Indications of Goods (Registration & Protection) Act, coupled with the 'Geographical Indications of Goods (Registration and Protection) Rules, 2002.

Paris convention defined geographical indications through industrial property in its article 1 (Faria, 2010). Article 1 stated that "Industrial property shall be understood in the broadest sense and shall apply not only to industry and commerce proper, but likewise to agricultural and extractive industries and to all manufactured or natural products" The substantive provisions of the Convention fall into three main categories: national treatment, right of priority, common rules.

2.2. Rice GI's of Kerala

George *et al.,* (2005) evaluated aromatic rice varieties in Wayanad, and the yield data indicated that Jeerakasala had the grain yield of 2777 kg ha-1 implying the variety's suitability for cultivation in Wayanad district. Regarding grain quality attributes, Jeerakasala is a short-bold lightly scented rice variety.

Krishna *et al.,* (2006) has conducted a study on conserving the indigenous-organic rice farming system of coastal Kerala. In his study he has reported challenges faced by Pokkali rice farmers. Despite the state government's direct intervention making the monoculture of prawn illegal, more area is being gradually brought under fallow-prawn and prawn-prawn systems owing largely to

the multitude of constraints associated with the labour-intensive rice cultivation in Pokkali lands. This poses a challenge to the in situ conservation of salinity-resistant indigenous rice varieties and cultivation practices. State inventions favouring certification and creation of markets for branded Pokkali rice will be having a high impact in ensuring the conservation of this unique farming system.

NAARM (2007) conducted a field experience training programme to explore the possibility of registration of Palakkad Matta rice as GI. PRA methodology and semi structured interview schedule was used to collect the required information about the product as well as the study area. It was found that the Palakkadan Matta farmers association with just ten members put up the application for registration for a small region (Chittoor) in Palakkad district. The scientific community in the state and officials of the Department of Agriculture strongly denies any scientific basis for the geographical link as claimed in the application. The farmers elsewhere in Palakkad who cultivate the same rice are not aware of the registration and the millers who have major say in deciding the market price of rice not only denies the geographical link also claim that the registration is not going to increase the price of Palakkadan Matta. The study concludes that under these circumstances the only way the farmers can be benefited seems to be by becoming members of the Palakkadan Matta farmers association. The group of farmers should be able to set up their own milling units so that they can ensure the quality of their produce and be able to get a fair price for their product.

Kocchar (2008) analysed two registered GI's namely Navara and Palakadan Matta to understand the relationship between GI and varietal component in the geographical location. He reported that two varieties of Navara rice namely, black glumed and golden yellow glumed covered under GI registration are distinct from each other only for their glume colour, which may or may not be a sufficient parameter for their registration as two different farmer varieties under the PPV & FR Act, 2001. Regarding Palakkadan Matta, 10 varieties comes under the purview of registration, but registration is flexible

for the varietal component as it is also stated that more rice varieties with matta properties cultivated in Palakkad can be added to this list after detailed examinations. The possibility of registration of different varieties constituting the GI may have to be separately explored under the respective law.

Joshua (2012) experimented a study on Navara exploring the changing production and consumption system. The results of this work shows that production and consumption of Navara production has changed to adapt to the changing socio- political conditions. There is a declining trend of Navara cultivation, which entails the loss of biological and cultural diversity associated with this unique rice. Preserving Navara is important for its medicinal, and economic value. Farmers used a variety of techniques for their cultivation, ranging from traditional techniques to those using modern inputs such as pesticides and fertilizers. While majority of farmers expressed difficulty with Navara cultivation, some felt it was a relatively easy crop to cultivate. This divide among farmers seemed to depend on the cultivation techniques they used. The farmers who had little difficulty with the crop used pesticides and fertilizers. They felt the rice had a good yield with low pest and disease incidence requiring very little pesticide and fertilizer compared to other rice varieties. These individuals also found the labour requirements of Navara to be moderate when compared to other conventional varieties.

Rose and Umesh (2012) analysed consumers' willingness to pay (WTP) and producers' willingness to accept (WTA) for the GI product, Palakkadan Matta rice. The results indicate that the consumers are willing to pay Rs. 5.01 per kg additionally, for ensuring the quality of the produce through GI label. Producers are willing to continue the cultivation by accepting an additional amount of Rs.5.82 per kg.

Nandeesha *et al.,* (2012) in their paper discusses about traditional aquaculture practices along the coastline by fisheries communities. In India, there are four geographical regions, with four different and specific integrated farming systems strategies being implemented as brackishwater rice-fish approaches,

namely: Pokkali paddy fields in Kerala, Bheries in West Bengal, the Khazan system of Goa and the Gajani system of Karanataka. These systems are still being implemented as efficient farming strategies adapted to very specific locations and as a way to provide an alternative and efficient use of brackishwater areas, to suit local conditions. They regard the pokkali system in Kerala as one of the most ancient traditional fish farming and also points to the fact that increasing cost of human labour has adversely affected the profitability of this farming system in recent past. The system is being promoted and maintained by some governmental and private initiatives as the fresh taste and quality of this specific production system are quite valuable and popular.

Vanaja (2013) reported that Kaipad is a unique coastal wetland rice production tract saline prone and naturally organic. Apart from integrated organic farming system in which rice cultivation and aquaculture go together. Kaipad ecosystem is featured with rich biodiversity of flora and fauna, organically rich soil, mangroves, and migratory birds. The Pokkali tract of south Kerala is said to be synonymous to Kaipad tract of North Kerala. But soils of Kaipad slightly differ from that of Pokkali. Rice farming in Kaipad is carried out in a peculiar way, relying on the monsoon and the sea tides. Besides its own saline tolerant land races of rice, recently high yielding rice varieties were developed for Kaipad tract by Kerala Agricultural University utilizing the traditional land races namely Ezhome 1 and Ezhome 2. Even though the product from Kaipad is purely organic, nothing much has been done to explore the value of organic rice for the benefit of farmers. Besides the research accomplishments, a comprehensive multi faced development approach is necessary to preserve, protect and develop this unique organic rice bowl of Kerala.

Arpke and Mannherz (2013) analysed the market potential of Gandhakasala rice in Germany. The results indicated an interest for Gandhakasala depending on quality, cooking attributes and taste. It was concluded that in order to gain a strong position in the market, marketing had to focus on Gandhakhasala as a niche product, adding value through certification as an organic and fair-trade product or both.

2.3 Socio-economic impact of Geographical Indication

2.3.1 Impact of GI on consumer Welfare

A consumer survey undertaken in European Union in 1999 found that 40 per cent of consumers would pay a premium of 10 per cent for origin guaranteed GI products (WTO, 2004).

Broude (2005) pointed out that a growing number of consumers place value on the traceability of the foods they eat and in addition, the origin-labelled foods are considered to be a counter movement against the increasing globalization of food chains with international brands. Das (2009) in his article on socioeconomic implications of protecting geographical indication in India, pointed out that GI acts as a signalling device that helps the producers differentiate their products from competing products in the market and thus enable them to build a reputation and good will around their products , which in turn lead to premium price. Information asymmetry between buyers and sellers in the market and the role of reputation conveyed through distinctive signs, in tackling such asymmetry are the two main factors deciding the economic rationale of GI.

Josling (2006) analysed the concept of terroir which indicate the concept of an essential link between location of production and a specific quality attribute. If there is no correlation between the geographical region and the quality attribute, then a GI would be unambiguously meaningless to the consumer. Thus, public policy on establishing GIs should include an examination of whether such a correlation exists before protecting the regional name. Also if the benefit that consumers get from the exclusive label denoting the region of origin outweighs the cost of providing that information and of enforcing the restriction then the GI is justified.

Lusk *et al.*, (2006) pointed out that consumers express strong preferences for domestic products based on an affinity to their home region and the wish to support domestic producers.

Ittersum *et al.,* (2007) reported that studies on consumers indicate increasing preferences and WTP for GI products are generally driven by two dimensions namely a quality dimension and a support-warranty dimension. The first dimension refers to the fact that most consumers expect GI products to be of a higher quality than non-GI products. The second one implies that consumers prefer domestic over foreign products, which was often referred to as "consumer ethnocentrism".

Roe and Sheldon (2007) considered the importance of reliable labelling standards for credence goods, those for which quality differences cannot be detected by consumers. They note that a single quality standard set too high limits the market opportunity of high quality producers, and reduces consumer welfare.

Moschini *et al.*, (2008), based on his study on the impact of GIs on consumer welfare, found that before the introduction of a GI, mixed qualities or only the low quality goods were supplied as per Shapiro's model on reputation. After the introduction of GI consumer welfare improved for those consumers purchasing high quality product while those consumers who purchase the low quality goods remain unaffected.

Yeung and Kerr (2008) stated that most of the GIs do not have any established image in the markets. For developing such an image, consumers in the developed countries should be convinced about the quality associated with the GI by informing them about the existence and whereabouts of the GI. Once the consumers have been successfully induced to try the product, novelty consumption must be replaced by sustained consumption. This is a difficult task as consumers are continually presented with new products. As the consumer preferences are often unstable, the initial success enjoyed by a novel GI may not be sustainable over time, making the resource-intensive marketing and promotional efforts a risky venture.

According to Bramley *et al.,* (2009) the reasons for surge consumers' demand for origin-labeled products includes rising income, increasing concerns about food quality and food safety and a growing desire for variety.

Teuber (2010) attempted to investigate consumers and producers expectations towards GIs in German context using GI of Hessian apple. The findings indicated that Hessian consumer's awareness and knowledge about GIs was very limited. It was found that the quality warranty dimension is not as important as the economic support dimension and perceived authenticity of the product. The producer side results highlight that the most important motivation to apply for a PGI is to secure the established reputation against misuse by competing producers in order to ensure the quality level of Hessian apple wine. While targeting new marketing channels, especially long-distance distribution channels such as exports to foreign markets, the PGI label may serve as a quality standard securing authenticity and traceability. One another important factor is that PGI label reduce transaction costs if foreign retailers and/or consumers are already familiar with this certification scheme.

Henseleit *et al.,* (2007) attempted a study on determinants of consumer preference towards regional foods in Germany. The main objective of the study was to identify and quantify the determining factors of consumers' preferences towards locally grown food. A theoretical frame work was proposed and tested empirically using a binary logit model. The results indicated that cognitive and normative factors were the most important determinants, whereas affective and socio demographic variables did not have a big impact on the preference towards local food products. Consumers were of the opinion that foods originating from the surrounding region were an extrinsic signal for food quality and safety and they wished to support the domestic agriculture by purchasing locally grown food. No significant influence could be examined for most of the socio-demographic variables, like gender, education, presence of children in the household and degree of urbanization.

According to Teuber (2010) geographically differentiated products can create economic value if the origin is valued by consumers. Empirical studies clearly confirm that geographically differentiated products are by no means a self-runner. The most successful GI products such as Parmigiano-Reggiano or Parma

ham are managed like international brands and advertising and promotion play a crucial role.

2.3.2 Impact of GI on improving market access

Lucatelli (2000) reported that in order to establish a geographically differentiated product the actors in the supply chain are required to cooperate, either horizontally, vertically or both. This collective action, which is one of the main features of geographical indications, raises concerns about possible anti-competitive practices, particularly the risk of monopolistic cartels and unjustified barriers to entry.

Barjolle and Sylander (2000) reported that GIs improves the market access which in turn leads to increase in the volume of goods sold and thus lead to higher incomes to the producers. He further pointed out that GIs have a further potential income effect through its collective process of value creation that could lead to the capturing of a premium.

Crespi and Marette (2002) analysed the effects of generic advertising on product differentiation. If generic advertising or a GI certification scheme reduces the perceived product differences within a producer group, high-quality producers may lose market shares to lower-quality producers.

Rangnekar (2003) in the context of growing interest in GIs conducted an economic analysis of issues related to GIs. The evidence and analysis presented in the paper states that at one level the interest concerns the possible use of GIs as a market promotion mechanism. The other key interest of relevance corresponds to the possible use of GIs, with other policy measures, to protect and reward the holders of indigenous knowledge. GIs are an example of a special category of public goods, *viz.* club goods, because of its properties of excludability and nonrivalry. So quasi-public interventions are required because GI-protection entails reorganization of pre-existing supply chains that might, apart from redistributing economic value, threaten existing relationships. The general conclusion regarding promotion and marketing of GI-products is that this is the

weakest link in the supply chain. A variety of factors including problems of market penetration, the economics of launching products, the multiplicity of labels and mixed notions of quality, and the threatening presence of substitutes and similar products can be identified. Consumers' perceptions of 'origin', 'authenticity' and 'quality' are culturally disparate and differentiated and it is important for producers to tap into traditional marketing strategies to convey these factors and enhance the distinctiveness and attractiveness of their products.

Hayes *et al.,* (2003) reported that GIs provide a valuable differentiation tool and help producers who are entitled to use the designation by improving market access for them. To capture any profits that result from the differentiation, producers must own the rights to the differentiated product. He points that reaching a sale sufficient to justify the expense of establishing and maintaining the differentiated image among consumers and preventing imitation of the differentiated product, are the important factors affecting any instrument of differentiation.

Carter *et al.,* (2006) used a case study approach to highlights the conditions necessary for a successful geographical-orgin branding strategy for farm produce in the US. The paper argues that the use of geographical identifiers to achieve product differentiation is viable, but is unlikely to benefit local producers. For achieving this objective, in addition to branding, some restriction on volume is required to raise prices.

Gopalakrishnan *et al.,* (2007) conducted case studies on GIs and analysed the potential for socio-economic growth. It was found that the traders enjoyed more economic benefits of GI than the actual producers which in the long-run might result in misuse of GIs and dilution of the quality of the products. This would have adverse implications on the improvement of the socio-economic conditions of the actual producers of the GI products.

Das (2009) argued that building up reputation about a GI-product is not an easy task, It takes enormous time, patience, resources, quality control and

well-crafted marketing strategy to create a valuable GI, citing the example of 'Champagne ', which is said to have taken as long as 150 years to develop the premium brand-image.

Das (2009) identified practical challenges confronting the stakeholders in India to the potential benefits ingrained in the registered GIs. Apart from effective enforcement of GIs in the relevant markets, success of a GI is depended upon appropriate marketing and promotion of the products. These tasks are resource-intensive and challenging to execute for stakeholders from a developing country like India. Another issue to address is to ensure that a fair share of the benefits accruing from the GI status of a product percolates down to the actual producers/artisans.

Teuber (2010) investigated on the direct and indirect origin effects on market segments. The paper provides a framework to analyse the same using a recursive hedonic model, if detailed data on product characteristics and prices are available. Thus, in contrast to consumer studies relying on stated preference data the present analysis is based on revealed preference data. The paper segments the specialty coffee market according to the origin of the buyer. The results suggest that direct origin effects are more important than indirect origin effects like the sensory quality and that implicit prices for certain coffee characteristics differ significantly across market segments.

Xiao *et al.,* (2010) experimented a study by application of a two factor model of agricultural policy to estimate the distribution of benefits from using GIs among different stakeholders of Oolong and Darjeeling teas. The results shows that in case of a whole country GI, production increases following any price rise would redistribute benefits to consumers, many international. A GI enhancing quality could alter the demand elasticity, but with little change in the quantity demanded beyond traditional consumers, the amount of additional revenue to be distributed would be small. So the countries must select their GIs very carefully as the confluence of product familiarity in international markets and land ownership

patterns needed for the generation and widespread distribution of benefits will be rare events.

Belletti *et al.,* (2011) reported that GI protection cannot by itself guarantee benefits for rural development. GI registration does neither guarantee a fair distribution of value to producers nor positive environmental and social effects. These effects depend strongly on the quality of the supply chain governance and on the elements of the code of practices. In the EU, collective organization has been identified as a crucial success factor.

Anson (2012) in his paper on marketing flexibilities in Geographical Indications (GI) and trademark examined the differences between GI and Trademark. Even though both are brand names, separate marketing strategy should be developed for marketing GI products. The major findings showed that the consumers were not much bothered about what was GI and the knowledge about the place of origin and its specialties. On the producer side, they were not using value added marketing techniques or differentiated marketing techniques and they were going with order sale marketing. He also examined the problems in the GI marketing system and concludes that market planning strategies are essential in both collective level GI organization and individual level and right balance and coherence to be ensured between them.

2.3.3 Impact of GI on rural development

Roest and Menghi (2002) found positive impacts of GI on rural development in the production system of Parmigiano-Reggiano (PR). In the case study on PR the main benefits in terms of rural development are higher levels of employment both in agriculture and in upstream and downstream activities. These higher employment effects are due labour intensive traditional techniques used at all stages of the production process.

Pacciani *et al.,* (2001) highlighted factors that influence the development dynamics of a GI. It included the ability of local actors to capture the rents and the strength of linkages between the product, the region and the local community.

Reviron and Paus (2006) argued that GI can impact development through diverse aspects including employment, agro tourism and environmental spin-offs. Promotion of agro-tourism around a GI could serve the added purpose of promoting the GI by strengthening of brand image.

Bramley *et al.*, (2007) reported that in the developing country context, geographical indications could provide a tool by which rural producers can enter niche markets and attempt to extract a premium, thereby improving their living conditions through increased incomes.

Suh and Macpherson (2007) reported that, in addition to promoting the product image, doubling production and increasing tea prices by ninety per cent, the number of tourists to the Boseong region has tripled in 6 years of introduction of the GI. It should also be noted that GI products not only represents an economic activity but is also an important cultural expression for local communities. These linkages should be exploited for improved rural development.

According to Tregear *et al.,* (2007) certification schemes for geographical indications are often designed with the aim to maintain or promote rural development. GIs are assumed to incorporate and valorises many local assets with special or immobile characteristics linked to the area.

Suh and MacPherson (2007) analysed the regional impacts of geographical indications using the case study of 'Boseong' green tea. The results show that geographical indication has enhanced the image of the product, leading to increased production and the stimulation of tea-related industries. The international certification of Boseong green tea under geographic indication has quickly assisted the regional economy and in a period of six years, production has doubled, tourist numbers have tripled and prices have increased by more than 90 per cent. The authors state that legal certification along with concerted efforts

among producers and a variety of public agencies, helped to improve and sustain local product quality.

Bowen and Zapata (2009) analysed the production system of tequila. The authors claim that the establishment of a GI for tequila has largely failed to benefit the local population. Tequila, a protected GI since 1974, is considered to be the oldest Non-European GI. They also argued that within GI supply chains the preservation of the link to terroir is both a critical strategy for local actors and a guarantee of the diversity and specificity of the product. Terrior helps to hold the production within a particular territory and allows producers to refrain actors from other areas as the traditional methods involved in the production of a good are indigenous to the area. They states that by valorising and protecting terroir, GI supply chains provide an alternative to homogenized, standardized flavors and celebrates the diversity and unique flavours of foods and drinks.

Bowen (2010) examined the supply chain of tequila and found out the reasons for its failure to benefit the local population and environment. He points that influential actors in the supply chain have manipulated production standards and certification policies in ways that contradict the theoretical concept of a GI and this negatively affect the overall quality of tequila. It was found out that the potential positive impact of the tequila GI for consumers, producers, and rural regions was affected by the weak national institutions for GI protection in Mexico and also by the influence that the United States has had on Mexican agricultural policy. The challenges for GI Implementation in developing countries are greater than in developed economies because the institutional context tends to be weaker or undeveloped. So a proper institutional environment along with reputation and quality enables the success of a GI.

2.3.4 Impact of GI on biodiversity conservation

Larson (2007) confirms that GI can promote biodiversity conservation both directly and indirectly. GIs create production limits, which are likely to have a positive impact on natural resource sustainability and on biodiversity conservation. Thus, GI directly promotes biodiversity and indirectly through the design of a code of practice.

Bowen and Zapata (2009) examined the potential of GIs with regard to contribution towards socioeconomic and environmental sustainability. They suggested that if the GIs were to make concrete contributions to long-term environmental conservation and rural development, the specification of sustainable production practices within the legal framework of GIs was essential.

2.3.5 Impacts of GI on producer income

European Union (1999) undertook a consumer survey of GI products and found that 40 percent of consumers would pay a 10 percent premium for origin – guaranteed products.

Dhar and Foltz (2005) evaluated the consumer welfare effects of labelling milk as either rBST – free milk. The analysis indicates an annualized per person benefit ($8.84, or $ 2.5 billion for the US population) from the existence of the labelled products. GIs can serve the same informational function, increasing the efficiency of markets and consumer welfare.

ETEPS (2006) conducted an EU financed pilot project on the economics of food quality assurance and certification schemes. Within this project, four different GI products were analysed with respect to their economic performance. The findings showed that direct costs such as certification costs, membership fees and control costs do not usually exceed one to three per cent of total costs. In most cases, indirect costs are much more important. Indirect costs arise from specific production and processing requirements. They also compared the price differentials for these products and results shows that nearly in all cases the GI product achieves a higher price compared to the non-GI product. Only in the case of Baena olive oil, olive growers received an undifferentiated price.

Sierra (2007) conducted a study in the cheese sector and concluded that cheese with designated status could claim a thirty per cent price premium over the competing products. Parmigiano Reggiano cheese and essential oils protected by GIs have also benefited from considerable price advantages. Studies also indicate that the added value is distributed along the food chain, allowing producers, local processors, retailers and other downstream players to gain.

United Nations Conference on Trade and Development (UNCTAD) study has revealed that in India, GI registered agricultural products can fetch a price premium of 10-15 per cent, whereas, for non-agricultural products it would be to the tune of 5-10 per cent (Das, 2008)

Menapace *et al.,* (2008) reported that collusion will decrease the high-quality production and thereby reduce the welfare. In a scenario where production factors like land are in scare supply, GI certification could benefit producers due to returns generated by these scarce production factors. However, in the absence of scarce inputs, producers will not benefit from a GI certification at all.

Kocchar (2008) in his study on institutional and capacity building for the evolution of intellectual property rights regime in India reported that even though the logo and word 'Darjeeling' have been registered as certification mark under the Trade Marks Act, 1999 and also as GI under the GI Act, there are spurious sales and the tea sold under same name around the world measures nearly forty million kilogram which was more than 3.5 times the production estimates registered with the GI registry. To protect and enforce the GI, costs incurred by Tea Board, India, in a period of 4 years, exceeded US $ 2, 00,000. Therefore, it would be prudent to view and consider protection and exploitation of IPR, irrespective of any form, on an economic balance sheet. Grote (2009) pointed out that GI indicates a possibility to earn premium, but evidence on the actual cost and benefits are scare. Difficulties in measuring the actual costs and net benefits of GIs complicate inferences on increases in producer welfare which is crucial for developing countries in making the decision on whether to promote GI.

Hedges (2009) explained two methods for empirically evaluating the impact of a GI. Diachronic evaluation which is a comparison of the position of a product before and after enhanced GI protection and/or origin based marketing and synchronic evaluation which compares two similar products of which one is protected and/or marketed as a GI and the other is not. These methods clearly highlight the difficulties in empirically evaluating the impact of a GI in those countries where GI protection has only recently been introduced or lack completely.

Barjolle *et al.,* (2009) suggested that subjective methods which measures opinions like Likert scale and Surveys can be used to analyse the impact of GI.

The study by Bowen and Zapata (2009) concluded that the introduction of the Mexican Tequila GI has successfully increased the sales in volume but has not significantly benefitted the local community or environment.

ITC (2009) reported that it was difficult to measure the exact amount of economic impact attributable directly to GI as subsidies and private investments exist in many regions. But GI represent opportunities for several different segments of the population in addition to the producers. The potential benefits ranges from having new socio-cultural values for traditional and indigenous assets to the more straight forward economic gains resulting from increased employment, higher incomes and improved market access. They suggested that in order to establish and maintain the GI locally, organizational and institutional structures must be developed.

Menapace and Moschini (2010) found that producers do not benefit at all or are even harmed by a GI certification scheme. In this context they distinguished between ex *post* and *ex ante* evaluation of GI certification systems. Before any investment in reputation has taken place, producers neither benefit not lose from the introduction of a certification system. In contrast, producers who have already invested in reputation (e.g., well-known brands) might be harmed by the introduction of a GI.

Jena and Grote (2010) based on their study tried to unveil the income effect of the Basmati GI. They reported that the adoption of a GI does enhance household welfare. Even though GIs have the potential to improve the livelihoods of producers, this is highly dependent on how equitably the actual benefit is distributed along the supply chain and the actual impact of GIs critically depends on whether share of benefits reaches the producer or not. They also stated that institutions play an important role in ascertaining this. For providing such an institutional context governments have to play a major role.

Benavente (2010) in his paper proposed a model on the welfare effects of claw-back of GI's. The setting of model included home and foreign country, three varieties namely foreign Gl-original goods, home Gl-variety goods and generics and a continuum of heterogeneous consumers. Two regimes, protection and non-protection were analysed in two scenarios perfect and oligopolistic competition for foreign firms. The results suggest that industrialized home countries, with sophisticated consumers and higher relative costs tend to lose less from protecting foreign GIs than developing home countries. With oligopolistic competition, GI firms become differentiated from their closest competitor after protection, further stressing the competitive distortion. Consumers with a low willingness to pay for origin and a high degree of valuation for the GI-variety are the biggest losers. In effect, if after protection home GI-varieties can successfully differentiate themselves from foreign GI-original goods and stay competitive by developing their own brand, the scenario of oligopolistic competition from foreign firms is more favorable to their development than the scenario of perfect competition.

Teuber (2010) in her article tried to investigate the importance of geographical indications (GIs) in the coffee market, particularly for Honduran coffee. The aim of this analysis was to investigate the influence of the region of origin on the achieved auction price of Honduran specialty coffee controlling for other coffee attributes. She attempted a hedonic price analysis using internet auction data for speciality coffees. The results indicated that coffees from the region Marcala, for which a denomination of origin was established in 2005, possess on an average a higher quality than coffees grown in other Honduran

regions. Since quality was the most important price determinant in the internet auctions, coffees from Marcala achieve on an average higher prices than coffees from other Honduran coffee-growing regions. However, influence of already established reputation of region of origin on auction price could not be confirmed.

Teuber (2010) reviewed the theoretical and applied literature on Rosen's two-stage model and based on the findings, a theoretical model for specialty coffee auction data was proposed and tested empirically. The empirical model comprises nonlinear hedonic bid functions at stage one and an inverse demand function for one characteristic, the sensory quality score (SQS), at stage two. The first-stage results indicate a high variability of the marginal price of the SQS across different auctions. The second-stage results identified that the marginal prices of the SQS have increased in the period of analysis from 2003 to 2009 and that country-of-origin and buyer effects were important. The highest marginal prices were paid for Rwandan and Honduran coffee.

Teuber (2011) in his reviewed paper supports the argument of Lence *et al.*, (2007) and Moschini *et al.*, (2008) that high fixed costs of establishing a GI product leads to potential market failure. Fixed costs usually occur in the form of registration costs. In general, fixed costs should also include research and development costs. However, in the context of GIs, these costs were borne by producers in previous periods and thus are already sunk which implies that they do not enter the analysis.

Jena and Grote (2012) evaluated the impact of GI by carrying out a case study of Basmati rice in India, based on a survey of 299 Basmati and non-Basmati rice farmers in the state of Uttarakhand. The study showed that growing Basmati rice was more profitable than the non-Basmati varieties, but less so than sugarcane. In the second stage, the endogeneity-corrected Heckman selection model revealed that Basmati adoption has increased welfare of the households. The estimation using a Tobit model revealed that the access to extension training facilities, a credible hedge against risk, and the availability of household labour were the major determining factors for adoption of Basmati among the farmer households.

Jena *et al.,* (2015), synthesized the results from empirical case studies undertaken in India and Thailand on welfare impacts of GIs. The results showed that the higher prices for Basmati compensate for the lower yield and higher production costs relative to the non-Basmati rice. Basmati farmers realised higher income per ha when compared with the non-Basmati farmers. This price difference was also reflected in the lower poverty incidence of Basmati farmers. The net rice income per ha for both Jasmine rice groups was very low compared with Basmati and non-Basmati groups, which could be partly explained by the lower yields. However, the GI Jasmine group had a slightly higher net rice income per ha when compared with the non-GI group. Thus they conclude that GI protection, by successfully delimiting the geographical boundary of the GI good, has effectively controlled the volume of supply, which, in turn, raised the price of the good and created economic benefits for the producers.

2.4 Issues and Challenges in measuring impact of GIs

Winfree and McCluskey (2003) highlighted the fact that policy makers in both developed and developing countries have identified GIs as a potential mechanism to assist primarily the agriculture sector in developing countries by reducing supply competition for traditional products while raising or standardizing the quality of those products. The perception seems to be that benefits will flow primarily to smallholders in local communities, but the correctness of that assumption, which is to say the projection of the distribution of benefits from the use of a GIs, has to date not been analyzed empirically. As the number of producing firms rises, the incentive to provide quality decreases.

Gallagher (2003) noted that, despite the emphasis placed by the European Commission on GIs, the Commission lacks even the most basic data on the use of its own GIs such as the value of product sold in the EU using those marks.

Rangnekar (2004) reported that the registration process of a GI is likely to involve some re-organization of the product's existing supply chain, leading to modifications in well-established commercial relations and distribution

channels. The process of registration raises issues concerning reorganization and governance of the supply chains. These may include demarcating the geographical territory pertaining to the Gl, defining the Gl-product, specifying its distinguishing characteristics, establishing the good-place link, agreeing on codes of practices to be followed while producing the product, developing mechanisms for quality-control and methods of governance along the supply chain. This often results in new economic opportunities for some new players at the cost of some pre-existing ones, thereby creating room for conflicts.

. OECD (2005) reported that methods to measure impact of GI are complicated by factors that constrain the empirical evaluation of GIs including lack of data as well as the difficulty in defining a point of reference and relevant set of Indicators. A further difficulty was separating the impact of GIs from that of other factors such as, technological advances, quality control, advertising and policy dynamics.

Gopalakrishnan *et al.*, (2007) pointed out that most of the laws limit the right to use the GI to the actual producers and traders of the product as the socio-economic benefits should flow to the actors within the region and not to external intermediaries. However the flow of socio-economic benefits to the producer will be improved if the right to use the GI was limited to the actual producers who can then license downstream actors to use the indication.

Das (2008) studied the issues and debates around GIs with particular reference to India. The results indicated that domestic registration of a GI is a relatively easy task when compared to registration and enforcement in other countries. Constraints encountered in the process may include technicalities involved in the registration process in various countries, Exorbitant expenses involved in appointing a watchdog agency to get information on misappropriation and huge financial resources needed for fighting legal battles in foreign countries. Marketing and promotion of GI products in various export destinations is also a challenging task as the GI producers may have to adopt

different distribution channels in different countries for selling the same product.

Bramley *et al.,* (2009) underlined the difficulties in measurement of the contribution of GIs. According to a report of the European SINERGL project, cited by them, the main methodological difficulties were linked to the choice of difference point, getting reliable data, choosing between objective quantitative data methods/ subjective qualitative data methods with their specific limits and separating causes as many factors were working together.

Jain (2009) in his paper attempted to analyse the issues relating to scope of extension of GIs under TRIPS agreement with regard to south Asian countries. He suggested that South Asian countries should equip their international property rights regimes to effectively protect the reputation of their GIs and their intrinsic qualities. Effective protection involves a balance of interests between consumers, producers and governments. Consumers have an interest in not being misled by GIs, producers have a trade interest in protecting those reputational characteristics of a product that are related to its geographical origin, and governments have an interest in ensuring that international obligations relating to GIs are administered in an efficient and equitable manner. In addition to the benefit of economies of scale, this would offer their products new opportunities in a competitive global market.

Barjolle *et al.,* (2009) in their paper focussed on methods for assessing territotial impact of GIs. They analysed 14 case studies and the results shows significant differences of the priorities of the stakeholders between established GIs and GIs in progress. For the first group of GIs in progress which they called enthusiasts, the most expected impacts are market stabilization or increase, the value added in the region, and preservation of local breeds or varieties. For a second group of GIs in progress, that they called socio-environmentalists the expectations on economic issues are less important than the social and the environmental ones. Finally for a third group of geographical indication in progress, that that called undecided, it could be found that the highest scores are given to the expected economic impacts.

Bramley (2011) in his paper explored the difficulties in empirically measuring the impact of GI's and challenges that GI in developing countries are likely to face. He concluded that there were significant benefits attached to GIs, but achieving these benefits were dependent on how the process were implemented, protected and exploited and requires concerted efforts by governments and producers. It should be noted that GIs are IPRs that protect the goodwill and reputation of these differentiated products. Additional socio-economic impacts may flow from its introduction and protection but were likely to require policies in support of these additional objectives.

Chattopadhyay (2012) in his study working on Geographical indications act; a case study on Darjeeling tea' pointed out that in order to rule out any unlawful use of GIs and to fully exploit the commercial potential, countries should firstly ensure adequate protection for their own GIs at the national level. As the next step effective protection should be granted for all GIs at the international level as the national legislation, which applies to only one country, is not sufficient in the context of a global economy.

TERI (2013) attempted a study on issues and challenges in the protection of GIs taking the case of Banarsi Sari, Malabar pepper and Bikaneri bhujia. The results of the study points to the fact that the volume of international sales is quite low, averaging about 14 per cent of the total volume of sales for the GIs surveyed. The main motivation for seeking user status have been enhancement of brand value (43 per cent) and prevention of duplication (37 per cent), The survey indicates that none of the registered users were consulted by the registered owners of the GIs prior to the application process of the GI itself. Among the respondents surveyed, only 21.43 per cent claim enhanced profit post registration, 33 per cent claim increase in product demand, while another 33 per cent say that it has led to revenue increment while 17 per cent of the respondents claim that registration has led to decrease of duplicates and enhanced brand value respectively. Respondents believed that the benefits of registration has accrued mostly to manufacturers/big traders in the sector (48 per cent), with only

9 per cent believing that benefits have actually gone to the artisan/ weavers/farmers, actually producing the GI

Anson and Pavithran (2014) opined that in GI protection, the position of the producer is significant since GI protection is granted to the association of producers who are responsible in maintaining the quality of the GI product. The certification and registration procedure decide and influence the market dominance and this remarkable reputation is of prime importance to producers of GI product. The attitude of these producers towards GI needs to be examined since their inclination and apprehension about GI system is vital for the protection to be used optimally.

Zhao *et al.,* (2014) conducted a field study to analyse the effectiveness of contemporary GI schemes in enhancing the quality of Chinese agri-foods. The study examined quality forming processes in three GI networks (Gannan naval orange, Nanfeng mandarin and Wuyuan green tea) in Jiangxi Province. The research indicates that the development of Chinese GI networks is driven primarily by the government's intention to increase farmer's and rural incomes, and that the GI schemes examined in this study are characterized by low or basic standards, inappropriate GI issuing procedures and weak government quality inspection programmes. The study concludes that quality of Chinese agri-food products may not be enhanced by GI schemes as currently implemented.

2.5 Methodologies used in the study

2.5.1 Treatment effect analysis

Teklewold *et al.,* (2013) developed a multinomial endogenous switching regression model of farmers' choice of combination of Sustainable Agricultural Practices and impacts on maize income and agrochemicals and family labour use in rural Ethiopia. In the first stage, farmers' choice of combinations/packages of SAPs was modelled using a multinomial logit selection model while recognizing the inter-relationships among the choices. In the second stage of the estimation, the impacts of each combination of SAPs on outcome variables were evaluated

using ordinary least squares (OLS) with a selectivity correction term from the first stage. The results show that adoption of SAPs increases maize income and the highest payoff was achieved when SAPs are adopted in combination rather than in isolation. Secondly, nitrogen fertilizer use was lower in the package that contains system diversification and conservation tillage. Conservation tillage increased pesticide application and labour demand, perhaps to compensate for reduced tillage. However, when it is used jointly with system diversification, it did not cause any significant impact on pesticide and labour use. In most cases, adoption of a package of SAPs increases women workload, suggesting that agricultural intensification technology interventions may not be gender neutral. This implies that policy makers and other stakeholders promoting a combination of technologies can enhance household food security through increasing income and reducing production costs, but need to be aware of the potential gender related outcomes.

2.5.2 Economics of Rice cultivation

Sathiadas *et al.,* (1989) analysed cost and returns of paddy cultivation in Pokkali region using cost concepts. The study indicated that the net income increased as the holding size increased for all the three areas. This may be due to the better management of labour in the production process and economics of scale in case of larger holdings. The cost of cultivation of paddy worked out to about ₹2780/ha for of paddy Vypeen, ₹2270/ha for Parur and ₹2320/ha for Varapuzha. Labour accounted for almost 81 per cent of the total cost. The yield per ha worked out to about 20 quintals in Vypeen, 17 quintals in Parur, 15 quintals in Varapuzha and 19 quintals for the whole area realizing a gross returns of ₹3900, ₹3270, ₹2870 and ₹3670 respectively. The net returns were ₹1120 per ha for Vypeen, ₹1000 for Parur and ₹550 for Varapuzha and the average of three areas was ₹1100. The cost of production per quintal of paddy worked out to ₹138 in Vypeen, ₹13 in Parur. ₹153 in Varapuzha, while the overall average worked out to ₹140. The average price realized per quintal was ₹192 in Vypeen, ₹191 in Parur, ₹188 Varapuzha and the price in the overall region was ₹191.

Jayakumar (2003) analysed the economics of commercial production and utilization of medicinal rice, Navara. Economics of cultivation was worked out using percentage analysis and cost concepts. The cost of cultivation of Navara was estimated ₹14059/hectare. The district wise analysis revealed that it is highest in Malappuram and lowest in Palakkad.

The results of the study "Simultaneous Rice – Fish Culture System in Modified Pokkali Rice Fields – A Possible Alternative to Improve Sustainability" suggest that growing fish and paddy together is a potentially better alternative, which could yield significantly higher production compared to the traditional Pokkali farming alone. The total income from the trial with both rice and fish was ₹30038, in which the income from fish alone was ₹20288. Assuming a rice yield of 3500 kg.ha-1 if paddy alone had been grown in the field, the income from the field would have been ₹13125, indicating that the simultaneous paddy fish system would yield nearly 130% higher income (by the additional yield of fish). (Nair *et al.,* 2010)

Rose (2011) undertook a study in Chittur taluk of Palakkad district to analyse the impact of GI registration on producers and to know whether consumers are valuing the GI label or not. Cost - Return analysis was used to study the economics of GI rice. The results of the study showed that impact of GI registration was marginal in terms of increase in annual agricultural income and possession of farm and household assets. For GI rice, total cost of cultivation per acre was ₹14,930 and for non- GI rice, total cost of cultivation per acre was ₹14427. Gross and net returns from GI rice were higher than non-GI rice. The gross returns and net returns of GI rice were ₹22439 and ₹7509 respectively per acre. Return per rupee of variable cost was 1.61 and return per rupee of total cost was 1.50

Radhika (2014) in her study entitled "Economic analysis of production and marketing of Kaipad paddy in Kannur district" worked out the costs and returns of Kaipad paddy cultivation in Kaipad areas. Cost-return structure was worked out both for Kaipad and conventional paddy production using percentage analysis and

cost concepts. The cost of cultivation (Cost C_2- ₹67128) was highest in the case of farmers growing HYV without shrimp in sequence. The cost of production of HYV was higher than the costs incurred for growing traditional varieties and the average income from the HYV was more than the income from traditional varieties. The highest average gross income of ₹61741/ha was obtained by farmers growing HYV and shrimp in sequence while it was lowest for the farmer respondents growing traditional variety without shrimp in sequence. Family labour income was estimated to be negative in the category of farmers growing traditional variety. The net income and Benefit Cost Ratio indicated that the farming is a loss making business in Kaipad region, especially when the value of the family labour, the land value and the managerial cost were accounted in the cost.

2.5.3 Data Envelopment Analysis:

Xiao (2011) in his paper analysed the efficiency of paddy production in China using BCC model of DEA method. The results showed that the production efficiency of paddy were low and unstable from 1990 to 2008. The tendencies of pure technical efficiency and scale efficiency were opposite. The pure technical efficiency was stable when the scale efficiency isn't stable, and vice versa. The impact of technical efficiency on paddy production is strong and that of scale efficiency was weak.

Rose (2011) in her study on Palakkadan Matta rice undertook production function analysis taking rice yield in physical units (kg/farm) as the dependent variable. It was obvious from the production function analysis that technical efficiency was low (51.43 per cent) for GI rice compared to non– GI rice (53.79 per cent) cultivation. Independent variables like area, seed, human labour and machine labour were accounted in physical units, while plant nutrients and plant protection chemicals were considered in monetary units. For GI rice, the variable land with an elasticity coefficient 0.4889 had a significant influence on yield. The inputs, plant nutrients and plant protection chemicals also had significant elasticity coefficients (0.1226 and 0.1424 respectively). The variable land had significant influence on yield of non- GI rice with an elasticity coefficient 0.3825.

The inputs, plant nutrients and plant protection chemicals also had significant elasticity coefficients (0.1213 and 0.0861, respectively).

Boubacar *et al.,* (2016) analysed the technical efficiency of rice farms in the southwest of Niger. The data collected from a survey conducted from January to March 2015 in three districts of south-western of Niger were analyzed by using DEA-Tobit two-step method. In the first step, data envelopment analysis (DEA) was applied to estimate technical, pure technical and scale efficiency. In the second step, Tobit regression was used to identify factors affecting technical efficiency. The results showed that rice producers in southwest of Niger could reduce their inputs by 52 per cent and still produce the same level of rice output. The Tobit regression showed that factors, such as farm size, experience in rice farming, membership in cooperative, main occupation and land ownership had direct impact on technical efficiency.

Parichatnon *et al.,* (2017) investigated the technical efficiency of rice production in four regions of Thailand using a three-stage data envelopment analysis (DEA) model for the period from 2006 to 2015. The results of the study showed a relatively high level of technical efficiency in production and that environmental factors have a significance influence on the production. Northeastern region obtained the best scores of technical efficiency and was recognized as the best region for Thai rice production. The study proposed Thai government to pay attention to zoning area for rice production and the land holdings. Government should provide sound policies to support modern agricultural machinery for rice production.

Pradhan (2018) made an attempt to measure technical efficiency (TE) in rice productivity in Odisha during the period of 2011–13 using an input-oriented data envelopment analysis (DEA). The estimated average TE score was 79.10 per cent, indicating overuse of critical input resources to the tune of 20.90 per cent. The model proved that seed and fertilizer use can be reduced to the extent of 4.14 kg/ha and 26.58 kg/ha respectively, without affecting the productivity of rice. Malmquist Index analysis was performed for panel data on TE change and it indicated regress in efficiency for 14 districts, progress for 13 districts and no

change for 3 districts. The observed technical inefficiencies in resource use was attributed to four important factors namely small-sized operational land holding, better off-farm income-generating activities and fluctuations of agricultural product prices, traditional mindset of older farmers and low degree of involvement of farmers with the cooperative bodies. The results suggested need for adoption of more efficient resource management practices in the state's rice cultivation scenario.

2.5.4 Marketing performance:

Jayakumar (2003) anlysed the marketable surplus of Navara in Kerala. The total marketed surplus accounted for 90.33 per cent (1380.50 kg/hectare) of the total production and only negligible proportion formed the farm retention. Lack of 'kind payment' system in Navara also lead to the higher marketed surplus. In addition, the higher market price promotes the farmers to sell maximum quantity of product. He also pointed that Navara was being used for domestic consumption to a very limited extent. In the study area six major marketing channels were identified. The most widely adopted channel was from producer to Ayurveda drug manufacturing unit.

Rose (2011) pointed out that GI registration was partially successful in securing higher price (₹14.01/kg), maintaining area of cultivation and increasing institutional participation among farmers. Highest number of farmers (50 per cent) opted to sell through private agent. Preference for the particular variety, high price and spot procurement were the reasons for preference. Forty three per cent opted government agency because of the late harvest, especially after unexpected incidence of rainfall. There is reduction in demand among private agents if it was late harvest or if there was incidence of rainfall as it deteriorates the quality of the whole lot. Six per cent of farmers opted local trader as they follow spot payment and spot procurement, but the price obtained was low compared to other channels. Farmers were forced to go for the third channel because of very late harvest, incidence of rainfall and stringent quality measures followed by other procuring agencies. With regard to problems faced in marketing, most of the farmers (97 per

cent) highlighted lack of promotional measures (97 per cent), lack of institutional support (95 per cent) and ban on export (86.67 per cent) were the major problems. She pointed out that granting GI registration does not ensure the success, unless it is legally protected along with other strong promotional and supportive measures.

Radhika (2014) analysed the marketing situations of Kaipad rice. The four marketing channels identified were, (i) farmer – rice miller – retailers -consumer (ii) farmer - local agent - rice miller- retailer - consumer (iii) farmer - local agent - Padasekhara-samithis - consumer (iv) farmer - consumer. The price spread was estimated as ₹16.3 in channel I, ₹17.51 in channel II, ₹2.97 in channel III and ₹3.85 in channel IV respectively. The marketing efficiency was found to be highest in channel III where padasekhara samithis act as an intermediary. Various constraints in production and marketing of paddy were identified and ranked using Garret's ranking technique. Low price realized for the produce was the foremost constraint faced in marketing of Kaipad paddy.

Anson and Pavithran (2014) analysed the attitude of farmers towards Pokkali rice under GI protection. The marketing aspects that were most valued by farmers for GI Pokkali rice production were identified. The economic value of GI products in the market was very high but the supply chain management was not in the hands of the producers, but the intermediaries. Therefore the major profit from the business goes to the intermediaries. Sustainability, intermediary influence and marketing factors were important aspects associated with GI products and their producers. From the results they concluded that rethinking of GI act is necessary and these elements should be considered while relooking geographical indication registration and protection act.

2.5.5 Institutional Analysis and Development Framework

Imperial (1999) in his paper described how the institutional analysis and development (IAD) framework can be used to better understand the institutional arrangements used to implement ecosystem-based management programs. He

argued that that if a new resource management paradigm is to take hold and flourish, researchers and practitioners must pay closer attention to the questions surrounding institutional design and performance, this would help improve the understanding of the relationship between science and human values in decision making and also help researchers avoid making faulty policy recommendations and thereby would improve the implementation of ecosystem-based management programs.

Anderson (2006) evaluated local institutional strategies associated with effective forest governance. Institutional Analysis and Development (IAD) framework was used to study the institutional conditions conducive to effective decentralized forest governance and their relation to sustainability. A series of testable hypotheses about institutional factors which influence the likelihood which in turn lead to successful governance outcomes was made and were tested using empirical data from forestry-sector activities in 32 randomly selected municipal governments in Bolivia. Preliminary results suggested that local governance systems were more successful when the system's governance actors enjoy favourable conditions for information exchange and learning.

Witting and Wegner (2016) conducted a public policy research to systematically describe the implementation of sustainable public transport policies in the Greater Johannesburg area of South Africa using Ostrom's Institutional Analysis Development (IAD) framework. Results indicated that African cities have to manage rapid urbanization and mobilization to decrease road congestion and air pollution that hinder economic development and social cohesion. This mixed-method of study focuses, in particular, on the process of developing a single trunk route of the Rea Vaya Bus Rapid Transit system.

Cole (2016) described Ostrom's IAD framework as "one of the most developed and sophisticated attempts to use institutional and stakeholder assessment in order to link theory and practice, analysis and policy." His paper focuses on "working rules" element in the framework which he thinks was not yet sufficiently developed. Some formal legal rules equal or approximate the working

rules, some legal rules and social norms equal or approximate the working rules and some legal rules bear no evident relation to the working rules.

Nigussie *et al.,* (2018) studied how Soil and Water Conservation (SWC) strategies are implemented and how participation was operationalized for Sustainable land management in Ethiopia using IAD framework. Findings of the study showed that on all levels of Ostrom's framework, there were shortcomings in the SWC institutions, which have to be addressed with more participatory approaches, a change from top-down to bottom-up measures, and economic incentives for farmers to invest in SWC measures instead of compulsory labour, and the integration of so far neglected groups like youth, women and the landless.

Methodology

3. METHODOLOGY

This chapter details the research design followed in the present study. A brief description of the study area, sampling procedure employed and the method of data collection followed in the study are detailed so as to provide a better understanding on how the research was performed. Further, the analytical tools are also briefly described in this chapter so that the reader can critically evaluate the research work performed and can also replicate the study in other crops.

3.1 AREA OF THE STUDY

The study was undertaken in selected rice ecosystems of Kerala, consisting of Palakkad, Thrissur, Malapuram, Ernakulam, Wayanad, and Kannur districts. An attempt is made to have a comparative economic analysis of the GI rice ecosystems of Kerala before and after GI registration.

3.1.1. Location

3.1.1.1. Kerala

Kerala, the God's own country was formed on 1st November 1956. The state lies in the south western coast of India is situated between the Arabian Sea to the west and the Western Ghats to the east. The state constitute only about one percent of the total area of the country and stretches for about 580 km in length, varying in width from roughly 30 to 120 km. Kerala has been ahead of other Indian States in achieving demographic and human development indicators. Agriculture is the state's main economic activity. The GSDP in real terms for agriculture and allied activities registered a growth rate of 3.64 per cent in 2017-18. As per area under cultivation, coconut, paddy, areca nut, jack and Pepper are the most important agricultural products of the state.

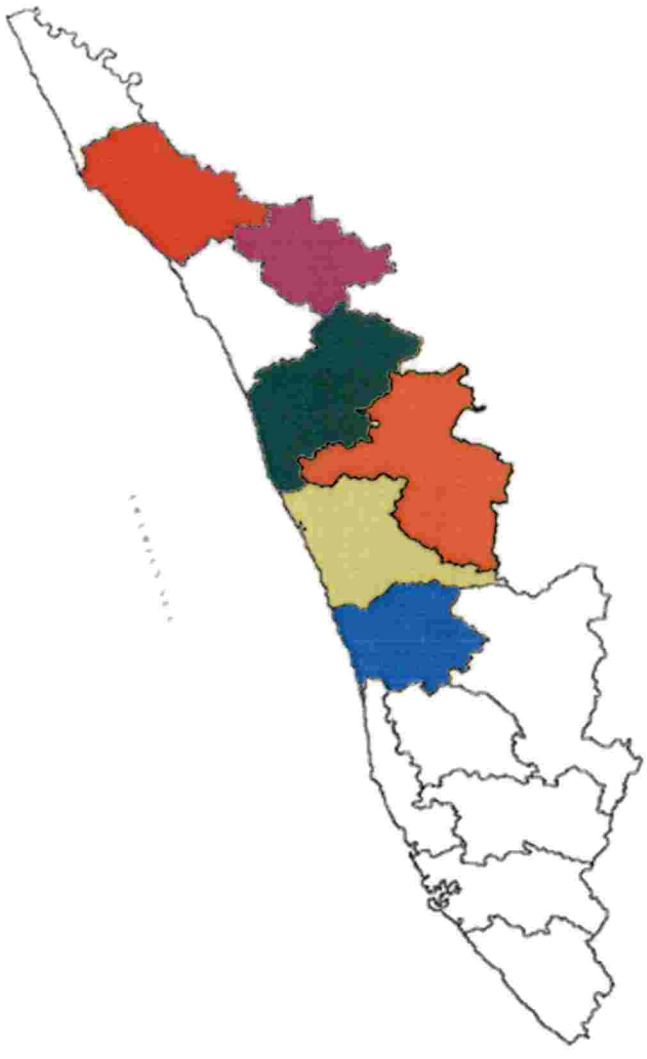

Fig. 3.1 Map of study area

Table 3.1 Details of study area

Sl no	GIs	Districts
1	Pokkali	Ernakulam
2	Navara	Thrissur Palakkad Malappuram Wayanad
3	Palakkadan Matta	Palakkad
4	Wayanad Jeerakasala	Wayanad
5	Wayanad Gandhakasala	Wayand
6	Kaipad	Kannur

3.1.1.2 Ernakulam

Ernakulam district was formed on 1st April 1958. It lies between 09°42'30" and 10°18'00" North latitude and 76°12'00" and 76°36'00" East longtitude. It has the credit of being the economic nerve centre of the State. Ernakulam district has an area of 3058 sq.kms which accounts for 7.87 per cent of the total area of the State. Agriculture is the major source of employment in the district. About 50 per cent of the geographical area is under cultivation. Coconut, rubber, tapioca, banana and paddy are the most important agricultural products of the district. Usually three crops of paddy are raised annually – virippu, mundakan and puncha. There is unique rice-fish sequential farming system practiced in the district called Pokkali system of rice cultivation.

Fig 3.2. Map of Eranakulam district

3.1.1.3. Thrissur district

Thrissur, the cultural capital of Kerala was formed on 1st November, 1956. It lies between 10°10'00" and 10°46'00" North latitude and 75°57'00" and 76°54'00" Eastern longitude. It ranks the fifth among the districts and constitutes 7.8 percent of the total area of the state. The main cultivated crops of the district are paddy, rubber, coconut, mango and arecanut. Paddy is however the most widely cultivated crop.

Fig. 3.3 Map of Thrissur district

3.1.1.4. Palakkad district

Palakkad district is called the 'rice bowl' of Kerala on account of its net sown area under paddy cultivation. Palakkad, the gate way to Kerala came into existence on 1st January 1957. It lies between 10°20'00" and 11°14'00" North latitude and 76°20'00" and 76°54'00" Eastern longitude As per 2011 census, the district accounts for about 8.41 per cent of the total population of the state.

Among the districts, Palakkad ranks the first in area (4482 Sq.km). The major crops cultivated in Palakkad district includes paddy,

Fig 3.4 Map of Palakkad district

3.1.1.5. Malappuram

Malappuram district came into existence on 16th June 1969. It lies between 75°00'00" and 77°00'00" North latitude and10°00'00" and 12°00'00" Eastern longitude. As per 2011 census, the district Malappuram is the most populous district in the state accounting for about 12.31 per cent of the total population of

the state. Agriculture is the mainstay of the population, involving 75 per cent of the people, directly or indirectly. The main crops raised are coconut, rubber, arecanut, paddy and banana.

Fig. 3.5 Map of Malappuram district

3.1.1.6. Wayanad district

Wayanad, is a rural district in Kerala and it came into existence on 1st November 1980. It lies between 75°00'00" and 77°00'00" North latitude and 10°00'00" and 12°00'00"Eastern longitude. As per 2011 census, the district

accounts for about 2.44 per cent of the total population of the state. This high altitude district is characterised by the cultivation of perennial plantation crops and spices. The major plantation crops include coffee, rubber, pepper, coconut and arecanut. Coffee based farming system is a notable feature of Wayanad.

Fig. 3.6 Map of Wayanad district

3.1.1.7. Kannur district

Kannur, the city of looms and lores came into existence on 1st January 1957. It lies between 11°27'00" and 11°58'35" North latitude and 75°47'50" and 76°26'35" Eastern longitude. The district accounts for about 7.56 per cent of the total population of the state. With an urban population of about 65 per cent, Kannur is the sixth most urbanized district in Kerala. Majority of the population of the district is dependent directly or indirectly on agriculture for their livelihood

and the main crops cultivated in the district include coconut, rubber, cashew, arecanut, and padig.

3.7 Map of Kannur district

3.1.2 Land utilisation pattern of the study area

The land utilisation pattern of study area is presented in Table 3.2. According to the land use statistics 2016-17, the total geographical area of the state is 3.89 million hectares, of which 2.01 million hectares is the reported net sown area and 2.58 million hectares is the gross cropped area with a cropping intensity of 128 per cent. The net sown area works out to be 52 per cent of the total geographical area.

Table 3.2. Land utilization pattern of study area in 2016-2017 (hectares)

Particulars	EKM	TSR	PKD	MPM	WND	KNR	KERALA
Total Geographical area	305826 (100.0)	302919 (100.0)	447584 (100.0)	355446 (100.0)	212966 (100.0)	297112 (100.0)	3886287 (100.0)
Forest	70617 (23.1)	103619 (34.2)	136257 (30.4)	103417 (29.1)	78787 (37.0)	48734 (16.4)	1081509 (27.8)
Land put to non-agricultural use	44330 (14.5)	39026 (12.9)	50662 (11.3)	51678 (14.5)	11789 (5.5)	37512 (12.6)	441934 (11.4)
Barren & uncultivable land	404 (0.1)	91 (0.0)	2003 (0.4)	844 (0.2)	87 (0.0)	1246 (0.4)	11780 (0.3)
Permanent pastures & other grazing land	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Land under misc. tree crops	160 (0.1)	201 (0.1)	724 (0.2)	203 (0.1)	56 (0.0)	287 (0.1)	2450 (0.1)
Cultivable waste	13455 (4.4)	10170 (3.4)	23284 (5.2)	6048 (1.7)	1098 (0.5)	6405 (2.2)	101379 (2.6)
Fallow other than current fallow	8031 (2.6)	6031 (2.0)	16155 (3.6)	5572 (1.6)	1195 (0.6)	3915 (1.3)	55530 (1.4)

Current fallow	8899 (2.9)	9813 (3.2)	13889 (3.1)	8084 (2.3)	2915 (1.4)	4069 (1.4)	72008 (1.9)
Marshy Land	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	95 (0.0)	106 (0.0)
Still Water	11171 (3.7)	5034 (1.7)	15333 (3.4)	6168 (1.7)	4047 (1.9)	6472 (2.2	98343 (2.5)
Water Logged Area	290 (0.1)	318 (0.1)	0 (0.0)	63 (0.0)	19 (0.0)	372 (0.1)	3210 (0.1)
Social Forestry	105 (0.0)	147 (0.0)	380 (0.1)	191 (0.1)	66 (0.0)	73 (0.0)	2556 (0.1)
Net area sown	148364 (48.5)	128469 (42.4)	188897 (42.2)	173178 (48.7)	112907 (53.0)	187932 (63.3)	2015482 (51.9)
Area sown more than once	17721 (5.8)	42509 (14.0)	89558 (20.0)	64682 (18.2)	53968 (25.3)	33434 (11.3)	568525 (14.6)
Total cropped Area	166086 (54.3)	170978 (56.4)	278456 (62.2)	237860 (66.9)	166875 (78.4)	221367 (74.5)	2584007 (66.5)

Source: Agricultural Statistics 2016-17, Directorate of Economics and Statistics, Kerala
Note: Figures in parentheses indicate per cent to Total Geographical Area

3.1.3 Cropping pattern in the study area

The cropping patterns in the selected districts are presented in Table 3.3. In the crop sector, commercial crops dominate Kerala's cropping pattern. In 2016-17, rice was grown on 1.71 lakh hectares of land and coconut was grown on 7.8 lakh hectares of land. Another 7.05 lakh hectares was cultivated with tea, coffee, rubber, and cardamom. The remaining 3.5 lakh hectares was cultivated with vegetables, fruits such as banana, and other crops, such as cashew.

Table 3.3. Cropping pattern in the study area in 2016-17 (hectares)

Crop	EKM	TSR	PKD	MPM	WND	KNR	KERALA
Paddy	4730	21100	65513	7140	7822	4671	171398
	(2.8)	(12.3)	(23.5)	(3.0)	(4.7)	(2.1)	(6.6)
Coconut	43079	80504	59547	102836	10322	88217	781496
	(25.9)	(47.1)	(21.4)	(43.2)	(6.2)	(39.9)	(30.2)
Arecanut	4069	6096	9033	18379	12079	9543	97696
	(2.4)	(3.6)	(3.2)	(7.7)	(7.2)	(4.3)	(3.8)
Tapioca	5415	1172	1900	5283	1726	1661	68664
	(3.3)	(0.7)	(0.7)	(2.2)	(1.0)	(0.8)	(2.7)
Banana	5158	2213	15199	7120	8555	2022	57158
	(3.1)	(1.3)	(5.5)	(3.0)	(5.1)	(0.9)	(2.2)
Plantain	4481	5407	9285	4459	1214	3150	57140
	(2.7)	(3.2)	(3.3)	(1.9)	(0.7)	(1.4)	(2.2)
Jack	4036	5070	6955	8600	7426	8504	91982
	(2.4)	(3.0)	(2.5)	(3.6)	(4.5)	(3.8)	(3.6)
Mango	4503	7275	9892	9245	4264	7829	79496
	(2.7)	(4.3)	(3.6)	(3.9)	(2.6)	(3.5)	(3.1)
Pappaya	1378	1471	1582	2618	378	2031	19694
	(0.8)	(0.9)	(0.6)	(1.1)	(0.2)	(0.9)	(0.8)
Cashew	446	1511	1951	2035	574	19411	41661
	(0.3)	(0.9)	(0.7)	(0.9)	(0.3)	(8.8)	(1.6)
Pepper	1866	1901	2488	2641	10565	4394	85207

	(1.1)	(1.1)	(0.9)	(1.1)	(6.3)	(2.0)	(3.3)
Ginger (cured)	101 (0.1)	48 (0.0)	1158 (0.4)	50 (0.0)	2156 (1.3)	53 (0.0)	5151 (0.2)
Turmeric (cured)	247 (0.1)	69 (0.0)	594 (0.2)	354 (0.1)	167 (0.1)	144 (0.1)	2632 (0.1)
Tea	0 (0.0)	530 (0.3)	831 (0.3)	0 (0.0)	5306 (3.2)	0 (0.0)	30205 (1.2)
Coffee	0 (0.0)	0 (0.0)	4833 (1.7)	0 (0.0)	67426 (40.4)	0 (0.0)	84976 (3.3)
Cardamom	0 (0.0)	0 (0.0)	2755 (1.0)	70 (0.0)	4120 (2.5)	0 (0.0)	39080 (1.5)
Rubber	60170 (36.2)	15660 (9.2)	37870 (13.6)	42770 (18.0)	10800 (6.5)	48070 (21.7)	551050 (21.3)
Gross Cropped Area	166085 (100.0)	170978 (100.0)	278455 (100.0)	237860 (100.0)	166875 (100.0)	221366 (100.0)	2584007 (100.0)

Source: Agricultural Statistics 2016-17, Directorate of Economics and Statistics, Kerala.
Note: Figures in parentheses indicate per cent to coloumn totals

3.2 Sampling design

The study was conducted in selected rice ecosystems of Kerala. The rice GIs of Kerala *viz*., Navara Rice, Palakkadan Matta Rice, Pokkali Rice, Wayanad Jeerakasala Rice, Wayanad Gandhakasala Rice and Kaipad Rice were selected for the study. The list of farmers were collected from the producer societies in each GI group who are the registered owners. Details of the producer societies are presented in Table 3.4. In case where adequate data was not obtained from producer societies, Krishibhavans in the respective district were contacted to collect details of farmers cultivating the GI. From the list thus obtained, 50

farmers each were randomly selected for all the GI rices making a total of 300 farmers (50X6). The six categories of sample farmers were

1) Palakkadan Matta Rice
2) Navara Rice.
3) Wayanad Jeerakasala Rice.
4) Wayanad Gandhakasala Rice
5) Pokkali Rice.
6) Kaipad Rice.

Table 3.4. Registered owners of the selected GIs in the study area

GI	Producer society
Palakkad Matta Rice	Palakkad Matta Farmers Producer Company Ltd
Pokkali Rice	The Pokkali Land Development Society
Jeerakasala Rice	Wayanad Jilla Sugandha Nellulpadaka Karshaka Samithi
Gandhakasala Rice	Wayanad Jilla Sugandha Nellulpadaka Karshaka Samithi
Kaipad Rice	Malabar Kaipad Farmers Society

Eventhough Navara Rice is grown throughout Kerala, Palakkad Thrissur, Malapuram and Wayanad districts were purposively selected for the study because these districts had the largest area under Navara. The geographical area of production of Palakkadan Matta is restricted to Palakkad in the GI application approved by the registry. So samples for Palakkadan Matta rice farmers were drawn from Palakkad. Pokkali rice is grown in the coastal areas of the districts of Alappuzha, Ernakulam and Thrissur. The traditional Pokkali areas in Ernakulam district was selected for the study because the district had the largest area under Pokkali. For Wayanad Jeerakasala Rice and Wayanad Gandhakasala Rice, samples were collected from Wayanad district, as all the of farmers in Wayanad who cultivate these varieties come under the purview of GI. Kannur district accounted for the largest share in area under Kaipad paddy among the three

districts where Kaipad system of cultivation is practiced. So sample farmers from Kannur were interviewed to collect data on Kaipad Rice. A sample of 50 farmers was randomly selected from each group, thus making a total sample size of 300 farmers. In addition, market intermediaries were also surveyed from respective districts. Apart from that focus group discussions were conducted as a part of Institutional Analysis and Development (IAD) framework analysis among the respective farmers.

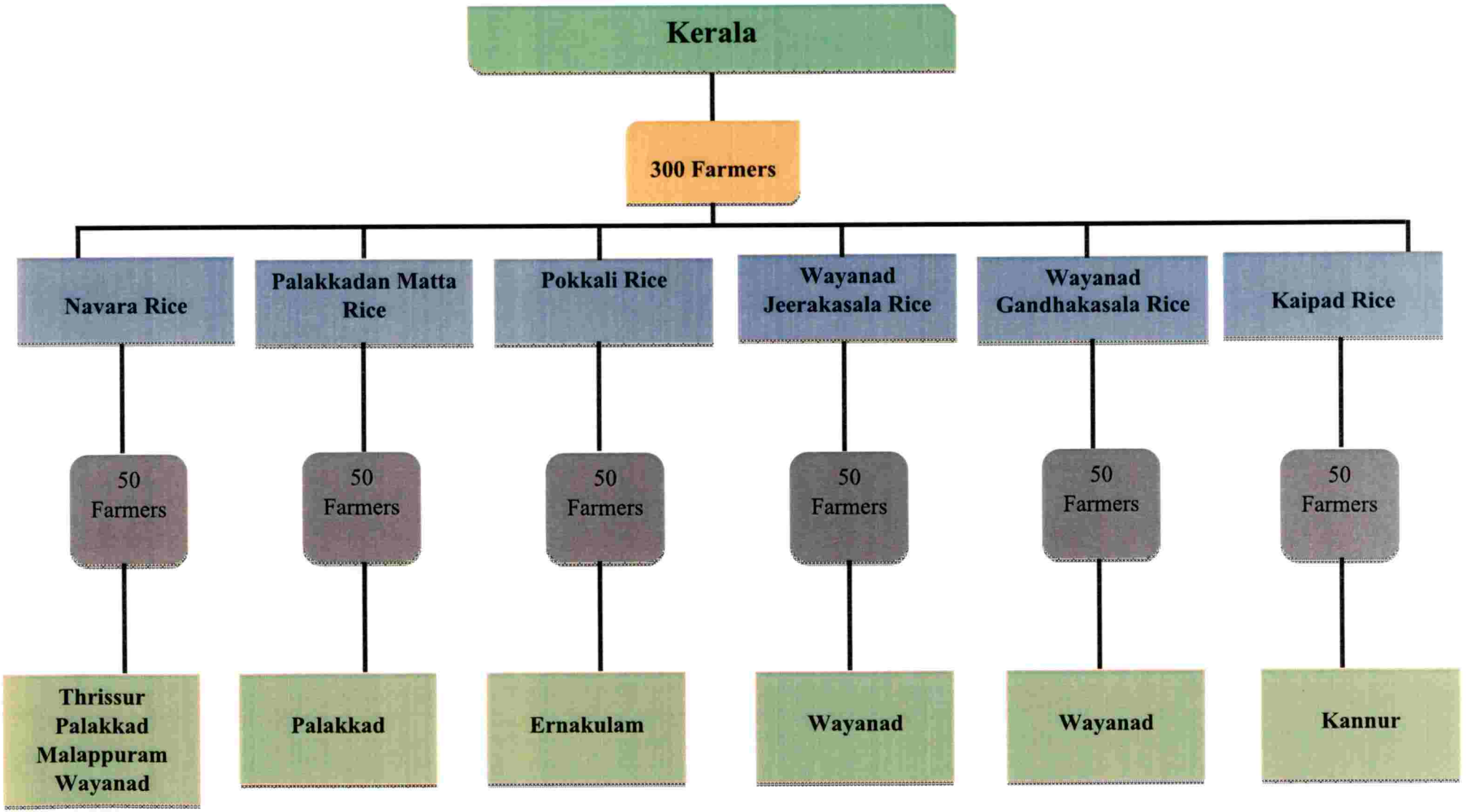

Fig. 3.8. Distribution of samples

3.2.1 Collection of data

Primary data were collected from the respondents by personal interview method using a well-structured interview schedule. Details on socio-economic condition of the farmers, production costs, yield, returns, mode of marketing, price of produce and problems encountered by farmers in production and marketing of paddy were collected. Secondary data were collected from various published and unpublished sources.

3.3 Tools of data

3.3.1 Welfare impact analysis

For the objective of assessing the impact of GI rice on income and welfare of the producer households, impact evaluation technique namely treatment effect analysis was used. A programme or a policy or a technology intervention seeks to alter or change the well-being of the intended beneficiaries. Impact evaluation technique analyses whether the alteration or change occurred after the intervention can be completely attributed to the intervention alone and not due to other observable or non-observable factors (Khandker *et al.*, 2010). For e.g., increase in income could also be due to the increased knowhow of farmers on the technical aspects of production (influenced by age, education), landholding size (economies of scale) etc. Eventhough here the intervention is the introduction of GI, we cannot solely attribute the increased income to the adoption of GI. The most important task in impact evaluation is to identify a control group which shows the situation of a participating group or beneficiary where the programme or innovation has not existed.

There are situations where programs which may appear promising before implementation fails to generate expected impacts. Effective impact evaluation can assess precisely whether intended effects are realised. For this, ex-ante (used before the introduction of the technology/before program development) and ex-post approaches (used after the introduction of the technology/after programme development) approaches are used. Ex- ante approach attempts to predict the

outcome of an intervention, assuming the individual behaviour and market situations. Ex-post evaluation measures the actual impact accrued by the beneficiary because of the programme. But the result of intervention cannot be attributed to programme itself as it is impossible to reach a conclusion about impact based only on a point observation after treatment. The impact can be truly observed by comparing the factual and counterfactual outcomes. Factual outcome refers to the outcome for participants exposed to the programme and counterfactual outcome refers to the outcome for participants had they not been exposed to the programme. There are two methods prescribed, one by comparing the 'before and after situation' and the other by comparing the 'with and without' situation. Evaluation using with and without situation is explained in Fig 3.9

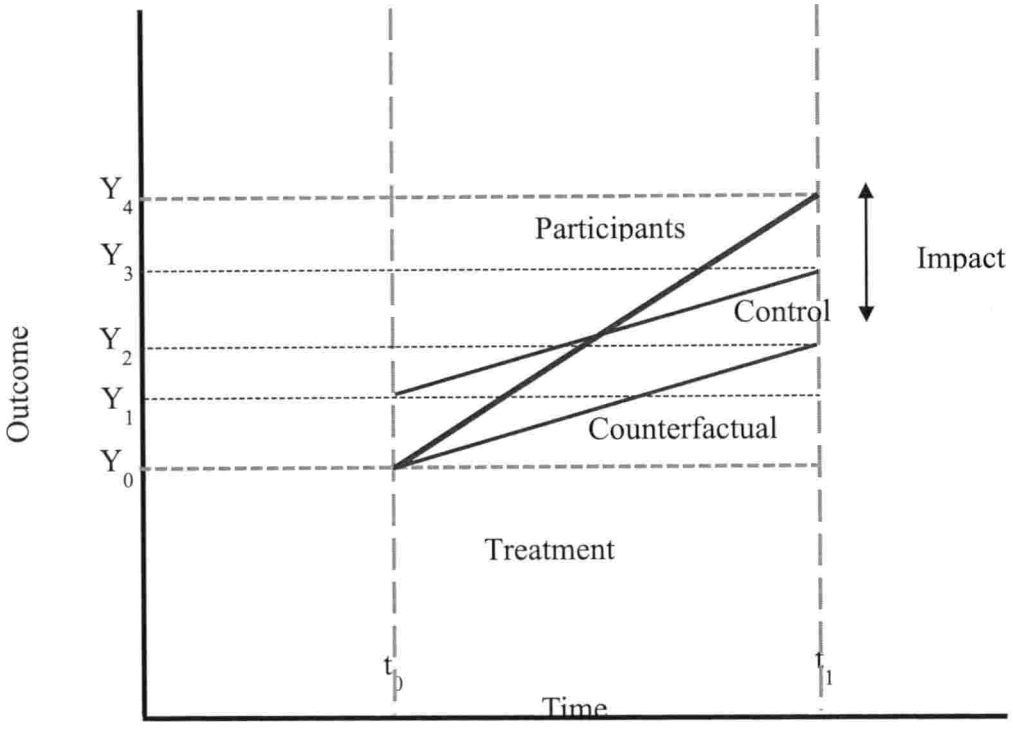

Fig 3.9. Evaluation using a with and without comparison (Khandker *et al.*, 2010)

Fig 3.9. provides an illustration. consider the income of participants after intervention as Y_4 and income of the control households as Y_3. The comparison between with and without group measure effect Y_4-Y_3. The problem is if this is the right estimate of the programme because incomes are different across participants and control group before the programme. Here if we know the counterfactual income of participants, (Y_0, Y_2), the real estimate of the programme is Y_4- Y_2. In the example the comparison with control is an underestimate of the programme effect.

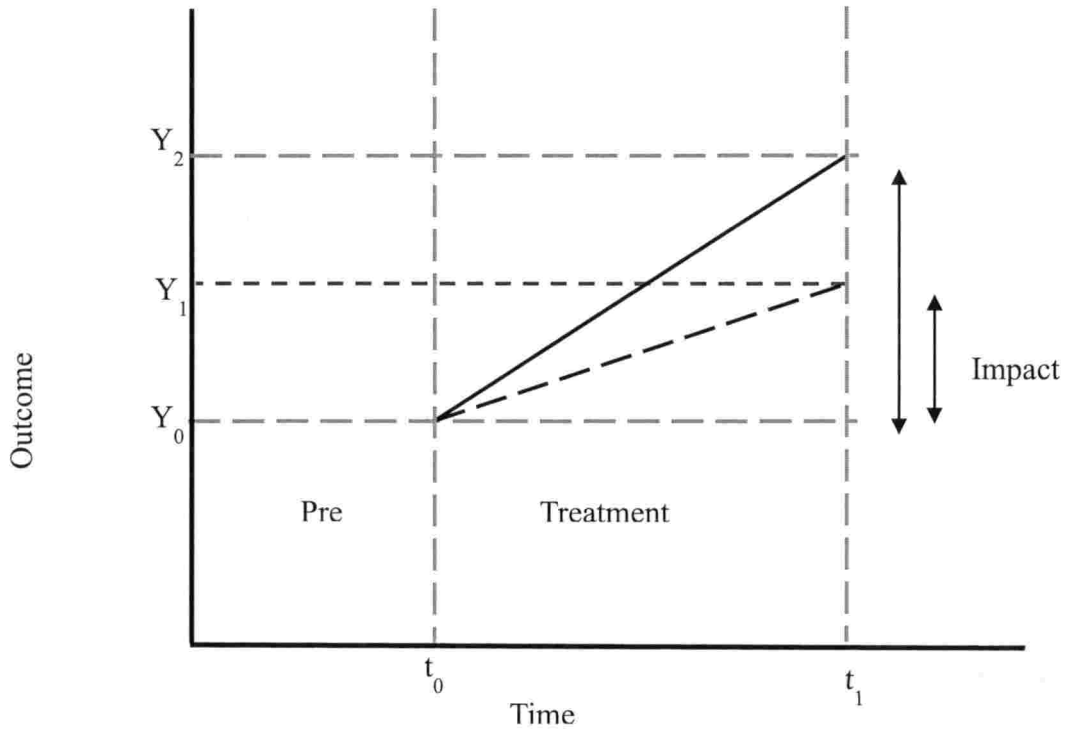

Fig 3.10. Evaluation using a before and after comparison (Khandker *et al.*, 2010)

In the illustration in Fig 3.10, the pre-intervention income of participants is Y_0 and post intervention the income increases to Y_2. Hence, the programme effect is Y_2- Y_0. Many other observable and non-observable factors (outside the intervention) may have changed over the period. Not controlling for those factors would falsely attribute the participant's outcome in the absence program as Y_0

when it might be Y_1. Here the real estimate of programme may be Y_2- Y_1. In the example, the impact Y_2- Y_0 is an overestimate of the programme effects

To experiment a comparison between pre and post outcomes of participants, a comparison of the ex post outcome of beneficiaries with data on their outcome before intervention either with comparable survey data or data from published secondary sources is to be made. As comparable survey data or secondary data was not available exclusively for GI rice, this also becomes a difficult task. Even though Government of Kerala collect data on area, production, productivity of rice every year, separate data on speciality rice are not available. The values are averages of all rice varieties cultivated in Kerala. Ex ante studies are also limited in GI. Another situation that can be used is by comparing how the same household or individual have fared with and without the treatment i.e., a comparison between treated and non-treated groups when both are eligible for treatment. It is not possible to assign GI status to all groups. It was difficult to find a control group which was eligible for treatment but not treated. Normal rice cannot be taken as a control in this case as they have no speciality attributed to the geographical area and they can be cultivated elsewhere, whereas GI possesses special characters attributed to the geographical area where it is grown.

GI is a relatively new concept, so it is difficult to analyse the impact of GI as the final outcomes have not yet reached the user. The impact of an intervention is still ahead of the outcomes (Fig 3.11). So here, a comparison was attempted between the situations of six GI rice groups taking in to consideration the output yield and some of the intermediate outcomes, net income, value of marketed surplus and marketed surplus. A simple ANOVA would have been sufficient to compare between situations. But as the effect of socio economic and observable characters could not be eliminated in that case, a treatment effect analysis was adopted so that GIs could be compared across, controlling for all the observable characters. The environmental factors were not taken into consideration as GI was awarded for a particular area where weather parameters may not vary much.

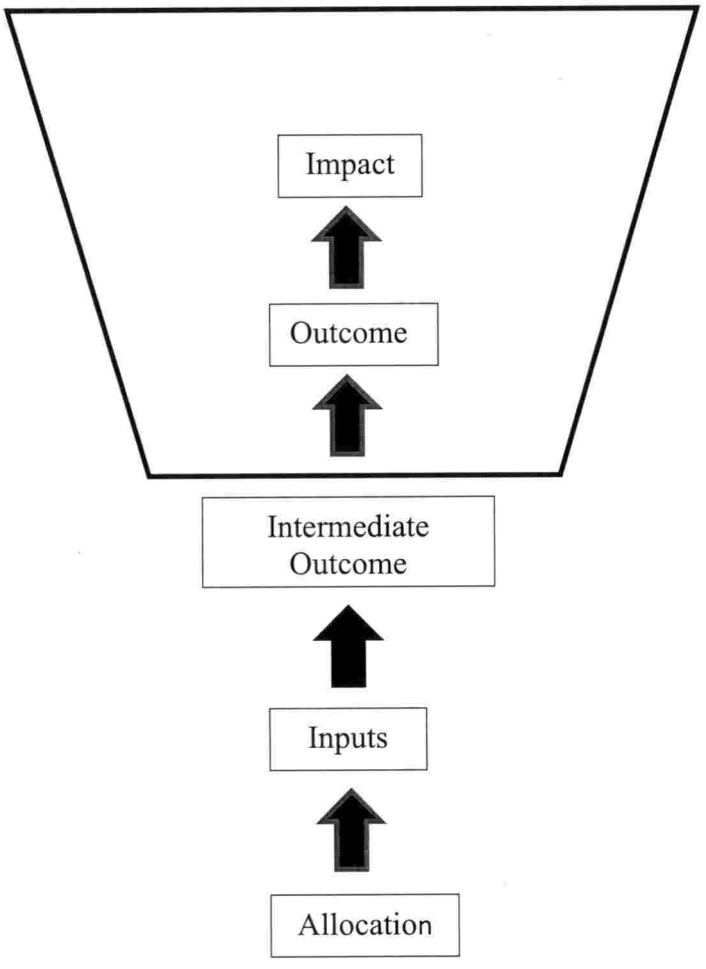

Fig 3.11. Pathway of impact of an intervention (Khandker *et al.*, 2010)

3.3.1.1 Conceptual and econometric framework

The effects of GI could be determined by comparing relevant variables across different GIs. Because of self-selection this approach may not be appropriate for empirical analysis using observational data but for controlled experiments. Farmers endogenously select themselves in to different GIs and these decisions are likely to be influenced by unobservable characters that may be correlated with outcomes. In order to correct this selection bias, multi value treatment effect model is used. The model evaluates alternate combination of practices as well as individual practices. Farmers choice of GIs is model using a multi nominal logit selection model, and the ATE is estimated using Regression adjustment,

Augmented inverse probability weighted (AIPW) and Inverse-probability weighted regression-adjustment (IPWRA) approach.

3.3.1.2 Multinomial Adoption Selection Model.

The empirical form is adopted from Teklewood *et al.*, (2013). It was assumed that farmers aim to maximize their profit, U_i, by comparing the profit provided by m alternative GIs. The requirement for farmer i to choose any GI, j, over any alternative GI, m, is that $U_{ij} > U_{im}\ m \neq j$, or equivalently $\Delta\ U_{im} = U_{ij} - U_{im} > 0\ m \neq j$. The expected profit, U_{ij}^*, that the farmer derives from the adoption of GI j is a latent variable determined by observed household, plot and location characteristics (X_i) and unobserved characteristics (ε_{ij}):

$$U_{ij}^* = X_i\beta_1 + \varepsilon_{ij} \quad \text{.....(1)}$$

where X_i is observed exogenous variables , εij is unobserved characteristics.

(I) is an index that denotes the farmer's choice of GI, such that:

$$I = \begin{cases} 1 \quad \text{iff} \quad U_{i1}^* > \max\limits_{m \neq j} (U_{im}^*) \quad or \quad \eta_{i1} < 0 \\ \vdots \quad \vdots \qquad\qquad \vdots \qquad\qquad \text{for all } m \neq j \\ J \quad \text{iff} \quad U_{i1}^* > \max\limits_{m \neq j} (U_{im}^*) \quad or \quad \eta_{ij} < 0 \end{cases} \quad \text{.....(2)}$$

where $\eta_{ij} = \max_{m \neq j} (U_{im}^* - U_{ij}^*) < 0$ (Bourguignon et al., 2007). Eq. (2) implies that the i^{th} farmer will adopt GI j to maximize his expected profit if GI j provides greater expected profit than any other package $m \neq j$, that is, if $\eta_{ij} = \max_{m \neq j} (U_{im}^* - U_{ij}^*) > 0$.

It is assumed that ε are identically and independently Gumbel distributed. So the probability that farmer i with characteristics X will choose package j can be specified by a multinomial logit model (McFadden, 1973):

$$P_{ij} = \Pr\left(\eta_{ij} < 0 | X_i\right) = \frac{\exp\left(X_i\beta_j\right)}{\sum_{m=1}^{J} \exp\left(X_i\beta_m\right)} \quad \text{.....(3)}$$

The parameters of the latent variable model can be estimated by maximum likelihood method.

3.3.1.3 Estimation of Average Treatment Effects

The above framework can be used to examine model multiple choices of farmers. To estimate the average treatment effects we used teffects ipwra command in stata for multi-level treatments (Cattaneo *et al.,* 2010; Cattaneo *et al.,* 2013).

3.3.1.4 Inverse-probability weighted regression-adjustment (IPWRA)

teffects ipwra estimates treatment effects from observational data by using inverse-probability weighted regression-adjustment (IPWRA) estimators. IPWRA estimators use weighted regression coefficients to compute averages of treatment-level predicted outcomes, where the weights are the estimated inverse probabilities of treatment. The contrasts of these averages provide the estimated treatment effects. IPWRA estimators use a model to predict treatment status, and another model is used to predict outcomes. IPWRA estimators have the double-robust property, only one of the two models must be correctly specified for the IPWRA estimator to be consistent. The IPWRA estimators are also known as "Wooldridge's double-robust" estimators because they were derived in Wooldridge (2007) and discussed at length in Wooldridge (2010)

y_{ti} is the potential outcome that subject i would obtain if given treatment level *'t'* where y_{ti} is the realization of random variable y_t. The subscript i denotes realizations of the corresponding unsubscripted random variables. y_0 is the potential outcome of a subject which do not receive any treatment. For multi valued treatments, the definition of unobservable individual level treatment effects is exented to be $y_t - y_0$ for $t \in \{1,.....,q\}$. The parameter of interest here is average treatment effect (ATEand it is the mean effect of giving each individual treatment t instead of treatment 0:

$$ATE_t = E(y_t - y_0)$$

IPWRA estimators use a three-step approach to estimating treatment effects.

1. Inverse-probability weights are computed after estimating parameters of the treatment model.
2. Using the estimated inverse-probability weights, weighted regression models of the outcome for each treatment level is estimated and thus the treatment-specific predicted outcomes for each subject is obtained.
3. Computation of the means of the treatment-specific predicted outcomes. The stimates of the ATEs are the contrasts of these averages.

3.3.2 Method of Estimation of Cost

3.3.2.1 Estimation of Cost

The cost concepts used by Commission on Agricultural Costs and Prices (CACP) of Government of India for farm management studies were used in the present study. Data was collected on selected indicators. Physical inputs including value of seed (purchased or home grown), value of insecticide and pesticide, value of manure (owned and purchased), value of fertilizers, irrigation charges, value of own or hired machinery, human labour (hired or own), Animal labour (hired or own), Machine labour (owned and hired), land revenue, rent paid for leased in land or rental value of own land, interest on working capital, land revenue, depreciation of machinery and miscellaneous expenses were the indicators included in the study

The structure of different costs and their components

(i) Cost A_1 includes value of human labour (casual and permanent), value of hired bullock power, value of owned bullock power, value of owned machine power, value of hired machine power, value of seeds (both farm produced and purchased), value of manures (owned and purchased), value of fertilizers, value of plant protection chemicals, value of weedicides, irrigation charges, land revenue cess and other taxes, depreciation on farm implements and farm buildings, interest on working capital and miscellaneous expenses

(ii) Cost A_2 = Cost A_1 + Rent paid for leased in land

(iii) Cost B_1= Cost A_1 + Interest on the value of owned fixed capital assets (excluding land)

(iv) Cost B_2= Cost B_1 + Rental value of owned land (less land revenue) and rent paid for leased in land

(v) Cost C_1 = Cost B_1 + Imputed value of family labour

(vi) Cost C_2 (Cost of Cultivation) = Cost B_2 + Imputed value of family labour

(vii) Cost C_3 = Cost C_2 + 10 percent of cost C_2 (to account for managerial input of the farmer)

3.3.2.2 Method of measurement of various costs included in the study:

The criteria for measurement of various input costs are presented in Table 3.5

Table 3.5. Criteria for measurement of costs of inputs

Sl.No.	Items	Criteria
1	Hired and permanent labour charges	Evaluated on the basis of hours worked on the field and wages paid for such work in the locality
2	Family Labour	On the basis of statutory wage rate or the actual market rate, whichever is higher.
3	Owned/Hired Machinery Charges	In the case of owned machine labour, cost was evaluated on the basis of cost of maintenance of farm machinery which includes diesel, electricity, lubricants, depreciation, repairs and other maintenance expenses. It may be evaluated at the rate of hire charges for machineries if hired
4	Cost of farm produced seed	Evaluated at prevailing locality prices
5	Farm Yard Manure	If it was purchased, then the evaluation was done on the basis of purchase price. Evaluated at prevailing locality rates in case of farm produced manure
6	Chemical fertilizer, insecticides, pesticides	Evaluated at purchase price.
7	Rent of owned land	Estimated on the basis of prevailing rents for similar land in a given area

8	Rent of lease in land	Estimated on the basis of actual rent paid
9	Interest on owned fixed capital	The present value of assets, equipments constitutes the fixed capital. An Interest rate of 10% per annum was charged.
10	Interest on working capital	Total paid out cost constitutes the working capital. An Interest rate of 7.5% per annum was charged on the working capital for the duration of crop.
11	Payments in kind	Evaluated at the prices prevailing at the time when such payments were made.
12	Main products and by-products	Calculated at the post-harvest prices prevailing in the locality.

3.3.3 Data Envelopment Analysis

The extent by which a farm lies below its production frontier, which sets the limit to the range of maximum obtainable output, can be regarded as the measure of technical inefficiency (Hota and Pradhan, 2012). Two methods used to measure the technical efficiency (TE).

1) Production frontiers estimation.
2) Data Envelopment Analysis (DEA).

In the present study data envelop analysis is employed to measure the technical efficiency of sample farms. The DEA frontier technology is formed as a non-parametric, piece-wise linear combination of observed "best-practice" activities. Data points are enveloped with liner segments, and efficiency scores are calculated relative to the frontier (Coelli *et al.* 1998). Technical efficiency was estimated by employing the input orientated DEA models under variable returns to scale (VRS). Input oriented VRS DEA model for *N* decision-making units, each producing M outputs by using k different inputs is given below

$\min_{\theta,\lambda} \theta$

$st - y_1 + Y\lambda \leq 0$

$\theta x_1 - X\lambda \geq 0$

$N1'\lambda = 1$

$\lambda \geq 0$

where θ is a scalar λ is a N×1 vector of constants and M is an $N \times 1$ vector of ones. The value of θ obtained will be the efficiency score for the i-th decision-making unit. It will satisfy $\theta \leq 1$, with a value of 1 indicating a point on the frontier and hence technically efficient decision-making unit, according to the Farrell (1957) definition. Thus, the linear programming problem needs to be solved N times and a value of θ is provided for each farm in the sample. The relationship between VRS and CRS DEA score is used to calculate the scale efficiency (SE) score for a farm (Dhungana *et al.,* 2004).

$$SE_i = \frac{TE_{i,CRS}}{TE_{i,VRS}}$$

where SE= 1 indicates a scale efficient farm that is operating at a point of CRS. a value SE<1 indicates scale inefficiency.

3.3.4 Marketing efficiency of different channels for GI rice

In the present study, the methodology detailed by Acharya and Agarwal (1987) was used for estimating marketing cost, marketing margin, price spread, producer's share in consumer's rupee and efficiency of the marketing channels.

Table. 3.6 Marketing concepts used in the study

Marketing cost	Marketing cost is the sum total of all costs incurred by every agency involved in the marketing channel of a product for performing their functions.
Marketing margin	It is the profit received by various marketing agencies (eg: middlemen, traders, wholesalers) in moving the produce from the producer to the end consumer
Price spread (concurrent margin method)	Price spread refers to the difference between the price paid by the consumer and the price received by the producer for an equivalent quantity of the commodity. (Consumer price – Producer price)

Marketing efficiency (Shepherd's formula)	Marketing efficiency is a measure of market performance. An efficient marketing system facilitates movement of goods from producers to the end user cost effectively with the provision of service desired by the consumers $ME = \frac{V}{I}$ Where, ME = Marketing efficiency V= Consumer's price I = Total marketing cost

3.3.5 Institutional Analysis and Development (IAD) framework

The Institutional Analysis and Development Approach (IAD) is a framework for organising research on institutions and governance structures. It has been developed by Elinor and Vincent Ostrom and their colleagues at Indiana University. The framework has been used and successively improved by numerous empirical case studies. This methodology was adopted to study the institutional innovations in the present study. The important concepts in this analysis are,

Action Situation: The IAD framework is a multi-tier conceptual map. The main part of the framework include identification of an action situation and the subsequent patterns of interactions and outcomes, and evaluating these outcomes. As the first step to analyse the problem, an action situation that can be utilized to describe, analyse, predict and explain behaviour within institutional arrangements is identified. The common set of variables used to describe the action situation includes the set of actors, the specific positions to be filled by participants, the set of allowable actions and their linkage to outcomes, the potential outcomes that are linked to individual sequences of actions, the level of control each participant has over choice, the information available to participants about the structure of the action situation and the costs and benefits of actions and outcomes.

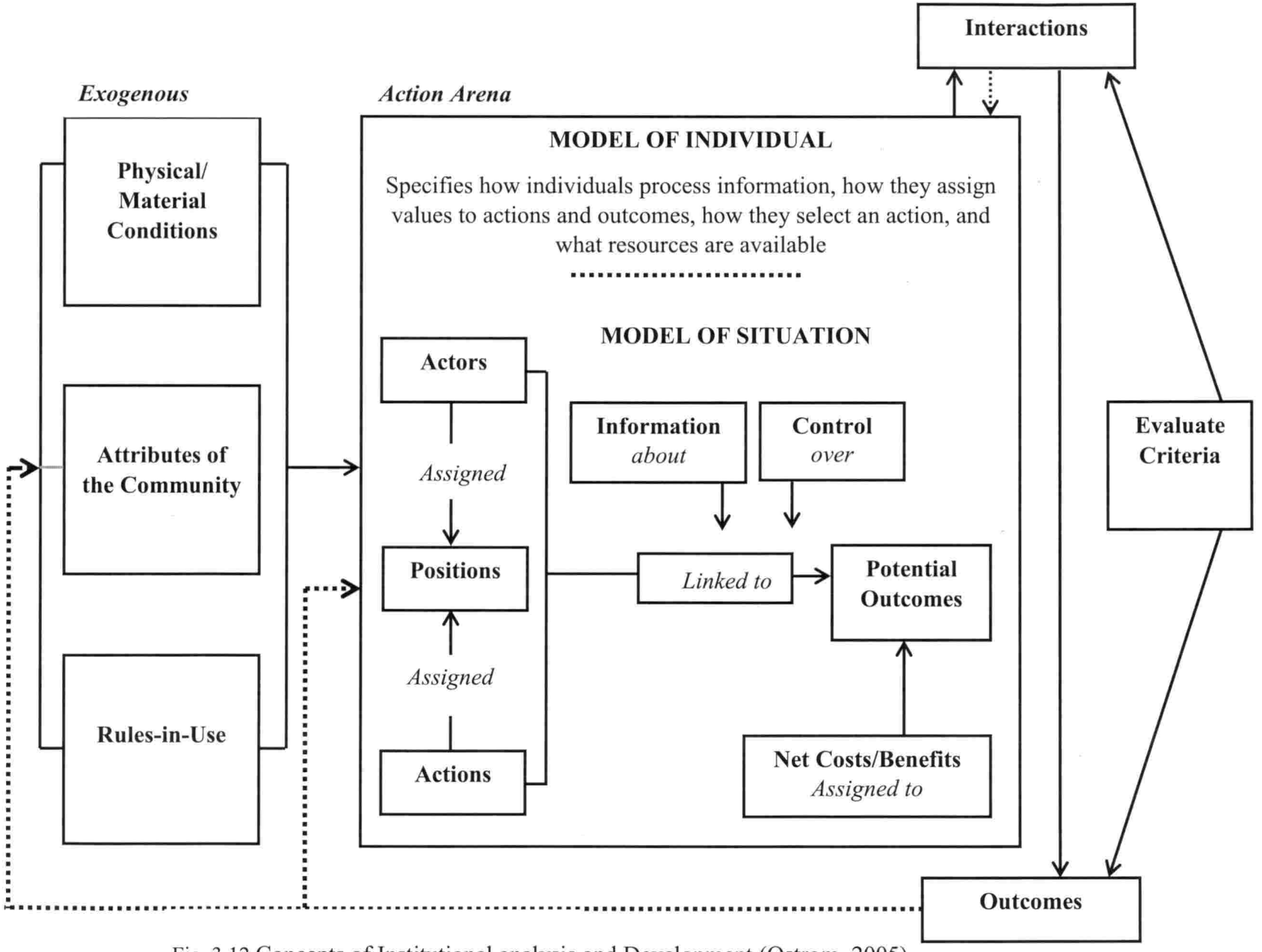

Fig. 3.12 Concepts of Institutional analysis and Development (Ostrom, 2005)

Table 3.7 Structure of an action situation

Actor	An actor within an action situation includes hypothesis about the resources that an actor brings to a situation, the valuation actors assign to states of the world and to actions, the way actors acquire, process, retain, and use knowledge contingencies and information and the processes actors use for selection of particular courses of action.
The positions	What positions exist (eg. Chair, members of the association etc)
The set of allowable actions	Regarding the technologies that can be used, seasons etc.
The potential outcomes	What geographic region and what events in that region are affected by participants in these positions? What chain of events links actions to outcomes?
The level of control over choice	Is there a need for the appropriators to seek permission or permit before actions or is the actions carried out on their own initiative
The information available	The amount of information the appropriators have about the condition of the resource, about other appropriators' cost and benefit, and about how their actions cumulate into joint outcomes
The costs and benefits of actions and outcomes	The costs associated with these actions and the benefit achieved by each appropriator.

3.3.5.1 Predicting outcomes

The analyst makes interpretations about the results after thoroughly analysing assumptions about the actor and the structure of the action situation. In strictly controlled, one-shot, action situations, under conditions of complete information where participants are motivated to select particular strategies or chains of actions that jointly lead to stable equilibria, an analyst can frequently make strong interpretations and predict the likely patterns of conduct and outcomes (Ostrom, 2011).

3.3.5.2 Evaluating outcomes

As the next step the institutional analyst evaluate the outcomes that are achieved as well as those which are likely achievable in future under alternative institutional arrangements. Both the outcomes and the processes of achieving outcomes are Evaluated.

Table 3.8. Evaluation criteria of outcomes

Economic Efficiency	Magnitude of net benefits associated with an allocation of resources is determined
Fiscal equivalence	On the basis of the equality between individuals' contributions to an effort and the benefits they derive and on the basis of differential abilities to pay.
Redistributional equity	Policies that reallocate resources to poorer individuals are of considerable importance. Efficiency principles dictate that scarce resources should be used to produce the greatest net benefit.
Accountability	Administrators should be accountable to citizens concerning the expansion and usage of public amenities and natural resources. Institutional arrangements that effectively aggregate information preferences of citizens assist in realizing efficiency at the same time that they serve to increase accountability and to promote the achievement of

	re-distributional objectives.
Conformance to Values of Local Actors	Evaluate how those outcomes fit the values of those involved. Are public officials or local leaders trustworthy
Sustainability	Institutional arrangements should be able to respond to changing environments without affecting the sustainability of situations. If an institutional arrangement is rigid to cope with natural disasters and highly localized special circumstances, it is unlikely to prosper.

3.3.5.3 The concept of rules

Rules are shared understandings among those involved that refer to enforced prescriptions about what actions (or states of the world) are required, prohibited, or permitted (Ostrom, 2011). Seven types of working rules can affect the structure of an action situation are identified.

Table 3.10. Types of working rules affecting the action situation

Boundary rules	Restrictions regarding who can use the resources. Whether it is limited to one group defined by traditions, race, caste, gender or family structure. Can a new member be allowed to join the group paying some kind of entry fee or initiation?
Position rules	How can a member of a group be assigned a specialized task in the organization (Eg: Election rules etc.).
Scope rules	Regarding authorized or forbidden geographic or functional domains, maps showing region from where an individual can act and regarding the resource units that are "off-limits".
Choice rules	About obligatory, authorized, or prohibited harvesting technologies
Aggregation rules	Regarding the understanding concerning the rules affecting the choice of harvesting activities? Whether the actions

	require prior permission from, or agreement of, others?
Information rules	Information regarding which information must be made public and which information should be kept secret
Payoff rules	Information regarding penalties that can be imposed for violating any of the rules identified, How rules are scrutinized? Who is responsible for identifying and punishing violaters, Regarding transparency of penalties imposed and positive rewards offered to appropriators for their positive actions

3.3.5.4 Attributes of the world affecting action situation

In an action situation, an actor generates interactions and outcomes and are affected by and affect a resource system, resource units and governance System, which in turn affect and are affected by social, economic, and political scenarios and related ecosystems. After exploring a number of field studies, a set of 10 variables have now been identified as affecting the likelihood of users (Basurto & Ostrom, 2009; Ostrom, 2009). The variables identified include the size, productivity, and predictability of the resource system, the extent of mobility of the resource units, the existence of collective-choice rules that the users may adopt authoritatively in order to change their own operational rules, and four attributes of actors including the number, the existence of leadership, knowledge about the SES, and the importance of the SES to the actors.

Results and Discussion

4. RESULTS AND DISCUSSION

The present study entitled "Implications of Geographical Indications for rice in Kerala" examines the impact of GI rice on income and welfare of the producer households, identify the major supply chain of registered GIs, evaluate the institutional innovations in the supply chains of registered GI rice and propose viable supply chain options for the registered GI rice. Keeping the objectives in view, the data collected was subjected to statistical analysis and the results obtained are discussed in this chapter under following sub-sections

4.1 Socio-economic characteristics of the sample farmers

4.2 Welfare impact analysis

4.3 Economics of cultivation of GI rice

4.4 Efficiency analysis

4.5 Supply chain of GI rice

4.6 Institutional Analysis and Development Framework

4.1 Socio-economic profile of the sample farmers

In this section, a brief description of the general characteristics of the respondent farmers with respect to age, gender, education, years of experience, family size, land holdings, and average annual income has been made.

4.1.1 Age

The age-wise distribution of the sample respondents in the study area is presented in Table 4.1. It could be observed from the table that majority of the farmers in all the GI rice groups were in the age group above 45, which included middle aged farmers (40 per cent) and senior citizens (46 per cent). Thus, it could be inferred that most of the growers were traditional farmers. GI is a recent phenomenon, but it was evident that there was not much inflow of new growers after the introduction of GI as there were no farmers aged less than 30 years in any of the six sample categories. This could be attributed to the reluctance of youngsters in taking up farming as a profession or may be due to the less

popularity of the market prospects of registered GIs . This observation is in tune with past studies (Rose, 2011; Roopa, 2005). The traditional farmers would have registered the GI to save tradition and preserve it for new generation. But young farmers were not motivated to take up the cultivation of these GI rice's further, as the evidences of profitability of GI was not much explored.

Table 4.1.Age-wise distribution of sample respondents

Category of farmers	Age profile (Years)			
	30-45	45-60	>60	Total
Palakkadan Matta	5 (10.00)	23 (46.00)	22 (44.00)	50 (100.00)
Navara	11 (22.00)	13 (26.00)	26 (52.00)	50 (100.00)
Jeerakasala	6 (12.00)	21 (42.00)	23 (46.00)	50 (100.00)
Gandhakasala	4 (8.00)	27 (54.00)	19 (38.00)	50 (100.00)
Pokkali	7 (14.00)	22 (44.00)	21 (42.00)	50 (100.00)
Kaipad	8 (16.00)	14 (28.00)	28 (56.00)	50 (100.00)
Total	41 (13.67)	120 (40)	139 (46.33)	300 (100.00)

Note: Figures in parentheses indicate per cent to row totals

4.1.2 Gender

The gender-wise classification of the sample farmers are presented in Table 4.2. It could be observed from the table that majority of the respondents in all the GI rice groups were male farmers (86 per ccent) and only 14 per cent were females. In the case of Kaipad rice, 38 per cent were females. The group-farming method of cultivation by various JLG groups were popular in Kaipad, which could have attracted the female farmers towards farming. Seenath (2014) observed that MGNREGS has an adverse effect on participation of females in agricultural works. She also observed that majority of the workers in the scheme

were females. Rice farming is characterized by strenuous work and low profitability in Pokkali (Shamna, 2014). As the study focused on speciality rice with increased risk regarding the profitability and irregular demand pattern in comparison with normal rice, the involvement of female farmers were found to be very low.

Table 4.2.Gender-wise classification of sample respondents

Category of farmers	Gender		
	Male	Female	Total
Palakkadan Matta	48 (96.00)	2 (4.00)	50 (100.00)
Navara	47 (94.00)	3 (6.00)	50 (100.00)
Jeerakasala	45 (90.00)	5 (10.00)	50 (100.00)
Gandhakasala	46 (92.00)	4 (8.00)	50 (100.00)
Pokkali	41 (82.00)	9 (18.00)	50 (100.00)
Kaipad	31 (62.00)	19 (38.00)	50 (100.00)
Total	258.00 (86.00)	42.00 (14.00)	300.00 (100.00)

Note: Figures in parentheses indicate per cent to row totals

4.1.3 Educational Background

The literacy level of the sample farmers are presented in Table 4.3. Even though all the farmers were literates, majority were having education only up to the primary or secondary level. It was found that 76 per cent of Kaipad, 40 per cent of Pokkali and Jeerakasala farmers were having primary education while for Palakkadan Matta, Navara and Gandhakasala categories, majority were having secondary education. The farmers having only primary education were found to be more among those growing Kaipad and Pokkali variety rather than Palakadan Matta, Navara and Gandhakasala. It may be noted that majority of the respondents of Pokkali and Kaipad were aged and traditional farmers who were experts in the age old cultivation practices.

Table 4.3. Educational status of sample respondents

Category of farmers	Educational status of farmers				
	Primary	Secondary	Higher Secondary	Collegiate	Total
Palakkadan Matta	7 (14)	14 (28)	17 (34)	12 (24)	50 (100)
Navara	15 (30)	16 (32)	11 (22)	8 (16)	50 (100)
Jeerakasala	20 (40)	16 (32)	5 (10)	9 (18)	50 (100)
Gandhakasala	5 (10)	33 (66)	10 (20)	2 (4)	50 (100)
Pokkali	20 (40)	13 (26)	10 (20)	7 (14)	50 (100)
Kaipad	38 (76)	6 (12)	3 (6)	3 (6)	50 (100)
Total	105 (35)	98 (32.67)	56 (18.67)	41 (13.66)	300 (100)

Note: Figures in parentheses indicate per cent to row totals

4.1.4 Experience in farming

The farmers were categorised into three groups based on their experience in farming as having less than 10 years, 10-30 years and greater than 30 years and are presented in Table 4.4. It could be observed that 95 per cent or more of the farmers in all the categories were having experience above 10 yea₹At the aggregate level, about 57 per cent had experience of more than 30 years and 41 per cent had 10 to 30 years of experience. Hence it could be concluded that young farmers have not much ventured into as well as exploited the GI status of these rice GIs.

Table 4.4. Farming experience of the sample respondents

Category of farmers	Years of Experience			
	<10	10—30	≥30	Total
Palakkadan Matta	1 (2.0)	16 (32.0)	33 (66.0)	50 (100.0)
Navara	2 (4.0)	24 (48.0)	24 (48.0)	50 100.0)
Jeerakasala	1 (2.0)	11 (22.0)	38 (76.0)	50 (100.0)
Gandhakasala	0 (0.0)	28 (56.0)	22 (44.0)	50 (100.0)
Pokkali	0 (0.0)	25 (50.0)	25 (50.0)	50 (100.0)
Kaipad	2 (4.0)	18 (36.0)	30 (60.0)	50 100.0)
Total	6.00 (2.0)	122.00 (40.7)	172.00 (57.3)	300.00 (100.0)

Note: Figures in parentheses indicate per cent to row totals

4.1.5 Family size

The size of the family would definitely influence the availability of family labour. The classification of sample respondents according to their family size is presented in Table 4.5. It could be observed that the size of the family of majority of the respondents were between 4-6 members except for Kaipad (2-4 members) and hencethe availability as well as utilisation of family labour as a substitute for hired labour was possible in the study area. The higher family size in all the categories of sample farmers implied the possibility of lessor marketable surplus.

4.1.6 Land Holdings

The sample respondents were classified based on the size of their operational holdings and as evident from the Table 4.6, majority of the farmers were having marginal holdings except for Palakadan Matta and it ranged from 98 per cent in the case of Gandhakasala farmers to 14 per cent for Palakkadan Matta farme₹The average holding size for all the marginal holdings which accounted for 69.3 per

cent of the total sample holdings was 0.24 ha. 74 percent of the farmers growing Palakkadan Matta were having large holdings, with an average size of 1.8ha. Farmers were practicing inorganic farming and mechanisation in this area and the average yield realised was higher than that of other categories. Hence even farmers who owned lesser area, cultivated in leased in land and thus operating in large sized holdings so that they could achieve the economies of scale. The average of holding size at the aggregate level was 0.59 ha and it varied from 1.47 ha for Palakkadan Matta farmers to 0.24 ha for Gandhakasala farmers.

Table 4.5. Details on the family size of sample respondents

Category of farmers	Family size (Numbers)				
	1	2-4	4-6	6 and above	Total
Palakkadan Matta	0 (0.00)	12 (24.00)	30 (60.00)	8 (16.00)	50 (100.00)
Navara	0 (0.00)	9 (18.00)	31 (62.00)	10 (20.00)	50 (100.00)
Jeerakasala	1 (2.00)	10 (20.00)	28 56.00)	11 (22.00)	50 (100.00)
Gandhakasala	0 (0.00)	20 (40.00)	22 (44.00)	8 (16.00)	50 (100.00)
Pokkali	2 (4.00)	21 (42.00)	21 (42.00)	6 (12.00)	50 (100.00)
Kaipad	1 (2.00)	27 (54.00)	16 (32.00)	6 (12.00)	50 (100.00)
Total	4 (1.33)	99 (33.00)	148 (49.33)	49 (16.34)	300 (100.00)

Note: Figures in parentheses indicate per cent to row totals

Table 4.6.Details on the size of land holdings of sample respondents

Category of farmers	Classes of land holdings							
	Marginal		Small		Large		Aggregate Holdings	
	(<0.5 ha)		(0.5-1 ha)		(≥1 ha)			
	Number	Size (in ha)	Number	Size (in ha)	Number	Size (in ha)	Number	Size (in ha)
Palakkadan Matta	7 (14.00)	0.38	6 (12.00)	0.75	37 (74.00)	1.8	50 (100.00)	1.47
Navara	43 (86.00)	0.24	5 (10.00)	0.6	2 (4.00)	1.11	50 (100.00)	0.35
Jeerakasala	43 (86.00)	0.22	4 (8.00)	0.8	3 (6.00)	1.44	50 (100.00)	0.34
Gandhakasala	49 (98.00)	0.22	0 (0.00)	0	1 (2.00)	1.4	50 (100.00)	0.24
Pokkali	29 58.00)	0.2	14 (28.00)	0.69	7 (14.00)	3.3	50 (100.00)	0.77
Kaipad	37 (74.00)	0.27	10 (20.00)	0.67	3 (6.00)	1.01	50 (100.00)	0.39
Total	208 (69.33)	0.24	39 (13.00)	0.70	53 (17.67)	1.90	300 (100.00)	0.59

Note: Figures in parentheses indicate per cent to row total

4.1.7 Annual Income

The average annual income of the sample respondents as presented in Table 4.7 revealed that the average annual income of majority of the sample farmers in all categories, except for Kaipad and Pokkali ranged between Rs.50,000 and one lakh. 22 per cent of the farmers growing Navara realised an average annual income of more than 2 lakh. Navara is a short duration crop, so more than one crop can be raised in a year. Apart from this, as a medicinal variety Navara fetches higher price in the market. Majority of the Pokkali and Kaipad farmers were earning an average annual income of less than ₹50000. The percentage of sample farmers with income less than ₹50,000 was as high as 92 percent in Pokkali and 72 per cent in the Kaipad. Majority of the respondents in Pokkali and Kaipad were full time farm workers and hence, income from other sources was very limited. Also only single crop is possible in these categories.

Table 4.7. Classification of sample respondents according to average annual income

Category of farmers	Average annual income (in Rupees)				Total
	<50000	50000-1 lakh	1 - 2 lakh	<2 lakh	
Palakkadan Matta	19 (38)	24 (48)	5.00 (10)	2.00 (4)	50 (100)
Navara	12 (24)	18 (36)	9.00 (18)	11.00 (22)	50 (100)
Jeerakasala	10 (20)	30 (60)	5.00 (10)	5.00 (10)	50 (100)
Gandhakasala	9 (18)	36 (72)	3 (6)	2 (4)	50 (100)
Pokkali	46 (92)	1 (2)	3.00 (6)	0.00 (0)	50 (100)
Kaipad	36 (72)	9 (18)	2.00 (4)	3.00 (6)	50 (100)
Total	132 (44)	118 (39.33)	27 (9)	23 (7.67)	300 (100)

Note: Figures in parentheses indicate per cent to row totals

4.2 Welfare Impact analysis

The impact of GI on income and welfare of producer households was measured using the method of treatment effect analysis. For the analysis, the outcome variables selected were yield/ha, net income, marketed income, and marketed surplus. The average treatment effects (ATE) were worked out, which shows the difference between the average of treatment and that of control. ATE was worked out for outcome variables yield, net income, marketed income and marketed surplus controlling for all other observable characters and the results are presented in the following section.

4.2.1 Treatment effect analysis

4.2.1.1 Yield per hectare

The results of the ATE when calculated for the variable yield per hectare is given in Table 4.8. Initially when Gandhakasala was assumed as control, Palakkadan Matta realized the highest yield followed by Jeerakasala_and all other GIs realised lesser yield than Gandhakasala. When Jeerakasala was kept as control, only Palakkadan Matta gained a net gain in yield. When Kaipad is taken as control, all other groups have comparatively higher yield with the exception of Pokkali. The highest yield was realised for Palakkadan Matta, followed by Jeerakasala. When yield of Palakkadan Matta was kept as control, all other groups realised a lesser yield and lowest yield was realised for Kaipad. When the yield of Navara was taken as the control, all other categories were better performers except Pokkali and Kaipad. Yield was highest for Palakkadan Matta followed by Jeerakasala and Gandhakasala. The lowest yield was realised for Pokkali. All categories had a net gain in yield when Pokkali was compared with other categories. While comparing the yield per hectare of the six registered GIs, it could be observed that Palakkadan Matta was a better yielder followed by Jeerakasala, Gandhakasala, Navara and Kaipad and Pokkali realised the lowest yield among these six GIs.

Table 4.8. Comparison of yield per hectare across selected rice GIs

Control		Treatment					
		Gandhakasala	Jeerakasala	Kaipad	Palakkadan Matta	Navara	Pokkali
Gandhakasala	Effect		411.8	-85.9	2210.6	-78.3	-527.2
	Robust. Std.Err.		210.9	568.2	101.2	209.6	110.0
	P value		0.051	0.880	0.000	0.709	0.000
Jeerakasala	Effect	-411.8		-497.8	1798.8	-490.1	-939.1
	Robust. Std.Err.	210.9		594.1	221.1	290.8	225.5
	P value	0.05		0.40	0.00	0.09	0.00
Kaipad	Effect	85.9	497.8		2296.6	7.6	-44.3
	Robust. Std.Err.	568.5	594.1		571.2	604.8	568.7
	P value	0.88	0.40		0.00	0.01	0.44
Matta	Effect	-2210.6	-1798.8	-2296.6		-2289.00	-2737.9
	Robust. Std.Err.	101.2	221.1	571.2		219.1	126.4
	P value	0.00	0.00	0.00		0.00	0.00
Navara	Effect	78.3	490.1	-7.6	2289.0		-448.9
	Robust. Std.Err.	209.6	290.8	604.8	219.1		223.3
	P value	0.71	0.09	0.99	0.00		0.04
Pokkali	Effect	527.2	939.1	441.3	2737.9	448.9	
	Robust. Std.Err.	110.0	225.5	568.7	126.4	223.3	
	P value	0.00	0.00	0.44	0.00	0.04	

**Effect calculated by ATE from the model*

4.2.1.2 Net income

When net income was compared across categories, the trend was different. Net income of Navara and Palakkadan Matta were higher when compared to Gandhakasala, while it was comparatively lower for Jeerakasala, Kaipad and Pokkali. When compared to Jeerakasala, Navara, Palakkadan Matta and Gandhakasala realised a higher net income, while net income realised for Pokkali was the lowest. Only Pokkali experienced a net loss in net income when Kaipad was kept as the control. When the net income of Palakkadan Matta was compared with other GIs, Navara was the only which realised a higher income. As observed in previous cases, Pokkali realised the least income. Examining the net income of the six registered GIs and arranging in descending order, it was in the order of Navara> Palakkadan Matta> Gandhakasala> Jeerakasala> Kaipad> Pokkali.

4.2.1.3 Marketed surplus

Marketed surplus is the quantity of the produce which the farmer producer actually sells in the market. The marketed surplus of Gandhakasala was greater than Palakkadan Matta, Kaipad and Pokkali and Jeerakasala but lesser than that of Navara. All categories realized a higher market surplus when compared to Jeerakasala. Kaipad realized a higher marketed surplus than Jeerakasala. The marketed surplus of Palakkadan Matta is lesser than Navara and Gandhakasala. Navara achieved the highest marketed surplus among all the GI categories. From the table it is clear that the Navara farmers realized a higher marketed surplus followed by Gandhakasala, Palakkadan Matta, Pokkali, Kaipad and Jeerakasala.

Table 4.9. Comparison of net income realised across selected rice GIs

Control		Treatment					
		Gandhakasala	Jeerakasala	Kaipad	Palakkadan Matta	Navara	Pokkali
Gandhakasala	Effect		-1935.6	-25721.7	8922.1	38392.2	-48740.1
	Robust. Std.Err.		10170.0	7115.6	8426.5	22157.3	8953.1
	P value		0.84	0.000	0.290	0.083	0.000
Jeerakasala	Effect	1935.6		-23786.1	10857.7	40327.8	-46804.5
	Robust. Std.Err.	10170.0		12352.1	12918.8	24059.3	13209.7
	P value	0.85		0.05	0.40	0.09	0.00
Kaipad	Effect	25721.7	23786.1		34643.9	64114.0	-23018.4
	Robust. Std.Err.	7115.6	12352.1		11102.7	24286.0	11166.9
	P value	0.00	0.05		0.00	0.01	0.04
Matta	Effect	-8922.1	-10857.7	-34643.9		29470.0	-57662.3
	Robust. Std.Err.	8426.5	12918.8	1102.7		23384.3	12448.8
	P value	0.29	0.40	0.00		0.21	0.00
Navara	Effect	-38292.2	-40327.8	-64114.0	-29470.0		-87132.4
	Robust. Std.Err.	22157.3	24059.3	24286.0	23384.3		24034.5
	P value	0.08	0.09	0.01	0.21		0.00
Pokkali	Effect	48740.1	46804.5	23018.4	57662.3	87132.4	
	Robust. Std.Err.	8953.1	13209.7	11166.9	12448.8	24034.5	
	P value	0.00	0.00	0.04	0.00	0.00	

**Effect calculated by ATE from the model*

Table 4.10 Comparison of marketed surplus across selected rice GIs

		Treatment					
Control		Gandhakasala	Jeerakasala	Kaipad	Palakkadan Matta	Navara	Pokkali
Gandhakasala	Effect		-63.41	-26.50	-10.10	1.37	-19.12
	Robust. Std.Err.		5.90	5.11	3.57	4.22	4.51
	P value		0.000	0.000	0.005	0.745	0.000
Jeerakasala	Effect	63.41		36.9	53.32	64.78	44.28
	Robust. Std.Err.	5.90		6.98	5.89	6.34	6.54
	P value	0.000		0.000	0.000	0.000	0.000
Kaipad	Effect	26.5	-36.90		16.41	27.88	7.38
	Robust. Std.Err.	5.11	6.98		4.99	5.45	5.83
	P value	0.000	0.000		0.001	0.000	0.206
Matta	Effect	10.09	-53.32	-16.41		11.46	-9.03
	Robust. Std.Err.	3.57	5.89	4.99		3.99	4.51
	P value	0.005	0.000	0.001		0.004	0.046
Navara	Effect	-1.37	-64.78	-27.88	-11.46		-20.50
	Robust. Std.Err.	4.23	6.34	5.45	3.99		5.08
	P value	0.745	0.000	0.000	0.004		0.000
Pokkali	Effect	19.12	-44.28	-7.38	9.03	20.50	
	Robust. Std.Err.	4.51	6.54	5.83	4.52	5.08	
	P value	0.000	0.000	0.206	0.046	0.000	

**Effect calculated by ATE from the model*

4.2.1.4 Value of marketed surplus

Value of marketed surplus refers to the income earned by the farmer by marketing his produce. It is the product of marketed quantity and the price obtained by the respective famer. Value of marketed surplus was also compared between these categories. The value of marketed surplus of Gandhakasala was greater than Kaipad, Jeerakasala and Pokkali. Navara and Palakkadan Matta realised a greater Value of marketed surplus in this comparison. When Jeerakasala was taken as a control, value of marketed surplus of Navara, Palakkadan Matta, Gandhakasala and Kaipad was higher than the control. The Value of marketed surplus of Kaipad was greater than Jeerakasala and Pokkali and lower than that of Navara, Palakkadan Matta and Gandhakasala. All categories except Navara realized lower income when the comparison was made by keeping Palakkadan Matta as control. Navara attained the highest marketed income whereas, Pokkali once again became the poorest performer. When ranked according to the Value of marketed surplus, the treatments followed the order, Navara followed by Palakkadan Matta, Gandhakasala, Kaipad, Jeerakasala and Pokkali.

Based on the above findings, it could be concluded that even though the yield of Navara was comparatively lesser than that of Palakkadan Matta, Jeerakasala and Gandhakasala, the net income, Marketed surplus and value of marketed surplus was higher for Navara. Navara is a short duration medicinal variety and so there is possibility of cultivating the crop more than once in a year. The premium price received by the cultivators of Navara rice due to its medicinal property may also be a reason for it. It was found that Jeerakasala is comparatively better yielder when comparing with other aromatic varieties (George *et al.*, 2005). The similar result was observed in our study also.

Table 4.11. Comparison of value of marketed surplus across selected rice GIs

Control		Treatment					
		Gandhakasala	Jeerakasala	Kaipad	Palakkadan Matta	Navara	Pokkali
Gandhakasala	Effect		-47257.3	-36326.3	4661.9	32984.3	-51638.4
	Robust. Std.Err.		6202.7	5907.9	10229.7	21273.1	6521.1
	P value		0.000	0.000	0.649	0.121	0.000
Jeerakasala	Effect	47257.3		10930.9	51919.2	80241.6	-4381.1
	Robust. Std.Err.	6202.7		6126.4	12166.4	22768.3	6764.8
	P value	0.000		0.074	0.000	0.000	0.517
Kaipad	Effect	36326.3	-10930.9		40988.3	69310.6	-15312.1
	Robust. Std.Err.	5907.9	6126.4		12163.9	22996.3	5529.8
	P value	0.000	0.074		0.001	0.003	0.006
Matta	Effect	-4661.9	-51919.2	-40988.3		28322.3	-56300.4
	Robust. Std.Err.	10229.7	12166.4	12163.9		23268.0	12372.8
	P value	0.649	0.000	0.001		0.224	0.000
Navara	Effect	-32984.3	-80241.6	-69310.6	-28322.3		-84622.7
	Robust. Std.Err.	21273.1	22768.3	22996.35	23268.0		23215.2
	P value	0.121	0.000	0.003	0.224		0.000
Pokkali	Effect	51638.4	4381.1	15312.1	56300.43	84622.7	
	Robust. Std.Err.	6521.1	6764.8	5529.8	12372.8	23215.2	
	P value	0.000	0.517	0.006	0.000	0.000	

**Effect calculated by ATE from the model*

The yield per hectare was higher for Jeerakasala when compared to Gandhakasala while the net income, marketed surplus and value of marketed surplus was higher for Gandhakasala. Jeerakasala farmers are very less in number and their land holding size was smaller. Hence, the production was also lesser when compared to Gandhakasala. Palakkadan Matta recorded the highest yield among these categories but net income, marketed surplus and value of marketed surplus were comparatively less. Even though the traditional varieties of Palakkadan Matta yields low, the improved verities developed by KAU are high yielders leading more than double the landraces. Due to its fine cooking qualities, Palakadan matta is having high consumer preference and repuatation among other rice varieties (Devi *et al.*, 2007). Marketed surplus was lower as this variety is -preferred for household consumption and farmers are selling of the produce only after keeping aside their consumption needs. Even though Palakkadan Matta is a registered GI, the farmers are not realizing the premium price as the production practices were conventional (inorganic). They were selling their products to the government agency (Supplyco) at the normal procurement price as in the case of other rice varieties. The marketed surplus of Pokkali was comparatively higher than Kaipad even though the yield, net income and marketed income were comparatively very low. The price realized for Pokkali was lesser than that of Kaipad. So the farmers may sell off higher proportion of their production in order to meet their immediate cash requirements. Unlike Malabar Kaipad Farmers' Society, the producer society of the Pokkali farmers was not taking any initiative to collectively market the Pokkali rice as a GI. Hence the farmers are away from realizing a premium price. The marketed surplus of Navara was higher than other categories as the variety cannot be preferred for daily household consumption. The marketed surplus of Jeerakasala was very less as the holding size was very marginal and consequent production loss per farm. Marketing was also very difficult because of the competition from Jeerakasala and other similar scented varieties produced in other parts of the country.

4.3 Economics of cultivation of GI Rice

The economics of GI rice with respect to Palakkadan Matta, Navara, jeerakasala, Gandhakasala, Pokkali and Kaipad are presented in the following section. It includes the cost of cultivation, cost of production and income measures for the above GI categories. The results obtained are presented in table 4.12 to 4.14 and are discussed below.

4.3.1 Cost of cultivation and production

The cost of cultivation of Palakkadan matta, Navara, Jeerakasala, Gandhakasala, Pokkali and Kaipad were worked out based on various cost concepts *viz*., Cost A, Cost B and Cost C. The results as presented in Table 4.12 revealed that in the study area, leasing of land was not practiced in the selected categories except for Palakkadan Matta. So with the exception of Palakkadan Matta Cost A_1 and Cost A_2 were the same in all categories. Similarly Cost A_1 and Cost B_1 were same in all categories because farmers included in the sample did not use any fixed assets other than land for cultivation. The labourers brought their own implements to the field and the wages paid included the rent for the implements also.

The average cost incurred for paddy cultivation in other categories was less when compared to that for the Kaipad area, because only limited quantity of inputs were used in Kaipad. Similar results were also reported by Shamna (2014). When compared to other categories, the rental value of land was also comparatively less in Kaipad . The highest cost of cultivation (Cost C_2) was found in the case of farmer respondents growing Jeerakasala (₹131082.6/ha) followed by Gandhakasaala (₹127308.9/ha). Among the survey areas, the rental value of owned land was the highest in Wayanad (₹20000/acre) which might have escalated the cost.

Table 4.12.Cost of cultivation of different rice GIs in Kerala(₹/ha)

Category of Respondents / Cost	Palakkadan Matta	Navara	Jeerakasala	Gandhakasala	Pokkali	Kaipad
Cost A_1	57069	80897	72976	65237	96523	67686
Cost A_2	63510	80897	72976	65237	96523	67686
Cost B_1	57069	80897	72976	65237	96523	67686
Cost B_2	83312	102519	122376	114637	104023	75186
Cost C_1	62036	90270	81682	77908	101410	79460
Cost C_2	88280	111893	131082	127308	108910	86960
Cost C_3	97108	123082	144190	140039	119801	95656

The average cost for growing Palakkadan Matta (₹88280.06/ha) was less compared to Jeerakasala, Gandhakasala, Navara and Pokkali. Palakkadan Matta was grown inorganically whereas other categories were organically grown rice varieties and mechanisation was extensively practiced by all farmers in Palakkadan Matta. Comparison of costs between Pokkali and Navara exhibited a different cost pattern. Up to cost C_1, the costs were higher for Pokkali as compared to Navara. Cost C_2 and C_3 were found to be higher for Navara when compared with Pokkali. The reason attributed to this change in cost pattern was lesser use of family labour for Pokkali, because of sternous work and lower weeding cost.

The cost of production of Palakkadan Matta, Navara, Jeerakasala, Gandhakasala, Pokkali and Kaipad are given in Table 4.13. Among the various categories, highest average yield was realised by farmers growing Palakkadan Matta (4498 kg/ha) while the lowest yield was realised by farmers growing Pokkali (1835 Kg/ha). Accordingly the cost of production was highest for Pokkali rice and lowest for Palakkadan Matta rice. In Pokkali, about 40-50 per cent of the potential yield is lost due to logdging and damages caused by pests (Shylaraj, 2006). The reason for Palakkadan Matta realising lowest cost of production could be the fact that it is cultivated with inorganic inputs and all other categories are organic rice varieties. Plant nutrients and plant protection chemicals have substantial effect on yield of Palakkadan Matta (Rose,2011) The cost of production of Gandhakasala (₹5713/quintal) was more than Jeerakasala (₹4710/quintal) as the average yield realized by Gandhakasala (2228 kg/ha) was less when compared to Jeerakasala (2783 kg/ha). Even though Pokkali and Kaipad were similar in cultivation practices, the farmers in Kaipad were growing high yielding Ezhome varieties, realising higher yield (3241kg/ha) and hence cost of production was comparatively less (₹2683 /quintal). The breeding efforts to develop saline tolerant Vytila varieties by Kerala Agricultural Universities were only moderate success as the native farmers still prefer cultivating traditional Pokkali varieties over them (Shamna,2014)

Table 4.13. Cost of production of different rice GIs in Kerala (₹/Quintal)

Cost/ category of respondents	Average yield/ha	Cost A_1	Cost A_2	Cost B_1	Cost B_2	Cost C_1	Cost C_2	Cost C_3
Palakkadan Matta	4498	1268	1411	1268	1852	1379	1962	2158
Navara	2221	3642	3642	3642	4615	4064	5037	5541
Jeerakasala	2782	2622	2622	2622	4397	2935	4710	5181
Gandhakasala	2228	2927	2927	2927	5144	3496	5713	6284
Pokkali	1835	5259	5259	5259	5668	5525	5934	6527
Kaipad	3241	2088	2088	2088	2319	2451	2683	2951

4.3.2 Income measures

The various income measures conventionally used in economic analysis was estimated for Palakkadan Matta, Navara, Jeerakasala, Gandhakasala, Pokkali and Kaipad rice are given in Table 4.14. The highest average gross income of ₹16128 per hectare was obtained by farmers respondents growing Navara while it was lowest for the farmer respondents growing Pokkali (₹75036/ha). Navara is a medicinal variety and hence a higher price was realised by farmers whereas farmers growing Pokkali realised a very low yield and also the price realised was very less compared to other varieties sampled. The gross income realised by Gandhakasala farmers (₹112848/ha) was higher than that realised by Jeerakasala (₹116874/ha) farmers. This could be due to the fact that the Jeerakasala farmers were operating in holding of smaller size. Hence could not exploit the economies of scale. Even though the average yield was

high for Palakkadan Matta, their gross income was less (₹101909/ha) owing to the lesser market price realised.

The highest farm business income was found in the category of farmers growing Navara (₹80380) followed by the farmers growing Gandhakasala (₹47611) and Jeerakasala (₹43897). The scented rice varieties like Jeerakasala and Gandhakasala and medicinal rice like Navara are realizing high market prices (Leena , 2007). So all the three speciality rice realised a higher price compared to Palakkadan Matta, Kaipad and Pokkali. Cost involved in the Pokkali rice cultivation has increased over the years owing to increased labour wages and other prices, (Shamna, 2014). The farm business income was lowest for farmers growing Pokkali (₹21487). This could be attributed to the poor yield, labour intensive cultivation practices followed while growing traditional varieties, unfavourable characteristics of these varieties and difficulties in reaching and exploiting the GI marketing channels. Even though the average yield was high and cost of cultivation was less for Palakkadan Matta, gross income is less for this category as they have not exploited the GI status while marketing this unique product. This product reaches the consumers through Supplyco as any other rice variety and in that process mixing with other varieties also takes place.

Family labour income was estimated to be negative in the category of farmers growing traditional Pokkali (₹-28987), Jeerakasala (₹-5502) and Gandhakasaala (₹-1789) rice. This was because of the reason that the cultivation practices from land preparation to harvesting in Pokkali need skilled labourers. In the case of Gandhakasala and Jeerakasala mechanisation was very much feasible and weed infestation was also comparatively less resulting in lower family labour preference of family labour. Family labour income was highest in respondents growing Navara (₹58758) which required less labour and effort. Navara is a short duration crop and hence all the operations should be timely completed. Hence, family labour was

employed more as scarcity of hired labour was presently the main problem faced by farmers.

The net income, Benefit Cost Ratio and Benefit Cost Ratio at explicit cost indicated that farming was a loss making business for respondents growing Pokkali, Jeerakasala and Gandhakasala rice, especially when the value of the family labour, the land value and the managerial cost were imputed and accounted in the cost. BC ratio worked out to be more than one in the sample categories of Navara (1.31), Palakkadan Matta (1.05) and Kaipad (1.02). Navara is a medicinal variety and it realises higher price and respondents surveyed had a prefixed buyer. The producer society MKFS was very active in Kaipad and they procured naturally organic GI tagged rice from farmers at a comparatively higher price. The yield realised by high yielding varieties cultivated in Kaipad was comparatively high. For Palakkadan Matta there was a regular procurement system through supplyco even though the producer society is dormant. It may be noted that the average yield realised in the case of Palakkadan Matta was the highest (4498.32 kg/ha) among the varieties surveyed.

Table 4.14. Estimates of different measures of income (₹/ha)

	Palakkadan Matta	Navara	Jeerakasala	Gandhakasala	Pokkali	Kaipad
Gross Income (GI)	110318.20	155568.40	116874.00	123131.48	75036.47	97179.92
Farm Business income (GI-Cost A_1)	44839.79	80380.66	43897.62	47610.98	-21487.32	29493.02
Family Labour income (GI-Cost B_2)	18596.44	58758.07	-5502.38	-1789.02	-28987.32	21993.02
Net Income (GI-Cost C_3)	4801.12	38195.59	-27316.87	-27191.11	-44765.16	1523.34
BC (GI:C_3)	1.05	1.31	0.81	0.81	0.63	1.02
BC At Explicit (GI:A_1)	1.22	1.57	0.96	0.98	0.72	1.29

4.4 Efficiency Analysis

The producer's performance was assessed taking into account one output and four inputs using DEA model. The output variable was yield in Kg/ha. The input variables were Seed cost (₹), human labour charges (₹), machine labour charges (₹), fertilizer charges (₹). The results are plotted and presented from Fig 4.1 to Fig 4.6 All the varieties showed low technical efficiency (<40 per cent). Among the decision making units (DMU) studied in the selected varieties, Navara showed the highest technical efficiency. 28 per cent Of the DMUs were technically efficient. 18 per cent of the DMUs of Jeerakasala were technically efficient whereas only 12 per cent of DMUs of Gandhakasala were technically efficient. 10 per cent of the DMUs were technically efficient in the case of Palakadan Matta and Kaipad. Pokkali showed the lowest technical efficiency and only 6 per cent of the DMUs were technically efficient. The average values of the variables used for assessing a producer's performance are presented in Table 4.15.

The estimated mean technical efficiency of producers of Navara was highest (90.5). The results implied that producers can reach full technical efficiency by increasing their output levels by 10 per cent with their present input levels. There is scope for further enhancement of yield in GI tracts using present input level as the utilization of resources was not optimal in GI rice cultivation (Rose,2011).The technical efficiency was 0.88, 0.69, 0.57, 0.56 and 0.30 for Palakkadan Matta, Gandhakasala, Kaipad, Jeerakasala and Pokkali respectively. The least efficient producers were seen in Pokkali. The producers has to increase their output levels up to 70 per cent with their present input levels to become technically efficient. The scale efficiency results showed that all the varieties showed scale inefficiency. The nature of scale inefficiency is due to low operational scale of units

Table 4.15. Input-output variables of GI rice

Variables	Matta	Navara	Jeerakasala	Gandhakasala	Kaipad	Pokkali	Overall
Output							
Yield	4498.32	2221.01	2782.84	2228.41	3241.12	1835.22	2801.15
Input							
Seed Cost	4855.50	1207.20	1222.35	728.40	1142.40	3600.00	2125.96
Human labour charges	56270.0	21170.0	12379.00	16278.00	28302.0	68809	33868
Machine labour charges	17472.8	3199.6	3966.0	3756.5	796.64	854.7	5007.71
Fertilizer and PP chemicals charges	6749.48	1044.0	8190.0	854.5	0	0	2806.33

Table 4.16. Mean efficiencies of selected GI rice

GI Rice	TE	SE
Palakkadan Matta	0.876	0.394
Navara	0.905	0.678
Jeerakasala	0.556	0.478
Gandhakasala	0.692	0.815
Kaipad	0.569	0.767
Pokkali	0.308	0.614

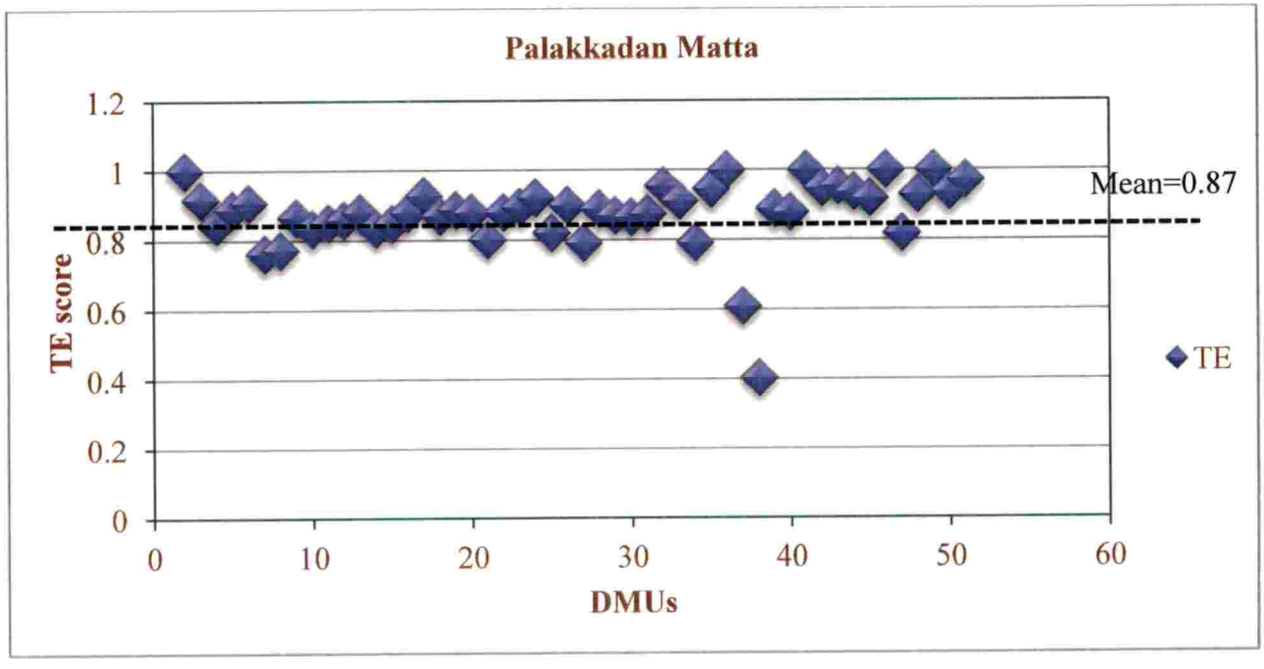

Fig 4.1. Technical efficiency of producers of Palakkkadan Matta

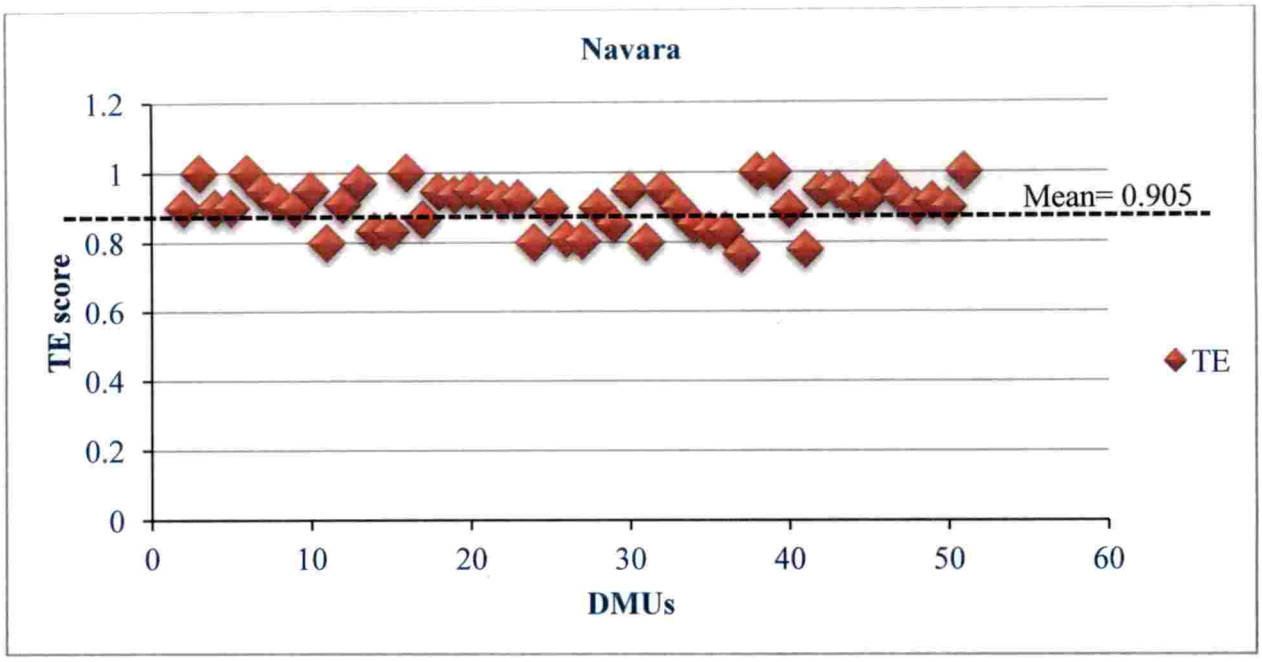

Fig 4.2. Technical efficiency of producers of Navara

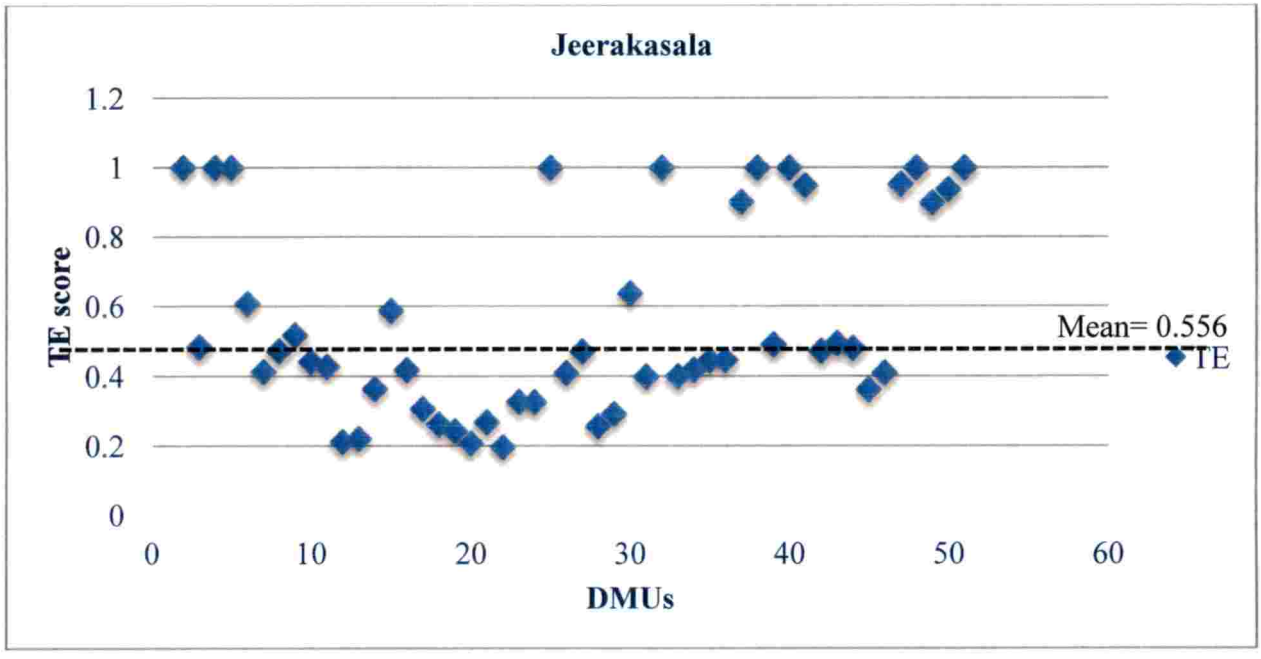

Fig 4.3. Technical efficiency of producers of Jeerakasala

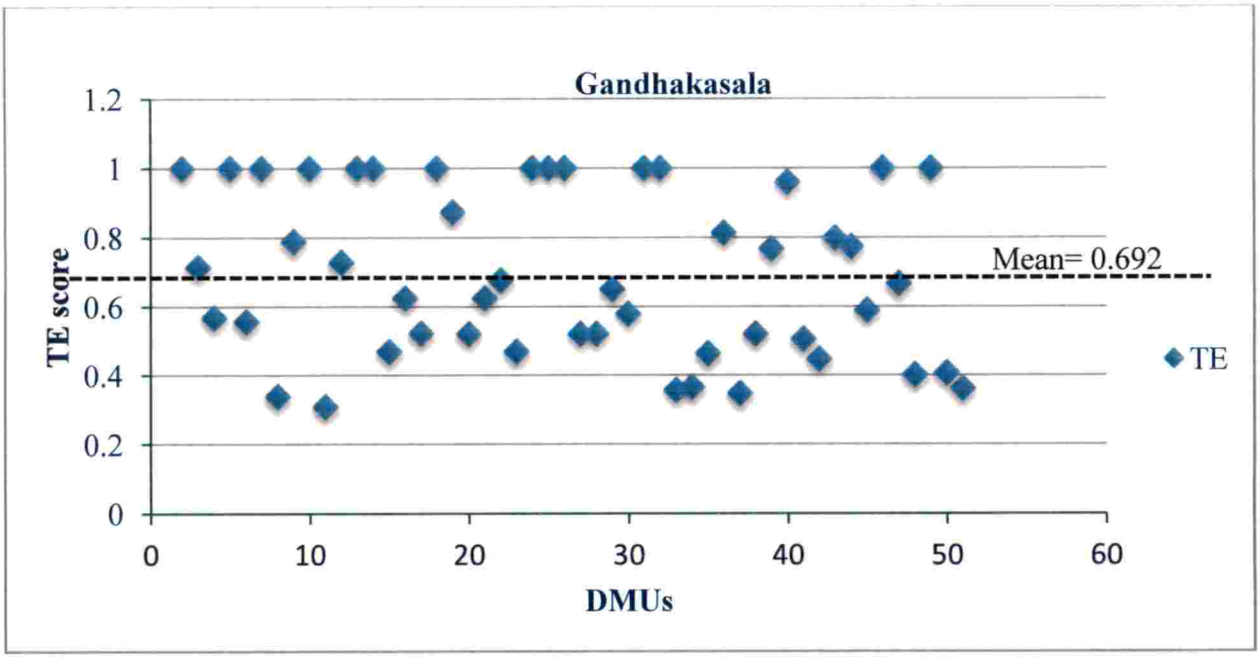

Fig 4.4. Technical efficiency of producers of Gandhakasala

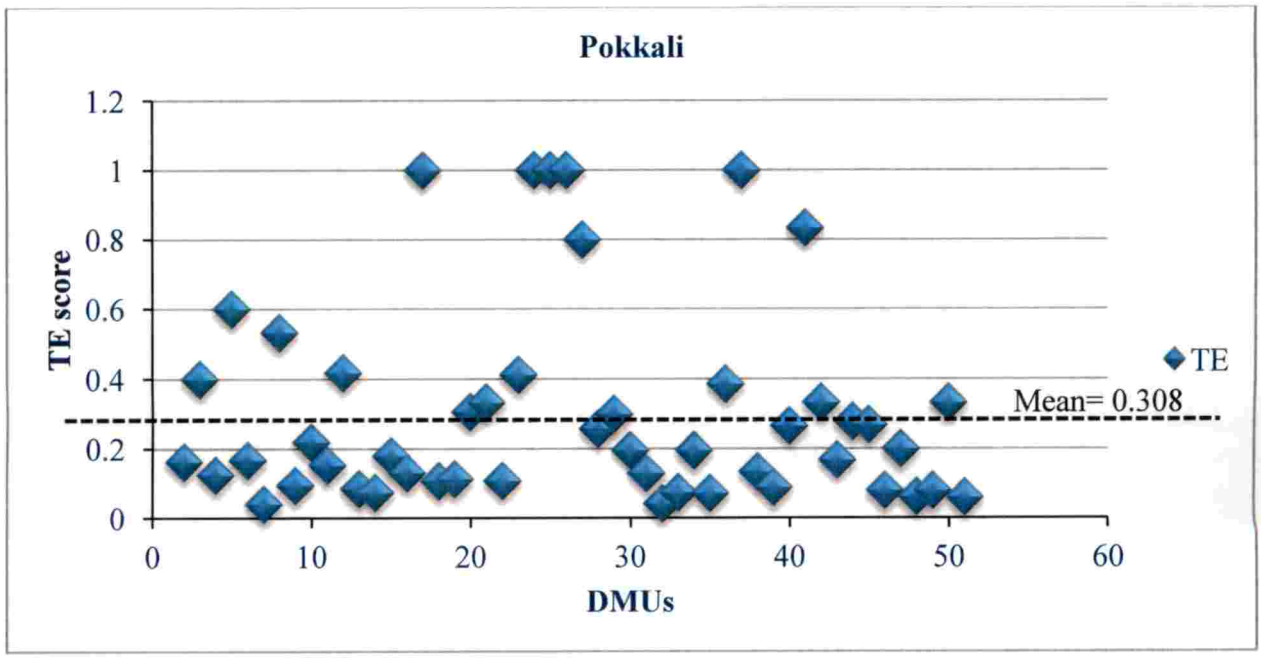

Fig 4.5. Technical efficiency of producers of Pokkali

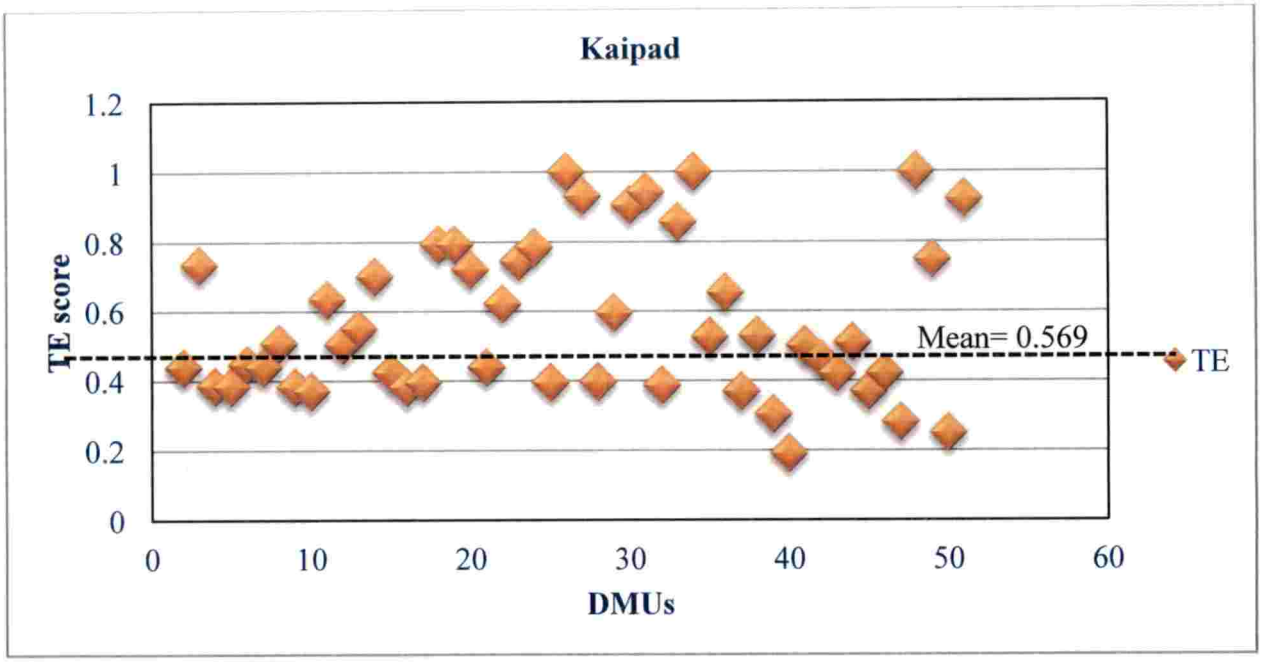

Fig 4.6. Technical efficiency of producers of Kaipad

4.5 Supply chain of GI rice

Agricultural marketing involves all the activities concerned with the movement of produce from the farmer to the ultimate consumer through various market intermediaries. The chain of intermediaries through whom the commodity moves from the farmer producer to the consumer constitutes the marketing channel. At each stage of marketing, marketing costs are incurred by intermediaries towards the operations carried out and accordingly marketing margins are realized by them.

An attempt is made in this section to identify the supply chains for the selected rice GIs *viz.*, Palakkadan Matta, Navara, Jeerakasala, Gandhakasala, Pokkali and Kaipad and to estimate the marketing cost, marketing margin, price spread and marketing efficiency. Three types of marketing were prevalent in the study area. Some farmers market their produce (Paddy) through market intermediaries, while some other resource rich farmers cultivate and process their produce to meet the requirements of high end consumers and the remaining resource poor farmers sell off

their produce to local consumers after processing in nearby mills. The supply chain of Palakkadan Matta, Navara, Gandhakasala, Jeerakasala, Pokkali and Kaipad rice identified in the study areas are presented from Fig 4.7 to 4.12. Further, the marketing cost, marketing margin, price spread and marketing efficiency in different supply chains of selected rice GIs were worked out and are presented from Table 4.17 to 4.22.

4.5.1 Palakkadan Matta

The selling behaviour of the farmers of Palakkadan Matta is represented in Fig 4.7. It is evident that farmers were depending on only one channel. The respondents were marketing their produce to Civil supplies corporation (Supplyco) at the rate of `22.50/Kg and Supplyco was not marketing it as Palakkadan Matta which made it impossible to trace the end consumer. Rose (2011) also emphasised the active role performed by the government agency in the procurement of paddy from the area. .

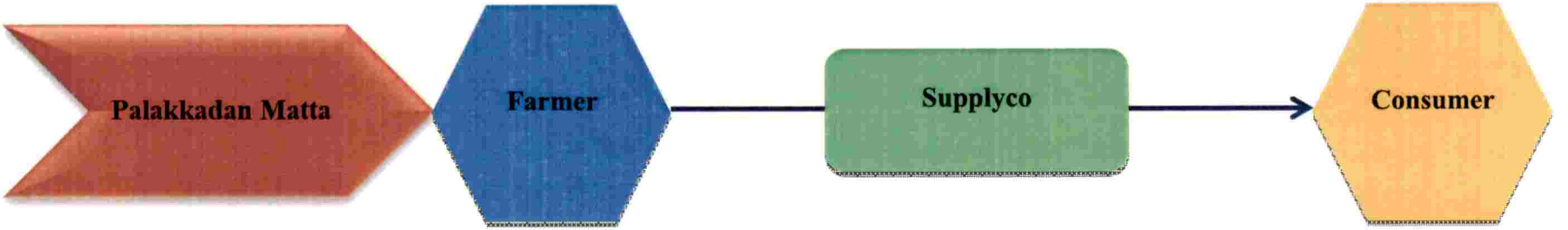

Fig.4.7 Supply chain of Palakkadan Matta rice

4.5.2 Navara Rice

The sample respondents of Navara rice were marketing their produce through two channels. The details of these channels are presented in Fig 4.8. It could be observed that the marketing costs were almost the same in channel I and II. It was the highest in channel II and accounted for 15.28 per cent of the consumer's price while in channel I marketing cost, accounted for 13.80 per cent of the consumer price. Marketing margin was also highest in channel II (₹51.5/Kg), whereas it was ₹33.1/ Kg in channel I. The higher cost and margin in channels II could be attributed to the higher number of intermediaries including miller and local agent and the higher cost incurred for processing and packing in this channel. Navara was stored for a period of one year before processing, leading to high storage cost. The price spread was about 63 per cent of the consumer price in channel II, while it was 59 per cent in channel I. Hence, the producer's share in consumer's rupee was about 40.99 per cent in channel I and it was 37.03 per cent in channel II. It could be found that channel I had the highest marketing efficiency of 7.25 while in channel II it was 6.55.

In the Case of Navara, some farmers were marketing their produce to high end consumers. In this channel, the marketing cost was higher than other channels owing to higher degree of specialisation and quality specification. The marketing cost accounted for 35 per cent of the consumer price (₹158.5/Kg). In this channel there were no intermediaries and the farmers were selling paddy directly to high end consumers, resulting in zero marketing margin. The price spread and marketing cost remained the same as there was no margin. It was found that only few farmers were able to explore the benefits of this channel as it is very difficult to locate such consumers and convince them about the quality of the produce. Even though there were no intermediaries between farmer and consumer in channel III, a higher marketing cost have caused the Shepherd's index to be lower (2.84) in this channel when compared to channel I and II (Table 4.18).

Very few sample respondents were marketing their produce directly to local consumers after processing in local mills. The price realised by them was lower than that realised in other channels as the quality of the milled produce was not very supreme, which was due to the lack of specialised milling facilities in the area. The marketing cost was ₹37.5/Kg in this channel and it accounted for 47 per cent of the consumer price (Table 4.19). The marketing margin is zero as the consumers directly sold their produce to the consumer. Since there were no intermediaries, the marketing cost and price spread remained the same.

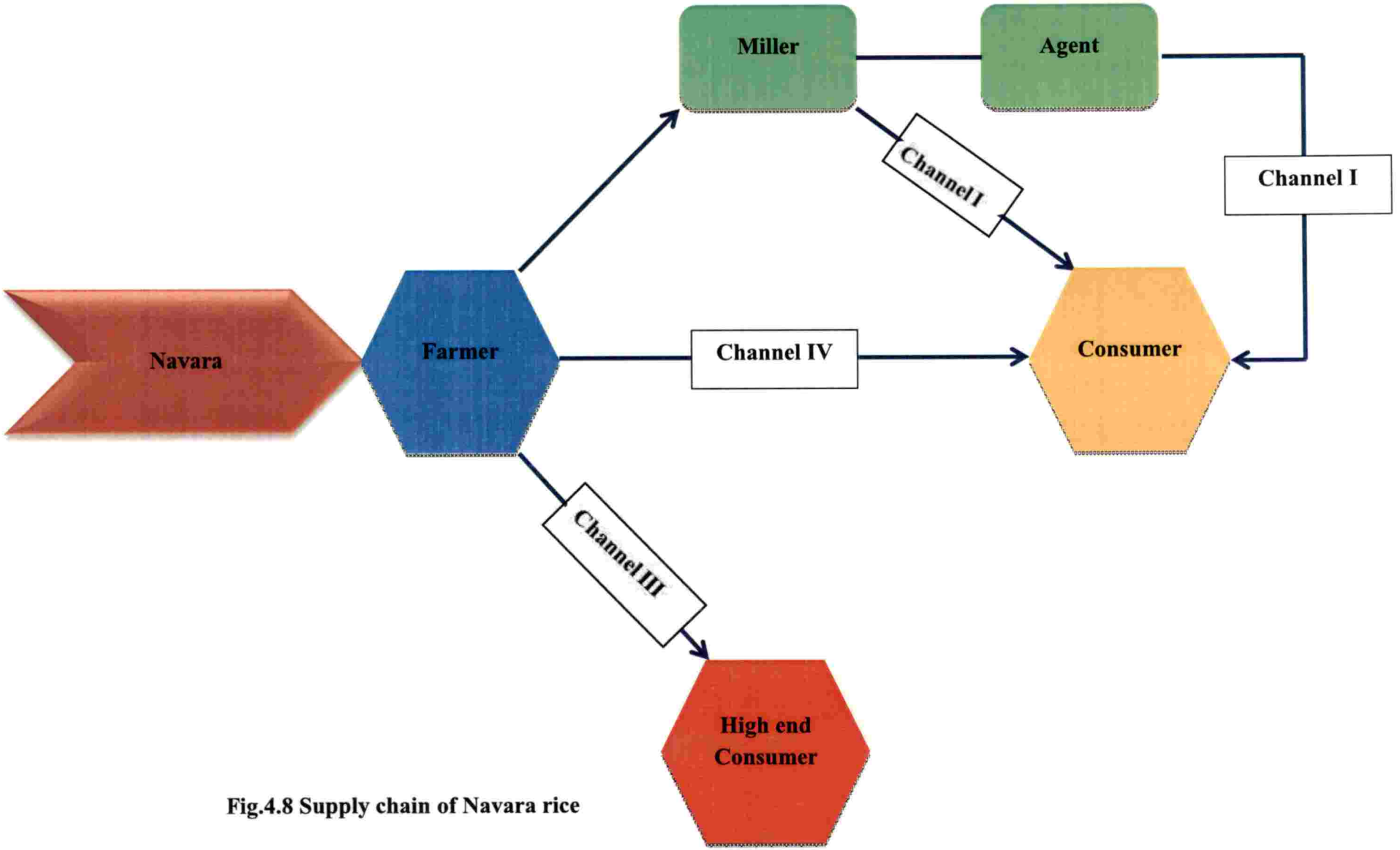

Fig.4.8 Supply chain of Navara rice

Of the four marketing channels identified for Navara rice, channel IV was the least efficient owing to lower market price received in that channel. Even though there were no intermediaries between the farmer and consumer in channel IV, a higher marketing cost and a lower consumer price have caused the Shepherd's index to be lower in channel IV (2.13) when compared to other channels. Marketing cost was very high as the recovery percentage of rice was very low when milled in the local mills.

Table 4.17. Marketing cost, Marketing margin, Price spread and efficiency in different marketing channels of Navara Rice

Particulars	Navara Channel I	Navara Channel II
Price realised by the farmer	30	40
Transportation charges	0	0
Marketing cost	0	0
Net price received by the farmer	30	40
Purchasing price of the miller	30	40
Cost Incurred by the miller		
Transportation cost	0.5	1
Processing charge	3	5
Storage charges	0	5
Packing Charges	0	2
Marketing cost of the miller	3.5	16.5
Marketing margin of the miller	2.5	33.5
Purchasing price of the wholesaler (60%)	36	0
Weighing and Unloading	0.7	0

charges		
Processing charge	1	0
Transportation charges	1	0
Storage charges	0.5	0
Packing Charges	3.4	0
Total cost of the wholesaler	6.6	0
Total margin of the wholesaler	30.6	0
Transportation charges to reach retailer	0	3.5
Purchasing price for retailers	0	90
Selling price @60% recovery	73.2	108
1 kg selling price	122	180
Total Marketing cost	10.1 (13.80)	16.5 (15.28)
Total Marketing margin	33.1 (45.22)	51.5 (47.69)
Price spread	43.2 (59.02)	68 (62.96)
Producers share in consumer's rupee	40.99	37.03
Shepherds index	7.25	6.55

Figures in parenthesis indicate per cent of the respective consumer price

Table 4.18. Marketing cost, Marketing margin, Price spread and efficiency in different marketing channels of Gandhakasala, Jeerakasala and Navara rice (high end consumers)

Particulars	Gandhakasala Channel II	Jeerakasala Channel II	Navara Channel III
Price realised by the farmer	180	170	450
Weighing and Unloading charges	1	0.55	1
Processing charges	5	5	9
Transportation charges	12.95	14.22	6
Packing Charges	3	3	30
Wastage*	54	51	112.5
Marketing cost	75.95	73.77	158.5
Net price received by the farmer	104.05	96.23	291.5
Consumer price (1 kg)	180	170	450
Price Spread			
Total Marketing cost	75.95 (42.19)	73.77 (43.39)	158.5 (35.22)
Total Marketing margin	0 (0.00)	0 (0.00)	0 (0.00)
Price spread	75.95 (42.19)	73.77 (43.39)	158.5 (35.22)
Producers share in consumer's rupee	57.80	56.60	64.77
Shepherds index	2.37	2.30	2.84

Note: Wastage calculated @ 30 % for Gandhakasala and Jeerakasala
Wastage calculated @ 25 % of Navara
Figures in parenthesis indicate per cent of the respective consumer price

Table 4.19 Marketing cost, Marketing margin, Price spread and efficiency in different marketing channels of Gandhakasala, Jeerakasala and Navara rice (Local consumers)

Particulars	Gandhakasala Channel III	Jeerakasala Channel III	Navara Channel IV	Kaipad Channel III	Pokkali Channel III
Price realised by the farmer	70	65	80	50	45
Weighing & Unloading charges	0	0	0	0	0
Processing charges	5	5	5	3	3.5
Transportation charges	.75	.75	.50	.50	.50
Packing Charges	0	0	0	0	0
Wastage*	28	26	32	20	18
Marketing cost	33.75	31.75	37.5	23.5	21.5
Net price received by the farmer	36.25	33.25	42.5	26.5	23.5
Consumer price (1 kg)	70	65	80	50	45
Price Spread					
Total Marketing cost	33.75 (48.21)	31.75 (48.85)	37.5 (46.88)	23.5 (47.00)	21.5 (47.78)
Total Marketing margin	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)
Price spread	33.75	31.75	37.5	23.5	21.5

	(48.21)	(48.85)	(46.88)	(47.00)	(47.78)
Producers share in consumer's rupee	51.79	51.15	53.12	53.00	52.22
Shepherds index	2.07	2.05	2.13	2.13	2.09

Note: Wastage calculated @ 40 %
Figures in parenthesis indicate per cent of the respective consumer price

4.5.3 Jeerakasala Rice

The marketing channels observed for Jeerakasala was similar to that of the Gandhakasala. In channel I which included farmer, local agent and consumer, marketing cost accounted for 36.94 per cent of the consumer price and the marketing margin was ₹16.67/ Kg which accounted for about 14 percent of consumer price. The price spread was about 50 per cent of the consumer price and so the producer's share in consumer's rupee was 50 per cent in this channel. The marketing efficiency was worked out as 2.71.

For farmers who were marketing their produce to high end consumers, the marketing cost is higher than channel I due to higher transportation cost. The marketing cost accounted for 43 percent of the consumer price (₹74/Kg). Since there were no intermediaries in this channel as marketing margin was zero and the price spread was 43 per cent of the consumer price. Due to higher marketing cost Shepherd's index was found to be lower in channel II than channel I (2.30).

The price realised by farmers who are marketing their produce directly to local consumers is lower than other channels as the quality of the produce is not very supreme. The marketing cost was highest in this channel and it accounted for 49 per cent of the consumer price. Of the three marketing channels identified for the category of Jeerakasala, channel III was the least efficient (2.05).

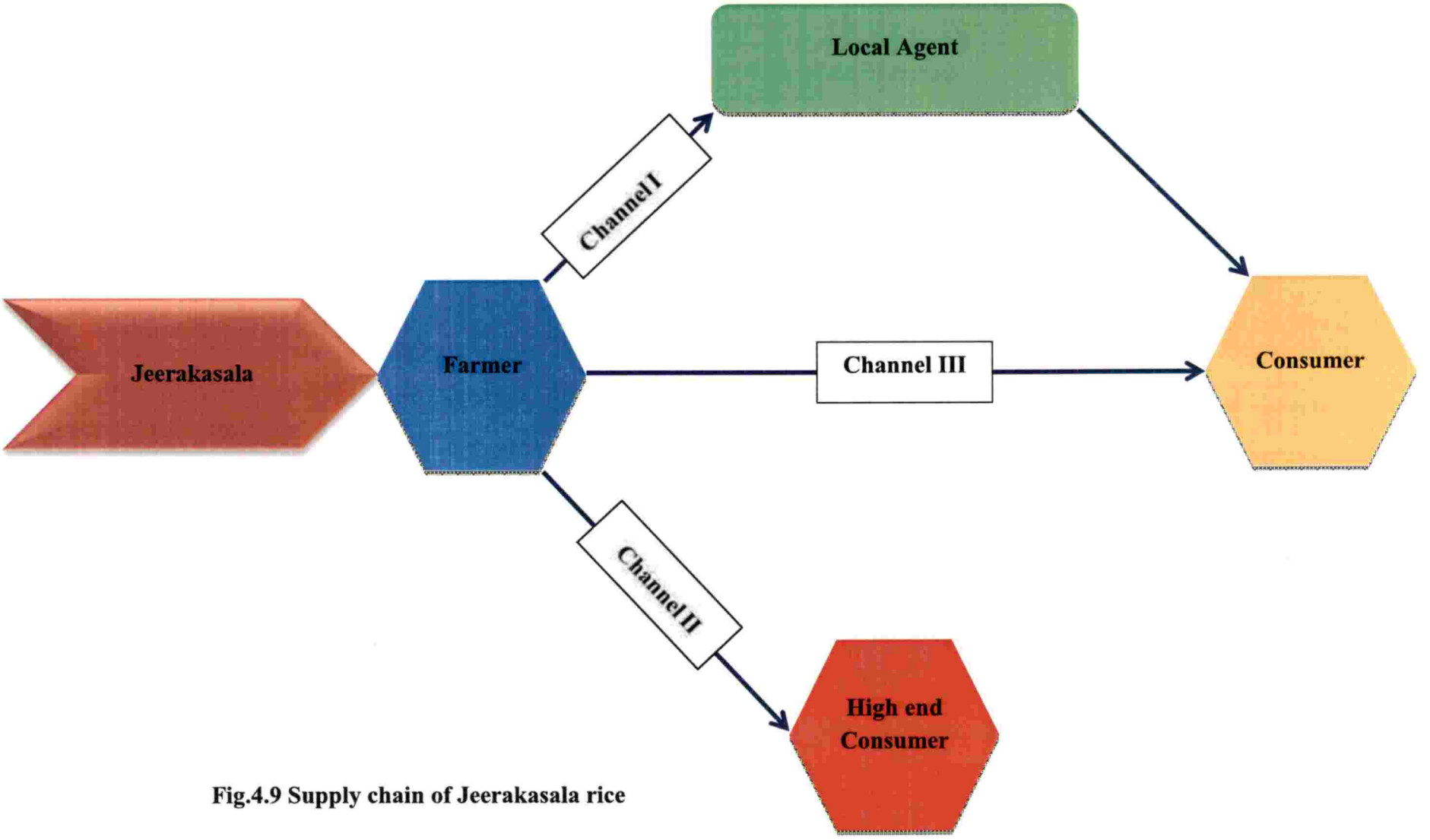

Fig.4.9 Supply chain of Jeerakasala rice

4.5.4 Gandhakasala rice

Three marketing channels were identified for Gandhakasala in the study area. In channel I, the marketing cost accounted for 37.48 per cent of the consumer price and the marketing margin was ₹16.67/ Kg which accounted for about 15 percent of the consumer price. The price spread was estimated as 53 per cent of the consumer price and hence the producer's share in consumer's rupee was about 47 per cent in this channel. The marketing efficiency in channel I for Gandhakasala was estimated as 2.66.

In the case of Gandhakasaala, some farmers were marketing their products to high end consumers. In this channel, the marketing cost is higher than channel I owing to higher degree of specialisation and quality specification. The marketing cost accounted for 42 percent of the consumer price (₹75.95/Kg). Since there were no intermediaries in this channel as the farmers were selling paddy directly to the high end consumer, marketing margin was zero. The price spread and marketing costs remained the same as there was no margin. Even though there were no intermediaries between farmers and consumers in channel II, a higher marketing cost have caused the Shepherd's index to be lower in this channel when compared to channel I. In channel II, the marketing cost is higher than channel I as the transportation charges to reach the millers as well as consumers were very high. There were no specialised mills near the farms and the producer has to mill the produce at specialised mills located distantly to maintain quality.

Some respondents were marketing their produce directly to local consumers after processing in local mills. The price realised by them was lower than other channels as the quality of the produce was not very supreme due to the lack of specialised milling facilities in the area. The marketing cost was highest in this channel owing to higher wastage during milling and it accounted for about 48 per cent of the consumer's price. The marketing margin is zero as the consumers directly sold their produce to the consumers. Since there were no intermediaries, the

marketing cost and margin remained the same. Of the three marketing channels identified for Gandhakasala rice, channel III was the least efficient channel as the market price was comparatively low.

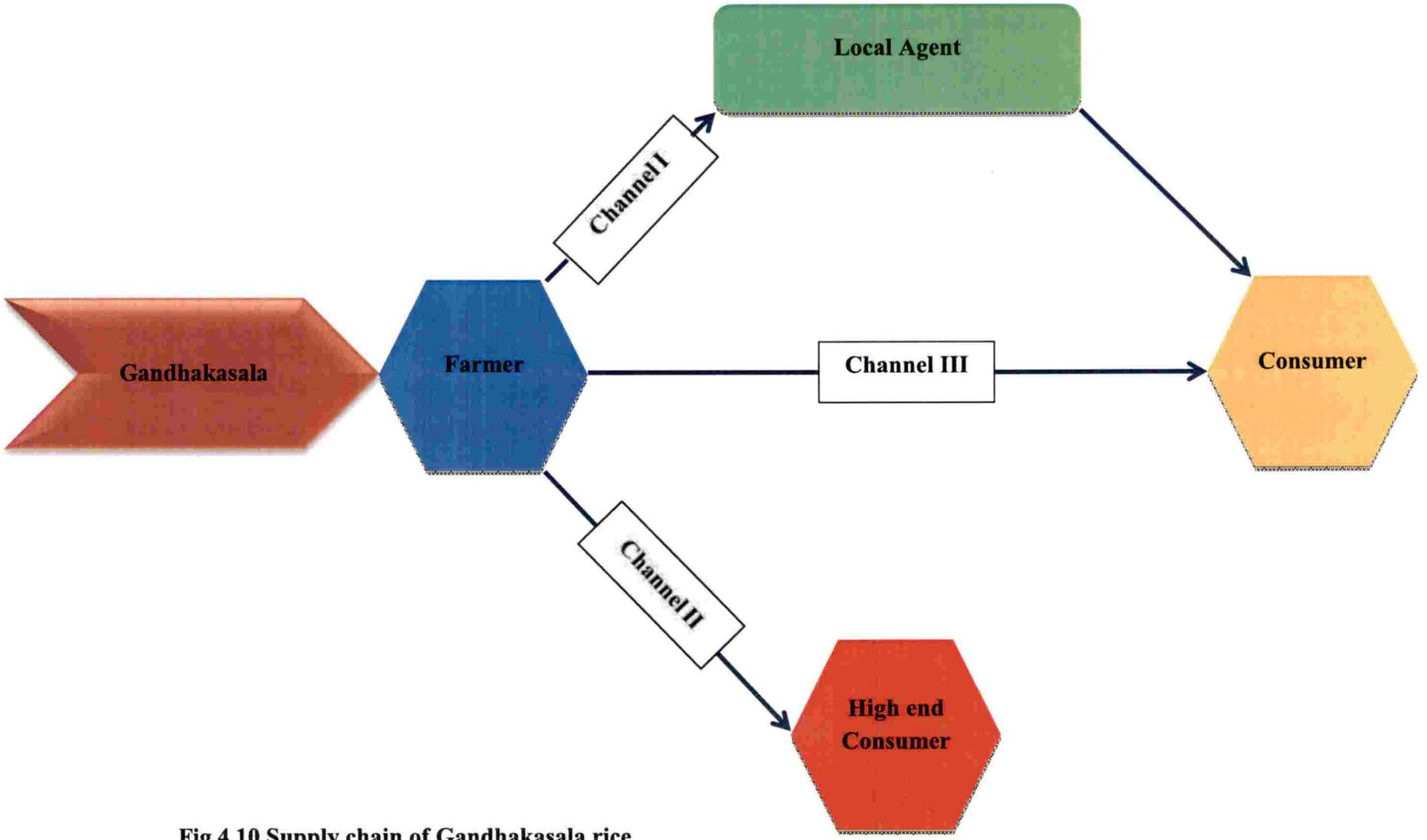

Fig.4.10 Supply chain of Gandhakasala rice

Table 4.20. Marketing cost, Marketing margin, Price spread and efficiency in different marketing channels of Gandhakasala Rice and Jeerakasala Rice

Particulars	Jeerakasala Channel I	Gandhakasala Channel I
Price realised by the farmer	95	85
Cost incurred by farmer		
Weighing and Unloading charges	0	0
Processing charges	5	5
Transportation charges	2.5	2.5
Wastage*	28.5	25.5
Packing Charges	0	0
Total marketing cost of the farmer	35.5	33
Net price received by the farmer	59.5	52
Purchasing price of the Agent	95	85
Cost incurred by the Agent		
Weighing and Unloading charges	0	0
Processing charges	0	0
Transportation charges	3	3
Storage charges	3.33	3.33
Packing charges	2	2
Total marketing cost of the Agent	8.33	8.33
Total margin of the wholesaler	16.67	16.67
Consumer price (1 kg)	120	110
Total Marketing cost	44.3 (36.94)	41.33 (37.48)
Total Marketing margin	16.67 (13.89)	16.67 (15.15)
Price spread	60.5 (50.41)	58 (52.73)
Producers share in consumer's rupee	49.58	47.27
Shepherds index	2.71	2.66

Figures in parenthesis indicate per cent of the respective consumer price

**Wastage is calculated @ 30 per cent*

4.5.5 Pokkali rice

It is evident that the marketing cost was highest in channel III, followed by channel II and I. Marketing costs accounted for 47.78 per cent of consumer price in channel III, 15.20 per cent of the consumer price in channel II and 10.21 per cent of the consumer price in channel I. The marketing cost was high in channel III as the producer's losses 40 per cent of the produce while milling. Marketing margin was ₹18/Kg in channel II whereas it was ₹3.87/ Kg in channel I. Marketing margin was low in channel I as the millers procured the produce at a higher cost when compared to channel II. Since there were no intermediaries, the marketing margin was zero in channel III and price spread was same as the marketing cost. The price spread was about 48 percent in channel II and channel III, while it was only 16.67 per cent in channel I. The prodcuer's share in consumer's rupee was about 83 per cent in channel I and it was only about 51 per cent in channel II and 52 percent in channel III. It could be observed that channel I had the highest marketing efficiency of 9.79, while in channel II it was 6.58 and channel III it was very less (2.09).

4.5.6 Kaipad rice

In Kaipad tracts, most of the farmers were depending on the Malabar Kaipad Farmers Society (MKFS) to market their produce. In both channels I and II, the main marketing intermediary was MKFS. It was evident that the marketing cost, margin, price spread and efficiency was almost same in both the channels. Marketing cost, accounted for 28 percent of the consumer price in channel II and 27 percent in channel I. Marketing margin was ₹21/Kg and ₹20/Kg in Channel I and Channel II respectively. The farmers were processing and selling Kaipad rice to the society. The only cost incurred by the society was for packing. In channel II, the retailer incurred a transportation cost and hence the marketing cost was slightly higher in channel II than channel I. The price spread was about 48 per cent of the consumer's price in both the channels. Hence, the producer's share in consumer's rupee was about 52 per cent and consequently the efficiency in these channels came to around 3.6.

Even though the MKFS was offering a higher price, some farmers opted direct selling of Kaipad rice. The reasons varied from lower production, distance to the society and age old consumer relationship (friends, relatives and neighbours). In the case of direct selling to local consumers, the price realised by farmers was lower than other channels. The marketing cost was ₹ 23.5/Kg in this channel and it accounted for 47 per cent of the consumer price. The marketing margin was zero as the consumers directly sold their produce to the consumers. Of the three marketing channels identified for Kaipad rice, channel III was the least efficient owing to lower market price. Even though there were no intermediaries between the farmers and consumers in channel III, a lower consumer price led to a lower value of the Shepherd's index, indicating less marketing efficiency.

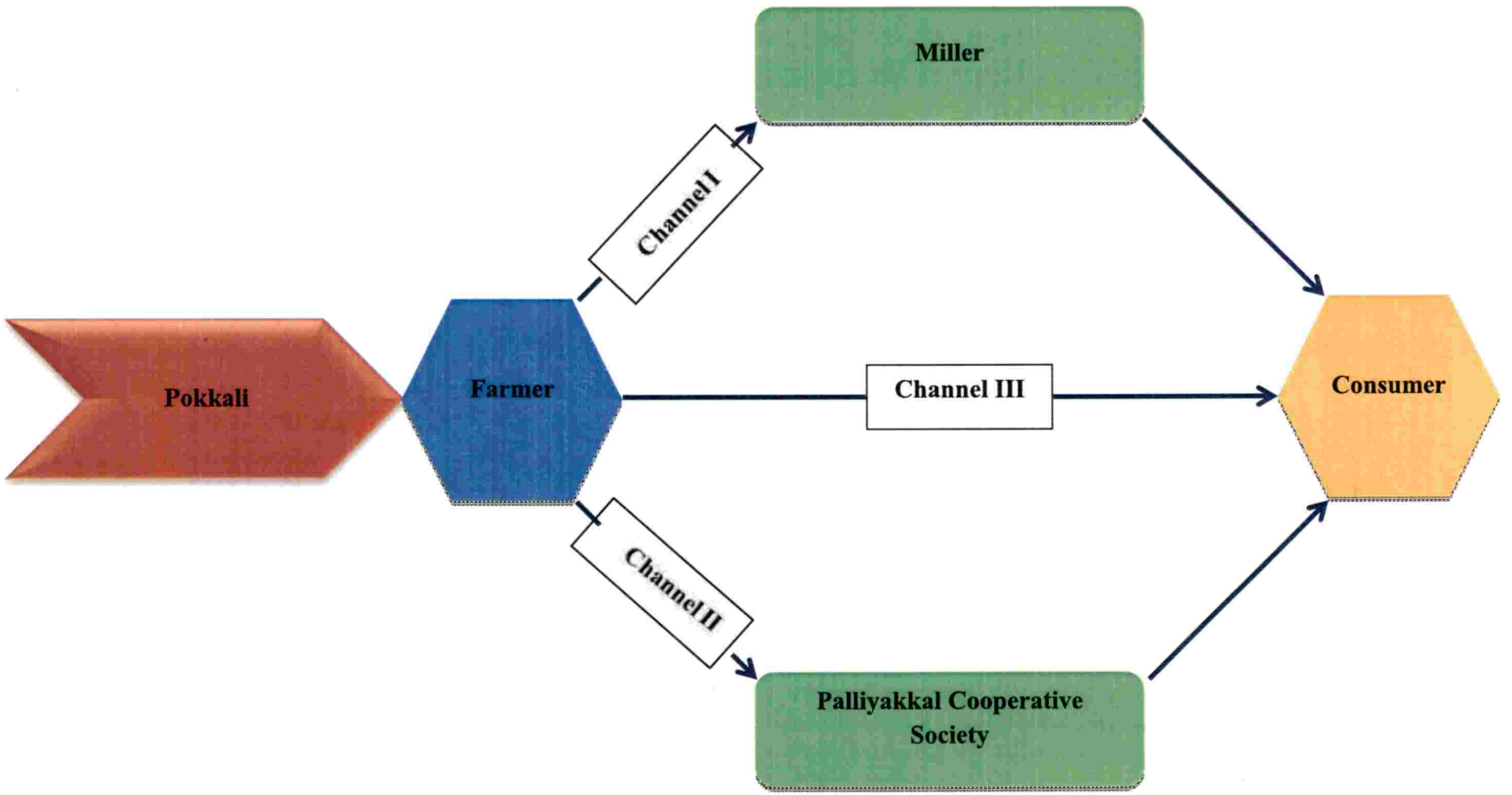

Fig.4.11 Supply chain of Pokkali rice

Table 4.21 Marketing cost, Marketing margin, Price spread and efficiency in different marketing channels of Pokkali rice

Particulars	Pokkali Channel I	Pokkali Channel II
Price realised by farmer	50	28
Transportation charges	0	0.21
Processing charge	0	0
Marketing cost	0	0.21
Net price received by farmer	50	27.79
Purchasing price of miller	50	28
Cost incurred by miller		
Weighing and Unloading charges	0.13	0
Processing charge	4	5
Transportation charges	2	0
Packing charge	0	3
Rice miller total cost	6.13	8
Millers total margin	3.87	18
Consumer price @60% recovery	60	54
Selling price for 1 kg	100	90
Total Marketing cost	6.13 (10.21)	8.21 (15.20)
Total Marketing margin	3.87 (6.45)	18 (33.33)
Price spread	10 (16.67)	26 (48.15)
Producers share in consumer's rupee	83.33	51.46
Shepherds index	9.79	6.58

**figures in the parenthesis indicate per cent to respective consumer price*

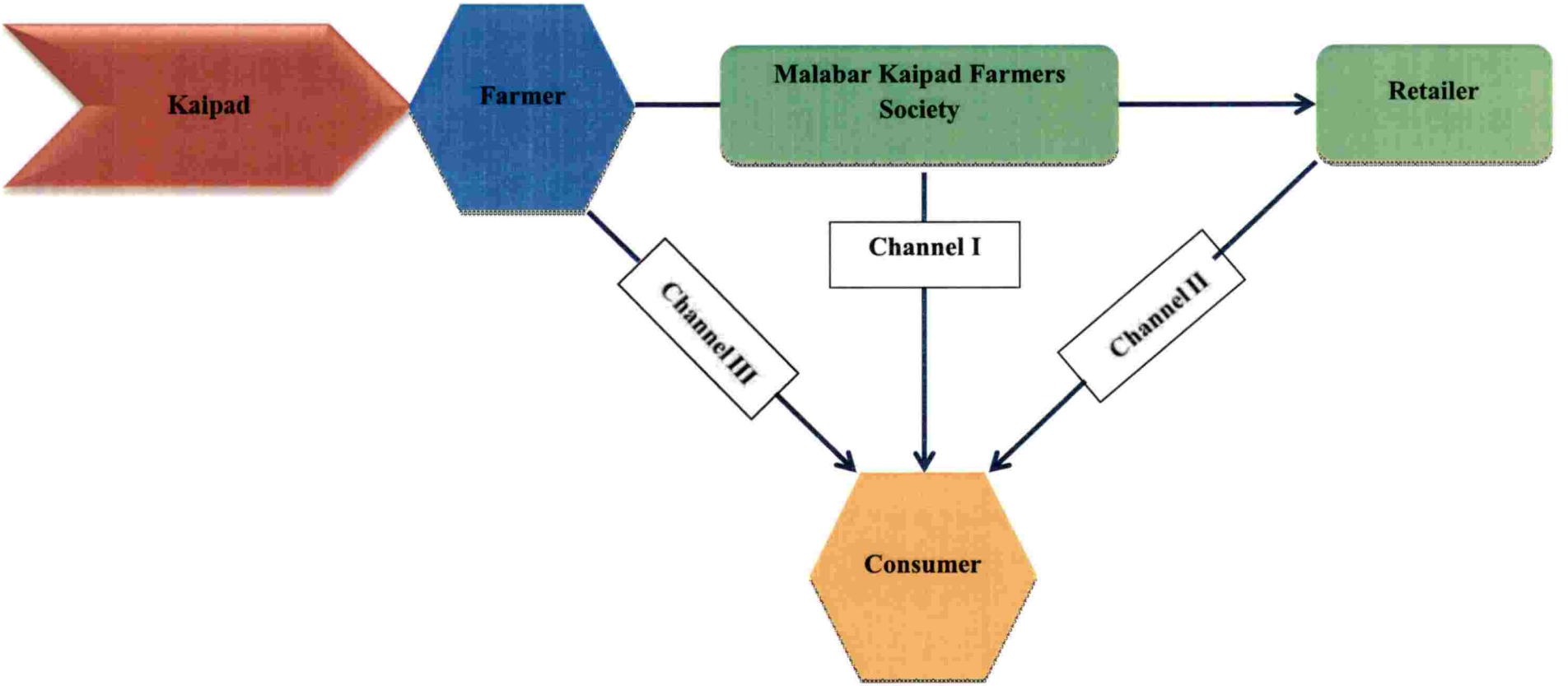

Fig.4.12 Supply chain of Kaipad rice

Table 4.22. Marketing cost, Marketing margin, Price spread and efficiency in different marketing channels of Kaipad Rice

Particulars	Kaipad Rice Channel I	Kaipad Rice Channel II
Price realised by farmer	75	75
Processing charge	5	5
Wastage*	15	15
Transportation charges	3.33	3.33
Marketing cost	23.33	23.33
Net price received by the farmer	51.67	51.67
Purchasing price of padasekharasamithi	75	75
Cost incurred by the Agent		
Weighing and Unloading charges	0	0
Processing charge	0	0
Transportation charges	0	0
Storage charges	0	0
Packing Charges	4	4
Total cost of Padasekharasamithi	4	4
Total margin of Padasekharasamithi	21	6
Purchasing price for the retailers	0	85
Cost incurred by the retailers		
Transportation charges	0	0.67
Cost of retailers	**0**	0.67
Margin of retailers	0	14.33
Consumer price	100	100
Price Spread		
Total Marketing cost	27.33	28

	(27.33)	(28.00)
Total Marketing margin	21 (21.00)	20.33 (20.33)
Price spread	48.33 (48.33)	48.33 (48.33)
Producers share in consumer's rupee	51.67	51.67
Shepherds index	3.66	3.57

Figures in parenthesis indicate per cent of the respective consumer price
**Wastage is calculated @ 20 per cent*

4.6 Institutional analysis and Development Framework

Despite having a rich biodiversity and a valuable array of traditional products, limited product diversification, fluctuating market value of traditional products and competition from spurious products both in the domestic and export destinations are hindering the progress of many developing countries including India. As a solution to these problems, the TRIPS agreement directed all member countries to provide protection for all GIs where the responsibility of the member is to provide the 'legal means for interested parties' to assure protection of their GIs. As a party to the TRIPS Agreement, India is obliged to protect GI and hence the Geographical Indications of Goods (Registration and Protection) Act, 1999 was enacted which came into force with effect from 15th September 2003. In this regard, the Central Government has established the 'Geographical Indications Registry' with its headquarters at Chennai. Subsequently, the Indian Council of Agricultural Research (ICAR), directed all agricultural universities in India to constitute an IPR Cell to facilitate protection of agriculture-related IPRs. KAU formed an IPR cell way back in 2003. The IPR cell in KAU with its constant efforts have registered 7 GIs under the registry and has assisted the interested parties in registering their GIs (Consultancy). Past studies had

showed that the protection of products under GIs has resulted in higher economic gains, improved quality production and helped in better distribution of profits. But the users of registered GIs (Navara Rice, Palakkadan Matta Rice, Pokkali Rice, Wayanad Jeerakasala Rice, Wayanad Gandhakasala Rice and Kaipad Rice) are unsure about the success as well as beneficial impacts of the GI registration.

4.6.1 Objective:

In the above background, the proposed IAD framework would explore the bottlenecks of the innovation. Efforts were also made for studying the institutional innovations strategies for enhancing profitability and effectiveness of the GI mechanism, to propose viable supply chain options and to examine the export prospects and market access of the registered rice GIs.

4.6.2 Actors

Table 4.23. Actors involved in GI registration

Actors	Role
IPR office, Chennai, Union Commerce Ministry	Processes GI applications and takes decisions.
IPR cell, KAU	To research, apply and assist protection of agriculture-related GI.
Navara Rice Farmers Society, Chittur, Palakkad	Registered proprietor of Navara Rice
Palakkad Matta Farmers Producer Company Ltd	Registered proprietor of Palakkad Matta Rice
The Pokkali Land Development Agency and KAU	Registered proprietor of Pokkali Rice
Wayanad Jilla Sugandha Nellulpadaka Karshaka Samithi and KAU	Registered proprietor of Jeerakasala Rice

Wayanad Jilla Sugandha Nellulpadaka Karshaka Samithi and KAU	Registered proprietor of Gandhakasala Rice
Malabar Kaipad Farmers Society and KAU	Registered proprietor of Kaipad Rice
Producers of GIs	Cultivate, process and market the respective GIs according to the rules of respective societies

Any association of persons, producers, organisations or authority established by or under law can only apply for the registration of a GI (GI Act, 1999). A president and secretary are elected from within the community to coordinate the activities of the society. The main activities of society include uniting the producers of the product, gathering information about the origin and method of production of the product and creating awareness about the specialty good among the community and post-GI follow up of the product. The society continuously interact with the farming community to know and act up on their problems with respect to the product. Even though producer societies still exist but are not actively seeking solutions to farmers problems in most of the cases. In the case of GI rice in Kerala, only MKFS is actively taking steps for the betterment of the users of their GI. No regular meetings or follow up activities are being conducted by other societies. Of late farmers who had high expectations about the GI on its initiation have lost even their faith in the utility of GI.

The IPR cell at KAU is constantly in search of potential products that can be registered as a GI. They encourage the farming community to come up with suggestions about new GIs that could be registered. The process of filling up an application for registering a GI is cumbersome. At present, legal representatives charge around Rs 60,000 to 70,000 for processing one GI application. The farming communities cannot afford to spend such huge amounts. The IPR Cell acts as a

saviour in such cases. Once a product is identified, the IPR Cell starts preparations to register the GI. The application filed should contain a testimonial about, how the GI serves to designate goods as originating from the concerned area, in respect of quality, reputation or other characteristics. The data and documents are needed to prove the proof of origin and the intrinsic qualities of the product. Often the society needs to work really hard to find out these evidences. The societies conduct discussions and awareness programs in the area and constantly interact with the farmers. A society of producers is formed or if it already exists, it is modified accordingly for applying for the ownership of the GI. A formal map showing the exact geographical location where the product is grown is another document that has to be submitted along with the application. In some cases, the District Collector has to endorse this while in some other cases, the Principal Agriculture Officer ratifies it. Multiple visits from the cell is required to gather data and fix the proof of origin. After registration, the IPR cell constantly take efforts to create awareness among farmers about the marketing prospects of GI.

The Geographical Indications of Goods (Registration & Protection) Act, 1999, came into force in 2003, as an obligation to World Trade Organisation (WTO). The Intellectual Property Office comes under the Ministry of commerce and Industry and its headquarters is in Chennai. They examine the GI applications and takes further decisions. On reception of an application, a number will be allotted for the application. Thereafter, the application will be examined to check whether it meets the requirement of the Geographical Indication of Goods (Registration and Protection) Act and rules. For this purpose, the registrar shall constitute an expert group to ascertain whether the particulars furnished are correct or not. After issuing the examination report, submissions of applicant would be carefully examined. If the applicant I fails to respond to the objections or rejections within two months of receipt of examination report, application will be rejected. If no objection is raised, registrar will accept the application and advertise in the geographical indications

journal. An opposition could be lodged within 3 months from date of the publication. The Registrar of geographical indications may register the GI after the application has been accepted and not opposed or if opposed, the opposition has been decided in favour of the applicant. Hereafter, the Registrar will issue the certificate of registration in the prescribed format along with the seal of geographical Indications registry to the applicants and authorized users.

4.6.3 Rules in use:

Once the GI is registered, only members of the concerned society in the specific geographical area mentioned in the application for GI registration can cultivate and market the GIs. The boundary of production and the varieties that comes under purview of the GI are also specified.

Table 4.24. Boundary of production and varieties cultivated under rice GIs of Kerala

Registered GIs	Boundary of production	Varieties that are cultivated
Navara Rice	Kerala	Black colour glumed navara and golden yellow colour glumed Navara
Palakkad Matta Rice	Palakkad	Chenkazhama, Chetadi, Aruvakkari, Aryan, Vatton, Ilupappoochampan, Chitteni, Thavalakannan, KunjuKunju and Jyothi
Pokkali Rice	Ernakulam Alapuzha, Thrissur	Traditional Pokkali varieties (Cheruvirippu, Chettivirippu, Kuruka, PonKuruka, Mundakan, Anakodan, Eravapandy,

		Orkayama, Orpandy) and Vytilla varieties
Wayanad Jeerakasala Rice	Wayanad	Jeerakasala
Wayanad Gandhakasala Rice	Wayanad	Gandhakasala
Kaipad Rice	Kasargode, Kannur and Kozhikode	Traditional Kaipad varieties (Kuthiru, Orkayama) and Ezhome Varieties

4.6.4Attributes of the community

Navara is an endemic rice of Kerala known for its nutritional, religious and medicinal value. This rice is used in Navarakizhi, a specialty traditional Kerala treatment of neuromuscular disorders. It received GI protection in 2007 and Navara Rice Farmers Society, Chittur, Palakkad is the registered proprietor of Navara Rice

Palakkadan Matta rice is the second agricultural product in Kerala to receive GI registration and it is cultivated in Palakkad region of Kerala. This unique red rice which claim to have its own flavour and taste when cooked, received GI protection in 2007. Palakkad Matta Farmers Producer Company Ltd is the registered proprietor of Palakkadan Matta Rice.

Pokkali is naturally organic system of rice cultivation practiced in the waterlogged coastal regions of Alappuzha, Ernakulam and Thrissur districts of Kerala. This is an integrated farming system in which rice cultivation and aquaculture go hand in hand. Kerala Agricultural University and The Pokkali Land Development Agency are the registered proprietors of Pokkali Rice. Pokkali rice obtained GI certification in 2007.

Wayanad Jeerakasala rice and Wayanad Gandhakasala rice received GI status in 2010. These are popular traditional aromatic rice varieties grown in Wayanad District of Kerala. It is traditionally cultivated by Wayanadan chettis, Kurichyar and Kuruma tribal group. These groups have a commitment for the conservation of these varieties as a gift to coming generation and their livelihood and food security mainly depend on paddy. It is a non-basmati rice yet has a unique taste and aroma when cultivated inside Wayanadan boundaries. Kerala Agricultural University and Wayanad Jilla Sugandha Nellulpadaka Karshaka Samithi are the registered proprietors of Wayanad Jeerakasala Rice and Wayanad Gandhakasala Rice. Although the agroclimatic conditions of Wayanad is favourable for aromatic rice production, only limited cultivation of Gandhakasala and Jeerakasala are presently taken up in the area. (George *et al.,* 2005). When data was collected through Krishibhavans in the districts, it was found that only less than 60 farmers are cultivating Jeerakasala

Kaipad Rice is organically cultivated in the brackish water tracts of the three districts of northern Kerala *viz*. Kannur, Kasaragod, and Kozhikode. Like Pokkali rice, cultivation of Kaipad rice is also done organically under salinity prone waterlogged fields. Due to this unique cropping pattern or system, 'Kaipad Rice' received the Geographical Indication tag in 2014. This rice variety has tolerance to salinity and is grown under a unique cropping pattern of Rice-Prawn rotational system. Kerala Agricultural University and Malabar Kaipad Farmers Society are the registered proprietors of Kaipad rice. Malabar Kaipad Farmers society is actively seeking solutions to problems of farmers cultivating 'Kaipad Rice'

4.6.5 Physical/ Material condition

Navara is characterized by extremely short duration of 60-90 days and the cultivation is generally confined to high lying paddy fields to make the water management easier. Navara is a direct sown crop. Cultivation practices from sowing to harvest are similar to other rice varieties. No fertilizers and other agro-chemicals

are applied for the cultivation of Navara rice as this could adversly effect the medicinal properties of the variety.

As the name indicates, Palakkadan Matta rice is cultivated in Palakkad district in Kerala. The rice has a distinct earthly flavour because of the type of soil in which it is cultivated. These paddy fields are characterised by soil which contains a lot of clay and silt. Because of these qualities, these paddy fields can retain more water. The crop production practices are similar to other rice varieties. But the system of cultivation is not strictly organic, as some farmers use fertilizers, plant protection chemicals and other agrochemicals in crop production .

In Kaipad and Pokkali cultivation, agricultural operations for rice cultivation begin in mid-April. In October, after the harvest of paddy fields are used for prawn filtration. Prawn filtration begins by February and continues till April. Both are completely organic system of cultivation and no fertilizers or plant protection chemicals are applied. Even though Pokkali holds an organic certification, the organic certification process is still in pipeline in Kaipad.

Gandhakasala and Jeerakasala are traditionally grown as organic crops to ensure best quality of the product. This variety is inherently resistant to pest and diseases with its thin and tall stature. Hence, no pesticides and chemicals are used and as the plants are also tall and thin, no fertilizers are applied as it can lead to lodging. Green manure crops and leguminous crops are raised and incorporated into the fields along with which farm yard manure is also applied. These varieties are cultivated as a transplanted crop between June-July and December-January mainly as a rainfed crop using the water from monsoon showers

4.6.7 Interaction Session

Navara rice is registered by a society in Palakkad. The farmers were definitely realizing a price higher than normal rice due to the medicinal properties. But the Navara rice farmer's society was not concerned about the farmers elsewhere in

Kerala. They are a group of high profile farmers who has permanent buyers and export orders. Their production is also very limited only to meet these orders. The society is not taking any actions to unite the farmers across Kerala or to improve quality of production in the state or to prevent duplication or fake products. Thus the activity of society was limited to Palakkad district, even though the production is all through Kerala. Thus two class of producers have emerged, one group of farmers selling for ₹300/ Kg and yet another class selling Navara rice at 30 Rs/Kg. Navara farmers in other areas who cultivate Navara rice are not even aware of the fact that they are cultivating a GI rice. Even though consumers have to pay high price for the Navara rice in the market, the premium price paid by the consumers was not getting translated to a higher procurement price.

Palakkad Matta Farmers Producer Company Ltd, the registered proprietor for Palakkadan Matta rice was not active and was not taking any action for promoting or popularising this variety. Farmers were relying on Supplyco to market their products. Another problem was in connection with the quality of these varieties. Mixing up of other Matta varieties from this area as well as other states was taking place which further diluted the quality of Matta rice from Palakkad and thereby was tampering the brand image of the product. The producers were unable to take legal actions against such issues due to various socio-economic and political reasons. Since the user registration did not take place, it was very difficult to take legal proceedings against these violations. From the study, It was clear that Palakkad Matta variety was preferred for household consumption. The problem with Palakkadan Matta was that is that it was not marketed as a GI. Devi *et al.,* (2007) has reported that it is difficult to trace the origin of Palakkadan Matta rice after processing as they are ultimately sold under different brand names depending on the processing entity. Hence steps need to be taken to absorb the existing demand by marketing Palakkadan matta as a brand.

Pokkali farmers were not realizing any premium price and they complained of the high cost of cultivation resulting from high labour cost, need for skilled labours

and lack of technology. They pointed out that in seasons with low productivity, the millers procurred at a higher price else the rice is marketed at the price of normal rice. The productivity was also low compared to other rice varieties. The motivating factor for cultivating rice in Pokkali was the income from chemeen kettu. Farmers were really doubtful about the beneficial effect of GI and according to them the demand was because of the organic production system. The society which was very active once is dormant now.

The productivity of Jeerakasaala and Gandhakasala was very low when compared to normal rice varieties grown in Kerala. Similar aromatic rice varieties which were cultivated in other states are flooding markets of Kerala. This clearly points to the fact that there exists a demand for this product. So the society can actually work in direction to promote the markets and thereby motivate the farmers to cultivate these varieties. Observing the consumer demand, people from other areas were coming to Wayanad and cultivating these varieties. They have the understanding that the product could be considered a GI only if it is cultivated in Wayanad. This itself points to the unexploited potential of these varieties. Another important problem faced by farmers of aromatic varieties was milling. Actions need to be taken at the government level to improve milling facilities in the area .The main problem reported by farmers of Jeerakasala and Gandhakasala varieties was lack of marketing facilities. Since these rice varieties are aromatic in nature, farmers were finding it difficult to find markets. Eventhough some of the farmers were selling Gandhakasala at ₹60-100/ Kg, majority of the resource poor farmers were not able to reach these markets and hence the societies should act as a connecting link between them and markets.

Malabar Kaipad Farmers Society (MKFS) is the registered proprietor of Kaipad Rice. Presently, the society is very active and it procure the Kaipad paddy at a rate of ₹ 2 more than the MSP and if the farmers are selling as rice to the society, they

procure it at rate of ₹50 /Kg and the rice was marketed to the public at the rate of ₹ 70/ kg. Recently in 2018, NABARD funded a selling point at Kannapuram Panchayat and the MKFS is marketing through this outlet. And in this outlet the parboiled rice is marketed at ₹ 70/ kg, raw rice at ₹ 65/kg. They don't have any proper milling facilities for milling Kaipad rice as of now. There is ample scope to increase area under cultivation and theirby increasing production to explore newer markets.

4.6.8 Outcome:

The present status of GI rice in Kerala is depicted in Table 4.25. Among the different rice ecosystems of Kerala, medicinal rice Navara, Pokkali rice, Wayanadan rice varieties of Jeerakasala and Gandhakasala, Palakkadan Matta rice and Kaipad rice have already found place in the GI registry. The main actor involved in GI registration is producer society and with the exception of Kaipad, all these societies have become less active. Even though the objective of GI registration is was achieved from the protection point of view, the GIs *viz.,* Palakkadan Matta, Navara, Jeerakasala, Gandhakasala Pokkali and Kaipad are registered under the GI registry. But, as the marketing societies were not very particular about increasing the production or producer welfare no effects in this regard is achieved in the case of Palakkadan Matta, Navara, Jeerakasala, Gandhakasala, and Pokkali. When the societies become active and involve in solving the problems faced by farmers, the trust between the society and the producers improve and the farmers actively participate in the meetings and activities associated with the society. This link between the GI societies and users were lacking and it was found that the society members have not initiated any collective action in any of the GIs except for Kaipad.

Table 4.25: Present status of GI Rice in Kerala

GI rice/ Attribute	Navara	Palakkadan Matta	Pokkali	Wayanadan Jeerakasala	Wayanadan Gandhakasala	Kaipad
Society	Not active	Not active	Not active	Not active	Not active	Active
Awareness	Partly aware	Partly aware	Yes	Yes	Yes	Yes
Quality	Low milling recovery	Supplyco Procurement	Low milling recovery	Low milling recovery	Low milling recovery	Low milling recovery
	Absencce of uniform quality		Absence of uniform quality	Absence of uniform quality	Absence of uniform quality	Absence of uniform quality
Duplication	No user registration	No user registration	No user registration	No user registration	No user registration	No user registration
	Inability to take legal action	Inability to take legal action	Inability to take legal action	Inability to take legal action	Inability to take legal action	Inability to take legal action
Demand	Demand for ayurvedic treatment	Preferred for Household consumption	Demand because of organic practices	Similar variety cultivated in other states	Similar variety cultivated in other states	Demand to absorb the existing production
		No demand as a GI		Producers from outside Wayanad	Producers from outside Wayanad	
Price (₹./Kg)	30-300	Supplyco price	Higher price in seasons of low production	60-100	60-100	75(MKFS)

The MKFS was very active and collective actions were being initiated by the society. Group farming is being promoted and the society was collecting and marketing rice from the producers at a premium price. As the members of the society were marketing collectively through society, they have achieved the goal of realizing higher price of the produce through increased bargaining power. The society even owns a selling point sponsored by NABARD and they were showcasing the products at this selling point. The only problem still faced by Kaipad farmers was the increasing penetration of the mangrove systems into paddy fields and the conflicts with the bund owners regarding when to stop shrimp farming. The society is actively working on evolving solutions for these problems. In the case of Matta, though registered as a GI, it was not marketed or promoted as a GI as the farmers were not aware of the GI status and the society. They were cultivating it inorganically and marketing through public procurement system. There is a confusion regarding the varieties that comes under the purview of GI. Steps should be taken to revise the varieties that comes under the purview of GI registration. In the case of Pokkali rice, farmers received a better price in the last season as the overall production was very low which was attributed to climatic problems. The farmers opined that if the season was good, they received very less price for the produce as there was limited demand in the area for the product. The society should actually make promotional arrangement and attract marketing firms outside district so that the entire production in the area could be effectively marketed throughout the state. In the case of Jeerakasala and Gandhakasala rice, farmers from outside the Wayanad district were practicing leased land farming in the district to exploit the GI status of the crop and hence there was enough demand for the crop. The main issue was that the arrival of aromatic rice from other states and districts were absorbing this demand. The society should promote the GI rice by highlighting the difference between Wayanadan aromatic rices and those cultivated elsewhere. For this, first the quality attributes of

GI products should be verified such that a standard production process could be uniformly followed by all producers in the area. Navara is a medicinal rice and its main consumers are ayurvedic producers including Arya Vaidya Salas and ayurvedic doctors. The society should actively negotiate with the ayurvedic entities across Kerala and also the country highlighting the specialities of Navara GI. Thus a persistent demand can be created for the entire quantity of Navara produced in the state. User registration (part II registration) has not been done for any of the GIs studied and hence was difficult to differentiate between the genuine GI and spurious products. Societies have to take steps for user registration so that they can initiate legal action against false products. It was also the right time to revisit the GI applications and revise the boundary of production and varieties that come under the purview of registration. Further, we can expand the scope of GI by exporting to various foreign destinations. As the farmers rightly pointed out, the main hurdle in this regard is to maintain uniform quality and continuous supply. Since there was no recorded data on export of GI rice, we could not progress much in this direction.

Table 4.26. Changes in price of paddy before and after GI registration (₹./kg)

GI	year of registration	price of paddy before GI registration		Price of paddy after GI registration	
		GIs	Non GIs*	GIs #	Non GIs*
Gandhakasaala	2010-11	25	14	50.00	22.5
Palakkadan Matta	2007-08	10	10	22.50	22.5
Pokkali	2008-09	12	11	37.50	22.5
Kaipad	2013-14	18	18	44.38	22.5
Navara	2007-08	15	10	70.60	22.5
Jeerakasaala	2010-11	10-12	14	44.60	22.5

**Price of Non GI is taken as paddy procurement price of supplyco in respective years*
#Price of GIs after GI registration is taken as the average of total respondents.

From Table 4.26, it could be clearly observed that the average prices of all the rice GIs in Kerala have increased post GI registration. Comparable results were obtained by Rose(2011). She had found out that agricultural income of farmers cultivating GI improved marginally after GI registration. But the question is that whether the price was sufficient to sustain the farming of these speciality rices. The cost of production was very high for all the rice GIs except for Palakkadan Matta as organic method of production was adopted. In the case of Pokkali and Kaipad rices, the production practices itself is risky and strenuous and need skilled labourers. Increased labour cost eventually escalates the cost of cultivation. These products reach the end consumers at a very high price, but these benefits are not reaching the producer.

4.6.9 Suggestions:

The Post GI follow up is very less in Kerala. There should be an apex body to monitor the activities of the registered producer societies. This apex body should be constituted at the government level including representatives from the ministry, Department of agriculture, local self-government, producer society, producers, traders and consumers. Apex body should conduct annual review meetings and should take strict actions against spurious products. The society should actively monitor and report incidences of fraud or duplicate products to the apex body. Part two registration (User registration) of the registered GI's should be completed with immediate effect, so that filling of complaint and validation of users becomes easier process. Registered users of each product should be formed as a directory and the directory of traders interested in collaborating with the producer societies should also be made so that farmers can contact traders directly and vice versa. Thus the marketing system could be made even more transparent. The most viable supply chain for GI products is through producer societies and the society can collect paddy from small scale producers, mill them in specialized mill so that uniform quality of

the produce is maintained and further market through the societies. This way bargaining power could also be increased which in turn result in higher price realization. As there is export demand for most of these products, the uniform produce thus generated by producer society could be marketed to export destinations also. Small scale farmers cannot directly access these export supply chains, but producer societies definitely can. Thus the problem of lack of continuous supply can also be solved by pooling the produce from small scale farmers. As in the case of Kaipad, all societies should try to set up a selling point showcase and sell GI products exclusively. The production process of GI products should be monitored strictly so that there will be no compromise on quality of products. For this an inspection body should be constituted under KAU or Department of Agriculture. Participatory Guarantee Scheme (PGS) could also be adopted for this purpose. The IPR cell in the KAU can be given charge of constituting the inspection body which should necessary include an expert from KAU, AO and ADA from the concerned area. IPR cell in the state should be strengthened in such a way that they can conduct awareness programmes and annual fairs to promote marketing of GI products. Even products which are not popular in export destinations can be popularized through combined interventions of producer societies and IPR cell, KAU.

Summary and Conclusion

5. SUMMARY AND CONCLUSION

Geographical Indication (GI) is defined as 'indications which identify a good as originating in the territory of a country, or a region or locality in that territory, where a given quality, reputation or other characteristic of the good is essentially attributable to its geographical origin' (Article 22, TRIPS). The present study entitled "Implications of Geographical Indications for rice in Kerala" was conducted in Palakkadan Matta, Navara, Jeerakasala, Gandhakasala, Pokkali and Kaipad tracts of Kerala. The objective of study were to assess the impact of GI rice on income and welfare of the producer households, to identify the major supply chains, to evaluate the institutional innovations in the supply chains, to propose viable supply chain options and to examine the export prospects and market access of the registered GI rice. The rice GIs of Kerala viz., Navara, Pokkali, Jeerakasala, Gandhakasala, Palakkadan Matta and Kaipad were selected for the study. From each of the six categories, fifty farmers each were randomly selected making a total sample size of 300 farmers (50X6). In addition, information were also be collected from market intermediaries (traders, retailers, wholesalers and processors) and producer societies in each GI tract.

The socio-economic characteristics of the respondent farmers with respect to age, gender, education, experience, family size, land holdings and annual income were analysed. Majority of the farmers in all the GI rice groups were in the age group above 45 which included middle aged farmers (40 per cent) and senior citizens (46 per cent). GI is a recent phenomenon, but it was evident that there was not much inflow of new growers after the introduction of GI as there were no farmers aged less than 30 years in any of the six sample categories. As the study focused on speciality rice with increased risk regarding the profitability and irregular demand pattern in comparison with normal rice, the involvement of female farmers were found to be very low. Even though all the farmers were literates, majority were having education only up to the primary or secondary level. In the overall sample, about 57 per cent had experience more than 30 years and 41 per cent had 10 to 30 years of experience. Family size of majority of the respondents was between 4-6 members except for Kaipad (2-4 members) and hence the availability as well as utilisation of family labour as a substitute for hired labour was possible in the study area. The higher family size in all the categories of sample farmers implies the

possibility of lower marketable surplus. Majority of the farmers were having marginal holdings and the average holding size at the aggregate level was 0.59 ha and it varied from 1.47 ha for Palakkadan matta farmers to 0.24 ha for Gandhakasala farmers. The average annual income of majority of the sample farmers in all categories, except for Kaipad and Pokkali ranged between Rs.50000- one lakh. Majority of the respondents in Pokkali and Kaipad were full time farm workers and hence, income from other sources was very limited. Also only single crop is possible in these categories. Hence majority of them were earning an average annual income below Rs.50000.

The impact of GI on income and welfare of producer households was measured using the method of treatment effect analysis. For the analysis, the outcome variables selected were yield/ha, net income, marketed income, and marketed surplus. The average treatment effects (ATE) were worked out, which shows the difference between the average of treatment and that of control. ATE was worked out for outcome variables yield, net income, marketed income and marketed surplus controlling for all other observable characters and the results are presented in the following section. While comparing the yield per hectare of the six registered GIs, it could be observed that Palakkadan Matta was a better yielder followed by Jeerakasala, Gandhakasala, Navara and Kaipad and Pokkali realised the lowest yield among these six GIs. Examining the net income of the six registered GIs and arranging in descending order, it was in the order of Navara followed by Palakkadan Matta, Gandhakasala, Jeerakasala, Kaipad and Pokkali. Navara farmers realized a higher marketed surplus followed by Gandhakasala, Palakkadan Matta, Pokkali, Kaipad and Jeerakasala. When ranked according to the value of marketed surplus, the treatments followed the order, Navara followed by Palakkadan Matta, Gandhakasala, Kaipad, Jeerakasala and Pokkali.

The average cost incurred for paddy cultivation in other categories was less when compared to that for the Kaipad areas, as only limited quantity of inputs were used in Kaipad. Highest cost of cultivation (Cost C_2) was found in the case of farmer respondents growing Jeerakasala (Rs. 131082.6/ha) followed by Gandhakasala (Rs. 127308.9/ha). Among the survey areas, the rental value of owned land was the highest in Wayanad (Rs. 20000/acre) which might have escalated the cost. The average cost for growing Palakkadan Matta (Rs. 88280.06/ha) was less compared to Jeerakasala, Gandhakasala, Navara and Pokkali.

Among the various categories, highest average yield was realised by farmers growing Palakkadan matta (4498.32kg/ha) and lowest yield was realised by farmers growing Pokkali (1835.26 Kg/ha). Accordingly the cost of production was highest for Pokkali and lowest for Palakkadan Matta. Even though pokkali and Kaipad were similar in cultivation practices, the farmers in Kaipad were growing high yielding Ezhome varieties, realising higher yield (3241.13 kg/ha) and hence cost of production was comparatively less (Rs. 2683.03/quintal).

The highest average gross income of Rs.16128 per hectare was obtained by farmers growing navara while it was lowest for the farmer growing Pokkali (Rs. 75036/ha). Navara is a medicinal variety and higher price is realised by farmers due to its medicinal property. Pokkali respondents realise a very low yield and also the price realised is very less compared to other varieties sampled. The highest farm business income was found in the category of farmers growing Navara (Rs. 80380) followed by the farmers growing Gandhakasala (Rs. 47611) and Jeerakasala (Rs. 43897). Navara is a medicinal variety and Gandhakasala and Jeerakasala are aromatic rice varieties. Hence all the three speciality rice realise a higher price compared to Palakkadan Matta, Kaipad and Pokkali. The farm business income was lowest in the case of farmers growing Pokkali (Rs.21487). This could be attributed to the poor yield, labour intensive cultivation practices followed while growing traditional varieties and the unfavourable characteristics of these varieties and difficulties in reaching the GI marketing channels. Even though the average yield is high and cost of cultivation is less for Palakkadan Matta farmers, their gross income was less as they have not exploited the GI status for marketing this unique product.

Family labour income was estimated to be negative in the category of farmers growing traditional Pokkali (Rs. -28987), Jeerakasala (Rs. -5502) and Gandhakasaala (Rs. -1789). The cultivation practices from land preparation to harvest in pokkali need skilled labourers. In the case of Gandhakasala and Jeerakasala mechanisation is very much feasible. Weed infestation is also comparatively less. Hence family labour is not preffered. Family labour income was highest in respondents growing Navara (Rs. 58758) which required less labour and effort. Also it is a short duration crop and so all the operations should be timely completed. Hence family labour is employed more as scarcity of hired labour is the main problem faced by farmers presently.

The net income and Benefit Cost Ratio indicated that farming is a loss making business for respondents growing Pokkali, Jeerakasala and Gandhakasala, especially when the value of the family labour, the land value and the managerial cost were imputed and accounted in the cost. BC ratio worked out to be more than one in the sample categories of Navara (1.31), Palakkadan Matta (1.05) and Kaipad (1.02). Navara is a medicinal variety and it realises higher price and respondents surveyed had a prefixed buyer, the producer society MKFS is very active in Kaipad and they procure naturally organic GI tagged rice from farmers at a higher price. The yield realised by high yielding varieties cultivated in Kaipad was comparatively high. For Palakkadan Matta there is a regular procurement system through supplyco even though the producer society is dormant. It may be noted that the average yield realised by Palakkadan Matta was highest (4498.32 kg/ha) among the varieties surveyed

The producer's performance was assessed using DEA model. All the varieties showed low technical efficiency (<40 per cent). The technical efficiency was 0.88, 0.69, 0.57, 0.56 and 0.30 at Palakkadan Matta, Navara, Pokkali, Jeerakasala and Kaipad respectively. The least efficient producers were seen in Kaipad. The producers has to increase their output levels upto 70 per cent with their present input levels to become technically efficient. The scale efficiency results showed that all the varieties showed scale inefficiency. The nature of scale inefficiency is due to low operational scale of units

Three Kinds of marketing were prevalent in the study area. Some farmers market their produce (Paddy) through market intermediaries, some resource rich farmers cultivate and process their produce to meet the requirements of high end consumers and other resource poor farmers sell off their produce to local consumers after processing in nearby mills. The Palakkadan Matta farmers are marketing their produce to supplyco at the rate of Rs. 22.50/Kg. In the case of Navara, Gandhakasala and Jeerakasala. Some farmers are marketing their produce to high end consumers. In this channel, the marketing cost is higher than other channels owing to higher degree of specialisation and quality specification. The marketing cost accounted for 35 percent of the consumer price (Rs. 158.5/Kg) in the case of navara, 42 per cent of the consumer price in the case of Gandhakasala and 43 per cent of the consumer price in the case of jeerakasala. In this channel there were no intermediaries and the farmers were selling paddy directly to high end consumers. Hence the marketing margin was zero. The price spread and marketing cost remains

the same as there is no margin. It was found that only few farmers were able to explore the benefits of this channel as it is very difficult to locate such consumers and convince them about the quality of the produce. Even though there were no intermediaries between farmer and consumer in this channel, a higher marketing cost have caused the efficiency to be lower in this channel when compared to other channels.

The sample respondents of Navara rice were marketing their produce through four channels. The first two channels involved traders. It could be observed that channel I had the highest marketing efficiency of 7.25 as the marketing cost was comparatively low in this channel. Very few respondents are marketing their produce directly to local consumers after processing in local mills. The price realised by them is lower than other channels as the quality of the produce is not very supreme due to the lack of specialised milling facilities in the area. Of the four marketing channels identified in category Navara, this channel (Channel IV) was less efficient owing to lower market price. Eventhough there were no intermediaries between farmer and consumer in channel IV, a higher marketing cost and a lower consumer price have caused the marketing efficiency to be lower in channel IV (2.13) when compared to other channels

Three marketing channels were identified for Gandhakasala in the study area. The marketing cost in channels II is higher than channel I as the transportation charges to reach the millers as well as consumers is very high. There are no specialised mills near the farms and the producer has to mill the produce at specialised mills located distantly to maintain quality. Some respondents are marketing their produce directly to local consumers after processing in local mills. The price realised by them is lower than other channels as the quality of the produce is not very supreme due to the lack of specialised milling facilities in the area. The marketing cost was highest in this channel owing to higher wastage during milling and it accounted for 48 per cent of the consumer price. Of the three marketing channels identified in Category Gandhakasala, this channel (channel III) was less efficient as the market price is comparatively low.

The marketing channels observed for Jeerakasala was similar to that of the Gandhakasala. In channel I which included farmer, local agent and consumer, marketing cost accounted for 36.94 per cent of the consumer price and the marketing margin was was Rs. 16.67/ Kg which accounted to about 14 percent of consumer price. The price spread was about 50 per cent of the consumer price and the producer's share in consumer's rupee was about 50 per cent in this

channel. The marketing efficiency was 2.71. The price realised by farmers who are marketing their produce directly to local consumers is lower than other channels as the quality of the produce is not very supreme. The marketing cost was highest in this channel and it accounted for 49 per cent of the consumer price. Of the three marketing channels identified in Category Jeerakasala, this channel (channel III) was less efficient (2.05).

Three channels were identified for Pokkali Rice. The marketing cost is high in channel III as the producer losses 40 per cent of the produce while milling. Marketing margin was Rs.18/Kg in channel II and whereas it was Rs. 3.87/ Kg in channel I. Marketing margin is low in channel I as the miller procure the produce at a higher cost when compared to channel II. Since there are no intermediaries, the marketing margin was zero in channel III and price spread was same as the marketing cost. The price spread was about 48 percent in channel II and channel III while it was only 16.67 per cent in channel I. The producer's share in consumer's rupee was about 83 per cent in channel I and it was only about 51 per cent in channel II and 52 percent in channel III. It could be observed that channel I had the highest marketing efficiency of 9.79 while in channel II it was 6.58 and channel III it was very less (2.09).

In Kaipad tracts, most of the farmers are depending on the Malabar Kaipad Farmers Society (MKFS) to market their produce. In both channel I and II, the main marketing intermediary was MKFS. It is evident that the marketing cost, margin, Price spread ad efficiency was almost same in both the channels. The farmer is processing and marketing Kaipad rice to the society. The only cost incurred by the society is for packing. In channel II the retailor has a transportation cost and hence the marketing cost is slightly higher in channel II than channel I. The price spread was about 48 per cent of the consumer price in both the channel. Hence, the producer's share in consumer's rupee was about 52 per cent. The efficiency of these channels comes to around 3.6.Even though the MKFS is offering a higher price, some farmers opt direct selling. The reasons may vary from lower production, distance to the society, age old consumer relationship (friends, relatives and neighbours). In the case of direct selling to local consumers, the price realised by farmers is lower than other channels. Of the three marketing channels identified in Category Kaipad, channel III was less efficient owing lower marketing price.

The proposed IAD framework was used to explore the bottlenecks of the innovation. Efforts were also made for studying the institutional innovations strategies for enhancing profitability and effectiveness of the GI mechanism, to propose viable supply chain options and to examine the export prospects and market access of the registered GI rice. The main actors involved in the innovation included IPR office, Chennai, Union Commerce Ministry, IPR cell, KAU, producer societies of various rice GIs and producers of GIs. The main actor involved in GI registration is producer society and these societies have become dormant in all cases except Kaipad after registration. If we are looking from the conservation point of view, the objective of GI registration is achieved and the GIs Palakkadan Matta, Navara, Jeerakasala, Gandhakasala Pokkali and Kaipad is being conserved from extinction. But, as the marketing societies is not very particular about increasing the production or producer welfare no effects in this regard is achieved in the case of Palakkadan Matta, Navara, Jeerakasala, Gandhakasala, and Pokkali. When the societies becomes active and involve in problems faced by farmers, the trust between the society and the producers improve and the farmers actively participate in the meetings and activities associated with the society. This link is lacking in between the GI societies and users. The society members have not initiated any collective action in any of the GIs except for Kaipad.

In Kaipad MKFS is very active and collective actions is being initiated by the society. Group farming is being promoted and the society is collecting and marketing rice from the producers at a premium price. As the members of the society are marketing collectively through society they have achieved the goal of realizing higher price of the produce through increased bargaining power. The society even owns a selling point sponsored by NABARD and they are showcasing their products in this selling point. In the case of Matta, which is a registered as a GI is not marketed or promoted as a GI. The farmers are not aware of the GI status and the society. They are cultivating it inorganically and marketing through public procurement system. In the case of Pokkali farmer received a better price in the last season as the overall production was very low due to climatic problems and doubts. The farmers opined that if the season is good, they receive very less price for their produce as there is limited demand in the area for the product. In the case of Jeerakasala and Gandhakasala farmers from outside the district are practicing leased land farming in Wayanad to exploit the GI status of the crop. So there is enough demand for the crop. The main issue is the aromatic rice coming from other states and

districts are absorbing this demand. The society should promote the GI rice by highlighting the difference between Wayanadan aromatic rice and aromatic rice cultivated elsewhere. Navara is a medicinal rice and its main consumers are arya Vaidya salas and ayurvedic doctors. So the society can actively negotiate with the ayurvedic entities across the state and country highlighting the specialities of Navara GI. Thus a permanent demand can be created for all the Navara cultivated in the state.

The average prices of all GIs has increased post GI registration, but the question is whether it is sufficient to sustain the farming of these speciality rice is very significant. The cost of production is very high in all the GIs as organic method of production is adopted and also. In the case of Pokkali and Kaipad the production practices itself is risky and strenuous and need skilled labourers. Increased labour cost eventually escalates the cost of cultivation. These products reach the end consumers at a very high price, but these benefits are not reaching the producer.

Post GI follow up is very less in Kerala. There should be an apex body to monitor the activity of the registered producer societies. This apex body should be constituted at government level including representatives from the ministry, Department of agriculture, local self-government, producer society, traders and consumers to monitor the activity of producer societies and to initiate the protection, promotion and marketing of GIs. The production process of GI products should be monitored strictly so that there is no compromise on quality of products. For this an inspection body should be constituted under KAU or Department of Agriculture. Participatory Guarantee Scheme (PGS) can also be adopted for this purpose. IPR cell in the state should be strengthened in such a way that they can conduct awareness programmes, fairs annually to promote marketing of GI products. Even products which are not popular in export destinations can be popularized through combined interventions of producer societies and IPR cell, KAU. The most viable supply chain for GI product is through producer societies. The producer society can collect paddy from small scale producers, mill them in specialized mill so that uniform quality of the produce is maintained and further market through the societies. This way bargaining power can also be increased which in turn result in higher price realization.

Policy suggestions

- As labour cost and labour scarcity are the major constraints in rice cultivation, measures should be taken to improve timely availability of labour through development of labour banks, green army etc. Efforts need to be made for reducing cost of cultivation. Promoting mechanisation in Kaipad and Pokkali can help.

- More incentives need to be provided for organic farming and Speciality rice cultivation to convince and attract farmers towards these farming systems. Government can adopt measures like declaring separate MSP, credit policy and insurance schemes for serving the purpose.

- Government should take steps to procure GI rice separately from farmers through civil supplies corporation (supplyco),

- A separate database should be maintained at the government level including details about the area production and productivity of speciality rice. Thus the problem of inadequate data can be solved.

- The group-farming method of cultivation is an option to bring more area under production. JLG groups can be trained and motivated to take up cultivation in fallow lands. Stringent regulations should be implemented to avoid fallowing of land. Strict actions should be taken against the violators of government's conservation acts. Thus the problem of lack of continuous supply to meet export orders can also be solved.

- Quality of production should be maintained as per specifications specified in GI applications. . For this an inspection body should be constituted under KAU or Department of Agriculture. Participatory Guarantee Scheme (PGS) can also be adopted for this purpose. Thus efficiency in production can also be improved

- Field demonstrations and experience sharing of successful farmers can attract young innovative farmers to production of GI goods. Awareness programmes to promote the use GI products by highlighting the quality parameters can attract more consumers towards GI products. Selling points specifically to showcase GI products are to be installed in all districts for popularising GI products.

- GI provides a brand identity to the product and opens a new avenue for farmers including possibility of exporting their produce. The 'Malabar Kaipad Farmers' Society' (MKFS) have taken initiatives to market Kaipad rice as a brand and also to obtain organic certification for their produce. Likewise other producer societies should take charge to procure the produce and market it as a brand. Government should take pertinent efforts to promote and advertise the GI products in the domestic or international market and should support GI producers in their marketing endeavours by providing incentives, guidance and assistance.

- Market prospects of GI can be broadened by promoting Farm tourism and e-marketing.

- By completing the user registration and registering all the registered users under a e-platform, we can improve the traceability of GI which in turn improve the quality of production of GIs.

- Lack of facilities for value addition is an important problem in the case of GI rice. There is ample scope for enhancing the income of farmers through value addition by diversifying the products. Processing units and storage facilities should be established near the production sites.

- Demand structure, prevailing prices and aspired markets of the concerned GI product should be specified in the GI registration format so that meaningful comparisons can be made in future to analyse the impact of GI

- An effective institutional arrangement to control production, marketing and promotion of GI rice should be mooted up. Involvement of IPR cell KAU, Agricultural department, Local Governments and NGOs may help in the effective control of Producer societies.

- A legal cell should be instituted under the IPR cell to take actions against fraudulent representation of GI goods. Producer societies should report such cases of false representations to the legal cell.

- IPR cell should be evolved into a research hub and resource centre. IPR cell should conduct pre and post GI studies to highlight the benefit of GI registration. Post GI follow up should be taken as an area of interest under the IPR cell. The cell should conduct awareness programmes and fairs annually to promote marketing of GI products.

References

REFERENCES.

Acharya, S.S. and Agarwal, N.L. 1986. *Agricultural Marketing in India*. Oxford & IBH Publishing Co, New Delhi, India, 572 p.

Addor, F. and Grazioli, A. 2002. Geographical indications beyond wines and spirits: a roadmap for a better protection for geographical indications in the WTO TRIPs Agreement. *J. Wld Intellectual Property.* 5:865-97.

Anderson, K. 2006. Understanding decentralized forest governance an application of the institutional analysis and development framework. *Sustain. Sci. Practice Policy,* 2(1):25-35.

Anson, C.J. 2012. Marketing flexibilities in Geographical Indications and trademark: a comparative study. *Int. Jn. Mkt. Financial Serv. Mgmt. Res.* 1(11):100-106.

Anson, C.J. and Pavithran, K.B. 2014. Pokkali rice production under Geographical Indication protection: the attitude of farmers. *J. Intellectual Property Rights*. 19:49-53.

Arpke, Hannah; Mannherz, Claudia. 2013. *Marketing Gandhakasala: Local varieties for livelihood options.* [on line] Available: https://www.umwelt.uni-hannover.de/fileadmin/institut/pdf/BioDIVA-BriefingNote3-2013.pdf [7 Dec. 2018]

Barjolle, D. and Sylvander, B. 2000. *PDO and PGI products: Market, supply chains and institutions*. [on line] Available: http://www.origin-food.org/pdf/pdo-pgi.pdf [10 May.2018]

Barjolle, D., Paus, M. and Perret, A. 2009. Impact of geographical indications: A review of methods and empirical evidences. In. Contributed paper prepared for presentation at the IAAE Conference, 16 – 22 August, 2009, Beijing, China, pp 1-114

Beletti, G. 1999. Origin labelled products, reputation and heterogeneity of firms. In: The socio-economics of origin labelled products in agro-food supply chains: spatial, institutional and co-ordination aspects. (In:). Sylvander, B., Barjolle, D. And Arfini, F. (Ed.). *The socio-economics of origin labelled products in agro-food supply chains: spatial, institutional and co-ordination aspects*.Series Actes et Communications, 17. INRA, Paris, pp.1-23.

Benavente, D. 2010. *Geographical Indications:The Economics of Claw-Back.* [on line] Available: https://ideas.repec.org/p/gii/giihei /heidwp11-2010.html [07 Dec. 2018]

Boubacar, O., Muhammad, Z.H., Rana, A. and Ghazanfar, S. 2016. Analysis on Technical Efficiency of Rice Farms and its Influencing Factors in South-western of Niger. *J. Northeast Agricu. Univ.* 23(4):67-77

Bowen, S. and Zapata, A.V. 2009. Geographical Indications, terroir, and socio economic and ecological sustainability: the case of Tequila. *J. Rural Stud.* 25:108-119.

Bowen, S. 2010. Development from within? The potential for Geographical Indications in global south. *J. Wld. Intellectual Property.* 13(2):231-252.

Bramely, C. and Kirsten, J.F. 2007. Exploring the economics rationale for protecting Geographical Indicators in Agriculture. *Agrekon.* 46(1):69-93.

Bramely, C.,Bienabe, E and Kirsten, J. 2007. *The economics of Geographical Indications: towards a conceptual framework for Geographical Indication research in developing countries. Contributed paper for the international round table on the economics of intellectual property rights,* WIPO publication no. 1012 (E), Geneva, 230p

Bramley, C., Bienabe, and Kirsten J.2009. The economics of geographical indications: towards a conceptual framework for Geographical Indication research in developing countries. (In:) World Intellectual Property

Organization (WIPO) (Ed.) *The Economics of Intellectual Propriety,* 1(1):1–216.

Bramley, C. 2011. A review of the socio-economic impact of geographical indications : considerations for the developing world. *WIPO Worldwide Symposium on Geographical Indications 22–24* June *2011, Lima,Peru.*, 1–22.

Broude, T. 2005. Taking "Trade and Culture" Seriously: Geographical Indications and Cultural Prote. *bepress Legal Series. bepress Legal Series.*Working Paper 649.43p

Carter, C., Krissoff, B and Zwane, A.P. 2006. Can country-of –origin labeling succeed as a marketing tool for produce? Lessons from three case studies. *Can. J. Agric. Econ.* 54: 513-530.

Cattaneo, M. D. 2010. Efficient semi parametric estimation of multi-valued treatment effects under ignorability. *J. Econometrics* 155:138–154.

Cattaneo, M. D., Drukker, D. M. and Holland. A. D. 2013. Estimation of multivalued treatment effects under conditional independence. *Stata J.* 13:407–450.

Chattopadhyay, A. n.d. *Working on Geographical Indications Act: A Case Study on Darjeeling Tea.* [on line]. Available at SSRN: https://ssrn.com/abstract=2123048 [03 Mar. 2016]

Coelli, T., Prasada Rao, D.S. and Battese, G.W. 1998. *An introduction to efficiency and productivity analysis* [on line]. Available: https://doi.org/10.1007/978-1-4615-5493-6. [03 Apr. 2018]

Cole, D.H., Epstein, G., McGinnis, M.D. 2014 *Toward a New Institutional Analysis of Social-Ecological Systems (NIASES): combining Elinor Ostrom's IAD and SES frameworks.* [on line] Available. http://ssrn.com/abstract=2490999. [07 Dec. 2018]

Crespi., John M. and Marette, S. 2002. Generic Advertising and Product Differentiation. *Am. J. Agric. Econ.* 84(3): 691-701.

CSO [Central Statistical Organisation]. 2008. *Manual on cost of cultivation surveys. Ministry of statistics and programme implementation* [on line] http://mospi.nic.in/publication/manual-cost-cultivation-surveys-0 [8 Jun 2018].

Das, A. 2008. *Geographical indications: UNCTAD's initiative in India, In: UNDP RCC, UNDP Cambodia and Economic Institute of Cambodia, Phnom Penh, September 4.* [on line] Available: http://hdru.aprc. undp. org/ext/regional_workshop_ 2008/pdf/Das [22 Octo. 2018]

Das, K. 2008. Select issues and debate around Geographical Indications with particular reference to India. *J.of Wld. Trade.* 42(3):461-507.

Das, K. 2009. *Socioeconomic Implications of Protecting Geographical Indications in India* [on line]. Available :http://wtocentre.iift.ac.in/Papers /GI_Paper_CWS_August% 2009_Revised.pdf. [02 Oct. 2014].

Devi, L.G., Saritha, R.K., Ranjitha, K., Solanki, R.K., Thangaswami, A and Alone, R.A. 2007. *Geographica Indications mapping: Palakkad Matta rice.* [on line]. Available: http://eprints.naarm.org.in/67/1/F-81_Palakkad.pdf [10 May 2018]

Dhar, T. and Foltz, J. D. 2005. Milk by any other name Consumer benefits from labeled milk. *Am. J. Agric. Econ.* 87:214-28.

Dhungana, B. R., Nuthall, P. L. and Nartea, G.V. 2004. Measuring the economic inefficiency of Nepalese rice farms using data envelopment analysis. *Aust. J. Agric. Resour. Econ.* 48(2):347–369.

Echols, M.A. 2008. *Geographical Indications for Food products: International Legal and Regulatory Perspectives*. Wolters Kulwer Law International, The Netherlands, 315p.

ETEPS 2006. *Economics of food quality , assurance and certification schemes managed within an integrated supply chain.* Final report. European Commission, Brussels.

FAOSTAT [Food and Agricultural Orgaization STAT]. 2019. FAOSTAT home page [on line] Available: http://www.fao.org/faostat/en/#data/QC [10 July 2018].

Faria, S.M. 2010. Producer's perspective towards Geographical Indications recognition process in Brazil- an analysis of difficulties found in the process and possible improvements. M.A thesis, Centre for International Studies of Ohio University, USA, 160p.

Gallagher, P. 2003. *Geographical Indicators and International Trade-Industry Perspectives.*[on line] Available: http://www. wipo. int/ edocs /mdocs/geoind/en/wipo_geo_sfo_03 /wipo_geo_ sfo _03_17-main1.pdf [22 Octo. 2018]

George, P.S., Bastian, D., Radhakrishan, N.V. and Aipe, K.C. 2005. Evaluation of aromatic rice varieties in Wayanad, Kerala. *J. Trop. Agric.* 43(1-2):67-69.

GIR [Geographical Indications Registry]. 2018. GIR home page [on-line]. Available: http:// ipindia.nic.in/girindia [03 July 2018].

GoI [Government of India]. 1999. The Geographical Indications of Goods (Registration & Protection) Act, 1999. Available: http://www.ipindia. nic.in/act-1999.htm [4 October 2017].

GoK [Government of Kerala]. 1986. Statistics for Planning. Department of Economics and Statistics, Thiruvananthapuram. 35p.

GoK [Government of Kerala]. 1987. Economic Review 1987. [on-line] Available: http://spb.kerala.gov .in/pdf/er1987/chapter02.pdf [03 July 2018].

GoK [Government of Kerala]. 2017. Agricultural statistics at a glance 2017. [on-line]. Available: http://agricoop.nic.in/recentinitiatives/pocket-book-agricultural-statistics-2017 [03 July 2018].

GoK [Government of Kerala]. 2017. *Economic Review 2017* [on-line]. Available:http:// http://spb.kerala.gov.in/ER2017/web_e/index.php [5 Oct. 2018].

Gopalakrishnan, N.S., Nair, P.S. and Babu, A.K. 2007. *Exploring the relationship between geographical indications and traditional knowledge: An analysis of the legal tools for the protection of geographical indications in Asia*. ICTSD Working Paper,. Grossman GM , pp.1-65.

Grant, C. 2005. *Geographical Indications: Implications for Africa*. [on line] Available: https://www.givengain.com/unique/ tralac/pdf/20051108 _TB6_2005_ Geographical _Indications.pdf [12 Dec. 2018].

Grote, U. 2009. Environmental labelling, protected geographical indications and the interest of developing countries. *Int. Law Trade Policy* 10(1): 94–110.

Hayes, D.J., Lence, S.H and Stoppa, A. 2002. A new brand for Agriculture? Farmer owned brands reward innovation. Centre for agricultural and rural development. Iowa State Uniersity. Briefing paper. 8(4):1-4.

Henseleit, M., Kubitzki, S., and Teuber, R. 2007. *Determinants of Consumer Preferences for Regional Food.* [on line] Available: http://ageconsearch. umn.edu/bitstream/ 7871/1/cp070004.pdf. [27 Mar. 2917]

Herrmann, R. 2007. *Comments on the economics of Geographical Indications: towards a conceptual framework for Geographical Indication research in developing countries.* Contributed paper for the international round table on the economics of intellectual property rights, WIPO publication no. 1012 (E), Janeva, 230p.

Hota, S.K., Pradhan, K.K. 2012. An Economic Analysis of Technical Efficiency in Rice Production: Data Envelopment Analysis Approach'. *Int. J. Advanced Res. Sci. Technol.* 1(2):109-119.

ICAR. [Indian Council of Agricultural Research] 2006. *ICAR Guidelines for Intellectual Property Management and Technology Transfer/ Commercialization.* Indian Council of Agricultural Research, New Delhi, 134p.

Imperial, M. 1999. Institutional Analysis and Ecosystem-Based Management: The Institutional Analysis and Development Framework. *Environ. Mgmt 24*(4): 449–465.

ITC . 2009. *Guide to Geographical Indications.* (In:) Giovannucci, D., Josling, T., Kerr, W., O'Connor, B and Yeung, M.T (Ed.). International Trade Organizations, Palais des Nations,1211 Geneva 10, Switzerland

Ittersum, V.K., Meulenberg, M.T.G., Trijp, H.C.M.V. and Candel, M. J. J. M 2007. Consumers' Appreciation of Regional Certification Labels: A Pan European Study. *J. Agric. Econ.* 58(1): 1-23.

Jain, S. 2009. Effects of the extension of Geographical Indications: a South Asian perspective. *Asia Paci. Dev. Jn.* 16(2):65-86.

Jayakumar, V. 2003. Economics of commercial production and utilization of medicinal rice (*Oryza sativa. L.)* Njavara. M.Sc (Ag) thesis, Kerala Agricultural University, Thrissur, 61p.

Jena, P.R and Grote, U. 2010. *Does Geographical Indication (GI) increase produce producer welfare? A case study of Basmati rice in Northern India.* [on line. Available: https://www.researchgate.net/publications/ 228453155. [20 Octo. 2018]

Jena, P.R. and Grote, U. 2010. Changing institutions to protect regional heritage: a case for Geographical Indications in the Indian food sector. *Dev.Policy Rev.*28 (2):217-236.

Jena, P. R. and Grote, U. 2012. Impact evaluation of traditional basmati rice cultivation in uttarakhand state of northern india: what implications does it hold for geographical indications? *Wld. Dev.* 40(9):1895–1907.

Jena, P.R., Ngokkuen, C., Rahut, D.B. and Grote, U. 2015. Geographical Indication protection and rural livelihoods: insights from India and Thailand. *Asian-Paci. Econ. Literature.* 29(1):174-185.

Joshua, H. 2012. Njavara, a medicinal rice: an exploration of the changing production and consumption system. Master thesis, Department of Plant and Environmental Sciences. Norwegian University of Life sciences. Norway.30p

Josling, T. 2006. The war on terroir: Geographical Indications as a Transatlantic trade conflict. *J. Agric. Econ.* 57(3):337-563.

Kerr, W.A. 2006. Enjoying a good port with a clear conscience: geographic indicators, rent seeking and development. *J. Int. Law Trade Policy*; Saskatoon. 7(1):1-14.

Khandker, R. S., Koolwal, B. G. and Samad, H, A. 2010. *Handbook on Impact Evaluation :Quantitative Methods and Practices.* The International Bank for Reconstruction and Development / The World Bank. Washington DC, 262p.

Kocchar, S. 2008. Institutions and capacity building for the evolution of intellectual property rights regime in india: iv– identification and disclosure of ip products for their ipr protection in plants and animals. *J. Intellectual Property Rights* 13(4):336-343.

Kolady, D.E. and Lesser, W. 2008. *The Economic Effects of Geographical Indications on Developing Country Producers.* [on line] Available: https://www.researchgate.net/publication/289415237_Economic_effects_of_geographical_indications_on_developing_countries_A_review_and_identification_ of_res earch_needs [02 oct. 2014].

Krishna, V.V., Suryaprakash, S. and Sethulakshmi, K.R. 2006. *On conserving the indigenous-organic rice farming system of coastal Kerala, India.* [on line] Available: http://www.tropentag.de/2006/abstracts/links/KrishnalmZ56NvQ.pdf [22 Octo. 2018].

Larson, J. 2007. *The relevance of geographical indications and designations of origin for the sustainable use of genetic resources*. [on lineAvailable: http://underutilized-species.org/Documents/PUBLICATIONS/gi_larson_lr.pdf [02 Dec 2014].

Lence, S. H., Marette, S., Hayes, D. J., and Foster, W. 2007. Collective marketing arrangements for geographically differentiated agricultural products: Welfare impacts and policy implications. *Am. J. Agric. Econ. 89*(4): 947–963.

Lucatelli S., 2000, *Appellations of origin and Geographical Indications in OECD members countries: economic and legal implications,* OECD,COM/AGR/APM/TD/WP(2000) 15, Paris, 73p.

Lukyx, D.M.M and Ruth, S.M.V. 2007. An overview of analytical methods for determining the geographical origin of food products. *Food Chem.* 107(2): 897-911.

Lusk, J.L., Brown, J., Mark, T., Proseku, I., Thompson, R and Welsh, J. 2006. Consumer Behavior, Public Policy, and Country-of-Origin. Labeling. *Rev. Agric. Econ.* 28(2): 284-292.

McFadden, D. 1973. *Conditional logit analysis of qualitative choice behavior*. In: Zarembka, P. (Ed.). Frontiers in Econometrics. Academic Press, New York, pp.106-145.

Menapace, L. and Moschini, G.C 2010. Quality Certification by Geographical Indications, Trademarks and Firm Reputation. *European Rev. Agric. Econ.*, 39(4):539–566,.

Mochini, G., Menepace, L and Pick, D. 2008. Geographical indications and the provision of quality in agricultural markets. *Am. J. Agric. Eocn.* 90(3):794-812.

Murphy, K.M. 2004. Conflict, Confusion, And Bias Under TRIPS Articles 22-24. *Am. Univ. Int. Law Rev.* 19(5):1181-1230.

Nair, C.M., Salin, K.R., Pillai, D. and Manoj, C.K. 2010. Simultaneous rice –fish culture system in modified Pokkali rice fields- a possible alternative to improve sustainability. (In:) B. Meenakumari, M.R. Boopendranath, Leela Edwin, T.V. Sankar, Nikita Gopal & George Ninan (Ed.). *Coastal Fishery Resources of India-Conservation and Sustainable utilisation, Society of Fisheries Technologists (India)*, Central Institute of Fisheries Technology, Kochi, India, pp59-66

Nair, C.M., Salin, K.R., Joseph, J., Aneesh, B., Geethalakshmi, V. and New, M.B. 2013. Organic rice-prawn farming yields 20 % higher revenues. *Agron. Sustain. Dev.* 34 (3): 569-581.

Nandan, N., Barpujari, I. and Srivastava, N. 2013. *The protection of Geographical Indications India: issues and challenges.* [onine] Available: http://yucita.org/uploads/yayinlar/diger/makale/8The_Protection_of_Geographical_ Indications_ india.pdf [12 Dec. 2018].

Nandeesha, M.C., Halwart, M., Gómez, G.R., Alvarez, C.A., Atanda, T., Bhujel, R., Bosma, R., Giri, N.A. Hahn, C.M., Little, D., Luna, P., Márquez, G., Ramakrishna, R., Reantaso, M., Umesh, N.R., Villareal, H., Wilson, M. & Yuan, D. 2012. Supporting farmer innovations, recognizing indigenous knowledge and disseminating success stories, In: R.P. Subasinghe, J.R. Arthur, D.M. Bartley, S.S. De Silva, M. Halwart, N. Hishamunda, C.V. Mohan & P. Sorgeloos, (eds). Farming the Waters for People and Food. Proceedings of the Global Conference on Aquaculture 2010, Phuket, Thailand. 22–25 September 2010. FAO, Rome and NACA, Bangkok, pp. 823–875.

Nigussie, Z., Tsunekawa, A., Haregeweyn, N., Adgo, E., Cochrane, L., Floquet, A. and Abele, S. 2018. Applying Ostrom's institutional analysis and development framework to soil and water conservation activities in north-western Ethiopia. *Ld. Use Policy.* 71:1-10.

Nyaga, A. 2004. *The geographical indication protection Africa perspective. In: WTO Round Table on Geographic Indications* [on line]. Available: http://www.wto.org [22 Octo. 2018]

OECD.2005. *Effects of eco-labelling schemes: compilation of recent studies*. [on line] Available: http://www.oecd.org/officialdocuments/displaydocumentpdf?cote=com/env/td(2004)3 4/final&doclanguage=en. [28 April 2016].

Ostrom, E. 2005. *Understanding Institutional Diversity*. Princeton Univ. Press, New Jersey, 375p

Ostrom, E and Basurto, X. 2009. *The Evolution of Institutions: Toward a New Methodology* [on line] Available :SSRN: https://ssrn.com/abstract=1934360 [12 Jan. 2019]

Ostrom, E. 2009. A General Framework for Analyzing Sustainability of Social-Ecological Systems. *Science.* 325:419-422.

Ostrom, E. 2011. Background on the Institutional Analysis and Development Framework. *Policy. Stud. J.* 39(1):1-27.

Pacciani, A., Beletti, G., Marescotti, A. and Scaramuzzi, S. 2001. The role of typical products in fostering rural development and the effects of regulation (EEC) 2081/92. In: 73rd Seminar of the European Association of Agricultural Economists, Ancona, 28-30 June 2001, 17p

Parichatnon, S., Maichum, K. and Peng, K. 2017. Evaluating technical efficiency of rice production by using a modified three stage Data Envelopment Analysis approach: a case study in Thailand. *Int. J. Scient. Technol. Res.* 6(1):152-159.

Pradhan, A.K. 2018. Measuring Technical Efficiency in Rice Productivity Using Data Envelopment Analysis A Study of Odisha. *Int. J. Rural Mgmt.* 14(1):1-21.

Radhika, A.M. 2014. Economic analysis of production and marketing of Kaipad paddy in Kannur District. M.Sc (Ag) thesis, Kerala Agricultural University, Thrissur, 130p

Rangnekar, D. 2003. *The socio economics of Geographical Indications : a review of empirical evidence from Europe.* [on line]. Available : https://unctad.org/en/PublicationsLibrary/ictsd2004ipd8_en. pdf [12 Jan. 2018]

Rangnekar, D. 2004. The Socio-Economics of Geographical Indications The Socio-Economics of Geographical Indications. [on line] *Wipo*, (8). Available https://doi.org/ISSN 1681-8954 [17 Nov. 2018]

Ravindran,S and Mathew, A.2008. *The Protection of Geographical Indication in India – Case Study on 'Darjeeling Tea'.* [on line]. Available: https://www.altacit.com/wp-content/ uploads /2015/03/The-Protection-of-Geographical-Indication-in-India-Case-Study-on-Darjeeling-Tea.pdf

Reviron, S. and Paus, M. 2006. *Special report: Impact analysis methods. WP2 Social and Economic Issues.* [on line] SINER-GI project. Sixth framework program. European Comission , Available: https://ec.europa.eu/research /fp6/pdf/fp6-in-brief_en.pdf [07 Jun. 2018]

Roe, B. and Sheldon, I. 2007. Credence good labeling: The efficiency and distributional implications of several policy approaches. *Am. J. Agric. Econ.* 89(4):1020-33.

Roest, K.D. and Menghi. A. 2002. Reconsidering 'Traditional' Food: The Case of Parmigiano Reggiano Cheese. *Sociologia Ruralis* 40(4):439 – 451. ·

Rose, N.C.D. 2011. Impact of Geographical Indication on Palakkadan Matta rice farmers in Kerala-an economic analysis. M.Sc (Ag.)thesis. University of Agricultural sciences, GKVK, Bangalore, 155p.

Rose, N. and Umesh, K.B. 2012. *Expectations towards Geographical Indications-Empirical Evidence from India* [on line]. Available: https://pdfs. semanticscholar.org/7c28/b6b3c19884280f65f98110b3f979207b9db3.pdf [22 Octo. 2018].

Sathiadas, R., Panickar, K.K.P., Satyavan, U.K. and Jacob,T. 1989. Economic evaluation ofpaddy prawn integrated farming in Kerala. *Seafood Export J.* 21(2): 9-22.

Seenath, P.K. 2013. Impact of Mahatma Gandhi national rural employment guarantee scheme (MGNREGS) on agricultural labour market. M.Sc (Ag) thesis, Kerala Agricultural University, Thrissur, 129p

Shamna, N. 2014. A study on farmers perceptions on prospects and problems of Pokkali rie farming in the state of Kerala. M.Sc (Ag) thesis,Professor Jayshankar Telengana State Agricultural University, Hyderabad, 141p

Shylaraj, K.S., Sasidharan, N.K., Sreekumaran, V. 2006. VTL 6: A semi-tall, non-lodging, and high yielding rice (Oryza sativa L.) variety for the coastal saline zones of Kerala. J. Tropic Agric. 44(1-2):48-51.

Sierra, R., (2007), *European Union Policy for High Quality Agricultural Products*. [on line]. Available: http://www.wipo. int /meetings/ en/doc_details. jsp?doc_id=81757 [12 Jan. 2018]

Suh, J. and MacPherson, A. 2007. The impact of Geographical Indication on the revotalisation of a regional economy: a case study of 'Boseong' green tea. *Area,* 39(4):518-527.

Teklewold, H., Kassie, M. B. and Shiferaw, B. B., and Kohlin, G. A. 2013. Cropping system diversification, conservation tillage and modern seed

adoption in Ethiopia: Impacts on household income, agrochemical use and demand for labor. *Ecological Econ.* 93:85-93.

Teklewold, H., Kassie, M., Shiferaw, B. and Köhlin, G. 2013. Cropping system diversification, conservation tillage and modern seed adoption in Ethiopia: Impacts on household income, agrochemical use and demand for labor. *Ecological Econ.* 93: 85-93.

TERI. 2013. *The Protection of Geographical Indications in India: Issues and Challenges*. [on line]. Available:http://yucita.org/uploads/yayinlar/diger/makale/8The_Protection_of_Geographical _Indications_india.pdf [17 Nov. 2018]

Teuber, R. 2010. Geographical indications of origin as a tool of product differentiation: The case of coffee. *J. Int. Fd. Agribusiness Mkt. 22*(3): 277–298.

Teuber, R. 2011. Consumers' and producers' expectations towards geographical indications: Empirical evidence for a German case study. *Br. Food Jn. 113*(7): 900–918.

Teuber, R. 2011. *Protecting Geographical Indications : Lessons learned from the Economic Literature.* [on line]. Available:http://www.researchgate.net/profile/Ramona_Teuber/publication241750986_Protecting_Geographical_Indications_Lessons_learned_from_the_Economic_Literature/links/00b7d533921089f9ff000000.pdf [18 Nov. 2018].

Teuber, R. and Anders, S. 2011. *The Economics of Geographical Indications : Welfare Implications.* [on line]. Availeble:http://ageconsearch.umn.edu/bitstream/103262/2/Lit-Overview_GI_ Paper _04_2011.pdf [17 Dec. 2018].

Tregear, A., Arfini, F., Belletti, G., and Marescotti, A. 2007. Regional foods and rural development: The role of product qualification. *J. Rural Stud.* 23(1):12–22.

Vanaja, T. 2013. Kaipad –a Unique, Naturally Organic, Saline Prone Rice Ecosystem of Kerala, India. *Am. J. Environ. Prot.* 2(2): 42-46.

Winfree, J.A., McCluskey, J.J., 2003. Collective reputation and quality. *Am. J. Agric. Econ.* 87(1):206-13.

Witting, A. and Wegner, D. 2016. Looking beyond the plan and understading the process: lessons from Rea Vaya. *African Politics Policy*. 2(1):1-16.

Wooldridge, J. M. 2007. Inverse probability weighted estimation for general missing data problems. *J. Econometrics*. 141(2):1281-1301.

Wooldridge, J. M. 2010. *Econometric Analysis of Cross Section and Panel Data* (2nd Ed). Cambridge, MA: MIT Press,741p

WTO.[Wprld Trade Organization] 2004. *Promoting Agricultural Competitiveness through Local Know-How.* [on line]. Available: http://agritrop.cirad.fr/525301/ [22 Octo. 2018].

Xiao, J. 2011. An analysis on technical efficiency of paddy production in China. *Asian Social Sci.* 7 (6):170-176.

Yeung, M.T. and W.A. Kerr 2008. *Increasing Protection of GIs at the WTO: Clawbacks, Greenfields and Monopoly Rents* [on line]. University of Guelph, Canadian Agricultural Trade Policy Research Network, http://www.uoguelph.ca n/~catprn/PDF /Working_Paper_2008-02_Kerr.pdf. [12 Dec. 2018]

Zhao, X., Finlay, D and Kneafsey, M. 2014. The effectiveness of contemporary Geographical Indications (GIs) schemes in enhancing the quality of Chinese agrifoods-experiences from the field. *J. Rural Stud.* 36:77-86.

Appendices

KERALA AGRICULTURAL UNIVERSITY
COLLEGE OF HORTICULTURE
KAU (P.O)
Vellanikara, Thrissur
Department of Agricultural economics
Implications of Geographical Indications for rice in Kerala

Survey-questionnaire

District: Block:
Panchayat:

I Socio economic profile of farmers:

1. Name of the farmer:

2. Age:

3. Gender:

4. Address:

5. Phone no:

6. Educational qualification:

class	Illiterate	Upto 9th	SSLC	HSC	Graduate	Diploma	Post graduate	others
code	1	2	3	4	5	6	7	8

7. Experience in farming (years):

8. Annual income:

Income	< 25000	25000-50000	50000-75000	75000-100000	100000-200000	>200000
Code	1	2	3	4	5	6

II. Family details:

	Male	Female
No. of family members		

2. Total family Income

Income	< 25000	25000-50000	50000-75000	75000-100000	100000-200000	>200000
Code	1	2	3	4	5	6

III. Land details:

Value of Land/ha:

	Area (ha)	
Owned		
Leased in		If leased in Rental value of land:
Total		

IV. Crop particulars:

Season	Crop	Variety	Area (ha)
Season I			
Season II			
Season III			

V. Farming Details:

Cost of cultivation:

Wage rate (Rs. /day)	Male	
	Female	

Seed cost:

Source of seeds	Own ☐	purchased ☐
Qty of seeds (Kg)		
Price of seeds (Rs./Kg)		

Seed treatment cost

Sl.No	Type	Material cost	No of labour				Total cost
			Hired		Family		
			Male	Female	Male	Female	

Nursery:

Sl.No	Material cost	No of labour				Machinery cost	Total cost
		Hired		Family			
		Male	Female	Male	Female		

Land preparation:

Sl.No	Material cost	No of labour				Machinery cost	Total cost
		Hired		Family			
		Male	Female	Male	Female		

Irrigation investments

Sl.No	Type	Cost if any

Planting

Sl.No	Material cost	No of labour				Machinery cost	Total cost
		Hired		Family			
		Male	Female	Male	Female		

Intercultural operation

Sl.No	Type of work	Times of replication	No of labours				Total cost
			Hired		Family		
			Male	Female	Male	Female	
weeding							
Others (if any)							

Manure

Sl. No	Type	Times of replication	qty	Cost/Kg	No of labour				Transportation cost	Total cost
					Hired		Family			
					Male	Female	Male	Female		

Chemical Fertilizers

Sl. No	Type	Times of replication	qty	Cost/Kg	No of labour				Transportation cost	Total cost
					Hired		Family			
					Male	Female	Male	Female		

Plant protection chemicals

Sl. No	Type	Times of replication	qty	Cost/Kg	No of labour				Transportation cost	Total cost
					Hired		Family			
					Male	Female	Male	Female		

Harvesting and threshing

Wage rate for harvesting:

quantity		No of labour				Machine hiring cost (if machine harvested)
grain	straw	Hired		Family		
		Male	Female	Male	Female	

VI. Marketing of paddy:

	Total production	Retained for own consumption	Quantity sold
Grain			
straw			

1. To whom do you sell your produce?
2. Contact details of the market intermediary:

season	Marketed qty	Storage cost	Processing cost	Marketed to	Transport charges	Price/kg

VII. Details of non crop activities

Sl No	Activities	Area/No	Annual maintenance expenses	Gross returns
1	Shrimp farming			
2	Livestock activities			
3	Poultry			
4	Self employment			
5	Others			

VIII. Constraints in Production and Marketing

Ranking of production constraints:

Sl no	Problem	Occurrence of problem (yes / no)	Rank
1	Presence of problem soil		
2	Low quality of irrigation water		
3	Inadequate supply of quality seeds		
4	Imbalance in use of fertilizers		
5	Excessive weed growth		
6	Occurance of pests		
7	Outbreak of diseases		
8	Excessive lodging		
9	Non availability of suitable variety		
10	Lack of technical knowledge		

Others constraints if any

Sl.No	constraints	Rank
1		
2		
3		

Ranking of marketing constraints:

Sl no	Problem	Occurrence of problem (yes / no)	Rank
1	Low price		
2	More distance to marketing society		
3	Transport charges		
4	Transport losses		

5	Non availability of storage yards		
6	Lack of processing units for value addition		
7	Marginal holdings leading to lesser production (Family consumption)		

Others constraints if any:

Sl.No	constraints	Rank
1		
2		
3		

IX. Economic impact of GI status on Sustainable Rural Development:

1. **Are you aware that your product is GI certified?**

2. **Why did you apply for GI status (main factors of motivation)?**

3. **Extra revenues generated by product**:

Sl.No	Question	Yes	No
	Does the GI product fetch a premium compared to similar non- GI products?		
	If so how is this premium distributed amongst stakeholders?		
	Does money generated from the product stay in the region?		
	Are you financially better off because of GI status?		

4. Sustainable employment

Sl.No	Question	Yes	No
	Have any new jobs (related to the GI) been created since GI status gained?		
	If so, do you think these jobs are rather temporary or sustainable?		
	Do you think the creation of jobs in the region helps maintain the population, particularly the young?		
	Has GI status lead to any job losses in other sectors within the region?		

5. PR and Marketing

Sl.No	Question	Yes	No
	Have you realised any difference in prices after the product attained GI status		
	If yes what is the difference in price:		
	Have any new markets been entered since GI status gained?		

	Has a new marketing strategy been devised?		
	Specify:		
	If so, is this impacting stakeholder's enthusiasm and motivation?		
	Have you realised any difference in demand after the product attained GI status		
	Have you realised any difference in popularity of the product after attaining GI status		

6. Infrastructure

Sl.No	Question	Yes	No
	Have any new buildings, offices, etc been constructed since GI status obtained?		

7. Innovations and Entrepreneurship

Sl.No	Question	Yes	No
	Have any new businesses been introduced to area related to GI status, such as farmers markets, local gastronomy, and tourism ventures?		
	Have any innovative changes within the production or processing of the GI product been made, since GI status gained?		
	Does GI status lead to a greater accumulation and sharing of knowledge amongst stakeholders in the area?		

8. Costs of GI status

Sl.No	Question	Yes	No
	Are you aware of the costs involved in GI application ?		
	Are you aware of the costs involved in user registration?		
	Are you a registered user?		
	if no are you interested to become a registered user?		
	Are you aware of the costs involved in user registration?		
	Is there any funding available to help with these costs?		
	If yes can you name the agency?		

(X) Environmental Impact of GI status on Sustainable Rural Development:

1. Environmental Standards

Sl.No	Question	Yes	No
	Are environmental standards imposed by GI regulations?		
	If so, do you think they are effective in preserving the environment?		

2. Sustainable farming

Sl.No	Question	Yes	No
	Does GI status encourage sustainable farming practices?		
	What farming styles are the most prominent in the production of the GI product? Conventional ☐ organic ☐		
	Is the amount or intensity of production of the GI product controlled within		

	the region?		
	If so is this for sustainable agricultural purposes such as a restriction on the amount of arable land used or to conserve the products status of exclusivity and scarcity?		
	In terms of environmental effects, do you think that there are any differences between before and after GI status?		

3. Biodiversity

Sl.No	Question	Yes	No
	Does GI status encourage biodiversity?		

(XI) Social Impacts of GI status on Sustainable Rural Development:

1. Social Cohesion and Social Capital

Sl.No	Question	Yes	No
	Have any new associations, groups or networks been setup since GI status gained?		

2. Image

Sl.No	Question	Yes	No
	Has the GI status contributed to a positive image of the region?		
	If so, does this improved image encourage people to move to the region, to visit or remain in the region?		

3. Traditional Knowledge

Sl.No	Question	Yes	No
	Is Traditional knowledge used at any stage of the production or processing of the GI product?		
	Do the regulations governing GI status encourage the use of Traditional knowledge?		

4. Rural Exodus

Sl.No	Question	Yes	No
	Is rural exodus an issue in your area?		
	If yes, overall do you think GI status has any effect on rural exodus?		

5. Social Cost of GI

Sl.No	Question	Yes	No
	Does GI status involve a social cost to the region?		

(XII)Can you think of any additional positive effects of GIs on sustainable rural development that this questionnaire has not addressed?

KERALA AGRICULTURAL UNIVERSITY
COLLEGE OF HORTICULTURE
KAU (P.O)
Vellanikara , Thrissur
Department of Agricultural economics
Implications of Geographical Indications for rice in kerala

Market intermediary survey

1. Name:

2. Address:

3. Type of market intermediaries:

Village merchant/ Wholesaler/ Retailer/ Exporter

4. Transactions made:

a. Purchase of produce : Time:

b. Sale of produce : Time:

5. Paddy transacted during the year:

S.No.	Season	Place		Distance	Total quantity transacted	Purchase price	Remarks
		From	To				
1.	Season I						
2.	Season II						
3.	Season HI						

6. Expenditure:

S.No.	Particulars	Amount (Rs)	Remarks
1.	Transport cost		
2.	Weighing and watching charges		
3.	Taxes		
4.	Commission charges		
5.	Loading and unloading charges		
6.	Others		
	SELLING PRICE (Rs./Quintal)		

104

7. Storage of .Rice / Paddy

a. Quantity stored :

b. Method of storage :

c. Storage expenditure incurred:

GI status

1.What is your understanding of what GI is?

2. What are the uses for this rice?

3. Are there any medicinal properties for this rice?

Process of marketing and selling

4. How do you obtain the rice?
5. Who are the main producers from whom you collect rice?
6. How do you market?
7. Are there any mandatory processing requirements?
8. Who are your main customers?
9. How much does rice cost?
10. Do this rice have any preference among customers when compared to other varieties?
10. Has there been an increase or decrease in demand for this rice in recent years?
11.What is the role of external factors on sales?
12. How do government policies affect your sales?
13. How has GI certification impacted?

.8.Constraints faced in buying it from .producers/traders

9. Problems faced in marketing of paddy

10. Give suggestions to overcome the problems

IMPLICATIONS OF GEOGRAPHICAL INDICATIONS FOR RICE IN KERALA

By

RADHIKA A. M.

(2014-21-114)

ABSTRACT OF THE THESIS

Submitted in partial fulfilment of the requirement for the degree of

Doctor of Philosophy in Agriculture

(Agricultural Economics)

Faculty of Agriculture

Kerala Agricultural University, Thrissur

DEPARTMENT OF AGRICULTURAL ECONOMICS

COLLEGE OF HORTICULTURE

VELLANIKKARA, THRISSUR – 680656

KERALA, INDIA

2019

196

ABSTRACT

The present study entitled "Implications of Geographical Indications for rice in Kerala" was conducted with the objectives of assessing the impact of GI rice on income and welfare of the producer households, identifying the major supply chains, evaluating the institutional innovations in the supply chains, proposing viable supply chain options and examining the export prospects and market access of the registered GI rice. The rice GIs of Kerala *viz.,* Navara, Pokkali, Jeerakasala, Gandhakasala, Palakkadan Matta and Kaipad were selected for the study. From each of the six categories, fifty farmers each were randomly selected making a total sample of 300 farmers. Data was also collected from market intermediaries and producer societies in each GI tract.

Cost-return structure was worked out for the selected GI rice using percentage analysis and cost concepts. The highest cost of cultivation (Cost C_2) was found in the case of Jeerakasala (₹.131082/ha) followed by Gandhakasala (₹.127308/ha). The highest average yield was realised for Palakkadan Matta (4498 kg/ha) and lowest yield was realised for Pokkali (1835 kg/ha). Accordingly, the cost of production was highest for Pokkali and lowest for Palakkadan Matta. The highest average gross income of ₹.155568/ha was obtained for Navara while it was lowest for Pokkali (₹.75036/ha). The net income and BC ratio indicated that farming was a loss making business for farmers growing Pokkali, Jeerakasala and Gandhakasala, especially when the value of the family labour, land value and managerial cost were imputed and accounted in the cost. The BC ratio worked out to be more than one in the case of Navara (1.31), Palakkadan Matta (1.05) and Kaipad (1.02).

The producer's performance was assessed using one output and four inputs using DEA model. All the GIs showed low technical efficiency (<40 per cent). The estimated mean technical efficiency for producers of Gandhakasala was highest (90.5 per cent) and the least efficient producers were seen in Pokkali. The scale efficiency results showed that all the GIs were scale inefficient which could be attributed to low operational scale of units.

The impact of GI on income and welfare of producer households was measured using the method of treatment effect analysis. The average treatment effects were worked out for the outcome variables; yield per hectare, net income, marketed surplus, and value of marketed surplus. Even though the yield of Navara was comparatively lower than that of Palakkadan Matta, Jeerakasala and Gandhakasala, the net income, marketed surplus and value of marketed surplus

were higher for Navara. The yield per hectare was higher for Jeerakasala when compared to Gandhakasala while the net income, marketed surplus and value of marketed surplus were higher for Gandhakasala. Palakkadan Matta recorded the highest yield among these categories, but net income, marketed surplus and value of marketed surplus were comparatively low. The marketed surplus of Pokkali was comparatively higher than Kaipad even though yield, net income and value of marketed surplus were comparatively very less.

Three marketing systems were prevalent in the study area. Some farmers market paddy through market intermediaries, some resource rich farmers cultivate and process their produce to meet the requirements of high end consumers and other resource poor farmers sell off their produce to local consumers after processing in nearby mills. The Palakkadan Matta farmers were marketing their produce through Supplyco at the rate of ₹.22.50/kg.

Institutional Analysis and Development Framework (IAD) was used to explore the performance of GIs. Efforts were made for studying the institutional innovations strategies for enhancing profitability and effectiveness of the GI mechanism, to propose viable supply chain options and to examine the export prospects and market access of the registered GI rice. Producer societies play a lead role in the registration process of a GI. The other actors include GI registry, IPR cell, KAU and Producers of the respective GIs. The average prices of all these speciality rice have increased after GI registration.

Group-farming can be adopted as an option to bring more area under production. Despite having ample scope for enhancing the income of farmers through diversification, lack of facilities for value addition is a major hurdle. Processing units and storage facilities should be established near major producing areas to overcome this problem. Taking advantage of the GI status, efforts are to be made for marketing GI products as a premium priced branded organic produce. An effective institutional arrangement should be constituted to ensure quality production and efficient marketing of GI rice.