

**VALUE CHAIN ANALYSIS OF MEDICINAL RICE IN KERALA**

**By**

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**(2016-15-002)**

**THESIS**

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**KERALA, INDIA**

**2020**

***DECLARATION***

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## **DECLARATION**

I, hereby declare that the thesis entitled “**Value chain analysis of medicinal rice in Kerala**” is a bonafied record of research work done by me during the course of research and that the thesis has not previously formed the basis for the award to me of any degree, diploma, fellowship or other similar title, of any other university or society.

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Certified that this thesis entitled “**Value chain analysis of medicinal rice in Kerala**” is a record of research work done independently by **Ms. Sreeja K Nair (2016-15-002)** under my Guidance and supervision and that it has not previously formed the basis for the award of any degree, fellowship or associateship to her.

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## ACKNOWLEDGEMENT

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## *INTRODUCTION*



## CHAPTER I

### INTRODUCTION

Rice is central to the lives of billions of people around the globe. Asia accounts for over ninetyth of the world's production of rice, with China, Asian country and Republic of Dutch East Indies producing the foremost. Solely 6-7% of the world's rice crop is listed within the world market. Thailand, Vietnam, China and therefore the US are the world's largest exporters. Rice belongs to the class *Oryza* and has 2 sophisticated and twenty two wild species. The refined species are *Oryza sativa* and *Oryza glaberrima*. Rice is mature everywhere the earth whereas *Oryza glaberrima* has been civilized in geographic area for the last 3500 years. Rice is mature beneath many substitute circumstances and manufacture systems, however soaked in water is that the commonest modus operandi used universal. Rice is that the exclusively cereal crop that may nurture for long periods of your time in standing water. Rice may also be establishing in cereals, nibble foods, brewed beverages, flour, oil, inducement and non secular ceremonies to call a couple of another use. (<https://en.wikipedia.org/wiki/Rice>)

Rice is individual principal grains of India. Moreover, this country has the leading area under rice nurturing, as it is one of the principal food crops. It is in reality the central trim of the nation. Asian country is one in each of the first makers of this trim. Rice is that the essential nourishment edits and being a tropical plant, it flourishes comfortable in hot and damp climate. Rice is particularly mature in rain fed areas that accept serious annual precipitation. That's why it's largely a kharif crop in Asian nation. Rice is additionally mature through irrigation in those areas that receives comparatively less precipitation. Rice is that the staple food of eastern and southern components of Asian nation.

**Table 1.1 Area, Production and Productivity of Rice in India from 1991-92 to 2018-19**

<b>Year</b>	<b>Area (Million Hectares)</b>	<b>Production (Million Tons)</b>	<b>Productivity (Kg/Hectare)</b>
1991-92	42.65	74.68	1751
1992-93	41.78	72.86	1744
1993-94	42.54	80.30	1888
1994-95	42.81	81.81	1911
1995-96	42.84	76.98	1797
1996-97	43.43	81.73	1882
1997-98	43.45	82.54	1900
1998-99	44.08	86.08	1921
1999-00	45.16	89.68	1986

2000-01	44.71	84.98	1901
2001-02	44.90	93.34	2079
2002-03	41.18	71.82	1744
2003-04	42.59	88.53	2079
2004-05	41.91	83.13	1984
2005-06	43.66	91.79	2102
2006-07	43.81	93.36	2131
2007-08	45.91	96.69	2202
2008-09	45.54	99.18	2178
2009-10	41.92	89.09	2125
2010-11	42.86	95.09	2239
2011-12	44.01	105.30	2393
2012-13	42.75	105.23	2461
2013-14	44.14	106.65	2416
2014-15	44.11	105.48	2391
2015-16	43.39	104.32	2404
2016-17	43.86	109.69	2500
2017-18	44.56	112.76	2530
2018-19	44.21	115.63	2615

**Source:** Directorate of Economics & Statistics, Department of Agriculture and Cooperation & Farmers Welfare

**Fig 1.1 Area, Production and Productivity of Rice in India from 1991-92 to 2018-19**

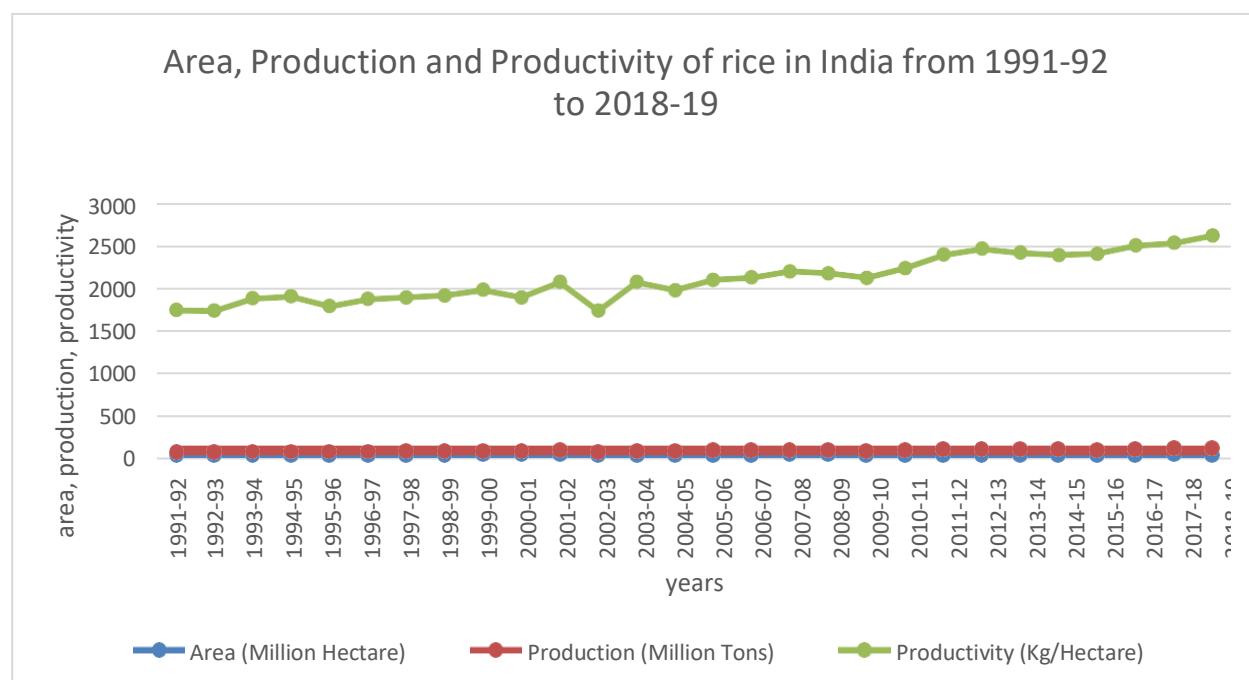


Table 1.1 explained about the area under the paddy crop in India and its production and productivity trends for a period from 1991-92 to 2018-19. The table shows that the area under paddy cultivation was lowest as 41.78 MHs in 1992-93 and highest as 45.91 MHs in 2007-08 and further decreased to by the end of the 2015-16 then increased to 44.56 in 2017-18. The generation of paddy was least as 71.82 MTs in 2002-03 and most elevated as 115.63 MTs in 2018-19. The efficiency of paddy was least as 1744 Hectares in 1992-93 and most noteworthy as 2461 Hectares in 2012-13 and assist diminished to 2404 hectares within the year 2015-16 and after that expanded to 2615 Hectares in 2018-19. All these appear a whimsical generation and efficiency patterns of paddy trim in India.

Rice involves as it were the third position among Kerala's agrarian crops with regard to region beneath development, and it is distant behind coconut and elastic. Rice has been an crucial nourishment grain edit, which has been expectedly refined and devoured all through India. Conceivably usually one among the exceptional crops which is expended by all lesson of buyers; destitute, center and wealthy wage gather. It is for this premise that rice is continuously treated as a chief and vulnerable edit from the view point of shoppers in India. It is additionally an noteworthy edit for agriculturists, since it appears to offer an ensured salary for them since of having comparatively way better acquirement and estimating arrangements actualized by the government organizations.

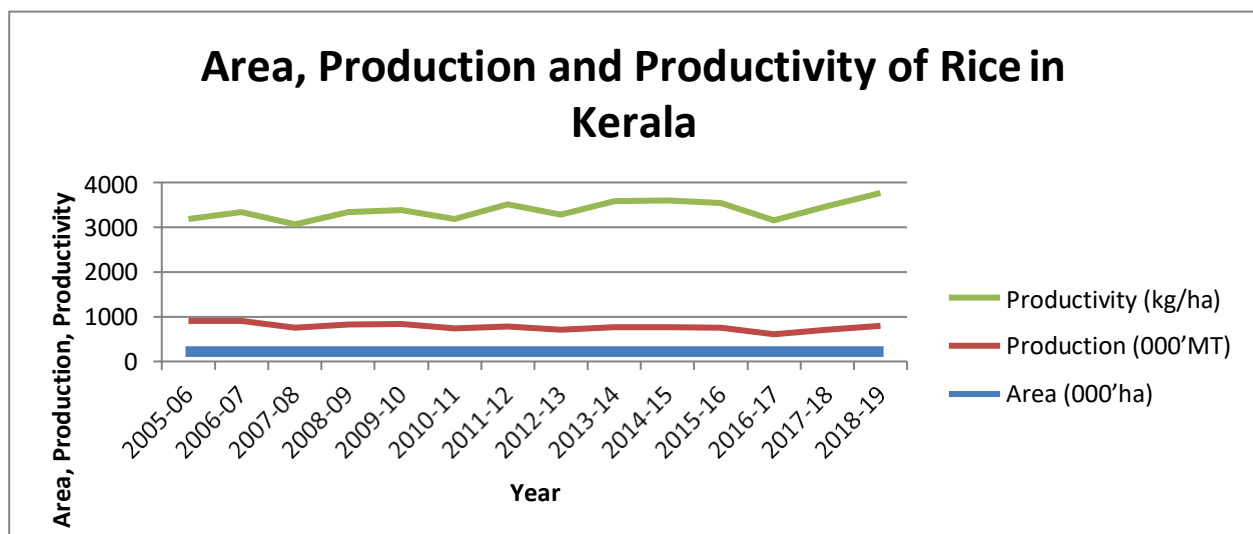
**Table 1.2 Area, Production and Productivity of Rice in Kerala from 2005-06 to 2018-19**

<b>Year</b>	<b>Area (000'ha)</b>	<b>Production (000'MT)</b>	<b>Productivity (kg/ha)</b>
2005-06	276	630	2285
2006-07	264	642	2435
2007-08	229	528	2308
2008-09	234	590	2520
2009-10	234	598	2557
2010-11	213	522	2452
2011-12	208	569	2733
2012-13	197	508	2577
2013-14	199	564	2827

2014-15	198	562	2837
2015-16	196	549	2790
2016-17	171	436	2547
2017-18	189	521	2757
2018-19	202	599	2965

Source: Directorate of Economics & Statistics, Department of Agriculture and Cooperation & Farmers Welfare

**Fig 1.2 Area, Production and Productivity of Rice in Kerala from 2005-06 to 2018-19**



### History of Rice Cultivation

Rice started at slightest 130 million a long time prior as wild grass. Developed rice, as we know it nowadays, was to begin with developed almost 10,000 a long time prior in south-east Asia, likely in India. Rice is the world's most adaptable edit. It can be developed in leave, slice and burn timberlands, 3000-meter tall mountains, 3 meters underneath ocean level and 8 feet of surge water. Rice is not a tropical plant, but is still linked with a wet, humid climate. It is commonly accepted that the taming of rice started some place within the Asian circular segment. The rice which is developed nowadays slid from a differing quality found within the northern Himalaya. From here it broadens to the rest of India and all through the world, barring Africa. Rice has been found in archeological locales in India, China, Japan, Korea, Thailand and a few other nations. In India, archeologists have found charred grains of rice in more than thirty-seven locales.

The species of rice grown-up in India is known as *Oryza Indica*. The word for a specific plant in extraordinary dialects too gives us clues as to where it has voyage. The Latin word for rice, *oryza*,



and the English "rice" are both coming about from the Tamil word arisi (Sharma, 1991). The travel of rice approximately the earth has been judicious, however one time it take starting place it remained as well as got to be a key agrarian along with financial item on behalf of the individuals. Within the Indian subcontinent more than a quarter of the civilized arrive is given to rice. It is horrendously pivotal portion of the day by day supper in a few parts of the nation. The rice grain is treated with respect within the subcontinent and in Asia; the collapse of the rice edit cannot as it were make a financial mishap but can moreover bring around a famine- like circumstance.

### **Nutritional Facts about Rice**

Rice could be dietary staple nourishment in numerous social cuisines around the world. It gives momentary vitality as its most noteworthy figure is carbohydrate (starch). Rice flour is well off in starch in addition to it is used for creation diverse nourishment materials. It is besides utilized by brewers to form alcoholic malt. Rice is additionally utilized within the arrangement of confectionery foodstuffs like bread, snacks, treats and rolls. The rice bran oil isn't as it were utilized as edible oil, but is additionally utilized in cleanser and greasy acids built-up. Other than it is utilized for makeup, engineered strands, plasticisers, cleansers and emulsifiers. The defatted fiber is furthermore utilized as livestock bolster, natural fertilizer (compost), therapeutic reason and in wax making

The wellbeing benefits of rice incorporate its capacity to offer quick and immediate vitality, control and progress bowel developments, stabilize blood sugar levels, and moderate down the maturing prepare, whereas too given that a fundamental source of vitamin B1 to the human body. Other benefits incorporate its capability to boost skin wellbeing, boost the digestion system, help in absorption, lessen tall blood weight, offer assistance weight misfortune endeavors, get way better the resistant framework and give protect against diarrhea, cancer, and heart malady. Old Ayurvedic writing affirms the therapeutic and healing properties of distinctive sorts of rice developed in India. (Umadevi et.al 2012)

Rice is believed by a few to have restorative properties. In spite of the fact that, this is often not logically demonstrated effective, it has been utilized in a few nations for restorative reason.

**Philippines:** Rice cleaning the bran-is extricated and utilized as a brilliant source of Vitamin B to put off and recuperate beri-beri (An affliction in which the body doesn't have adequate vitamin B1 (thiamin))

**Malaysia:** from the original copy of Malayan Pharmaceutical, it is bolster that bubbled rice

"greens" can be utilized as an eye moisturizer and for utilize with sharp delicacy of the inside body tissues. The book besides recommends applying a mix of got dried out, powdered rice on certain skin sicknesses.

**China:** The Chinese consider rice fortifies the grumpiness, as well as "immobilized belly," increments thirst, and cures corrosive stomach. Dehydrated rice grains are formerly utilized as an outside medication to help in absorption, donate tone to muscles, and thrust out gas from the midriff and guts

**India:** Rice water is affirmed by the Pharmacopoeia of India as a balm to work against swollen surface.

### **Medicinal rice and its Uses**

Each Indian state has its possess unmistakable assortments of restorative rice over centuries and sound built-in into its particular environmental specialties. India incorporates a riches of therapeutic vegetation, the majority of which have been habitually utilized in Sidha, Ayurveda and Unani frameworks of solutions and by ancestral healers for eras. In collectible Indian news coverage it is without a doubt specified that each plant on this soil is supportive for individual creatures, creatures and for further foliage (Oudhia 1999).

Kerala is domestic to a number of claim to fame rice assortments such as Pokkali, a saltwater-tolerant natural rice having restorative properties and uncommon flavor; Jeerakasala and Gandhakasala (scented rice assortments); Dark Njavara, Brilliant Njavara and Rakthashali (therapeutic rice assortments generally utilized within the Ayurveda).Navara rice and Rakthashali rice are the well-liked assortments in Kerala state.

### **Rakthashali Rice**

Red rice is customary pigmented rice developed in Southeast Asia and is considered greatly nutritive and restorative because it possesses antioxidant properties additionally contains a prevalent substance of vital micronutrient like iron (Fe) and Zinc (Zn) (Desai Amruta S. 2012). Red rice could be a nutritive foodstuff and an indispensable component of the revels and customs in India since verifiable era.

Within the antiquated times, different conventional red rice landraces with unequivocal characteristics were developed simply for utilize, as nourishment and in drugs. Apart from this landraces are developed for family investing and illustrate wide extend of idiosyncrasies such as effortless to dry season, surge, bug, maladies, saltiness and alkalinity the potential to abdicate well indeed beneath least administration hones. Security of local landraces, a potential source of

valuable qualities that seem advance the rural community, needs momentary concentration (Loresto et al., 2000).

The foundation of colored rice is aged as rice itself. Concurring to a Japanese myth, the rice plant at first did not bear any grains. At that point the goddess Kuan Yin sprinkled her deplete over the plant and white grains appeared up, but as well much smashing caused blood to come out and a couple of grains have to be reddish (Sharma,1991).

Rakthashali could be a uncommon red rice assortment. It is additionally called “Chennellu”, is broadly specified in puranas and collectible content of Ayurveda having hoisted therapeutic value. Ayurveda says this differences of rice, dating its utilize back to more than 3,000 a long time, is nice for dosha, such as Vatha, Pitha, and Kafa (<http://www.thehindu.com>, 2018). This white-tipped rice with red bran is understood to have properties to slow down the procedure of aging. Studies say that it is affluent in antioxidants, calcium, zinc, iron, and other minerals. Within the past, various customary red rice assortments with express character were developed absolutely for utilize, as nourishment and in drugs. Rakthashali has been only utilized in expanding drain emission in lactating mothers and is utilized totally different shapes in food and medicines. Its rice porridge is suggested in all afflictions because it is feeding, easily digested and absorbed within the body. The rice gruel is an reviving drink and could be a great diuretic. The water left after washing rice is used as a base in combination of all the medicinal ingredients in medications. The paste of Rakthashali is used for outside applications as in skin allergies and for detoxification of the body.

### **Navara rice**

Navara may be a incomparable rice cultivar innate to Kerala, gave with extra brief development length. Reports appear that it has been beneath development in Kerala for in relation to 2500 a long time. Navara is called Shasthika because it gets full-fledged in sixty days. It is one of the local hereditary assets of Kerala, renowned worldwide for its utilize in Ayurveda It appears to have begun in a confined zone and did not broaden discernibly, consequently considered as an endemic trim. Navara is cited as a interesting cereal with properties to remedy the essential sick influencing the circulatory, respiratory and stomach related framework.

Navara could be a sole grain plant within the Oryza class inborn to Kerala, broadly utilized within the Ayurvedic framework of pharmaceutical, mainly in Panchakarma treatment. It is well known in Ayurvedic treatments for treating loss of motion and certain neurological clutters. Lesser starch substance of Navara rice has made it appreciated amongst diabetes for standard utilization, anti-inflammatory and uncommon flavonolignans, asset of cancer prevention agents and anti-cancer

action.

### **Medicinal uses of Navara rice**

Navara in Ayurveda: Navarakizhi and Navaratheppu are two greatest medicines in Ayurveda for conditions such as joint pain, loss of motion, neurological disarranges.

**Navarakizhi:** In Navarakizhi (“Pindasweda”) Navara rice is bubbled in kurunthotti kashayam (a decoction of sida root and drain). It is at that point wrapped in tablecloth pockets (kizhis) and is utilized for roughness

**Navaratheppu:** - A paste of bubbled Navara rice of light tenderness is allied on the body. Here once more the rice is bubbled in kurunthotti kashayam.

### **Other Medicinal and Therapeutic uses of Navara:**

1. **Navara rice** – Utilized the same as diet (within the form of gruel) within the treatment of psoriasis, osteoporosis, cirrhosis of liver and piles..
2. **Navara bran** Navara rice bran in bubbled drain or with jiggery is utilized as a slurp for oral cavity ulcers.
3. **Navara rice powder** – Glue prepared with Navara rice grind is utilized in airstream nibble to lessen the distress and for curative of the wound.
4. **Navara root** – Bubbled in water and used as a drink in urinary tract defilement additionally as a diuritic.
5. **Karkidakakanji / Marunnukanji [Navara gruel]:** During the period of July 15 – Aug 15 (or Karkidakam, because it is known within the Kerala calendar), Kerala gets the greatest sum of the south-west rainstorm downpours and body resistances are seen to be at its lowest. In this month, Navara is consolidated within the count calories to assist construct up immunity.
6. **Health food for babies:** Navara rice powder cooked with brown sugar and drain is found to be feeding nourishment for babies.
7. **Navara palkanji:** Bubbled drain blended with cooked Navara rice is effortlessly edible and utilized as wellbeing nourishment for more seasoned people

## **Geographical Indication and etymology of Navara**

Taking into consideration its noteworthiness, the rice landrace Navara was concurred Geographical Indication (GI) Registry of Intellectual Property Rights beneath the Geographical Indication of Goods (Registration and Protection) Act, 1999. This was the starting time that a rice assortment of Kerala recognised Geographical Indication Registry.

In favor to GI registry 2008, selection for Navara rice landrace was gotten as Navara by the Navara Rice Agriculturists Society near Chittur, Palakkad. Subsequently the customarily utilized cultivar title Njavara is being supplanted with the word Navara. In Ayurvedic writing distinctive names have been embraced for Navara and they take account of Shashtika, Shastihayana, Shashti Sali, Garbhapaki, Shashtija, Asadvayodbhava, Snigdha tandula, Kakalakam and Shashtivasaraja ([www.dhanvantari.in](http://www.dhanvantari.in), 2017).

Agreeing to Astanga samgraha of Vagbhata (4th century Advertisement approx), Navara is mainly incredible among the paddy because it is unctuous, effortlessly edible, sugary and mitigates all the three doshas. Susruta Samhita (400–200BC) outlines Shastikasas syrupy in taste and assuages the vayu and kapha ([www.navara.in](http://www.navara.in), 2017).

The agriculturists verbalize about Navara as Gold with Scent for the reason that in the event that he features a stock of the seeds with him, he might win prevalent cost in any season. This rice is accepted to be a secure infant food and in this way suggested to bolster infant babies within the frame of a dish locally called “angri” made of Navara flour and dried out powder made out of the banana assortment called “Kunnan’ much some time recently there to begin with nourishing custom. Periodic utilization of Navara rice gruel cooked in cow’s drain guarantees delayed presence and increment drain stream in lactating moms. A sweet dish made of this rice in jaggery and ghee and cow’s drain is additionally prescribed for heightening mother’s drain. Navara rice is suggested for intense complaints of heaps. It is considered as secure nourishment for snake-bitten patients and individuals with stomach ulcer. Navara roots utilized within the shape of decoction is said to be valuable in urinary complaints of children

## **Value chain Approaches**

Kaplinsky and Morris (2000) illustrate Value chain having assorted stages and activities which are obligatory to get an item or administrations from conception, generation, change and conveyance of item extreme customers. In Kaplinsky and Morris“ move toward, value chain

exploration looks for to illustrate how chain workout are performed and to make out how value is formed and shared between chain members.

Value chain mapping could be a superlative way to way better known on the association between on- screen characters. Through the mapping, able to get a significant viewpoint of the value chain conjointly this will help in distinguishing the imperatives and potential reply at distinctive levels.

There are three main research streams in the value chain literature:

1. Filiere approach (Durufle, Fabre,1988)
2. Porter's approach (Porter,1985)
3. Global approach (Kapplinsky and Gereffi,1994)

### **Filiere approach**

The filiere approach incorporates extend of schools of thought and investigate conventions. At to begin with, the approach was utilized to look at the rural framework of creating nations beneath the French colonial framework. The investigation fundamentally served as a apparatus to consider the conduct in which the agrarian generation frameworks (particularly elastic, cotton, coffee and cocoa) were organized within the setting of creating nations. Thus the filiere outline paid distinctive concentration to how local production systems were linked to processing industry, trade, export and final spending. The filiere concept has in this manner continuously included a well-built observational point of view which was utilized to outline the stream of commodities and to be familiar with performing artists and exercises. The beginning of the filiere is equivalent to the broader idea of value chain displayed over. In any case, the filiere generally decided on issues of material and quantitative specific connections, outlined in flow-charts of commodities and mapping of change relationship.

There are two strands of filiere approach which share some insights with value chain analysis:

- the fiscal and monetary measurement of filieres (displayed in Duruflé, Fabre and Yung and utilized in a amount of French-funded improvement ventures within the 1980s and 1990s), centers on revenue creation and mission within the product chain, and isolates costs and livelihoods between nearby and internationally-traded mechanism to dissect the spill-over of the chain onto the national economy and its assurance to GDP along the “effect method”.

- the strategy-focused exploration of filiere, principally utilized within the college of Paris-Nanterre, a few investigate organizing and NGOs working on agrarian advancement inquiring about in a systemic way the interaction of targets, limitations and comes about of each type of performing artists within the chain.

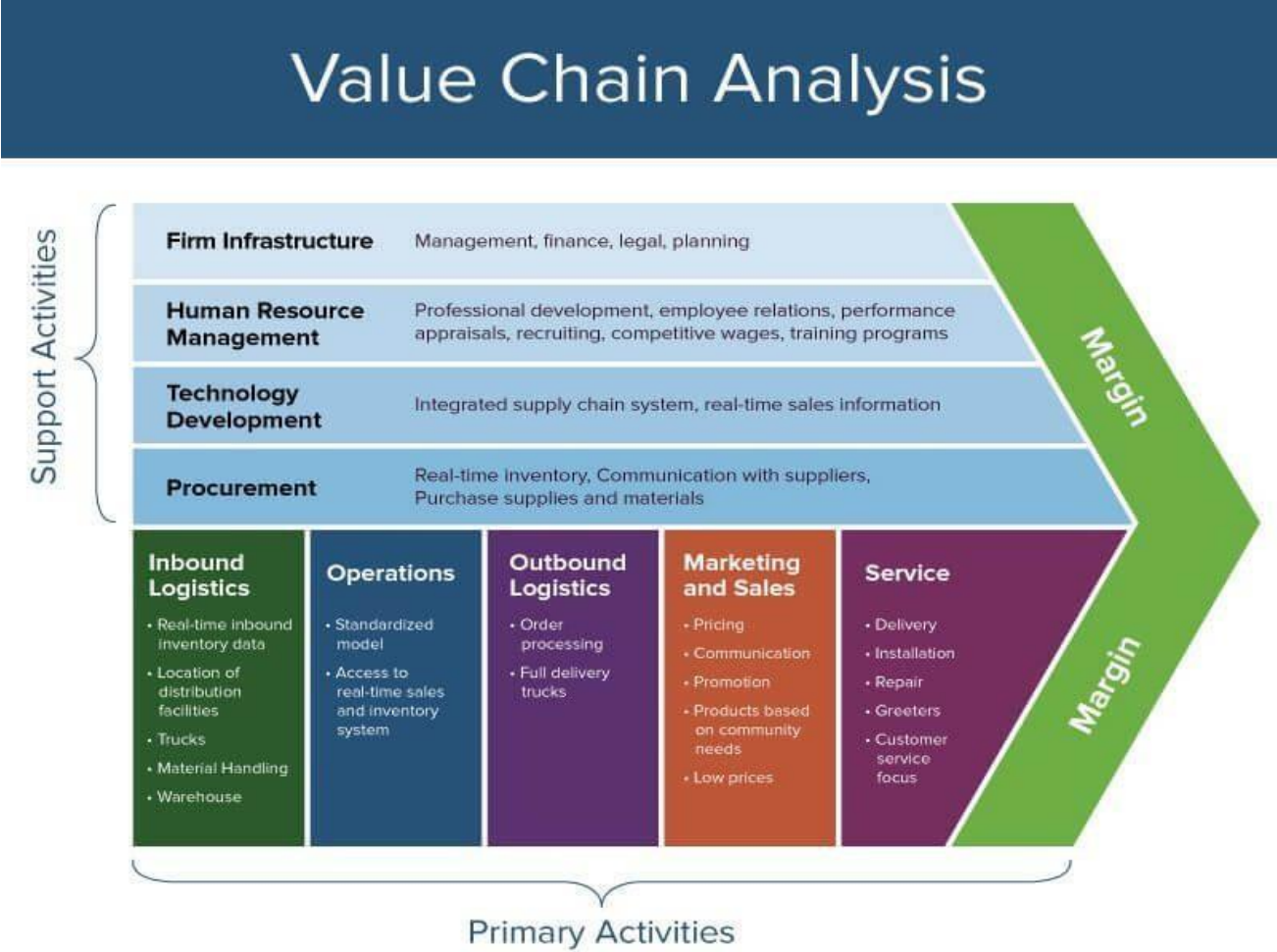
### **Porter's approach**

Michael E. Watchman was the prime to start the thought of a value chain. Porter has utilized the structure of value chains to degree how a firm should place itself within the broadcast and within the union with providers, buyers and competitors. The belief of competitive advantage of an undertaking are: how can a firm offer client with an item or benefit of comparing value compared with competitors, but at lower taken a toll? On the other hand, how can an enterprise create an item or benefit that clients are pleasing to pay a better cost for?

In Porter's system the value chain gives an instrument that firms can utilize to choose their source of competitive advantage. In specific, Watchman contended that the sources of competitive advantage cannot be identified by looking at the firm as an entirety. Or maybe, the firm ought to be part into an arrangement of exercises and competitive advantage found in one (or more) of such exercises. Porter recognizes between essential exercises, which truly contribute to include value to the generation of the item or administrations and bolster exercises, which have a backhanded impact on the ultimate value of the item.

Surrounded by the system of Porter the impression of value chain does not harmonize with the reflection of physical change. Porter offered the thought that a firm's competitiveness does not talk around completely to the generation prepare. Undertaking competitiveness can be dissected by looking at the value chain which incorporates item plan, input acquirement, logistics, outbound logistics, promoting, deals, after-sale and back administrations such as key arranging, human assets administration and inquire about exercises.

Fig 1.3 Porter’s value chain



**Global approach**

Kaplinsky and Morris experiential that within the course of globalization, there has been a recognition (as a rule well-justified) that the breach in salaries inside and between nations has increased. They contend that value chain examination can offer assistance out to clarify this prepare, especially in a energetic point of view.

At first, by mapping the choice of exercises along a chain, a value chain examination breaks down add up to value chain profit into the rewards that are accomplished by diverse parties within the chain. A value chain examination is the foremost honest way of understanding the allotment of profit. Other ways of seeing worldwide distributional designs offer as it were halfway bits knowledge into these ranges. Furthermore, a value chain investigation can illustrate how firms, locales and nations are related to the worldwide economy. This will generally decide the distributional results of worldwide generation frameworks and the capability which person makers



ought to make strides their operations and hence to dispatch themselves onto a pathway of maintainable salary enlargement.

Within the value chain system worldwide exchange relations are measured portion of systems of makers, exporters, merchants, and retailers, whereby truths and affiliations are created to put on right of section to markets and providers. In this circumstance, the achievement of creating nations and showcase on-screen characters in developing nation lies within the capability of getting to these systems.

### **1.1 Statement of the problem**

Value chain alludes to all the exercises attempted by a company from essentially obtaining crude materials and after that fabricating an item, to setting it on the showcase prepared to be bought by consumers. All the value-adding exercises within the value chain are interlinked, and are outlined to define the finest conceivable item or benefit. The method of changing over the paddy into rice incorporates numerous stages. There are certain costs involved in each point of the value chain and a well-organized value chain in agricultural commodities must be fetched viable. A long and useless chain does not offer value to the members. Indeed, in spite of the fact that Kerala has a fabulous potential for restorative rice cultivating but non-availability of unadulterated seeds, moo surrender and tall generation fetched were cited as reasons for the necessitate of allure of these rice assortment among farmers. Disparate other rice varieties, which are white in colour, Navara is deep red and has been sophisticated in the Palakkad region for more than 2,000 years. But it was completely depleted amid the final four decades when a few modern half breed rice assortments were presented. Like Navara rice, Rakthashali rice was too confronting the inconveniences for development. Within the starting a long time, the agriculturists were battled difficult to gather and isolate sufficient seeds. Sourcing immaculate seeds was without a question a challenge for them. After that they were centering on to the natural development of the restorative rice.

The strategy of changing over paddy into rice incorporates various stages. The paddy goes through different stages to urge the ultimate items. For this point, a set of individuals were involved in it. Not as it were farmers all individuals within the chain wish for the input at a lower cost and to offer it at a sensible cost to urge a great edge. It is exceptionally critical to know approximately the advertise, transportation, innovation, financing, work taken a toll and misuse of ranchers by broker with appropriate execution approaches.

It is crucial to analyse the actors, their association and harmonization, the flow of products, flow of information, value addition at different level and their constraints. This analysing was helpful for realize the number of intermediaries, producers share in consumer rupee as market

efficiency and different harms faced by the actors in the value chain. The study helps to put on a basic overview of the value chain, the various chains and actors, price spread efficiency and the factors influencing it and the constraints and possible solutions at different level in the value chain. This study fills the existing research gap with regards to medicinal rice of Kerala. The present study will provide insight for developing and suggesting new marketing models and improve the livelihood situation of farmers involved in the cultivation of Navara and Rakthashali rice varieties of Kerala.

## **1.2 Objectives of the study**

- To map the value chain of Navara rice and Rakthashali rice of Kerala,
- To identify and explore the various chains and actors involved in the value chain,
- To analyse the price spread efficiency and factors influencing it, and
- To identify the constraints and possible solutions at different levels in the value chain.

## **1.3 Scope of the study**

The study helps to know the mapping of actors, flow and volume of products, information, institutional linkages, and geographical flow of Navara and Rakthashali rice in Kerala. This study also assists to identify the actors and a detailed analysis of actors involved in the value chain. The cost and margin received by each actor and constraints faced by the actors were identified with the help of this study.

## **1.4 Limitation of the study**

The major limitation of the study is that the area of the study confined to only two (Palakkad and Malappuram) districts of Kerala.

## **1.5 Organisation of the thesis**

The report of the study has been presented in five chapters. Design of the study statement of the problem, objectives, scope of the study, main observation and organisation of the thesis were narrates in the first chapter. The second chapter includes the review of literature. The third chapter presents the methodology and data sources used for conducting the study. The fourth chapter represents the results and discussion of the study. The last chapter elucidates the summary of findings and conclusion of the study followed by references and abstract of the thesis.

## **CHAPTER II**

### **REVIEW OF LITERATURE**

Literature review points to portray the critical focuses of show and collected information on the subject under study. It looks for to demonstrate précis, survey, rearrange and put together the substance of essential reports. Besides, it shapes the basis for the clarification for future inquires about within the range. As such, survey of writing has gotten to be an unavoidable portion of any examination. Subsequently, a brief audit of accessible writing, related to the study is displayed beneath the taking after heads:

#### **2.1 Concepts of value chain**

#### **2.2 Studies on value chain analysis and mapping**

#### **2.3 Studies on agricultural value chain**

#### **2.4 Studies on medicinal rice and its health benefits**

#### **2.5 Price spread and marketing efficiency**

#### **2.6 Constraints faced by farmers**

#### **2.1 Concepts of value chain**

The value chain moves toward be made by Michael Porter inside the 1980s, and depicted in his book *Competitive Advantage: Making and Keeping up Predominant Execution*. His thought was to part a trade into its key exercises to make them improved than the rivals, or to a lower taken a toll. A firm's value chain is impacted by their suppliers' and customers' value chains since they are all parts of a value framework (Porter, 1985). The thought of value included inside the shape of an esteem chain has been utilized to put up an industry's conservative competitive advantage inside the commerce field. The full industry is molded of works out that interface commonly to form the value of the trade, and together these exercises frame the industry's value chain. Since the value chain system is utilized as a persuasive explanatory apparatus for the key arranging of an organization, it points to create the foremost of value creation whereas minimizing costs.

Kaplinsky and Morris (2000) clarify value chain because; it is the complete run of exercises which are essential to convey a piece or assistance from display, throughout the diverse stages of generation changes and conveyance to last shoppers. In Kaplinsky and Morris' approach, value chain assessment looks for to distinguish how chain movements are performing and to identify how

value is shaped and shared among chain members

Barnes (2004) embody value chain is a agreement of happenings work jointly vertical to conquer a more pleasant point within the platform. The elementary feature of a value chain is market-focused collaboration. Distinctive trade undertakings work mutually to deliver and advance items and administrations in a useful and capable way. Value chains authorize businesses to take action to the showcase put by interfacing generation, preparing and promoting exercises to showcase requests. Vertically adjusted implies that companies are emotionally involved from one winding up of the essential generation handle, through preparing, and conceivably into the ultimate showcasing stages where customers buy a wrapped up item.

According to Richard and Besigye (2005), they characterize value chain as the alliance recognized between on-screen characters included frankly and by suggestion in a gainful movement with the plan of including value in each position of the value chain. It blended up with organizations collectively among makers, processors, merchants, dealers, clerical and back educate. This approach built up a joint vision; to classify shared must, work commonly within the realization of objectives, to designate the related dangers and benefit, and to contribute time, vitality, and assets in assembly these objectives.

Baker (2006), they portray value chain as the bond renowned between on-screen characters incorporated exclusively and in approximately way in a gainful movement with the plan of counting value in each arrange of the value chain. It blended up with alliances among makers, processors, merchants, dealers, administrative and back teaches. This approach set up a joint vision; to classify shared should, work commonly within the realization of objectives, to apportion the related dangers and benefit, and to contribute time, vitality, and assets in assembly these objectives.

German Technical Cooperation (2007) states that, a value chain is the string of exercises blended up in changing rough materials into a thing that's procured by the extreme client. It consolidates exchange works out from the creation of unrefined materials, to changing them into center things, to manufacturing the extreme thing. It joins exchange dealings, but besides trades between companies and governments (e.g. the bureaucracy included in trans- border trade), and trades among companies and underneath instruct in zones like support, planning, ask approximately and advancement, metrology and certification, and others. Value chain support is concerned with competitiveness of makers. It points at relating makers in creating nations with markets, be it broadly or globally. A value chain can be moderately uncomplicated, for occurrence within the case

of the Natural vegetable value chain, where rustic makers, intermediates and processors/ bundling houses, and wholesalers and retailers are included

UNIDO (2009) illustrate value chain can be immovable on as a set of businesses, movements and contact included in building a last item or benefit. It builds on the thought that a item is seldom devoured in its unique shape but gets to be changed, pooled with other items, transported, bundled, showcased etc, until it comes to its last customer. In this sense, a value chain portrays how makers, processors, buyers, venders, and shoppers isolated by time and space continuously include value to items as they pass from one interface within the chain to the another. The value chain approach is getting to be plan utilized by improvement, government and private segment specialists or organizations to both make out choices for mechanical advancement and execute advancement programs.

Hawkes and Ruel (2011) stated that the study of value chains comprised of two key concepts: value and chain. The term value was equivalent word to “value added” within the Value Chain Investigation (VCA) because it characterized the incremental value of a coming about item delivered from behavior of an item. For agrarian items, value expansion seems moreover taking put through separation of a item based on nourishment security and nourishment usefulness. Cost of the resulting item appeared its incremental value. The term chain referred to a supply chain representative the hone and the performing artists possessed within the life cycle of an item.

## **2.2 Studies on value chain analysis and mapping**

According to a handbook for value chain research by Kaplinsky and Morris (2002), there are three major sets of reasons why value chain examination is vital in this period of fast globalization. The vital rationale they raised is that with the increasing part up of work and the universal dispersion of the generation of component, systemic competitiveness has ended up increasingly critical. Moment, competence in generation is as it were a vital state for productively entering worldwide markets. Third, get to into worldwide markets which permit for steady salary broadening requires an thankful of energetic components inside the entire value chain.

Dooren (2005) represent in his working report on rice value chain investigation in Thailand, each life begins with a small seed. The think about consolidated steps within the value chain of rice such as cost break down of distinctive sorts of rice, working the edges to the rancher, mill operator, dealer, and exporter. It moreover worked the cost setting components and unsurprising causes of shakiness

in costs. The report has analyzed that there was uneven cost conveyance between ranchers and dealers. The ponder wrapped up that expanded rice cost has improved the agents, mill operators, brokers, retailers and exporters and the study has expected the imperatives confronted by agriculturists such as need of capital and capacity offices. Encourage it was fulfilled that more than 50 per cent of rice after collect is transported through dealers and agents and 6% through cooperatives and the tax boundaries act as trouble for preparing businesses in creating nations.

Hellin and Meizer (2006) have talked about the procedure for value chain investigation. The work open the instruments of value chain investigate such as the mapping of the advertise to build an understanding of diverse players within the seed input and item yield chain and affiliations between them. It had supported the utilize of member investigation, semi-structured meet and focus gather meetings beside surveys to attain a quantitative evaluation of larger-scale designs, patterns and connections among diverse value chain performing artists.

McCarthy et al. (2008) worked on value chain assessment of wheat and rice in Uttar Pradesh in which foundation discoveries and proposals were displayed. The think about distinguished the major on-screen characters within the rice and wheat value chains, portray the part played by each performing artist and worked out the financial matters of each performing artist from input provider to retailers with reference to wheat. It has developed an value chain outline containing various performing artists included within the value chain and appeared the linkage potential between performing artists of value chain additionally considered the relationship and administrations of supporting markets. The think about concluded that there was need of the both level and vertical linkages within the exchanging work of the value chain

A comparative case study of high-value vegetable value chains in Nepal by USAID (2008) stated value chain examination is conducted for an assortment of purposes. The essential reason of value chain examination, in any case, is to get it the reasons for wasteful aspects within the chain, and recognize potential use focuses for progressing the execution of the chain, utilizing both subjective and quantitative information. Value chain investigation encourages an moved forward understanding of competitive challenges, makes a difference within the recognizable proof of connections and coordination instruments, and helps in understanding how chain on-screen characters bargain with powers and who oversees or impacts the chain. The value chain system looks for to overcome these imperatives by recognizing diverse entry-points and linkages that little and medium ventures can use in a given generation or supply chain

Emongor et al. (2009) worked on the rice value chain in Kenya with reference to rice makers. The comes about appeared that at the maker level, rice generation required seriously utilize of cultivate inputs such as work, fertilizer and seed which most agriculturists were not utilizing ideally since of tall costs included. It has anticipated the rice value chain outline appearing item streams and on-screen characters included within the chain. The most on-screen characters within the rice value chain in Kenya comprised of particular input and service providers, essential makers, calculated centers and businesses, dealers and last customers. The foremost vital imperative for the rice ranchers was need of credit (31.1 %), lacking water supply (20.3%), destitute water system framework (12.2 %), maladies (5.4 %), and destitute costs of paddy (5.4 %).

UNIDO (2009) Stated in their working paper on agro-value chain analysis and development, mapping a value chain facilitates a clear understanding of the sequence of activities and the key actors and relationships involved in the value chain. This work out is agreed out in qualitative and quantitative conditions during graphs presenting the assorted actors of the chain, their linkage and all operation of the chain from pre-production (supply of inputs) to trade processing and promotion

Kumar et al. (2010) worked on value chain examination of coconut in Orissa. It has found that the cost and showcase edges computed at distinctive stages of chain reflected the value expansion through different members along the chain. The foremost unmistakable channel recognized for showcasing of coconut in Orissa was: Agriculturists - Sellers – Aggregators - Retailers - Buyers.

According to Bezabih and Mengistu (2011) on their study on potato value chain investigation in Tigray and SNNP locale show that generation of potato is both for seed as well as utilization. The major potato value chain performing artists incorporate input (seed, fertilizer, fungicide, cultivate, execute) providers, makers, wholesalers, brokers, retailers and buyers. They consider too, expressed that the potato value chain is obliged by deficiency of made strides and quality seed, moo abdicate, moo water system office, destitute infection control, less focused on to seed generation, perishability, capacity office, moo expertise in post-harvest administration, need of capacity office, need of preparing offices, moo expertise and innovation for handling, brokers obstructions within the advertise and dealers smothering of potato cost contrasts.

Ghoshal (2011) worked on value chain examination of paddy in Andhra Pradesh. The study was centered on the patterns and issues from agriculturist to customer tossing light on the cost edges of distinctive performing artists included within the add up to paddy value chain. It has detailed the share of distinctive on-screen characters within the value chain, with ranchers (33%) distributer (15%) mill operator (24%) and retailer (28%).

Kodigehalli, (2011) in his study on value chain investigation of coffee states that value chain examination shapes an vital apparatus to look at basic alter. The investigation of these structures answers a set of questions like how does the generation handle take put?, who takes an interest at which arrange?, where do the diverse stages take put?, how are they connected, who has which benefits?, etc. These answers are required to discover the related focuses of intercession for an effective integration of destitute populace segments

Fearne et al. (2012) describes in their study on measurements of maintainable value chains: suggestions for value chain investigation, there are noteworthy contrasts between value chain and supply chain rationalities. The objective of supply chain administration is to decrease costs, increment edges, and increment advertise share; that of value chain administration is to include value and section the advertise with separated items planned to extend profitability at all stages within the chain. In addition, whereas the center of supply chain administration is Asian Diary of Advancement and Arrangement (2016) 5.2:116-128 123 on effectiveness, advertise get to, and expanded conveyance, the accentuation of value chain administration is on quality, benefit, and agility with conveyance decided by customer request instead of capacity utilization

A guide to market oriented extension services with special reference to Ethiopia by Gebremedhin et al.(2012) depict that mapping the value chain makes a difference to distinguish value chain performing artists, benefit suppliers, their parts and capacities; the different channels of item streams the stages included within the value chain recognize the area and position of specific chain performing artists of interest and visualize networks to induce distant better stronger understanding of associations and interdependencies between on-screen characters and processes in a value chain, distinguish limitations and openings at different stages of the chain. The mapping handle is additionally critical in 7 illustrating related between actors and forms within the value chain. The mapping handle advance makes a difference to make mindfulness of partners to see past claim association within the value chain.

Reshmi and Nandini (2013) conducted their study on Helpful value of Indian Therapeutic Rice (*Oryza Sativa L.*) Cv. Njavara to discover out the restorative value of restorative rice Njavara. The rice was secured from Rice Inquire about Station, Moncompu for the study. A nourishing trial for 3 months was conducted among five subjects who were diabetic and willing to take part but not on medicine, for evaluating the viability of Njavara on the blood sugar levels. Blood sugar levels were checked amid 0, 45 and 90th day of supplementation. The comes about uncovered that for all subjects' blood sugar levels diminished after supplementation think about. Diphenyl picryl hydrazyl



(DPPH) radical rummaging movement, hydroxyl radical rummaging action, superoxide anion radical rummaging movement and Vitamin E level were moreover discovered.

Almaz et al. (2014) utilized value chain approach to consider on imperatives of vegetables in Ethiopia in point of view of sexual orientation. The finding of think about show that onion and tomato value chain is complicated by considerable issues counting; moo surrender, need of generation and showcasing expertise, need of capital, contaminated (destitute quality of seed), need of advertise data, brokers ruining decency cost, incapable to have great vegetable showcasing arrangement, issue of country street get to, capacity issue, dishonorable shading and need of request. The efficiency level of onion and tomato within the ponder region is underneath its potential. Female-headed makers had moo surrender compared to their male partners. The study prescribed giving due consideration required for vegetable showcasing and generation in any on-going and future vegetable improvement arrange.

Rahana (2014) the study entitled value chain investigation of turmeric in pazhayanur piece of Thrissur area was conducted with the objective of to outline the distinctive components and partners in value chain of turmeric ,to dissect the dissemination of benefits at each level of value chain of turmeric. The think about was based on both essential and auxiliary source of information. The collected information was dissected by utilizing the instruments like value chain mapping, rate analysis, and rank arrange scale. value chain mapping was made by analyzing the different measurement like center forms within the value chain, performing artists included in turmeric value chain, particular exercises of center forms, stream of items, data and information, volume of item, topographical stream of item, values at distinctive levels of value chain, sort of relationship and linkage exist and mapping the limitations and potential arrangement. At each level, actors are adding values to the product. Turmeric cultivation in the study area gives a good return to the farmer because of the subsidy from Krishi Bhavan. Farmers face a lot of problems in production stage which include erratic climate condition, low productivity and yield, small size of land holding and lack of scientific technology. Institutional support to farmers in input provision and marketing of turmeric is the major solution for the problems.

Elvira (2016) has appeared in her consider that, value chain examination is a successful way to look at the interaction among distinctive players in a given industry. In spite of the fact that all commerce firms are portion of the value-creating arrange, a few firms have more prominent impact than others. R&D proficiency, as assessed inside the value-chain system, does not relate to operational proficiency or mechanical commercialization proficiency. Fundamentally, Porter's value chain

show gives valuable but as it were fractional understanding of value creation in supply chain relationship. Mechanical overhauling within the setting of worldwide value chain emphasizes the significance of worldwide linkages. Porter's "closed-economy" show has not practically taken into thought globalization that expanded the portability of exchange, speculation and information past national borders

Shihabeldin (2016) pointed at tending to the examination of value chain of Sudan Dairy industry. Sudan has been confronting bounty of challenges in terms of their dairy industry, it being the center winning source for their individuals. This significance is obvious within the amount and representation of value chain components spoken to by makers and industry that they are particular, without considering the wholesalers. The integration of markets and legislative bolster for the nation would make an expanding standardization of requests buyers, the spread of productive action around the world. The efficient move within the dairy industry would start to create universal strategies focusing on the specifics of distinctive districts in which they work. Hence, distant better stronger and improved value chain method would emphatically complement the Sudan dairy industry, blessing their individuals with superior business openings as well. The investigate approach utilized within the paper is based on auxiliary subjective plan.

Gaurab (2017) in his think about on value chain investigation of coffee generation in central Nepal, recognized the key players of coffee value chain as input providers – providing seedlings and other inputs; coffee makers – creating new cherry; pulping administrators – creating dry material; auxiliary processors – creating green beans and other mediator & last coffee item; showcase performing artists – conveying it to shoppers; and customers – drinking coffee. Too recognized four promoting channels to begin with, catering to 0.15% neighborhood request. Moment channel collected 21.30% of new cherry and contributed 24.50% share in household showcase through private preparing centres. Third and fourth channels expended 76.66% of the new cherry and contributed 27.55% and 47.80% of household and trade request through cooperatives possessed handling centres.

The study on cassava value chain mapping and gender role analysis in Southeast Nigeria by Osuji et al, (2017) was conducted with the objective to outline the cassava value chain and to analyze the gender roles. A multi-stage examining procedure was utilized to choose 288 respondents which incorporate cassava makers, processors and marketers. Center gather discourse (FGD) and personal interview were utilized to gather essential information. Information were analyzed utilizing the utilitarian examination apparatus, subjective explanatory device and tables. The major findings were

that lion's share of the makers don't source for inputs and actualizes from recognized source operator (input providers).

The study on mapping of value chain of paddy in Thrissur district by Keerthi (2018), conducted with the objective of mapping value chain of paddy, distinguishing the components affecting choice of value chain of paddy, analyzing cost spread productivity and variables impacting it and distinguishing intercessions fundamental to progress value chain of paddy. The test respondents comprise of 30 agriculturists, one mill operator, one specialist, five distributor and three retailers. The collected information were dissected with the assistance of value chain mapping instrument, altered advertise effectiveness, rate investigation, file strategy and chi square test. The mapping of paddy value chain uncovered that the core prepare included within the chain like input supply, generation, acquirement, handling, showcasing and utilization. On-screen characters, accessibility of inputs, holding capacity, time required for realization of installment and item adequacy were taken as the variable for recognizing the calculate affecting the choice of value chain of paddy. Four marketing channels were identified they were I- farmer- agent- miller- wholesaler- retailer- consumer, II- farmer- miller- wholesaler- retailer- consumers, III- farmer- consumer and IV- farmer- Supplyco- PDS- consumers. The problems faced by actors were analysed, labour shortage, attack by pest and diseases and lack of fair price in marketing of produce was the major problems faced by the farmers. Non availability of demanded variety in the market and higher storage expenses were the problems faced by millers and agent. The development and dissemination of good quality seeds and fertilizers will be continued by the institutions, timely distribution of seeds, training programmes, availability of machineries and setting up of rural godowns and labour bank were the major area of intervention necessary to improve the value chain of paddy.

### **2.3 Studies on agricultural value chain**

According to promotion of private sector development in agriculture (PSDA) (2006) rural value chains connect urban utilization with rustic generation. Changing request, as a result of urbanization, development of advanced utilization designs or unused patterns in worldwide exchange, impacts on provincial ranges along value chains and spills over to promoting and generation frameworks.

Bammann (2007) depicts that agrarian value chains can incorporate three or more of the taking after: makers, processors, wholesalers, brokers, wholesalers, retailers and buyers. The accomplices inside the value chain will work together to recognize targets and are willing to share dangers and benefits and will contribute time, vitality and assets to create the relationship work. The

administrations given by different on-screen characters who never specifically bargain with the item, but whose administrations include value to the item. Value chain influencers: The administrative system, arrangements, frameworks, etc.

Anandajayasekeram and Berhanu, (2009) expressed an rural value chain is ordinarily characterized by a specific wrapped up item or closely related items and incorporates all firms and their exercises locked in in input supply, generation, transport, preparing and showcasing (or dissemination) of the item or Items. Rural value chain examination could be a energetic approach that looks at how markets and businesses react to changes within the residential and worldwide request and supply for a product, mechanical alter in generation and showcasing, and improvements in organizational models, regulation courses of action or administration procedures.

Trienekens (2011) in his paper on rural value chains in creating nations a system for examination displayed a system for creating nation value chain examination which was made up of three components. The primary comprises of distinguishing major imperatives for value chain updating: showcase get to confinements, powerless foundations, missing resources and organization voids. Within the moment component, three components of a value chain were characterized: value expansion, even and vertical chain-network structure and value chain governance instruments. At long last, overhauling alternatives were characterized within the region of value expansion, counting the explore for markets, the value chain- organize structure and the administration frame of the chain. The three components of the system were inferred from major hypothetical streams on intercompany connections and from the writing on creating nation value chains.

#### **2.4 Studies on medicinal rice and its health benefits**

Rohman et al., (2014) considered on rice in wellbeing and sustenance, rice is one of the foremost critical cereal crops and dietary staple nourishment, particularly for individuals in Asia. Rice bran will produce rice bran oil and defatted rice bran. Defatted rice bran constituent comprise a number of polysaccharide and dietary fiber that bolster in cancer and cardiovascular eat less treatment. These surveys will cover a few unused investigate data on rice, rice bran and rice bran oil, particularly within the organic exercises and wholesome angles to human.

Study on health benefits of traditional rice varieties of temperate regions plants by Bhat and Riar (2015) outlines that rice is the driving trim delivered and expended on a expansive scale within the state of J&K (India). It may be a steady nourishment of the tenants dwelling within the domical, and is dynamically wealthy in hereditary differing qualities. Rice generation is the central movement and

a major source of salary for the State. Conventional rice assortments have an improving potential in wide extend of neutraceutical and useful nourishments. Other than having therapeutic and wholesome properties, the remaining by-products gotten from these rice assortments in different post collect operations are similarly profitable.

Lisha (2016) in her study on an analysis of rice cultivation by joint liability groups of Kudumbashree in Palakkad, shows that poverty has been prevailing as a social and economic condition that exists throughout the country. The central government has been taken several measures to tackle this issue. Each state has recommended and implementing their own poverty eradication missions. One of the most successful state poverty eradication missions is that of Kerala known as Kudumbashree. Kudumbashree as a state mission has been working with the main purpose of poverty eradication through women empowerment, relentlessly for the past 19 years. The formation of Joint liability groups was one of the recent developments and flagship efforts of Kudumbashree, which can then function as self employing enterprises. Collective Farming initiated by Kudumbashree in Kerala state in India is a fine example of grass root level interventions making remarkable difference in the local agrarian landscapes. This provides a stimulating model of sustainable intervention through the livelihood programmes that suit the local geographic, demographic, social and economic realities. The project focuses to go long way in order to make its impact felt deeply and substantially in the region, the extent to which it has been implemented marks extraordinary degrees of success. The rice cultivation can be built into a successful and enthusiastic women led enterprise in Palakkad district with a few more initiatives from the women and persistent effort from the administration.

Malathi et al., (2016) a molecular docking and dynamics study on ethyl iso-allochololate from a medicinal rice karungkavuni inhibits dihydropteroate synthase in escherichia colistated that rice (*Oryza sativa*) is the grain of life and it is one among the most cereal crops and it is the staple nourishment for most of the world's populace. The separated compounds with detailed antimicrobial action are subjected to atomic docking strategies to get it the authoritative conduct of the ligands with the target. Our investigation uncovers that, ethyl iso- allochololate and 9,12,15-octadecatrienoic corrosive- 2,3-dihydroxypropyl ester as the most excellent authoritative compounds. Molecular dynamics studies reveal dihydropteroate synthase-ethyl iso -allochololate complex is more stable than other ligands throughout the simulation. Our study demonstrates that ethyl iso-allochololate compound isolated from "Karungkavuni" can serve as a potent inhibitor for dihydropteroate synthase

Selvarajan, et al., (2016) in their study on impact of rice assortments in diabetics among Indian populace appears that the rate and burden of diabetes is disturbing all over the world. In later days diabetes is making untoward happenings in India, in show disdain toward of Indian culture and convention. A few formulas and nourishment propensities are beneath hone in Indian landmass, particularly in south India. Westernization has affected not as it were the eat less, but took the life fashion of Indian populace. Concurring to antiquate Indian compositions “food is medication and pharmaceutical is food”, which suggests that, appropriate dietary propensities underpins for sound living. Among the assortment of cereals, rice is the staple nourishment of India, which has near connection with expanding glycemic list in diabetics.

Mohammed Ashraf and Subbalakshmi Lokanadan (2017) in their study on “a review of rice landraces in India and its inherent medicinal values -the nutritive food values for future” depicts that rice being staple nourishment has extra qualities past its nutritive value with tall degree of digestibility and slightest unfavorably susceptible properties compared to other cereal grains. The ruddy rice assortments with engaging ruddy colour, has more complex taste and contains more nourishment, fiber-filled bran compared to ordinary rice.

Keneswary et al., (2018) stated that in their study on “phytochemical profile of brown rice and its nutrigenomic implications” entirety grain nourishments have been advanced to be included as one of the imperative components of a sound eat less since of the relationship between the normal utilization of whole-grain nourishments and decreased hazard of inveterate maladies. Rice may be a staple nourishment, which has been broadly expended for centuries by numerous Asian nations. Ponders have recommended that brown rice is related with a wide range of nutrigenomic suggestions such as anti-diabetic, anti-cholesterol, cardio defensive and antioxidant. Typically, since the nearness of different phytochemicals that are primarily found in bran layers of brownrice.

A study on “effect of pre-processing on the cooking characteristics of Rakthashali rice- a traditional rice variety by Manoharan Durgadevi et.al (2018) portrays that rice is known as the grain of life and cannot be maintained a strategic distance from frame the Asian nourishment menu. Colored rice is more nutritious when compared to white rice. Among colored rice, ruddy rice is accessible as unhulled or somewhat hulled and it includes a nutty flavor and is with tall dietary quality

Prabha et al., (2018) in their study on “rice nutritional and medicinal properties” embody that rice is most far reaching cereal, serving as steady nourishment for roughly half of the worldwide populace. Over 2 billion individuals in Asia alone infer 80% of their vitality needs from rice, which contains

80% carbohydrates, 7–8% protein, 3% fat, and 3% fiber. Particle may have way better physiological compatibility with lesser or no harmful impact. A few inquires about are going on diverse assortments of rice around the globe, number of distributions from a few nations appeared the powerful impact of diverse assortments of rice against diabetes, hyperlipidemia, cancer, irritation etc. Rice has lesser antioxidant power or has less antioxidant particle compared with other cereals. Hence, rice could be a great candidate for common sources of cancer prevention agents and other restorative properties and may hold the potential for the advancement of rice based useful nourishments, drugs, nourishment additive, pharmaceuticals and corrective items.

## **2.5 Price spread and marketing efficiency**

Selvin (1982) in his study on “production and marketing of vegetables in Malappuram district” was embraced to appraise the fetched of development, fetched of generation, benefit-cost proportion, cost spread and to recognize the promoting channels. The study was too pointed at recognizing the issues of the agriculturists. Stratified multistage irregular examining was embraced for the ponder. The overwhelming showcasing channel was makers- wholesalers- retailers- buyers. Almost 50 per cent of the consumers’ rupee went to the go between within the promoting of the vegetables and thus the cost spread was tall. It was moreover found that the benefit edge of mediators were exceptionally tall, demonstrative of promoting wastefulness.

Vinod (1984) in the study entitled cost of cultivation and marketing of pepper in Idukki district was undertaken to identify the cost of cultivation and marketing of pepper. The information for assessing the taken a toll of development was created from multistage arbitrary testing. The taken a toll was examined operation shrewd and input astute. The financial matters of generation were moreover considered by a capital efficiency investigation. Pepper promoting was examined from the level of the makers to the terminal showcase Cochin. The cost spread was arrived by concurrent edge strategy. The fetched of development was found to diminish as the measure of holding expanded. The examination of capital efficiency uncovered that, on the total, speculation in pepper development had a payback period of 10 a long time, the benefit-cost proportion of 1.09. The advertise structure; advertise hones and promoting fetched was investigated decently in detail. The marketing channels identified were channel I: producer- village merchant-upcountry wholesaler-exporter, channel II : producer- upcountry wholesaler-exporter, channel III : producer- village merchant- upcountry wholesaler- internal wholesaler and channel IV: producer- upcountry wholesaler- internal wholesale. The price spread in these four channels was found to be 13.94 per cent, 13.38 per cent, 11.20 per cent and 10.63 per cent in that order.

Kapur (2003) in his study “a diagnostic study report of rice milling industry at Karnal(Haryana), India” identified value addition of raw rice (Grade-A) processing unit as handle fetched which incorporates Rs. 69.6per quintal.(12%) for charges and demands, cleaning, stacking and various costs (Vat-4%, Arat-2.5%, advertise fee-2%,process charge 2%, miscellaneous-1.5%), Rs. 9 per quintal for drying, Rs.20 per quintal for de-husking and cleaning, Rs. 2 per quintal for evaluating. After reviewing surrender of crude rice @ 67% collected value gets to be Rs. 1015.8. Fetched of rice bran (7%) at 500 per quintal. Taken a toll of rice husk (19%) at Rs. 100 per quintal. was Rs.19. Generally net benefit was Rs. 79.2 per quintal

A price spread analysis of coconut in central Kerala by Narayanan and Bastine (2004) uncovered that larger part of the agriculturists sold their deliver within the cultivate itself. The conspicuous showcasing channel distinguished was maker- copra creator- oil mill operator- distributor- shopper. The concurrent edge concept was utilized to recognize the showcasing edge and it was found that producer’s share in consumer’s rupee was as it were 60.58 percent, inferring a tall cost spread.

Gilbert (2007) worked on value chain analysis and market power in commodity processing with application to the cocoa and coffee sectors. The article has pointed to resolve the clear catch 22 that retail coffee and chocolate costs have declined at most unassumingly over the past three decades whereas maker costs for coffee and cocoa have fallen more significantly, coming about in significant falls within the maker shares of retail costs. The most conclusion of the paper is that worldwide value chain examination isn't valuable in clarifying value shares, and undoubtedly, the producer's value share of the retail item isn't continuously a valuable concept. The clarification of declining maker offers is more straightforward - preparing, showcasing and dissemination costs, caused in devouring nations, have tended to extend over time whereas generation costs at beginning have declined.

The department of economics and statistics (ECOSTAT) (2009) has conducted a study on “price spread analysis on coconut in Trivandrum district of the state Kerala” states that the normal cost on one coconut was higher for huge scale cultivators and least cost variety was watched for little scale cultivators additionally cost gotten was higher when it was specifically sold to customers. As the length of the showcasing channel diminishes, the cost variety was found to be moo demonstrating a lesser cost spread. When the showcase channel has five players, the variety in cost per coconut was 1.63 whereas it was 0.92 for a three part channel.

Krishna and Hanumanthaiah (2010) have analysed price spread of cotton in different supplychain in the Warangal district of Andra Pradesh. The study has been conducted among 90 little and medium



agriculturists, and distinguished four major promoting channels of cotton. In supply chain IV, the cotton Enterprise of India (CCI) acquired cotton straightforwardly from the maker and consequently the agriculturist gets the most elevated share of consumer's rupee. The least share was in supply chain I, wherein the town merchant's part was unmistakable. Higher cost and low marketing taken a toll made the larger part of agriculturists to receive supply chain IV.

Chiu et al. (2012) studied the R&D and production efficiencies of 21 Chinese high-technology businesses using value chain data envelopment analysis (DEA) as evaluation framework. This system permitted the estimation of R&D and generation efficiencies in a single execution, comprising of two stages: arrange one includes the calculation of R&D prepare productivity, the yield of which is licenses; licenses in turn serve as inputs to organize two, which includes the calculation of generation proficiency. Discoveries from the think about appear that R&D proficiency does not relate to operation effectiveness. The extra value of development and R&D in operation execution isn't satisfactorily clear among most of the high-tech businesses.

Deepa et al. (2012) studied "characterization of antioxidant compounds and antioxidant activity of Indian varieties. In this study she clarify that pigmented rice assortments (Njavara and Jyothi) had tall antioxidant exercises than non-pigmented assortment (IR-64). Njavara appeared higher decreasing capability and higher dissolvable (15- 46%) and insoluble phenolic acids (51%-75%) compared to Jyothi and IR 64. Phenolic acids particularly ferulic and p-coumaric corrosive were in higher concentration and the concentration of dissolvable and insoluble frame of ferulic corrosive was 33-66% and 51% -75% higher individually than non-medicinal rice.

Helga Joshua (2012) in his study on "an exploration of the changing production and consumption System of Navara" explores the system of production and cultivation of Navara in Kerala. It explores the changes that have influenced the rice over the past era, and explicates the reasons behind numerous of these changes. This consider gives a more profound understanding of how the Navara framework has adjusted to changes in socio-economic conditions over the past decades, in this way giving a few knowledge into what end of the of this rice might see like. Njavara will proceed to confront challenges in terms of keeping up realness whereas too adjusting to changing conditions of rice development in Kerala. The parts of Navara in therapeutic arrangements and in devout ceremonies represent a few of the social conventions worth protecting and keeping up this rice assortment. Protecting the rice requires preservation of the plant by keeping up the relationship between agriculturist and the seed, but it moreover requires proceeded acknowledgment of the significance of Navara for the individuals included in its chain.

Umagwori (2012) in her study on “an economic analysis of value chain of banana in western Tamil Nadu” enlighten that banana farming has become an important source of income for millions of rural families and provides employment for more than a million. The show consider was attempted to get it thevalue chain of banana division in western Tamil Nadu. Taken a toll, returns, post-harvest misfortunes, cost spread and promoting effectiveness lists were worked out and examined for distinctive assortments of banana — Nendran, Poovan, Kathali and Robusta.

Devi and Saika (2014) in their study entitled “Price spread and market margin of fish in Ujanbazar fish market of Guwahati, Assam’ recognized three sorts of players within thevalue chain viz, merchants, wholesalers, and diverse sorts of retailers extending from expansive retailer offering 30-50kg angle to little retailers and angle vendors who offer angle at the entryway step of consumers. The shoppers have to be bear the fetched of showcasing included like fetched of ice, transportation, and work charges within the cost and commission of the dealer.

Kumilachew et al. (2014) stated in their study on “risks in vegetables production from the perspective of smallholder farmers Kombolcha Woreda, Oromia Region, Ethiopia” dangers in vegetable generation from the point of view of smallholder farmers“ comes about recommend that generation and cost dangers were by and large seen as the foremost imperative sources of dangers. Of all the chance sources, yield cost vacillation, dry spell, pests/diseases, termites/insect assault, tall costs of inputs, flood/high precipitation, illness/injury/death of operator/member, changes in family relations, robbery, struggle and savagery, changes in approach and rules, and tall fetched of credit were of vital concerns in that arrange of significance.

Price spread and marketing efficiency of tomato in Rajasthan was studied by Meena and Singh (2014). They have recognized two noticeable advertise channels. Channel I with producer’s share in shopper rupee of 52.73 per cent was more effective when compared to channel II, where because it was 47.27 percent. Add up to fetched of promoting in channel I and channel II were 18.21 per cent and 18.40 per cent separately. Showcasing edges of 34.33 per cent in channel II and 29.06 in channel I was generally disseminated among the middle people.

Radhika (2014) studied economic analysis of production and marketing of Kaipad paddy in Kannur district, attempted with the objective of working out the taken a toll and returns of Kaipad paddy development, assessing the size and the components contributing to the abdicate hole, recognizing the showcasing channels and cost spread totally different channels, discover out the limitations in generation and showcasing of Kaipad paddy and recording the social hones of Kaipad paddy

development. Essential information collected from farmers, traders and advertise mediators. The ranchers within the consider range were categorized into five bunches such as agriculturists developing conventional assortment, agriculturists developing conventional Kaipad and shrimp in arrangement, ranchers developing HYV, ranchers developing HYV and shrimp in grouping and paddy agriculturists from non saline range adjoining to KaipadFour marketing channel were identified; I – farmer- rice miller- retailer- consumers, II- farmer- local agent- rice miller- retailer- consumer, III- farmer- local agent- padasekara samithi- consumer and IV- farmer- consumer. Different constraints in production and marketing of paddy were identified and ranked using Garrett ranking technique.

Fathimath (2017) in her study on “market access to quality paddy seed in Kerala” was undertaken in three major rice growing districts in Kerala namely: Palakkad, Alappuzha and Thrissur. From each locale one square having most extreme zone beneath rice development was chosen and from each square two Panchyat were haphazardly chosen. Essential information collected from 60 ranchers and 60 rice seed producers within the chosen panchyat. Rice seed supply chain in Kerala can be broadly classified into formal and casual framework. The formal rice seed supply framework comprises institutionalized rice seed supply component. Major formal rice seed supply chains distinguished were Kerala State Seed Improvement Specialist rice seed supply chain. KAU rice seed supply chain and National Seed Organization rice seed supply chain. Commission on Agrarian Fetched and Cost (CACP), fetched concept and Advantage Fetched apportion were utilized to recognize the financial execution of rice seed generation beneath the distinguished supply chain. Constraints faced by the rice farmers in access to quality rice seed was analysed using Garrett ranking technique. Timely availability of rice seed was the major constraint followed by poor rice seed quality. Lack of timely procurement and payment was the major constraint faced by seed growers.

## **2.6 Constrains faced by farmers**

Prakash (1989) considered successive examination of imperatives in expanding generation of rice and coconut in Kerala. The study pointed at distinguishing the generation limitations of rice and coconut and measuring the legitimacy of recognized imperatives in chosen generation centres. The arrangements to the distinguished imperatives were too collected and their achievability appraised in arrange to define suitable advancement techniques for expanding generation of rice and coconut in Kerala. The ponder was conducted in all the NARP locales of the state, specifically, Southern, Central, Northern, Tall Run and Issue Locales. The respondents of the ponder comprised of 160

ranchers each for the distinguishing proof and approval of imperatives and 100 Investigate laborers, 100 Expansion laborers and 57 Input offices for the distinguishing proof of imperatives. To identify the production constraints of rice and coconut, Delphi technique – the methodology for elicitation of expert opinion was used. Data from the farmer's collected using pre tested interview schedule. Change of lands, dry season and need of water system were the major generation limitations of rice positioned agreeing to their significance within the southern locale whereas non accessibility of cultivate yard fertilizer (FYM), moo benefit and tall taken a toll of generation were the constraints positioned tall within the central locale. Tall challenges in development, non availability of FYM and fracture were the limitations within the northern locale. Tall wage rate, obligation and high taken a toll of generation were positioned tall in tall extend locale. Within the issue locale surges, moo productivity and tall fetched of FYM were positioned generation limitations.

Aswathy Ashok (2014) in her study, Value chain management of virgin coconut oil – a case study on golden vintage farmers industry, Koratty, Thrissur district, identify various components in value chain of coconut. Linkages among diverse performing artists in coconut generation, preparing and showcasing operation of virgin coconut oil in Thrissur locale and get it the diverse fetched and returns included within the each step of value chain of virgin coconut oil. The testing outline taken for the investigation is 15 agriculturists, 1 handling unit, 1 private operator and 10 buyers. The information were produced by person interview using organized survey. The most market participants for virgin coconut oil value chain within the area amid the study period were ranchers, processors, operators and shoppers. Other than, a noteworthy sum of virgin coconut oil delivered I channeled specifically to customers from processors. The virgin coconut oil showcasing execution was moreover measured utilizing showcasing edges complemented with investigation of fetched and net benefit created by distinctive value chain performing artists. From the study, the major problems of production identified, availability of raw materials, packing materials, high labour cost, lack of promotional activities and high transportation cost.

Lakshmi Priya (2014) in her study entitled value chain analysis of cowpea in Nagalassey grama panchyat of Palakkad district, attempted with the objective of distinguishing different partners within the cowpea value chain and mapping the value chain. The think about was primarily based on essential information. Five actors are included within the value chain of cowpea and they are input providers, ranchers, wholesalers, retailers and buyers. Agriculturists were chosen utilizing arbitrary examining strategy. The calculations were made from the information collected amid the study period. Socio financial profile of the partners, generation, obtainment, and promoting subtle

elements were dissected in spite of the fact that rate strategy. For analyzing the collected information rate examination, recurrence and rank arrange scale were utilized. Edges of distinctive players were too calculated and retailers get most elevated edge taken after by agriculturists. All the performing artists of value chain are confronting numerous limitations with respect to the input supply, development, credit/finance and showcasing. Government ought to take compelling measures for fathoming all these problems. Even though there are having demand and all the factors are favoring the technique and marketing of value added products have to be initiated.

Meera kumara *et.al* (2015) in their paper attempts to analysis problems and prospects of maize crop in eastern zone of Bihar. The study was based on essential as well as auxiliary information. Information were collected through a symptomatic overview of the farmers/growers, dealers and maize processors within the state in arrange to think about existing development and post collecting hones, capacity frameworks, maize entries and cost developments, showcasing channels,value chains etc. and recognizing the components obliging the development of the division at diverse levels of generation and marketing. Major organization limitation was village's network with showcase which influences agriculturists of town. Need of proper promoting office within the study area was major showcasing limitation which could be a awesome baffling figure for the maize cultivators within the ponder zone of inquire about. Possibilities of building storage capacities in PPP format should be considered. Optimum utilization of nutrient based fertilizers should be used. Farmers must be are of low cost irrigation technology like drip and sprinkler irrigation system

Ashly (2017) studied value chain analysis of coconut based food products in Thrissur district. The study was taken up in arrange to recognize the value chains, cost spread, productivity and showcasing proficiency of coconut based value included nourishment items utilizing the value chain examination system. The think about too centered on the limitations confronted by different chain players and measures for moving forward the execution of the chains. The study was conducted in Thrissur locale of Kerala and four items chosen for the study were coconut oil, virgin coconut oil, dried up coconut and coconut chips. Center bunch discourse was held to recognize the key chain on-screen characters included in value chain. Study strategy utilized for the essential information collection. Master suppositions were too utilized for arriving at conclusions. The value chain outline of each item was arranged counting the item and by item streams. The most chain players included were rancher, town dealers, copra dealers, processors, wholesalers, retailers, exporters, and buyers. Coconut oil value chain included nearly all chain players. But for coconut chips large buyers like wholesalers were not present. The investigation of promoting fetched appeared that the

taken a toll included were exceptionally less where the pointless brokers were slightest included or truant. Cost spread examination has appeared that virgin coconut oil has the most reduced producer's share in customer rupee though the producer's share in customer rupee was most noteworthy in coconut oil. Most reduced showcase cost expanded work charges, expanded fetched of generation and work deficiency were the major issues confronted by the cultivating community. Item particular limitations confronted by fabricates were inaccessibility of adequate quality crude nut and copra. Budgetary imperatives, contaminated and cost recognized as the major imperatives confronted by the wholesalers.

## CHAPTER III

### MATERIALS AND METHODS

The present study entitled “Value chain analysis of medicinal rice in Kerala” is aimed to map the value chain of medicinal rice in Palakkad and Malappuram districts in Kerala, to identify and explore the various chains and actors involved in the value chain, price spread efficiency and factors influencing it, to identify the constraints and possible solutions at different levels in the value chain. The methods used to study these objectives are explained in this chapter.

#### **3.1 Concepts used in the study**

##### **3.1.1 Value chain**

Value chain is the full range of activities including design, production, marketing and distribution – business conduct to bring a product or services from conception to delivery.

##### **3.1.2 Value chain mapping**

Value chain maps graphically outline all of the components and relationship between them, of the chosen value chain. It could be a visual device that makes a difference to get it how an item in an industry moves from crude fabric through generation, handling, and other steps until it in the long run winds up with customers.

##### **3.1.3 Core process in the value chain of paddy**

Basic process includes process from input of raw materials used for cultivation into output.

#### **3.2 Medicinal rice**

Each Indian state has its own unique varieties of medicinal rice over centuries and well fitted into its specific ecological niches. It is mature beneath miscellaneous cultural environment and greater than large geographical range. The slogan ‘Rice is Life’ is more proper for India as this crop plays a crucial role in our National food refuge and is a means of livelihood for millions of rural households. India has a wealth of medicinal plants, most of which have been traditionally used in Sida, Ayurveda and Unani systems of medicines

Navara rice and Rakthashali rice are the prevalent assortments in Kerala state. Rakthashali could be a uncommon ruddy rice assortment. It is additionally called “Chennellu”, is broadly said in puranas and old content of Ayurveda having tall restorative esteem. Ayurveda says this assortment of rice, dating its utilize back to more than 3,000 a long time, is sweet for dosha, such as Vatha, Pitha, and

Kafa. Among the different restorative rices, Navara may be a special grain plant within the Oryza sort innate to Kerala, broadly utilized within the Ayurvedic framework of medication, particularly in Panchakarma treatment. It is well known in Ayurvedic treatments for treating loss of motion and certain neurological disarranges

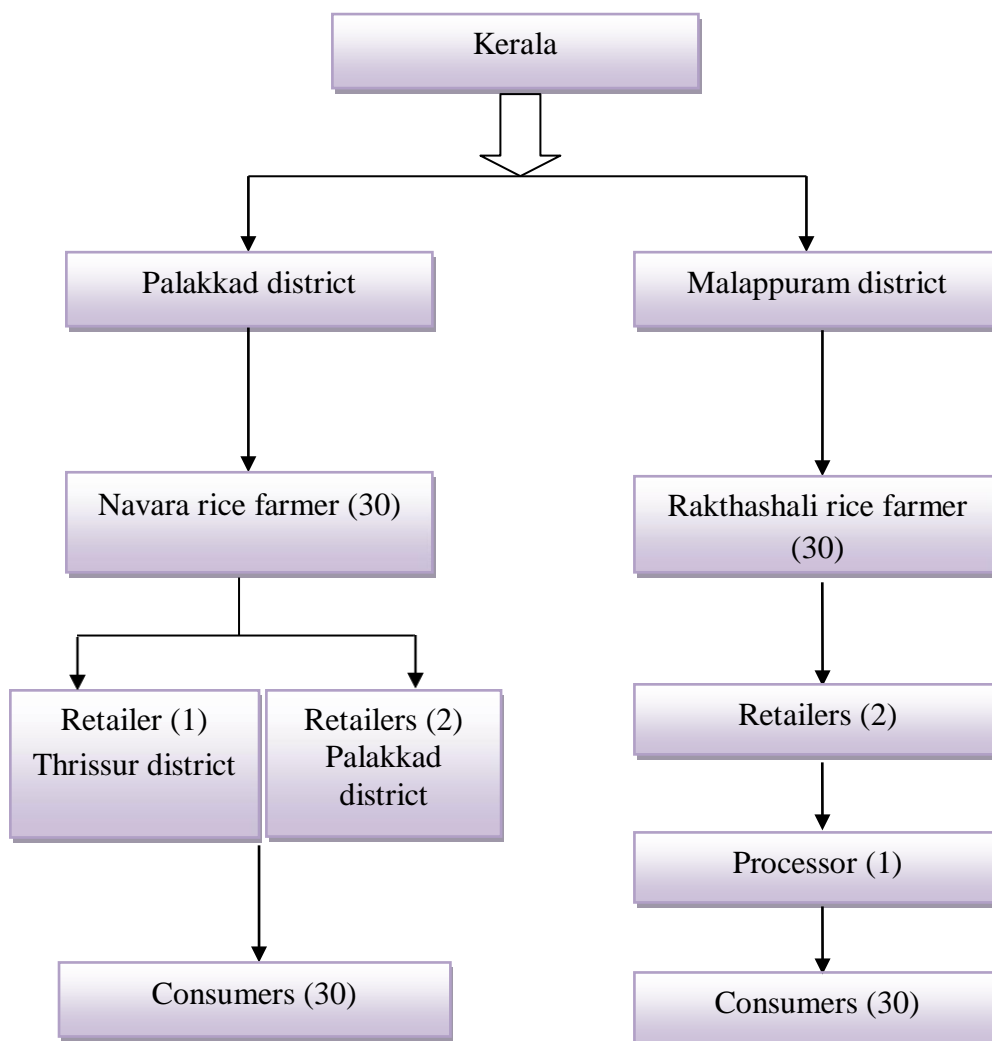
### 3.3 Location of the study

The study area confined to Palakkad and Malappuram district of Kerala. These districts were selected based on the highest number of Navara rice farmers and Rakthashali rice farmers.

### 3.4 Source of data

Both primary and secondary data were used in the study

### 3.5 Sample design





The study was confined to the state of Kerala. Both primary and secondary data were collected from Palakkad and Malappuram districts of Kerala. Primary data were collected from 60 farmers (30 each from the selected districts) and 60 consumers (30 each from selected districts) using snow ball sampling. Sample from the rest of the actors in the value chain was selected based on the information received from farmers, processors, marketers and consumers. Secondary data were collected from Department of Agriculture, Kerala, KVKs, District and Block level offices in the two districts of Kerala and relevant Krishi Bhavan. Value chain mapping tool and other appropriate tools will be used in the study.

### 3.6 Variables measured

Variables for each objective were listed out based on the reviews of literature. Objectives of the thesis and variables were listed below

**Table 3.1 Variables and tools used for analyzing the objectives**

Objectives	Variables	Tools
To map the value chain of Navara rice and Rakthashali rice	<ul style="list-style-type: none"> <li>▪ Core process</li> <li>▪ Actors involved</li> <li>▪ Flow and volume of products</li> <li>▪ Information, knowledge and services</li> <li>▪ Institutional linkages</li> <li>▪ Geographical flow</li> <li>▪ Value addition at different levels</li> <li>▪ Constraints faced by actors</li> <li>▪ Value chain map matrix</li> </ul>	Value chain mapping tool
To identify and explore the various chains and actors involved in the value chain	<ul style="list-style-type: none"> <li>▪ Actor profile</li> <li>▪ Production and productivity of Navara rice and Rakthashali rice</li> <li>▪ Cost and income of the actors</li> </ul>	Percentage analysis, indices, Kruskal walli test

	<ul style="list-style-type: none"> <li>▪ Marketing channels</li> <li>▪ Availability of inputs</li> <li>▪ Promptness of payment</li> <li>▪ Awareness and satisfaction of the consumers</li> </ul>	
To analyse the price spread efficiency and factors influencing it	<ul style="list-style-type: none"> <li>▪ Cost and returns of farmers</li> <li>▪ Retailers</li> <li>▪ Consumers</li> <li>▪ Price spread</li> <li>▪ Marketing efficiency</li> </ul>	Price spread, marketing cost, marketing efficiency, marketing margin, producer's price, marketing margin of middle men.
To identify the constraints and possible solutions at different levels in the value chain	<ul style="list-style-type: none"> <li>▪ Adequacy</li> </ul>	Indices, Kruskal Wallis test

### 3.7 Data analysis

The collected information were examined with suitable measurable instruments for each objective. Esteem chain mapping instrument by Gereffi and Korzeniewicz in worldwide approach were utilized to outline the value chain. The examination of cost spread productivity was done by calculating cost spread and promoting effectiveness, Achary's strategy. The imperatives within the value chain were dissected utilising indices. The brief description of the tools used are as follows:

#### 3.7.1. Producer's price

Net price received by the farmer at the time of first sale is known as producer's price.

#### 3.7.2 Producer share in consumer price

It is the price received by the farmer expressed as a percentage of the retail price.

$$Ps = ( Pf / Pr) 100$$

Ps = producers share in consumer price

Pf = price received by farmer

Pr = retail price

### 3.7.3 Marketing margin of middleman

Middlemen margin = sales price – (purchase price + marketing cost + loss in value if any)

It is the difference between the total payment and receipt of the middleman.

### 3.7.4 Marketing cost

It refers to cost incurred by producer-seller from point of production to sales.

### 3.7.5 Price spread

It is the difference between price received by the producer and price paid by the consumer

**Price spread (Ps) = Pp – Pf**

Pp – price paid by ultimate consumer

Pf – price received by the producer seller

### 3.7.6 Marketing margin

Difference between marketing cost and selling price

**MM = SP – MC**

MM = marketing margin

SP = selling price

MC= Marketing cost

### 3.7.7 Modified marketing efficiency (Acharya's method)

It is the ration of price received by the farmer to marketing cost and marketing margin.

Modified marketing efficiency (MME) = 
$$\frac{Pf}{MC + MM}$$

Pf = price received by the farmer

MC= marketing cost

MM= marketing margin

### 3.7.8 Problem index

Index was calculated based on Likert scale of summated rating

$$\text{Index} = \frac{\sum_{i=1} \sum_{j=1} \sum_{ij}}{\sum_{\max} S_j}$$

i = respondent

j = factor

S<sub>ij</sub> = total score of the j<sup>th</sup> factor of i<sup>th</sup> respondent

Max s<sub>j</sub> = maximum score of j<sup>th</sup> factor

### 3.7.9 Kruskal-Wallis test

The Kruskal Wallis test by ranks, Kruskal Wallis H test (named after William Kruskal and W. Allen Wallis), or one way ANOVA on ranks is a non parametric method for testing whether samples originate from the same distribution. It is used for computing two or more independent samples of equal or different sample size. It extends the Mann- Whitney U test, which is used for comparing only two groups. The parametric equivalent of the Kruskal-Wallis test is the one way analysis of variance (ANOVA).

$$H = \frac{12}{N(N+1)} \left( \sum \frac{(T_g)^2}{n_g} \right) - 3(N+1)$$

n = sum of sample sizes for all samples,

T<sub>g</sub> = sum of the ranks in the g<sup>th</sup> sample,

N<sub>g</sub> = sample size of the g<sup>th</sup> sample.

### 3.7.10 Cost calculation

#### (a) Concepts of cost

Cost incurred for growing the selected crops are classified under cost A, cost B and cost C and the data analysis of the data made as:

Cost A: all kind of expenses (paid out costs) actually incurred by the cultivators includes:

- Hired human labour
- Animal labour
- Machine labour
- Seed/ seedlings
- Farm yard manures and chemical fertilisers
- Plant protection
- Repair and maintenance charges of implement, machinery and buildings
- Other expenses.

Cost B1: Cost A + interest on fixed assets (excluding land)

Cost B: Cost B1 + interest on fair value of land

Cost C: Cost B + imputed value of family labour

#### **(b) Procedure for imputation of values of owned inputs**

In the production process, certain inputs from stocks are used. In order to estimate the cost, the value of input used out of home stock is imputed. The procedure was used for the imputation of values of such home stock inputs are:

1. Owned seed – farm produced seed has been imputed at the prices prevalent in the investigator zone concerned at the time of sowing.
2. Implements – repair and maintenance charges of implements
3. Interest on fixed capital- interest on the present value of fixed assets such as land farm, building implements and machinery at the rate of 10% per annum has been calculated.

#### **(c) Allocation of costs to different crops**

Some of the inputs used for the cultivation of one crop are common for other crop also. For the purpose of computing the cost share of individual crops, the cost of such input is apportioned in the following manner.

1. Repair and maintenance charges of implements- in proportion to the area under the crop

2. Interest on fixed capital (excluding land)- in proportion to the area under the crop
3. Interest on land value- interest on the fair value of land under the crop

**(d) Procedure for valuation of farm assets**

1. Own farm buildings (cattle shed, storage shed etc) – prices prevailing in the locality
2. Implements and other machinery – prevalent market price
3. Livestock (only draught animals) – prevalent market price

In calculating the cost of production of each crop in season wise the interest on fair value of land at the rate of 10% per annum is taken into account.

Based on the methodologies stated above, the objectives of the study were analysed and the results and discussion were presented in the next chapter.

## **CHAPTER IV**

### **RESULT AND DISCUSSION**

The present study “value chain analysis of medicinal rice in Kerala” is aiming to map the value chain of Navara rice and Rakthashali rice of Kerala, to identify and explore the various chains and actors involved in the value chain, to analyse the price spread efficiency and factors influencing it, and to identify the constraints and possible solutions at different levels in the value chain. The study was confined to the state of Kerala. Both primary and secondary data were collected from Palakkad and Malappuram districts of Kerala. Primary data was collected from 60 farmers (30 each from the selected districts) using purposive sampling technique and 60 consumers (30 each from selected districts) using snow ball sampling. For the purpose of studying the objective, a pre structured questionnaire was used for each actors involved in the value chain of medicinal rice. Sample from the rest of the actors in the value chain were selected based on the information received from farmers, processors, marketers and consumers. The selection of actors between the farmers and consumers was based on accessibility, five retailers and two processors were selected. The analysis of objectives is explained under four heads as follows.

1. Mapping the value chain of Navara rice and Rakthashali rice of Kerala
2. Various chains and actors involved in the value chain
3. Price spread efficiency and factors influencing medicinal rice
4. Constraints and possible solutions at different levels in the value chain.

#### **Session I**

##### **4.1 Mapping the value chain of Navara rice and Rakthashali rice of Kerala**

The global approach forwarded by Gereffi and Korzeniewicz 1994 and Kaplinsky 1999. In this approach, it scrutinizes the ways in which the firms and countries are globally integrated and access the determinants of global income distribution.

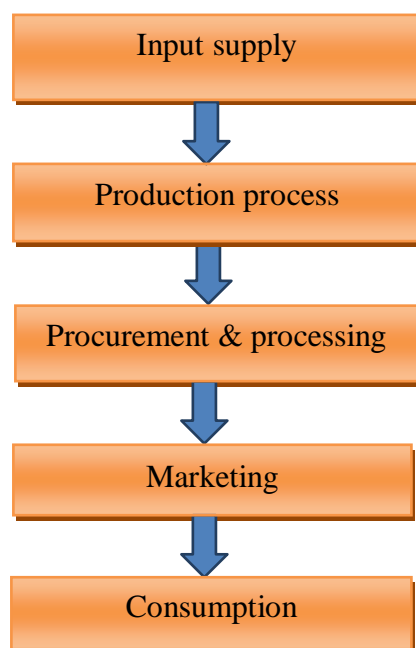
Mapping the value chain facilitates a clear understanding of the sequence of activities and the key factors and relationship involved in the value chain. This exercise is carried out in qualitative and quantitative terms through graphs presenting the various actors in the chain, their linkages and all operations of the chain from pre-production to industrial processing and marketing. In this study, for mapping of value chain global approach of value chain analysis has been used. Which will helps to understand the overview of value chain as well as constraints and possible solution at different level in the value chain.

The following dimensions are mapped for the present study.

- 4.1.1 Mapping of core process in value chain of medicinal rice
- 4.1.2 Mapping of actors involved in the value chain of medicinal rice.
- 4.1.3 Mapping of flow of product.
- 4.1.4 Mapping of knowledge and information in value chain.
- 4.1.5 Mapping of linkages in value chain.
- 4.1.6 Mapping of geographical flow of medicinal rice.
- 4.1.7 Mapping of value addition at different levels.
- 4.1.8 Mapping the constraints and possible solutions.
- 4.1.9 Value chain map matrix.

#### 4.1.1 Mapping of core process in the value chain of medicinal rice

**Fig 4.1 Core process in medicinal rice value chain**



##### 4.1.1.1 Input supply

The cultivation of medicinal rice is purely organic, because the application of chemical fertilisers deteriorates its medicinal properties. The main inputs required for the cultivation were seed, organic manures, machinery, agricultural labour, traditional knowledge and information. Farmers have been using organic manures like cow dung cow urine and green leaf manures for cultivation. All the



farmers were collecting green leaf manure, required for cultivation from their own internal source. Some of the farmers collect seeds from fellow farmer or use self-produced seeds during cultivation. In the case of other input like labour force and tractors, they hired from the local sources. It is Krishi Bhavan who supplies knowledge and information.

#### **4.1.1.2 Production**

Since medicinal rice is rich in nutritional value, it has to be cultivated organically. Mostly the direct sowing method was adopted, with duration of 60-110 days, depending on the time cultivation of Navara rice and Rakthashali rice. About 15 to 35 Kg of seed was required for 1 acre of cultivation for Navara rice and Rakthashali rice. Majority of the farmers have been preserving seeds for the next season by adopting indigenous practice and also got it from fellow farmers. Green manures, cow dung and cow urine were used as manures. Farmers stored the harvested seed after threshing and with proper sun drying with suggested moisture content. It could be stored in gunny bags or in traditional storage device. The produce was taken to the local mill for dehusking.

#### **4.1.1.3 Processing**

Paddy in its raw form cannot be consumed by human beings. It needs to be suitably processed to obtain in rice form. The milling process of Rakthashali rice requires rubberised rice mills, since it has to retain rice bran which has high nutrient content. The outer layer of paddy is only removed using rubberised roller fitted shelling machine. The services of rubberised rice shellers for this purpose are very few in the district. Only one such type of processing unit was identified during the survey at Malappuram district.

#### **4.1.1.4 Marketing**

In any business, marketing plays a vital role. It is the process of exchanging of goods or services. Without proper marketing many business would fail to exist. Profit is the bottom line of any business. In the case marketing of Navara rice, the farmers sold their produce through retailers and also sold directly to consumers. The farmers of Rakthashali rice sold their produce sold through the processor, retailers and directly to consumers. The demand for this special rice was established through word of mouth and not through advertising.

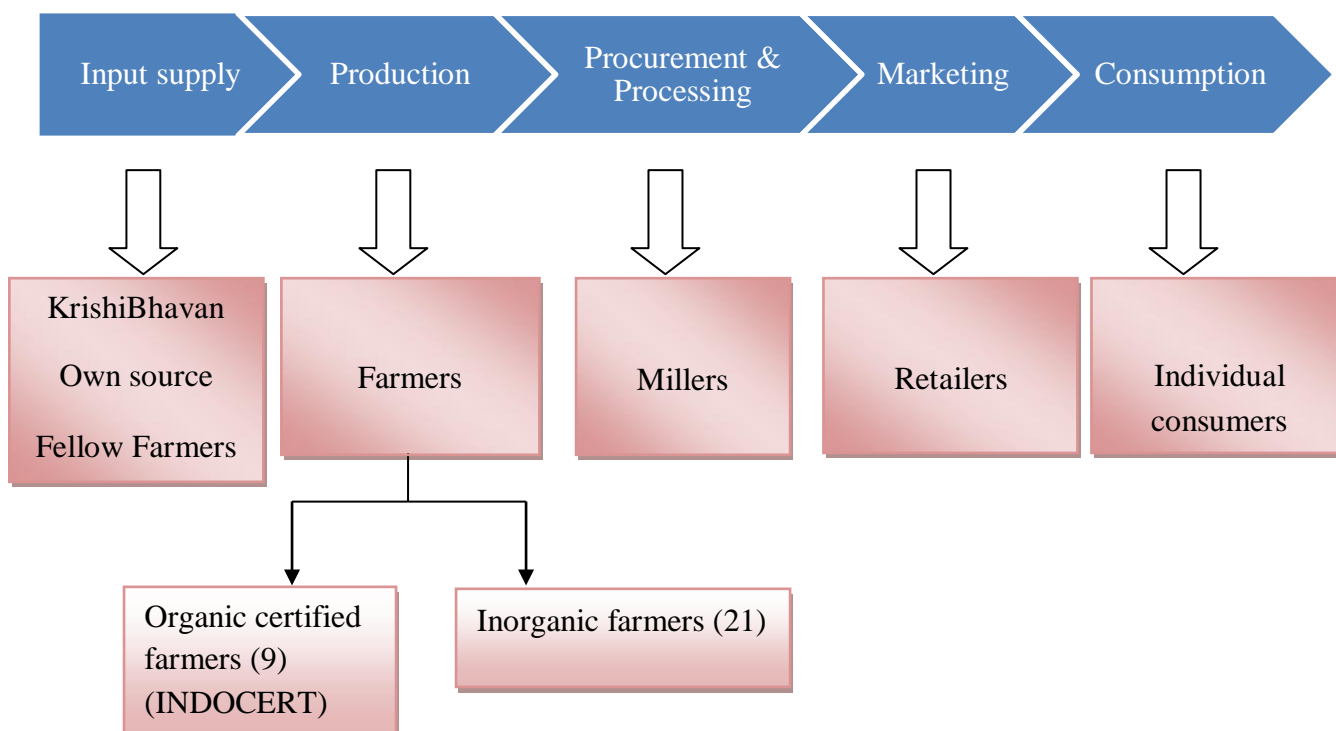
### 4.1.1.5 Consumption

Navara rice and Rakthashali rice has great value for its medicinal properties and therapeutical application. The Ayurvedic physicians learned to use the rice for their medicinal preparation. The individuals used this rice for personal consumption also.

### 4.1.2 Mapping of actors involved in the value chain of medicinal rice

Actors involved in the value chain means the persons who are involved in each process of medicinal rice value chain such as input provision, cultivation, processing, marketing and consumption. Mapping of actors in the process would help to identify the efficiency in the value chain of medicinal rice. An efficient value chain in agricultural commodities must be cost effective with only participation of necessary participants required to do the job in any given value chain. An elongated and inefficient value chain does not create value to the participants. Mapping of actors involved in the core process of medicinal rice value chain is given below:

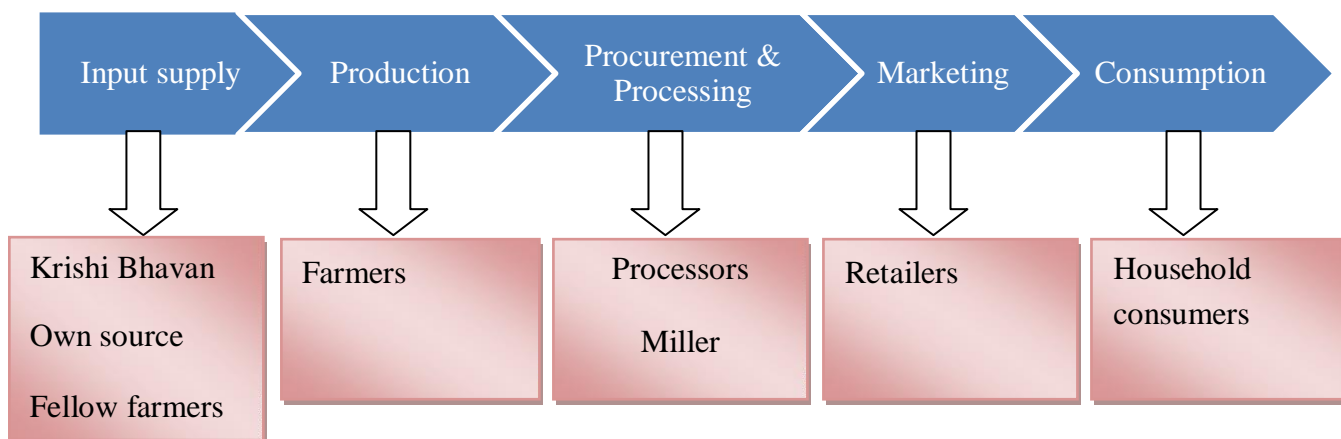
**Fig 4.2 Actors involved in the value chain of Navara rice**



Krishi Bhavan, farmers, millers, retailers, organic certification agency and consumers were the major actors involved in the value chain of Navara rice. Krishi Bhavan provides advisory services and information for farmers. However the farmers have been greatly depended fellow farmers to get

specific inputs like cow dung, cow urine and green leaf manures. The knowledge dimension about the Navara rice, and its cultivation method was also greatly disseminated through farmer to farmer communication. Farmers have been considered as most important actor in the process of Navara rice value chain. They organised land, labour, capital and other inputs required for the cultivation and produce rice for meeting the demand for the rice in the market as well as self-consumption. They are considering the provider of raw materials for the next level of performance of the value chain. There are 9 farmers, who were going for organic certification. INDOCERT is the certification agency providing organic certification for their produce. Remaining farmers were not going for organic certification because of its difficult and long procedures. The actors next to farmers are procuring and processing members. The farmers approaching miller for converting the paddy and bring back the rice for marketing. There were three retailers selected from the study area who are involved in Navara rice marketing. Two retailers were situated at Palakkad itself and one from Thrissur district. The organisation called “Swabhimaan and Jaivakalavara were the retailers who are engaged in marketing of the Navara rice in Palakkad district. The retailer who was engaged in the Navara rice marketing from Thrissur district was “Alter media”. The consumers were spread over Palakkad and Thrissur districts of Kerala.

**Fig 4.3 Actors involved in the value chain of Rakhthashali rice**



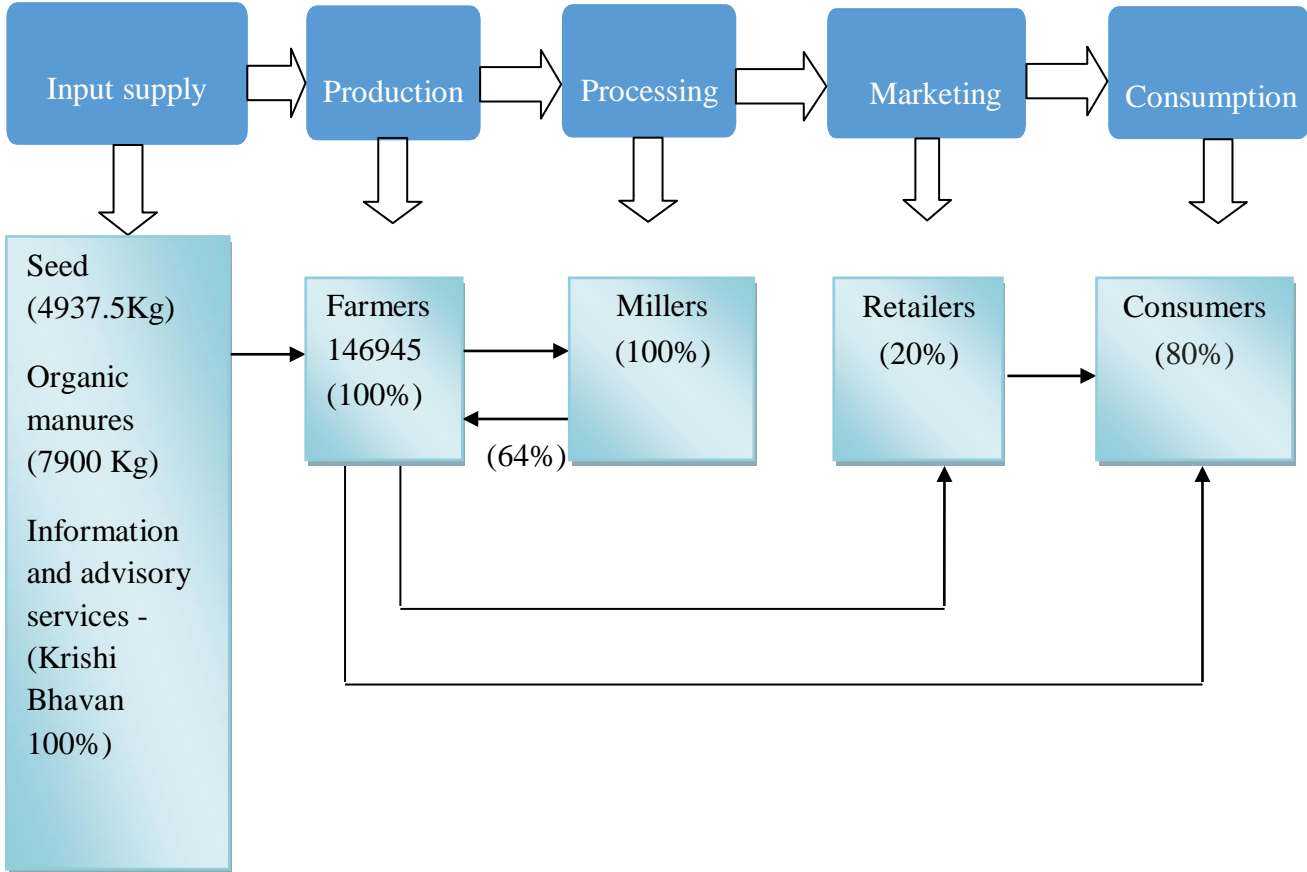
For Rakhthashali rice Krishi Bhavan, farmers, processors, miller, retailers and consumers were the major actors involved in the value chain. The farmers approach the Krishi Bhavan for getting information and advisory services. The base of an agriculture value chain is the farmer; they are the supplier of raw materials for the next level of activities of value chain. Some of the farmers approach their fellow farmers for getting the inputs like seed, cow dung, cow urine and green leaf

manures. The next actor in the value chain was processors. Only a small number of farmers were selling paddy to processor. The remaining portion was taken for conversion of paddy into rice. For that the famers approaching miller in the Malappuram district itself. The retailer shops engaged in the Rakthashali rice marketing were “Green remedy organic shop” and “Punarjani mart” at Malappuram district. The consumers were spread over the different parts of Malappuram district.

**4.1.3 Mapping of flow and volume of products in the value chain**

The mapping of flow and volume of product involves identifying the each stage of the process as they are transformed inputs to final products. It creates a clear picture of what form and volume of product are transformed at each stage in the chain.

**Fig 4.4 Flow and volume of products in the value chain of Navara rice**



The fig 4.4 shows the flow and volume of rice, it shows the flow of rice gone through the production, procurement, marketing and consumption. The farmers were using seeds from their own source. They preserve seeds for future cultivation because they were trying to safeguard the quality of the rice. All the farmers collect organic manures like cow dung, cow urine and green leaf

manures from fellow farmers. Input likes information and advisory services were availing from Krishi Bhavan. After the production (147700 Kg) the farmers were keeping some portion (755kg/year) of paddy for self consumption and also for seed purpose. The remaining portion was the marketed surplus of Navara farmers. This portion (100 per cent) was taken for conversion. After the conversion, Navara farmers get 64 per cent of rice from paddy. From that portion, 80 per cent sold directly to consumers and 20 per cent to the retailers.

**Fig 4.5 Flow and volume of products in the value chain of Rakthashali rice**

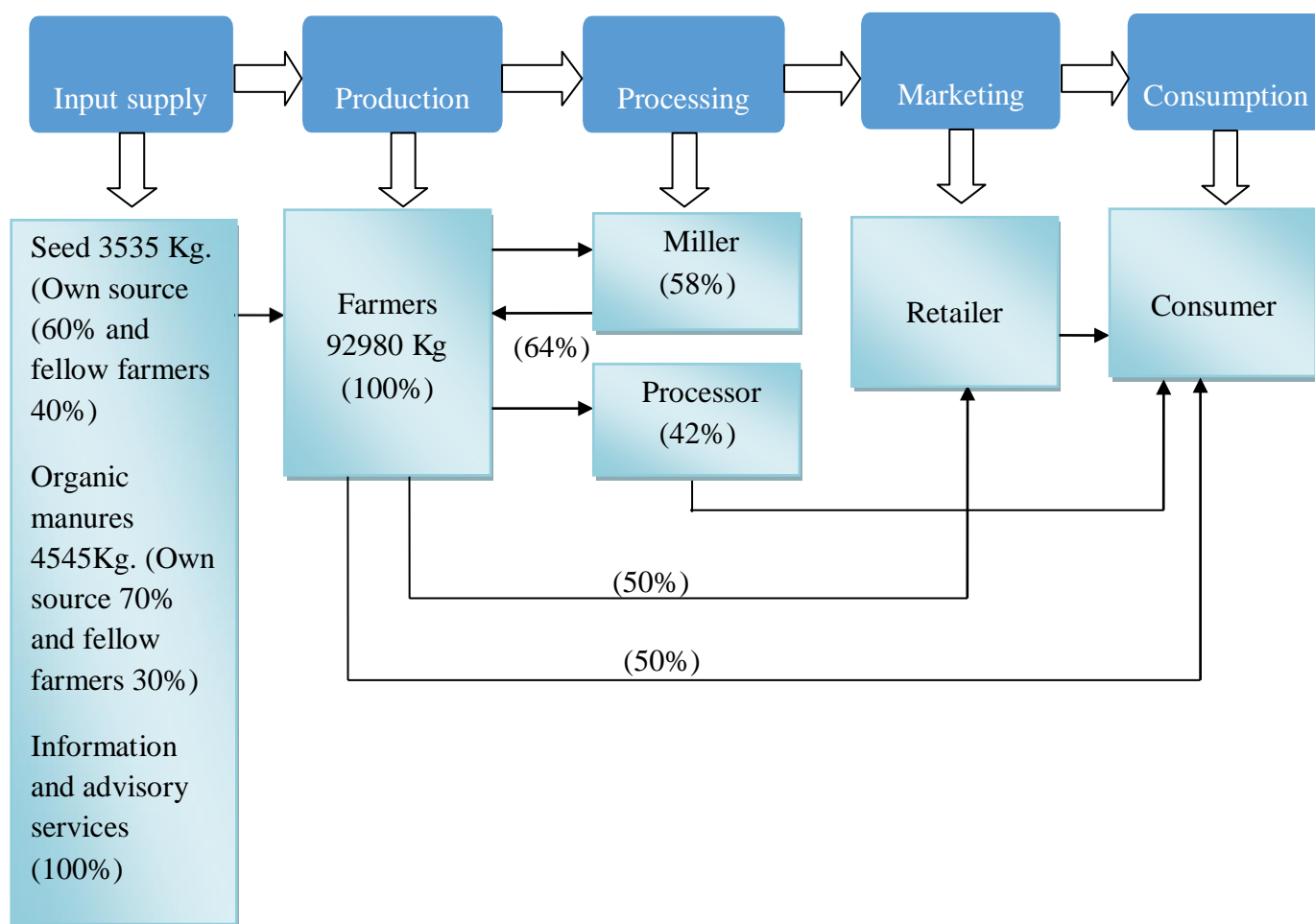


Fig 4.5 shows the flow of Rakthashali rice. The majority (60%) of the farmers uses seeds from their own source, they were preserving seeds for the upcoming cultivation. Some of the farmers (40%) were purchasing the seeds from fellow farmers. Organic manures like cow dung, cow urine and green leaf manures using from their own source (70 per cent) and also from fellow farmers (30 per cent). The other inputs like information and advisory service were availing from Krishi Bhavan. The farmers were producing 93250 kg of paddy. After the production the farmers save paddy (270 Kg/year) for self consumption and for seed purpose. The remaining portion was the marketed

surplus of Rakthashali farmers. From that the farmers were sold 42 per cent of the paddy to processor directly. The remaining 58 per cent was taken to the miller for the conversion of paddy into rice and then sold 50 per cent to retailers and 50 per cent to consumers directly.

#### 4.1.4 Mapping of knowledge, information and services in the value chain

The reason for the existence of a value chain is that goods, services or information is passed on between different actors. It flows through every chain. This may be tangible or intangible like product, services, goods, money, knowledge and information. Finding out the nature of flow of products is the main thing in any value chain analysis.

**Fig 4.6 Flow of knowledge, information and services in the value chain of Navara rice**

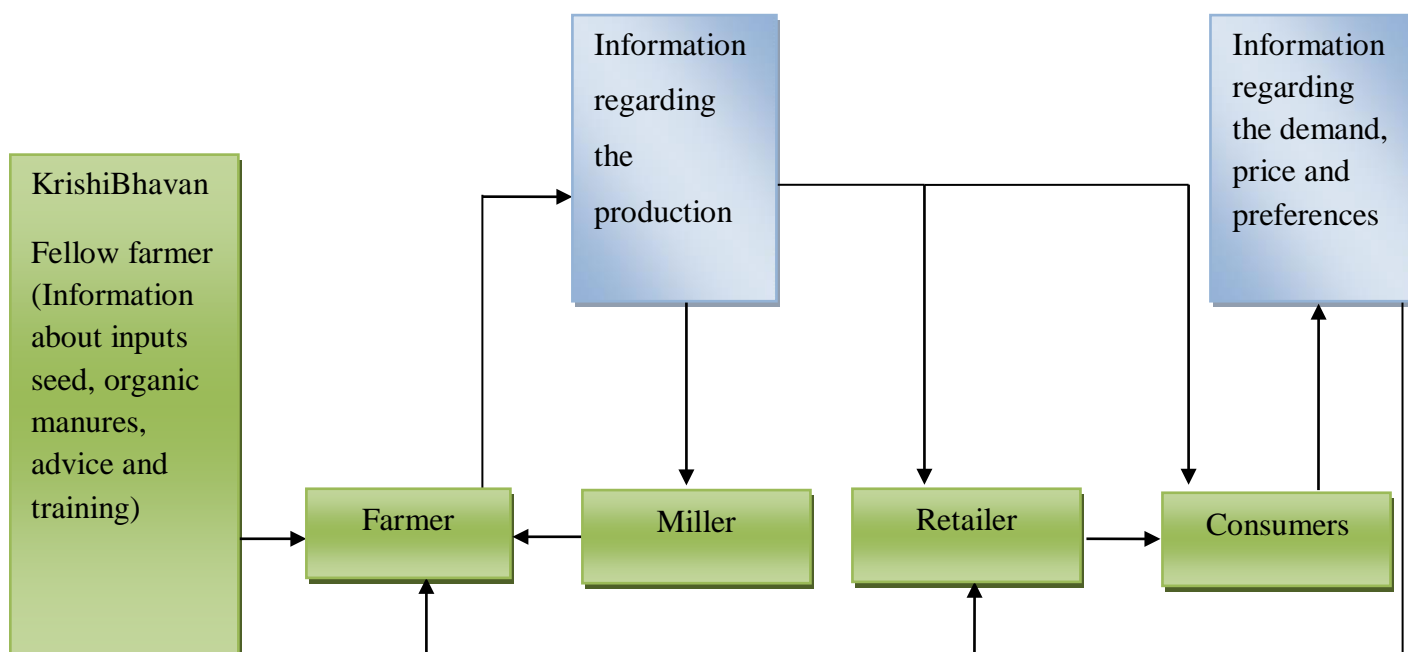


Fig 4.6 indicates that the flow of knowledge, information and services. The inputs like information and knowledge were receiving from fellow farmer and Krishi Bhavan. The information regarding the seeds, organic manures like cow dung, cow urine, green leaf manures and cultivation practices and methods were mostly exchange through farmer to farmer communication. The farmers were communicated about the production details to the miller, retailers and also to consumers. The consumers are the end users they sent their feedbacks to farmers directly or through the retailers. The open market sales, sales through supplyco, padasekarasamithi, and cooperative are not prevailing in the study area

**Fig 4.7 Flow of knowledge, information and services in the value chain of Rakthashali rice**

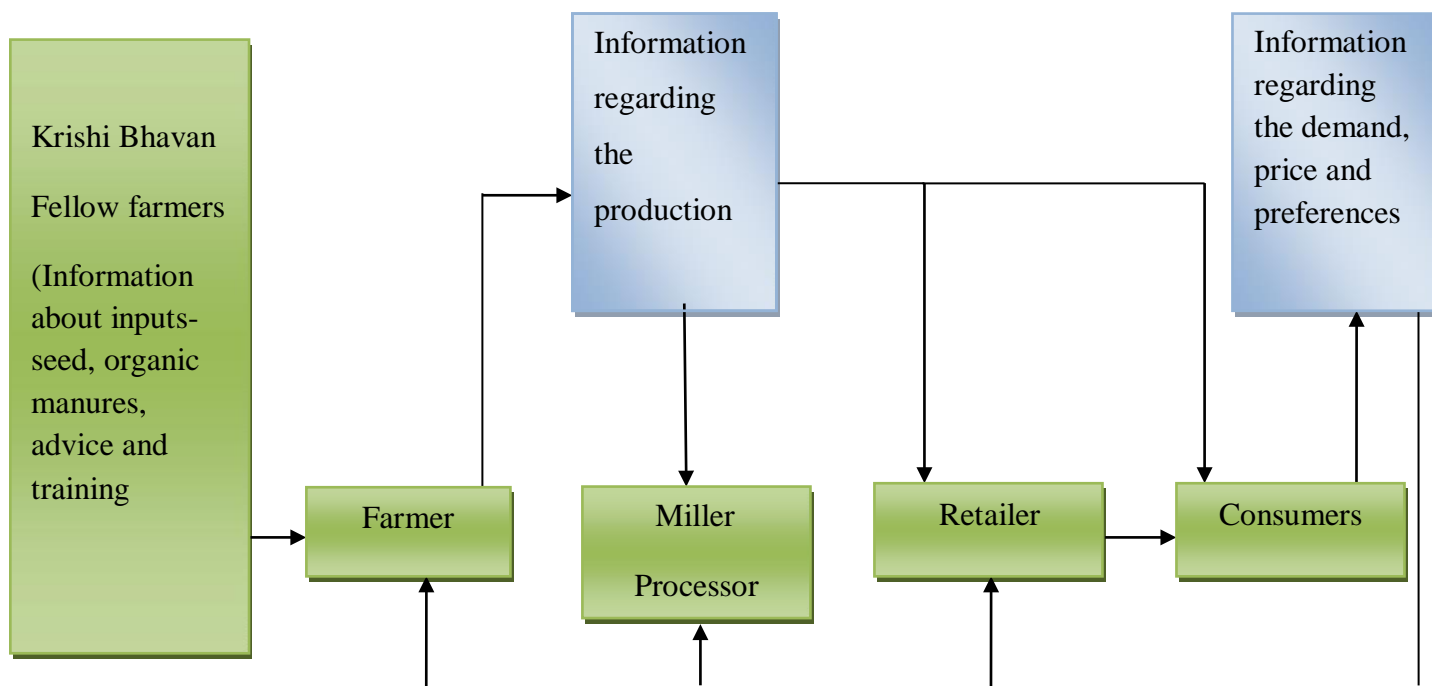


Fig 4.7 shows the flow of knowledge, information and services. The flow starts from the input suppliers. The Krishi Bhavan and fellow farmers were the major input suppliers in the value chain. Inputs like information knowledge and advisory services were availing from Krishi Bhavan. For seeds and organic manures, farmers were approaching fellow farmers. The details regarding the production were communicated to the processors and retailers. The processor and retailers in turn sent back the information about the demand, price and preferences of consumers. There is no other middleman such as wholesalers, supplyco and padasekarasamithi involved in the marketing of Rakthashali rice.

#### **4.1.5 Mapping of linkages in the value chain**

Organisational linkage of a farmer symbolizes their level of connection. Input supply, information sharing or for training needs were the major reasons for the linkage with the organisations. These linkages will help the farmers for adopting better practices in the field and also for availing benefits and improving cultivation.

**Fig 4.8 Linkages in the value chain of Navara rice**

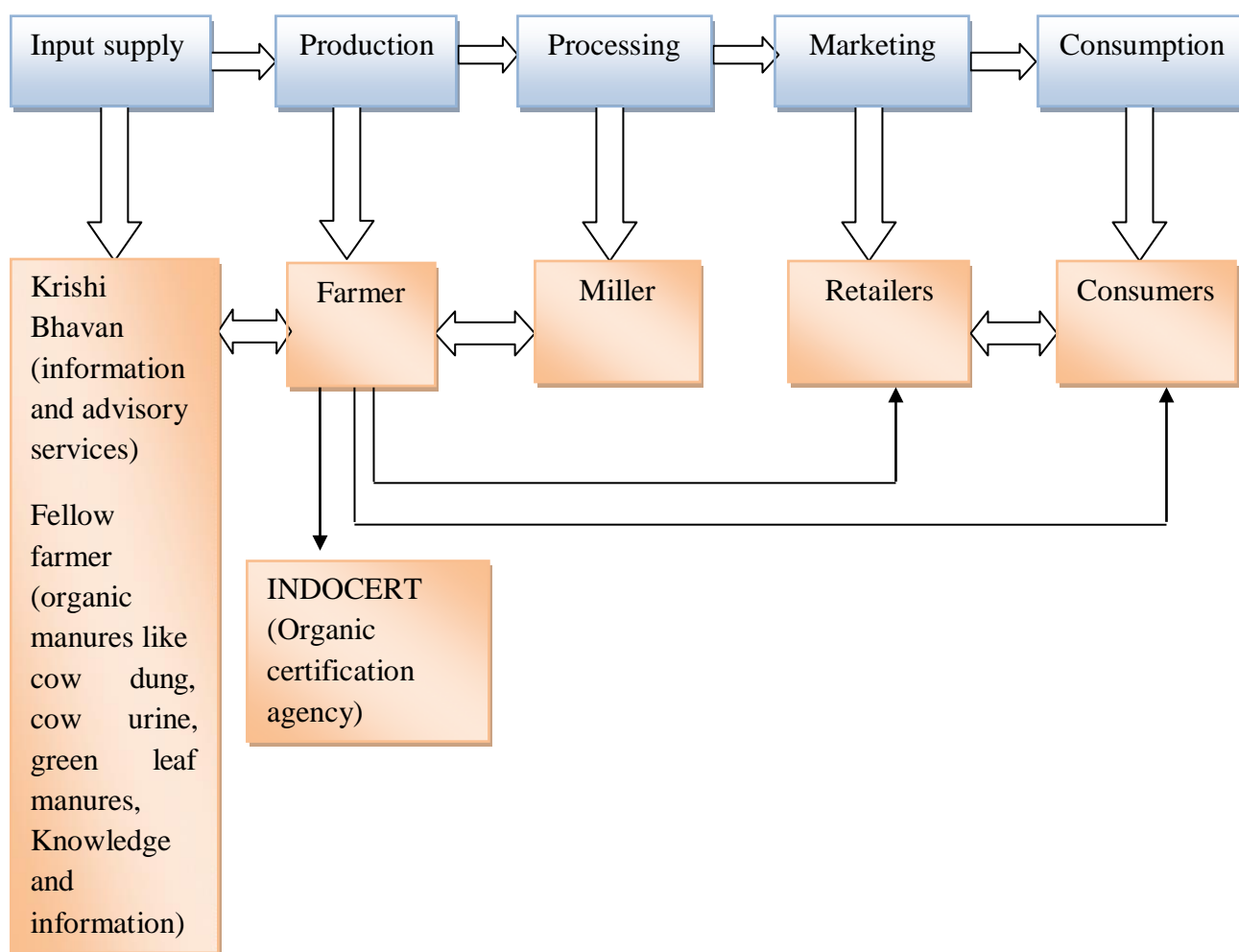
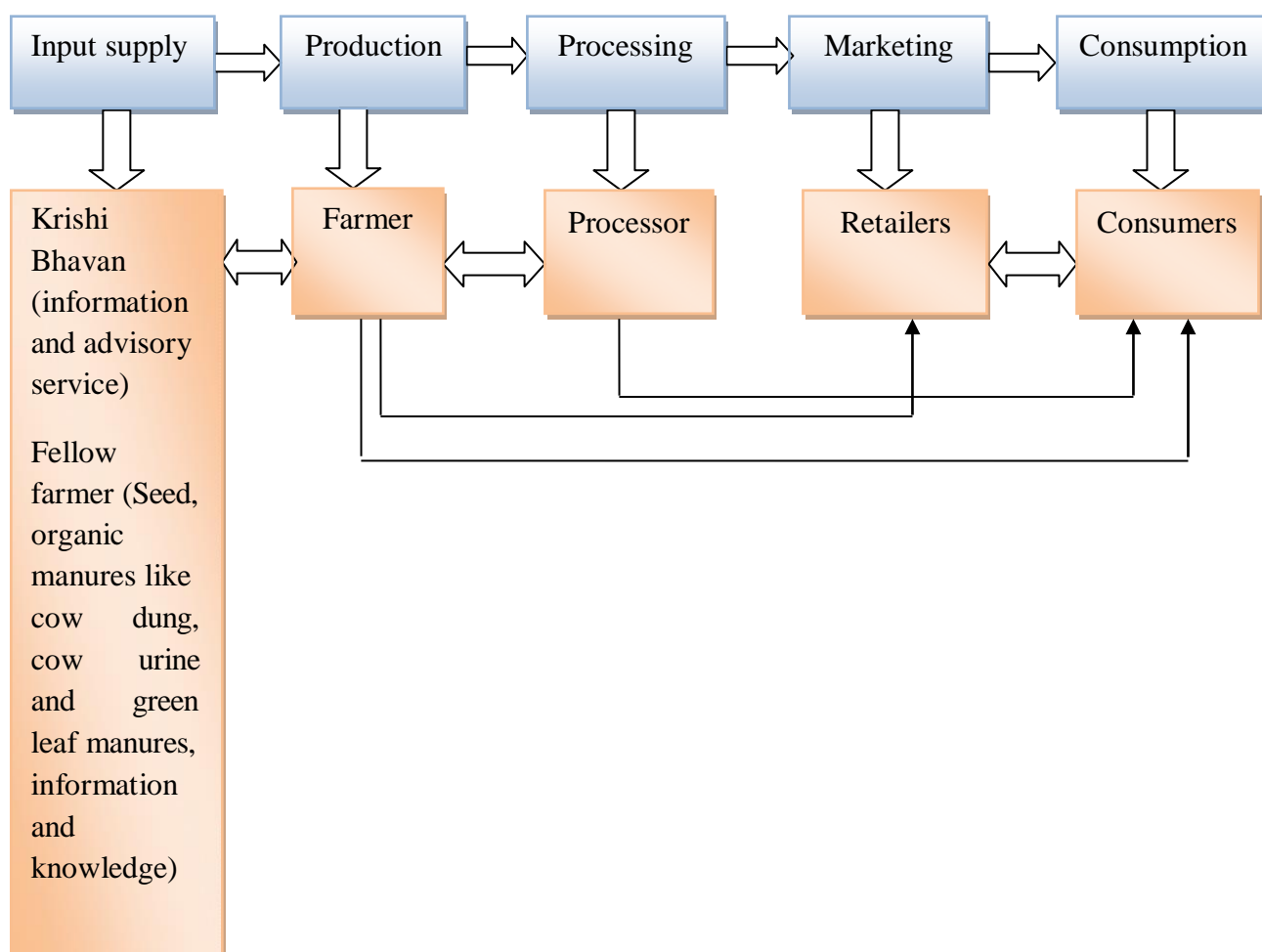


Fig 4.5.1 indicates that Navara rice cultivators having good linkage with Krishi Bhavan. The institutions like financial institutions, padasekarasamithi and cooperatives having not much role in the value chain of Navara rice. The farmers having connection with other farmers in the area, they exchange the organic manures and other cultivation ideas each other. The major source of information related to market price and demand of the product were miller and retailers. They have close relation with farmers because they are directly procuring the products from farmers. The consumers are the end users, they communicate about the demand, price and preference of the product to the retailers and also to the farmers. INDOCERT is the organic certification agency who provides certification for the product. Only a few farmers were going for organic certification because of its difficult formalities.



**Fig 4.9 Mapping of linkages in the value chain of Rakthashali rice**

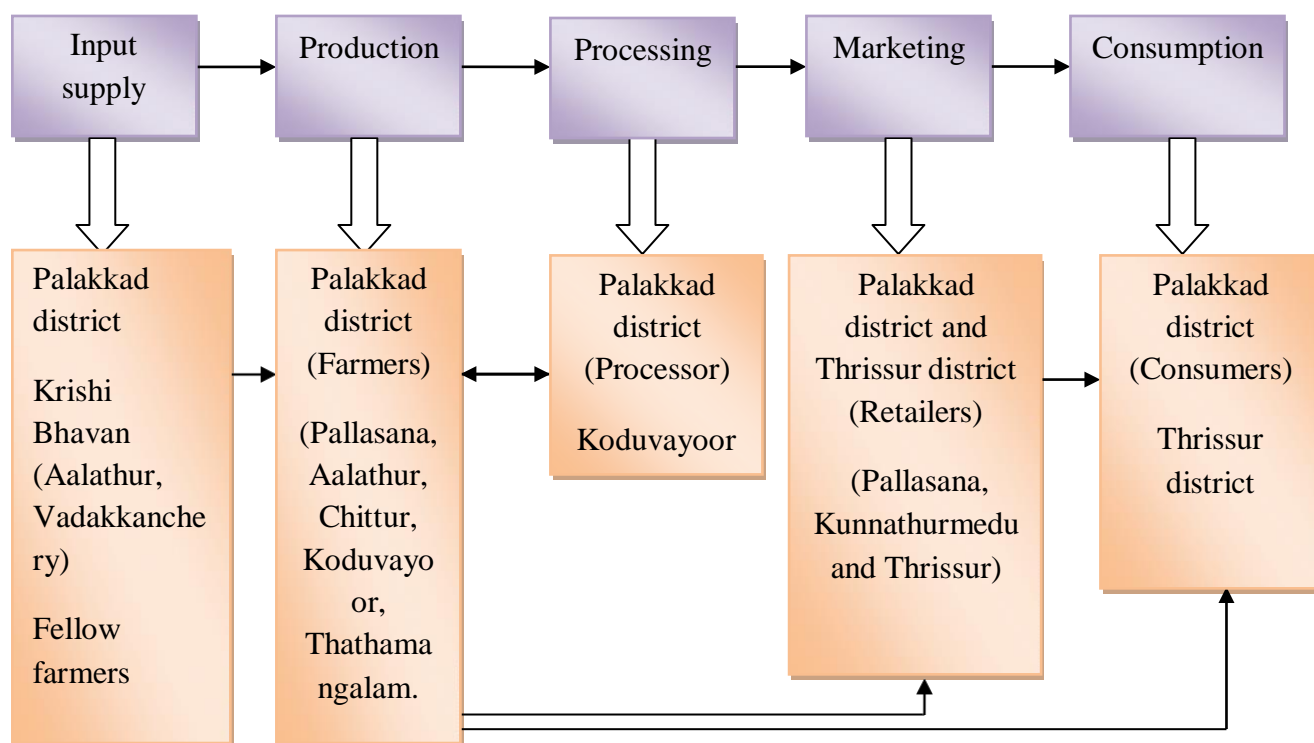


The figure 4.9 shows the institutional linkages of Rakthashali rice cultivators. The farmers were mostly linked with Krishi Bhavan. Krishi Bhavan provides information and advisory service to farmers. Some of the farmers were bought seeds and organic manures from fellow farmers. After the production taken place, they sold their produces to processor and retailers, and also sold directly to the consumers. The processors and retailers were provides the information like the needs, wants and demands of the consumers to the farmers.

#### **4.1.6 Mapping of geographical flow of product**

Mapping of geographical flow helps to identify the location of the product in the chain and to identify where the process located starting from the place of origin till it reaches the consumers. The production and flow of products in both Navara and Rakthashali were reaches different parts of Palakkad and Malappuram district. The geographical flow of both Navara and Rakthashali were depicted in figure 4.10 and fig 4.11

**Fig 4.10 Geographical flow of Navara rice**



From the figure 4.10, it is clear that the source of input like information and advisory services given by the Krishi Bhavan and organic manures like cow dung, cow urine and green leaf manures were collected from fellow farmers. The production of Navara rice taken place under different areas in Palakkad district. After the production, the farmers keep some portion of paddy for self consumption and remaining portion was taken to the miller located at Koduvayoor for de-husking and bring back the produce to the farmers place. From this, some portion of rice were moved to retailers place in Palakkad (Swabhimaan and Jaivakalavara) and Thrissur (Alter media). Retailers sold the produce to nearby consumers. The other portion of produce was sold by the farmer himself directly to the consumers.

**Fig 4.11 Geographical flow of Rakthashali rice**

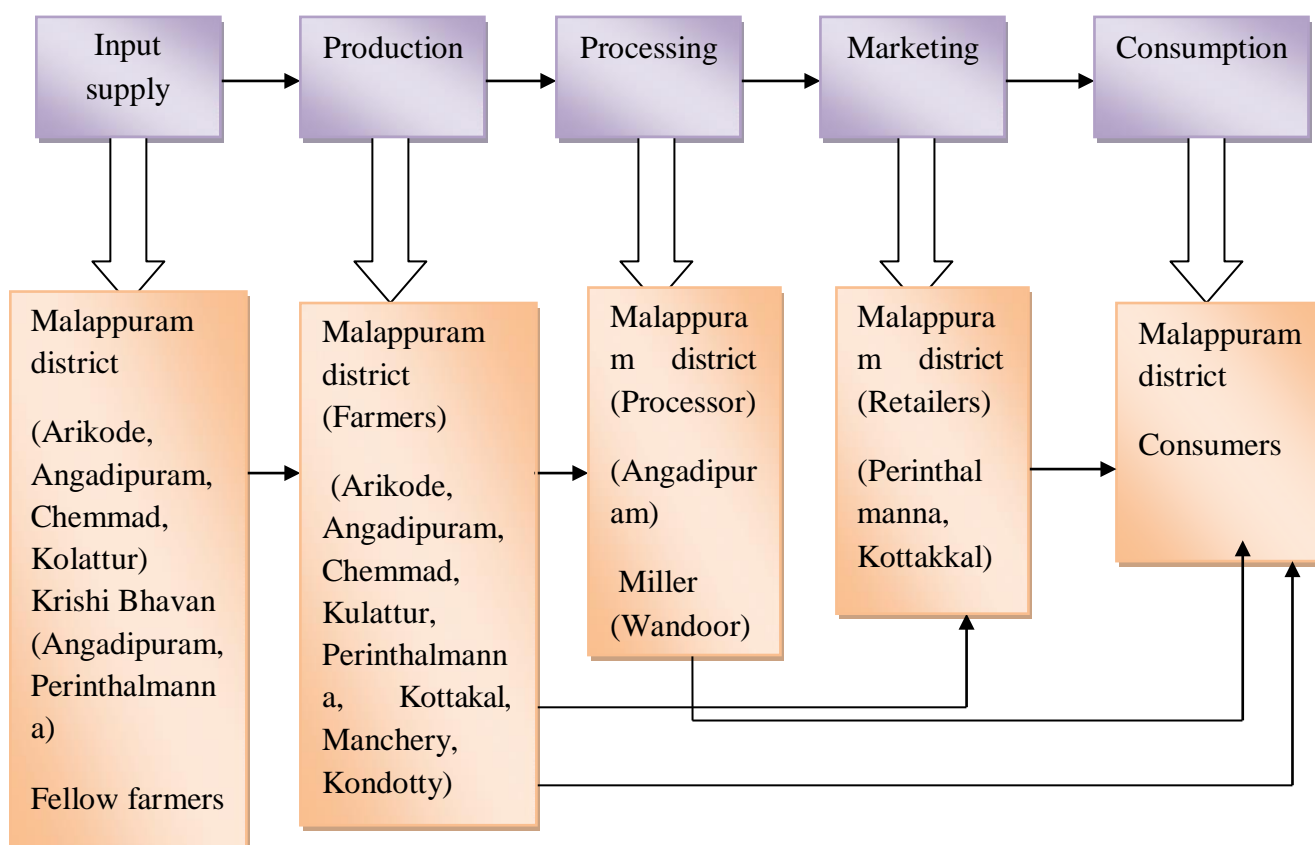


Fig 4.11 shows the geographical flow of Rakthashali rice in Malappuram district. The farmers were preserving seeds for the upcoming cultivation and also they were procuring seeds and organic fertilisers like cow dung, cow urine and green leaf manures from colleague farmers in nearby area. This is because, they were highly conscious about the quality of product. They approach Krishi Bhavan for advisory services and for getting information. The production was taken place within the district. After the production, the farmers keep some portion of paddy for self consumption. The farmers then sold a portion of their produce to processor located at Angadipuram, the processor then sold it to the end user. The remaining surplus was taken to the miller located at Wandoor for the conversion of paddy into rice. The farmers sold a portion of rice to the retailers who are located at Perinthalmanna and Kottakal in the Malappuram district and the rest was sold directly to the consumers with in the Malappuram district.

#### **4.1.6 Mapping of value addition at different levels of value chain**

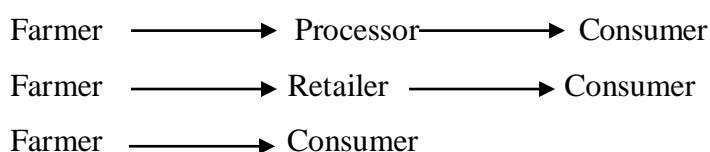
Value addition is the difference between sales price and cost incurred by each actor while passing the product to next level. The cost incurred by farmers includes production, transportation, harvesting and marketing cost. It includes cost of input, cost of labour and machinery. The margin

was calculated through all cost like investment cost, procurement cost, transportation, labour, investment cost, investment cost and sales.

The marketing channels for Navara rice:



The marketing channel for Rakthashali rice:



**Fig 4.12 Value addition at different actors in the value chain of Navara rice**

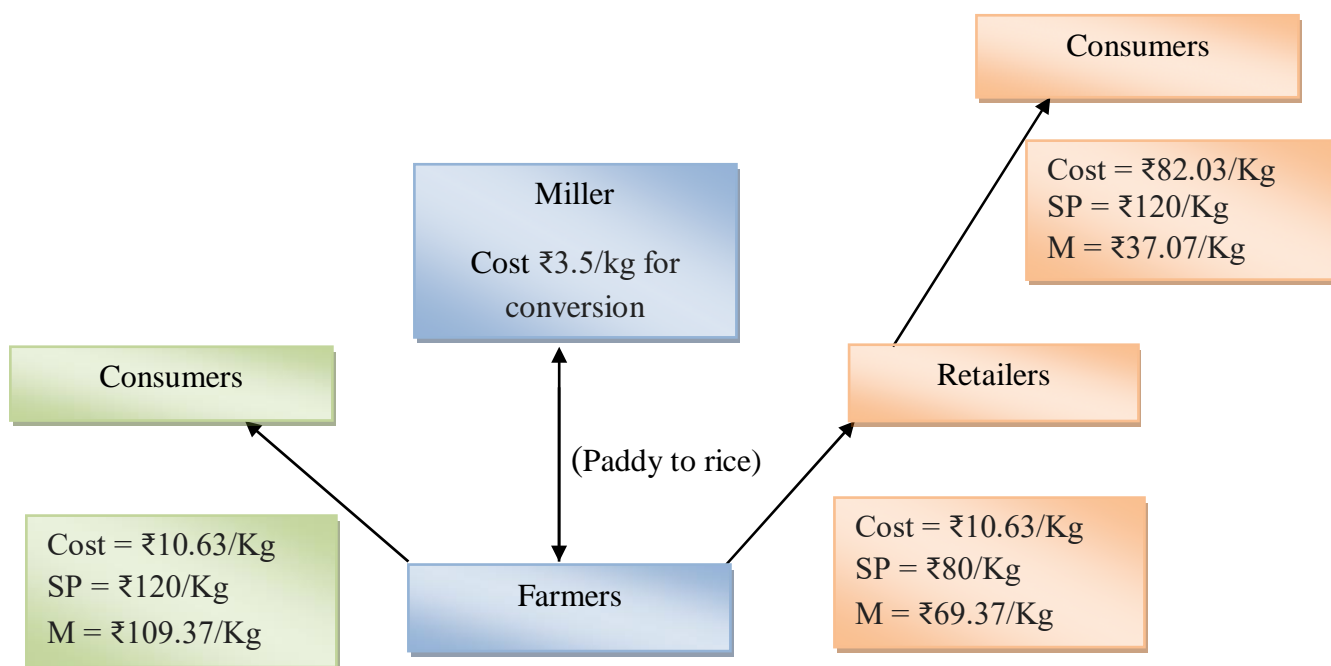


Fig 4.12 shows the value addition at different actors in the value chain of Navara rice. The farmers were approaching the millers for converting the paddy into rice. The miller was charging ₹3.5/kg for converting the paddy. There are two channels in the value chain of Navara rice. They are channel I- farmer – retailers- consumers and channel II- farmer- consumers. The total cost incurred for farmer

in the channel I was ₹10.63/Kg. The farmers were sold the produce to retailers at ₹80/Kg. The farmers were incurred a margin of ₹69.37/Kg. The retailers earn a margin of ₹37.97/Kg. In the second channel the farmers earn a margin of ₹109.37/Kg. The farmers get a high margin in channel II when compared with channel I, because of this reason the farmers were interested to sell their product directly to the consumers.

**Fig 4.13 Value addition at different actors in the value chain of Rakthashali rice**

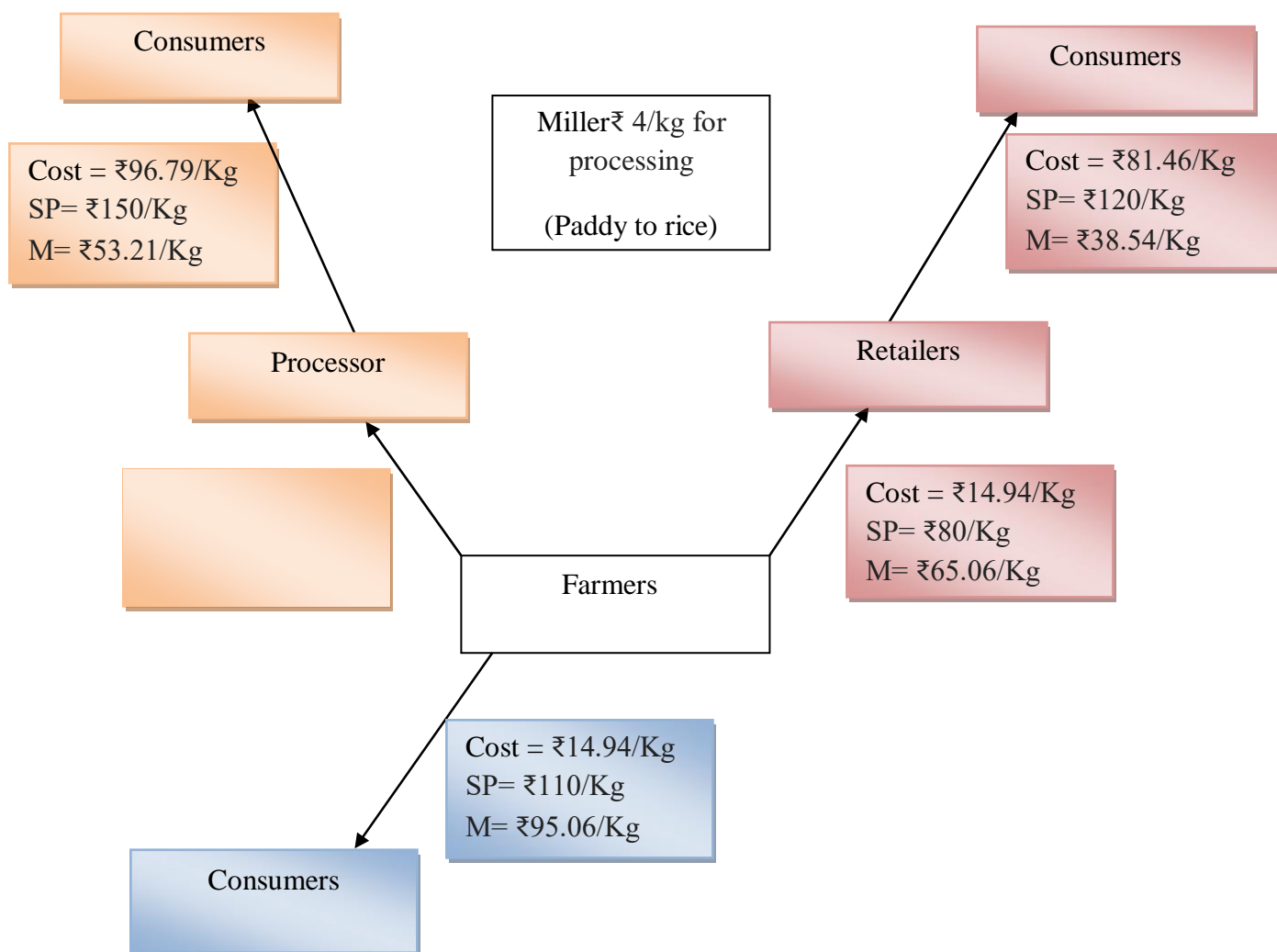


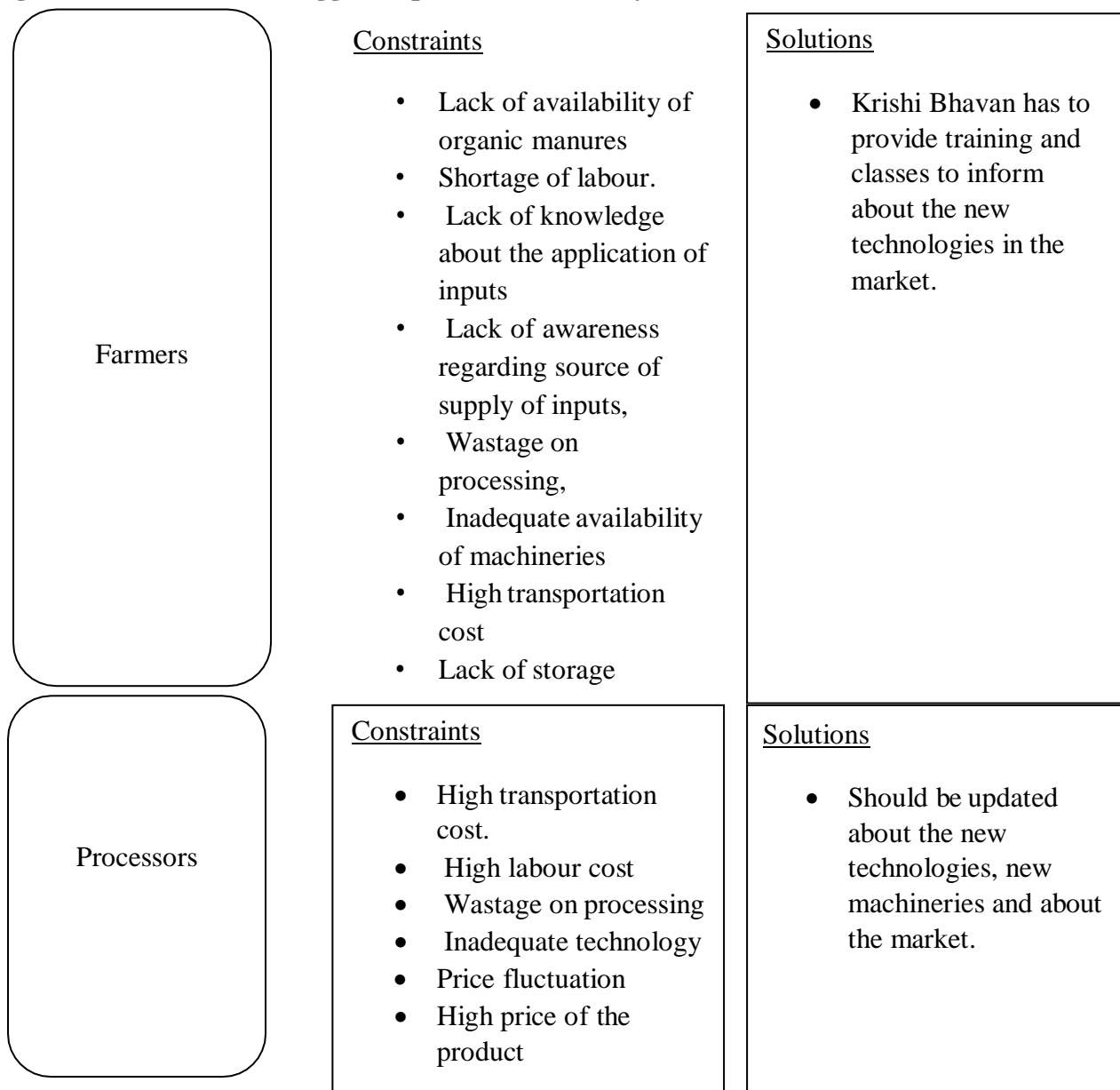
Fig 4.13 indicates the value addition at different actors in the value chain of Rakthashali rice. There are three marketing channels for Rakthashali rice. Channel I – farmer – processor- consumer, channel II- farmer- retailers- consumer and channel III- farmer- consumers. The farmers sell some portion of their produce to the processors and the remaining portion taken for conversion into rice. The miller charges ₹ 4/ Kg as conversion cost. The farmers incurred a high margin in channel III of ₹95.06/Kg when compared with channel I (₹ 81.24/Kg) and channel II (₹ 65.06/Kg), because of this less margin the farmers were not much interested in involving the retailer’s or processors in the

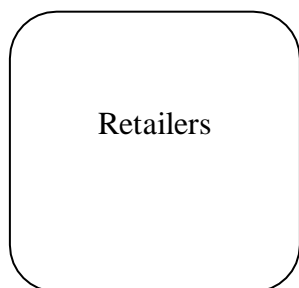
channels. The total cost incurred by the farmer is less in channel I of ₹ 8.71/Kg. In this channel the farmers doesn't incurred any marketing cost, because the farmer sell their produce to the processor without any conversion. The processor himself procures the product from the farmers. In channel II and channel III, the farmers incurred marketing cost, because the farmers sell the product after the conversion of paddy into rice.

#### 4.1.8 Mapping the constraints and possible solutions

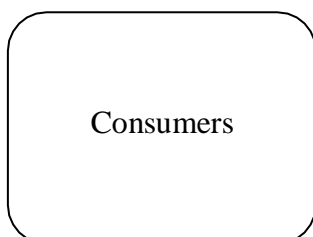
Each level in the value chain was facing different constraints. Constraints exist in all levels in the value chain. The initial identification of these constraints and also suggested possible solutions were given in the figure 4.14

**Fig 4.14 constraints and suggested possible solution by actors in the value chain**





- Constraints
- Lack of availability of product in time
  - Lack of storage
  - High price of the product



- Constraints
- High price of the product
  - Lack of availability of product

#### 4.1.9 Value chain map matrix

A value chain map matrix summarises the key information from the value chain mapping done by using global approach.

**Table 4.1 value chain map matrix of Navara rice**

	<b>Input supply</b>	<b>Production</b>	<b>Procurement</b>	<b>Marketing</b>	<b>Consumption</b>
<b>Inputs</b>		Seed, fertilisers like cow urine, cow dung and green leaf manures			
<b>Activities</b>		Planting, irrigation, fertilizing, harvesting	Collection of Navara rice, loading and unloading to the miller destination	Loading/ unloading to the destinations, directly sold it to consumers.	Purchase of Navara rice for house hold consumption
<b>Output</b>		Navara rice	Navara rice	Navara rice	Navara rice
<b>Actors</b>	Krishi Bhavan, Fellow	Farmers	Miller	Retailers	Consumers

	farmers				
<b>Knowledge and information</b>		Krishi Bhavan Fellow farmers	Farmers	Farmers	Feedback to the marketers about the demand, price, preference and satisfaction
<b>Geographical flow</b>		Pallasana, Aalathur, Chittur, Koduvayoor, Thathamangalam	Koduvayoor	Pallasana, Kunnathurmedu and Thrissur	Different places in Palakkad and Thrissur district
<b>Value additions</b>		<b>Channel I:</b> Cost= ₹10.63/Kg SP = ₹80/Kg M = ₹69.37/Kg <b>Channel II:</b> Cost=₹10.63/Kg SP = ₹120/Kg M = ₹109.37	₹3.5/kg (conversion cost)	<b>Channel I:</b> Cost=₹82.03/Kg SP= ₹120/Kg M = ₹37.97/Kg <b>Channel II</b> Direct to consumers	<b>Channel I:</b> ₹ 80/Kg and ₹120/Kg <b>Channel II:</b> ₹ 120/Kg



<b>Constraints</b>		(1)Lack of availability of organic manures,(2)Shortage of labour, (3)Lack of knowledge about the application of inputs,(4) Lack of awareness regarding source of supply of inputs,(5)Wastage on processing,(6) Inadequate availability of machineries, (7) High transportation cost, (8) Lack of storage	-	(1)Lack of availability of product in time, (2)Lack of storage,(3) High price of the product	(1)High price of the product, (2)lack of availability of product
<b>Perceived solutions and suggestions by actors</b>		Krishi Bhavan has to provide training and classes to inform about the new technologies in the market	-	-	-

**Table 4.2 Value chain map matrix of Rakthashali rice**

	<b>Input supply</b>	<b>Production</b>	<b>Procurement</b>	<b>Marketing</b>	<b>Consumption</b>
<b>Inputs</b>		Seed, fertilisers like cow urine, cow dung and green leaf manures			
<b>Activities</b>		Planting, irrigation, fertilizing, harvesting	Collection of Rakthashali rice, sells it to processor.	Loading/unloading to the destinations, directly sold it to	Purchase of Rakthashali rice for household

			Loading and unloading to the miller destination	consumers.	consumption.
<b>Output</b>		Rakthashali rice	Rakthashali rice	Rakthashali rice	Rakthashali rice
<b>Actors</b>	Krishi Bhavan, Fellow farmers	Farmers	Processor Miller	Retailers	Consumers
<b>Knowledge and information</b>		Krishi Bhavan Fellow farmers	Farmers	Farmers	Feedback to the marketers about the demand, price, preference and satisfaction
<b>Geographical flow</b>		Arikode, Angadipuram, Chemmad, Kulattur, Perinthalmanna, Kottakal, Manchery, Kondotty	Angadipuram, wandoor	Perinthalmanna Kottakkal	Different places in Malappuram district.
<b>Value additions</b>		<b>Channel I:</b> Cost = ₹ 8.76/Kg SP= ₹ 90/Kg M= ₹ 81.24/Kg <b>Channel II:</b> Cost= ₹14.94/Kg	₹4/kg (conversion cost)	<b>Channel I:</b> Cost= ₹ 96.79/Kg SP= ₹ 150/Kg M= ₹53.21/Kg <b>Channel II:</b> Cost=₹81.46/Kg	<b>Channel I:</b> ₹ 90/kg and 159/Kg <b>Channel II:</b>

		SP= ₹80/Kg M= ₹65.06/Kg <b>Channel III:</b> Cost = ₹14.94/Kg SP= ₹ 110/Kg M= ₹95.06/Kg		SP=₹120/Kg M= ₹38.54/Kg <b>Channel III:</b> Direct to consumers	₹80/kg and 120/Kg <b>Channel III:</b> ₹ 110/kg
<b>Constraints</b>		(1)Lack of availability of organic manures, (2)Shortage of labour, (3)Lack of knowledge about the application of inputs,(4) Lack of awareness regarding source of supply of inputs,(5)Wastage on processing,(6) Inadequate availability of machineries, (7) High transportation cost, (8) Lack of storage	(1)High transportation cost, (2) High labour cost, (3) Wastage on processing,(4) Inadequate technology, (5) Price fluctuation, (6) High price of the product	1)Lack of availability of product in time, (2)Lack of storage,(3) High price of the product	(1)High price of the product, (2)lack of availability of product
<b>Perceived solutions and suggestions by actors</b>		Krishi Bhavan has to provide training and classes to inform about the new technologies in the market	Should be updated about the new technologies, new machineries and about the market.		

## Session II

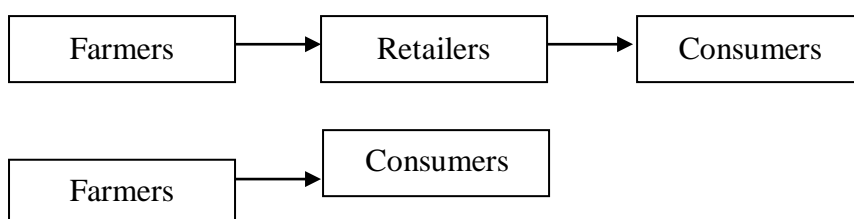
### 4.2 Various chains and actors involved in the value chain

This section aimed to know the various chain and actors involved in the value chain. The area selected for the study was Palakkad and Malappuram district. Samples of 60 farmers, 30 each from selected district were identified purposively.

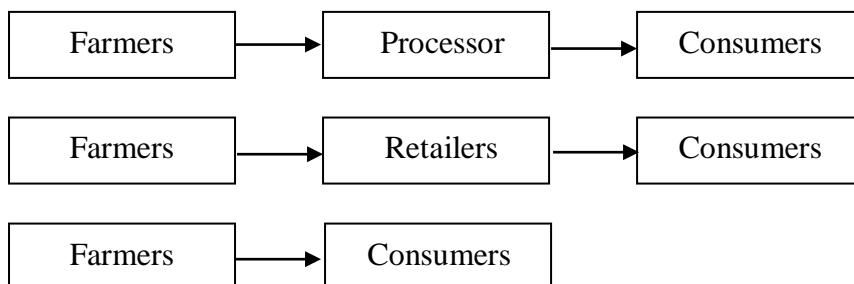
#### 4.2.1 Value chain of medicinal rice

There are five marketing channel identified for medicinal rice in the study area. The rice passes through various value chain actors.

##### Channel for Navara rice



##### Channel for Rakthashali rice



The actors involved in the value chain of Navara rice were farmers, millers, retailers and consumers. The farmers approach the millers only for the conversion of paddy into rice and return back the produce by the farmer himself. Whereas the actors in the value chain of Rakthashali includes farmers, processor, retailers and consumers. The details regarding actors involved in the value chain of both Navara rice and Rakthashali rice were given below.

#### 4.2.2 Farmer

Farmers were the major part in the value chain. The farmers from two different districts Palakkad

and Malappuram were selected for the study. Their socio-economic characteristics are explained below:

#### 4.2.2.1 Socio economic characteristics of farmers

The socio-economic characteristics of farmers were analysed with variables viz, age, gender, education and occupation and annual family income.

**Table 4.3 Socio-economic characteristics of farmer respondents**

<b>Variables</b>	<b>Navara rice (n= 30)</b>	<b>Rakthashali rice (n=30)</b>	<b>Total (n=60)</b>
<b>Gender</b>			
Male	30	30	60(100)
<b>Total</b>	<b>30(100)</b>	<b>30 (100)</b>	<b>100</b>
<b>Age</b>			
25-35	4 (13.33)	0	4 (6.67)
35-45	10 (33.33)	9 (30)	19(31.66)
45 and above	16(53.34)	21 (70)	37(61.67)
<b>Total</b>	<b>30(100)</b>	<b>30(100)</b>	<b>60 (100)</b>
<b>Education</b>			
SSLC	19(63.34)	11(36.66)	30(50)
Higher Secondary	1(3.33)	8(26.68)	9(15)
Graduation	10(33.33)	11(36.66)	21(35)
<b>Total</b>	<b>30(100)</b>	<b>30(100)</b>	<b>60(100)</b>
<b>Occupation</b>			
Agriculture	30(100)	30(100)	60(100)
<b>Total</b>	<b>30(100)</b>	<b>30(100)</b>	<b>60(100)</b>
<b>Family size</b>			
1-2	3(10)	1(3.33)	4(6.67)
2-3	6(20)	8(26.67)	14(23.33)
3-4	19(63.33)	20(66.67)	39(65)
Above 4	2(6.67)	1(3.33)	3(5)
<b>Total</b>	<b>30(100)</b>	<b>30(100)</b>	<b>60(100)</b>

<b>Annual family income from agriculture (in Rs.)</b>			
100000-200000	7(23.34)	5(16.66)	12(20)
200000-300000	9(30)	16(53.34)	18(30)
Above 300000	14(46.66)	9(30)	30(50)
<b>Total</b>	<b>30(100)</b>	<b>30(100)</b>	<b>60(100)</b>

Source: compiled from primary data

\*figure in the parenthesis indicate percentage to total

The table 4.3 shows the gender, age, education, occupation and annual income from agriculture of the farmer respondents in the study area. This table revealed that male farmers dominated the area in medicinal rice cultivation in both Palakkad and Malappuram district of Kerala.

Farmers were the prime actors in the medicinal rice cultivation. In the case of Navara farmers, 53.34 per cent of the farmers were under the age group of above 45 followed by 33.3 per cent of the respondents under the age group of 35-45. The youngsters were also ready for adopting the agricultural fields as their occupation, because they are aware about the nutritional and medicinal properties of this kind of rice. For Rakthashali rice, 70 per cent of the respondents come under the age group of above 45 years.

Out of the 60 respondents, 33.33 per cent of Navara farmers and 36.66 per cent of Rakthashali farmers were graduated. This shows that they are well educated and they know very well about the traditional rice variety and their quality and nutritional properties and also the importance of the cultivation of medicinal rice.

In the case of annual income from agriculture, 46.66 per cent of Navara farmers and 53.34 per cent of Rakthashali farmers comes under above 3 lakh category.

#### **4.2.2.2 Background of rice cultivation in the study area**

In this section, studied about the reason for cultivation of medicinal rice, how long they were doing cultivation, the land holding position of the farmers and seed varieties used by the farmers in the study area.

**Table 4.4 Background of rice cultivation of farmer respondents**

<b>Rice variety</b>	<b>Navara Rice (n=30)</b>	<b>Rakthashali Rice (n=30)</b>	<b>Total (n=60)</b>
<b>Particulars</b>			
<b>Year of experience</b>			
1-5	0	12(40)	12(20)
5-10	15(50)	16(53.33)	31(51.66)
10-15	8(26.67)	2(6.67)	10(16.67)
15 above	7(23.33)	0	7(11.67)
<b>Total</b>	<b>30(100)</b>	<b>30(100)</b>	<b>60(100)</b>
<b>Reason for cultivation</b>			
High market value	9(30)	6(20)	15(25)
Large demand	13(43.33)	7(23.33)	20(33.33)
Medicinal property of rice	8(26.67)	7(23.33)	15(25)
Preserving traditional variety	0	10(33.34)	10(16.67)
<b>Total</b>	<b>30(100)</b>	<b>30(100)</b>	<b>60(100)</b>

Source: compiled from primary data

\*figure in the parenthesis indicate percentage to total

From the table 4.4, it is revealed that, 50 per cent of Navara farmers doing cultivation for a period of 5-10 years. With respect to Rakthashali farmers, 53.3 per cent of the farmers were doing cultivation for a period of 5-10 years.

The major reasons for cultivating the Navara rice were large demand, high market value and medicinal properties. In the case of Rakthashali rice, large demand, high market value, medicinal property of rice and preserving traditional variety were identified as the major reasons for the cultivation.

Large demand was the major reason for 43.33 per cent of the Navara farmers for cultivating this variety rice, followed by high market value (30 per cent) and medicinal property of the rice (26.67 per cent).

For Rakthashali rice, the major reason for the cultivation by the farmers were preserving traditional variety (33.34 per cent), large demand (23.33 per cent), medicinal property of rice (23.33 per cent), and high market value (20 per cent).

#### 4.2.2.3 Category of farmers doing medicinal rice cultivation

According to NABARD guidelines, farmers are classified into marginal, small and large on the basis of land holding. Farmers having a land holding of less than 1 hectare (2.5 acre) are called marginal farmers, farmers who are having land holding of 1-2 hectare (2.5-5 acre) are coming under small farmer category and the farmers who having land above 2 hectare (5 care) is comes under the category of large farmers

**Table 4.5 Land holding position of farmers in the study area**

<b>variety category</b>	<b>Navara Rice (n=30)</b>	<b>Rakthashali rice(n=30)</b>	<b>Total (n=60)</b>
Marginal	7 (23.33)	12 (40)	19 (31.67)
Small	9 (30)	16 (53.33)	25 (41.67)
Large	14 (46.67)	2 (6.67)	16 (26.66)
<b>Total</b>	<b>30 (100)</b>	<b>30 (100)</b>	<b>60 (100)</b>

Source: compiled from primary data

\*figure in the parenthesis indicate percentage to total

Out of the 30 respondents from Navara farmers, 46.67 per cent of farmers belong to large farmer category followed by 30 per cent small farmers and 23.33 per cent marginal farmers. In the case of Rakthashali farmers 53.33 per cent of the farmers come under the category of small farmers followed by marginal farmers (40 per cent)

#### 4.2.2.4 Area, production and productivity of medicinal rice

The details of total area, area under cultivation, production and productivity of Navara and Rakthashali rice were given in the table 4.6

**Table 4.6 Area, production and productivity of medicinal rice**

<b>Particulars</b>	<b>Navara Rice (acre) (N=30)</b>		<b>Rakthashali Rice (acre) (N=30)</b>	
	<b>Total</b>	<b>Average</b>	<b>Total</b>	<b>Average</b>
Total area under cultivation (acre)	212	7.06	164	5.4
Area under rice cultivation (acre)	197.5	6.58	101	3.36
Production (Kg)	147700	4923.3	93250	3108.3
Productivity(Kg)	747.8		923.2	



Source: compiled from primary data

From the table 4.6, it is revealed that, average of total area under cultivation of Navara rice of a farmer was 7.06 acre and the average area under rice cultivation was 6.58 acre. For Rakthashali rice, the average total area under cultivation was 5.4 acre, and the average area under cultivation of the farmer respondent was 3.36 acre. The average production of the selected Navara farmers was 4923.3kg/year. In the case of Rakthashali farmers, the average production was 3108.3 kg/year.

#### 4.2.2.5 Production and marketed surplus of medicinal rice

The marketed surplus represents the difference between the total output produced by a farmer and his own farm consumption. The details regarding total production and marketed surplus of farmers were given below in the table

**Table 4.7 Production and marketed surplus of medicinal rice**

<b>Particulars</b>	<b>Total production (Kg)</b>	<b>Average production (Kg)</b>	<b>Self - consumption and seed purpose (Kg)</b>	<b>Total quantity sold (Kg) after conversion</b>
Navara rice (n=30)	147700	4923.3	755	94045
Rakthashali rice (n=30)	93250	3108.3	270	73554

Source: compiled from primary data

From the table 4.7, it shows that the production and marketed surplus of Navara and Rakthashali rice. The farmers were using some of the produce for self-consumption and also for seed purpose. Both farmers were highly conscious about the quality of produce, thus they are keeping some quantity for future cultivation. The other portion of the produce were sold to the market through processor, and retailers and also sold directly to consumers.

#### 4.2.2.6 Sources of information for farmers

The reason for the existence of a value chain is that goods, knowledge, services or information is passed on between different actors. The sources of information for farmers include Krishi Bhavan and farmer colleagues.

**Table 4.8 Sources of information for farmers**

<b>Sources of information</b>	<b>Type of information</b>	<b>Navara rice (n=30)</b>	<b>Rakthashali rice (n=30)</b>
Krishi Bhavan	<ul style="list-style-type: none"><li>• Information about inputs and organic manures</li><li>• Training</li></ul>	30(100)	30(100)
Fellow farmers	<ul style="list-style-type: none"><li>• Information about seeds and organic manures</li></ul>	30(100)	30(100)

Source: compiled from primary data

\*figure in the parenthesis indicate percentage to total

Table 4.8 shows the source of information for farmers. Farmers receiving information and knowledge from input suppliers like fellow farmers and Krishi Bhavan. The information regarding the rice seeds, organic manures like cow dung, cow urine, green leaf manures and cultivation practices and methods were mostly exchange through farmer to farmer communication. The open market sales, sales through supplyco, padasekarasamithi, cooperative and agencies are not prevailing in both of the study area. So the farmers were not much connected with this type of institution

### **4.2.3 Millers**

The Navara and Rakthashali rice farmers were themselves brought paddy to these kinds of mills for the conversion of paddy into rice. In Palakkad district, the farmers approaching millers for converting the paddy into rice and bring back the rice for marketing. The miller charges Rs 3.5/ Kg as processing cost from farmers.

In the case of Rakthashali, Majority of the famers approach miller for converting the paddy and they collect it back by the farmers for marketing it. The conversion cost charged by the millers for the paddy was Rs. 4/kg.

#### **4.2.3.1 Profile of the miller of Navara rice**

##### **VAR Modern Rice Mill**

VAR Modern Rice Process in Koduvayoor, Palakkad set up within the year 1979, may be a beat player within the category Rice Plants within the Palakkad. This well-known foundation acts as a one-stop goal adjusting clients both nearby and from other parts of Palakkad. Over the course of its

travel, this commerce has set up a firm decent footing in its industry. The conviction that client fulfillment is as vital as their items and administrations have made a difference this foundation earns a tremendous base of clients, which proceeds to develop by the day. This trade utilizes people that are devoted towards their individual roles and put in a parcel of exertion to realize the common vision and bigger objectives of the company. Within the close future, this trade points to grow its line of items and administrations and cater to a bigger client base.

VAR Modern Rice Mill has a wide range of products and services to cater to the varied requirements of their customers. The staffs at this establishment are courteous and prompt at providing any assistance. They readily answer any queries or questions that you may have. Pay for the product or service with ease by using any of the available modes of payment, such as Cash, Cheques. The miller charges ₹3.5/Kg for processing the raw paddy into rice.

#### **4.2.3.2 Profile of the miller of Rakthashali rice**

##### **Mufeed rice mill**

Mufeed Rice Process commenced working in 1974 at Wandoor, Malappuram Area, Kerala, India as a family commerce unit. Mr. K. Alavikutty begun this wander. The Wandoor Grama Panchayat gave absent the Nalla Karshakan Grant to Mr. K. Alavikutty in 2010. At display Mr. Anees K, Child of Mr. K. Alavikutty an enthusiastic and sprouting youthful businessman is in steerage of commerce exercises of M.R.M. The different items of M.R.M. are famously known as Bangle Nourishments within the market. It is really expressed that all the items are in great quality. They utilize no colors and fake flavors that are destructive to wellbeing. Tasty and delicious nourishments can be arranged immediately. The mill operator charges ₹ 4/Kg for the preparing.

#### **4.2.4 Processor**

Only one processor was engaged in the value chain of medicinal rice. The processor involved in the Rakthashali rice value chain.

##### **Chandragiri Modern Rice Mill**

Set up within the year 2004, at Malappuram, “Chandragiri Present day Rice Mill”, are recognized as the unmistakable Producer and Dealer of Pathiri Podi, Navara Rice, Ruddy Rice, Rice Flour, Unboiled Rice, etc. The company is Sole Proprietorship (Person), based company. Beneath the supervision of “P.N. Chandrasekharan”, they have been able to manage their driving position within the market. They are one of the driving producers of rice and related items found at Malappuram

District Kerala. They moreover have advancing quality nourishment items for final a few a long time. They have a "N" number of fulfilled clients over Kerala. The company proceeds giving their Items and benefit to their important clients through retail shops over Kerala.

**Table no. 4.9 Organisational Profile of the processor of Rakthashali rice**

<b>Particulars</b>	<b>Processor</b>
<b>Name and address</b>	Chandragiri Modern Rice Mill
<b>Year of establishment</b>	2004
<b>Company CEO</b>	P.N. Chandrasekharan
<b>Area of operation</b>	Malappuram
<b>Total number of employees</b>	26 to 50 People
<b>Legal Status of Firm</b>	Sole Proprietorship (Individual)
<b>Annual Turnover</b>	Rs. 50 Lakh - 1 Crore
<b>Infrastructure</b>	Backed by the support our sophisticated infrastructural unit, They have been able to provide high quality range of products. This infrastructure is categorized into different sub-units like procurement, processing, quality testing, warehousing & packaging, R & D and sales & marketing. Our infrastructural unit helps us to meet the requirements our clients.

#### 4.2.5 Retailers

The five retailers surveyed for the study area. Three retailers were engaged in Navara rice marketing and two retailers were engaged in Rakthashali rice marketing. The details of selected retailers from the study area were given below:

**Table 4. 10 Socio economic characteristics of retailers**

<b>Variables</b>	<b>Navara (n=3)</b>	<b>Rakthashali (n=2)</b>
<b>Gender</b>		
Male	3 (100)	2 (100)
<b>Total</b>	<b>3 (100)</b>	<b>2(100)</b>

<b>Age</b>		
40-50	1 (33.33)	
50-60	2 (66.67)	2 (100)
<b>Total</b>	<b>3 (100)</b>	<b>2(100)</b>
<b>Education</b>		
SSLC	2 (66.67)	1(50)
Higher Secondary	1 (33.33)	1(50)
<b>Total</b>	<b>3 (100)</b>	<b>2(100)</b>
<b>Ownership</b>		
Individual	3 (100)	2 (100)
<b>Total</b>	<b>3 (100)</b>	<b>2(100)</b>
<b>Mode of investment</b>		
Own fund	3 (100)	2(100)
<b>Total</b>	<b>3 (100)</b>	<b>2(100)</b>
<b>Monthly income (in Rs.)</b>		
20000-40000		
40000-60000	1 (33.33)	
60000-80000	1 (33.33)	1(50)
Above80000	1 (33.33)	1(50)
<b>Total</b>	<b>3 (100)</b>	<b>2(100)</b>

Source: compiled from primary data

\*figure in the parenthesis indicate percentage to total

From the table, it is clear that all the respondents are male and majority of the respondents were comes under the 50-60 age category. The retailers selected for the study from the selected area were doing business individually. They started business with their own source of fund. They have their own shops. Monthly basis they are collecting orders from the farmers. The retailers themselves were procuring the produce from the farmers place. The payment in cash form and the time period for payment was spot payment or within a week. The monthly income for the retailers comes under

60000-80000category.

#### 4.2.5.1 Marketing of medicinal rice

There are three retailers involved in Navara rice marketing. Two retailers were situated at Palakkad itself and one from Thrissur district. The organisation called “Swabhimaan and Jaivakalavara were the retailers engaged in marketing of the Navara rice in Palakkad district. The other retailer engaged in the marketing of Navara rice was “Alter media” in Thrissur district. The retail shops engaged in Rakthashali rice marketing were Green remedy organic shop and Punarjani mart at Malappuram district. The retailers themselves were procuring the product from the farmers’ place.

**Table no. 4.11 Organisational Profile of the retailers in the value chain of Navara rice**

<b>Particulars</b>	<b>Swabhimaan</b>	<b>Jaivakalavara</b>	<b>Altermedia</b>
<b>Name and address</b>	<b>Swabhimaan</b> Parakkalam, pallasana, Palakkad, Kerala	<b>JaivaKalavara Organic Outlet,</b> AtharaBavan Compound, District Panchayath Junction, Near State Bank Of India,Kunnathurmedu, Palakkad	<b>Altermedia</b> Brhamswommadom building,Opp.Ambika arcade, M G road Thrissur
<b>Year of establishment</b>	2013	2015	1987
<b>Company CEO</b>	Gireesh	Sudeep P	Anil
<b>Area of operation</b>	Palakkad	Palakkad	Thrissur
<b>Total number of employees</b>	6	4	2
<b>Legal Status of Firm</b>	Sole Proprietorship (Individual)	Sole Proprietorship (Individual)	Sole Proprietorship (Individual)
<b>Procurement list</b>	Organic rice, Vegetable and Fruits	Fruit Vendors Organic Rice Retailers Organic Food Retailers	Organic rice, organic vegetables, fruits wheat,pulses, babay

		Organic Fertilizer Dealers Organic Fruit Retailers Organic Vegetable	foods, <b>Books-</b> Organic farming, wildlife, education & alternate literature & Eco friendly products
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**Table no. 4.12 Organisational Profile of the retailers in the value chain of Rakhthashali rice**

<b>Particulars</b>	<b>Punarjani mart</b>	<b>Green remedy organic shop</b>
<b>Name and address</b>	Punarjani mart Changuvetty, NH66, Kottakkal, Malappuram – 676503	Green remedy organic shop Haritham Organics, Perinthalmanna Road Valancherry, Malappuram - 676552
<b>Year of establishment</b>	2013	2014
<b>Company CEO</b>	Sundararajan P	Krishnaraj
<b>Area of operation</b>	Malappuram	Malappuram
<b>Total number of employees</b>	2	3
<b>Legal Status of Firm</b>	Sole Proprietorship (Individual)	Sole Proprietorship (Individual)
<b>Procurement list</b>	Organic rice, wheat, organic vegetables, oil and other handcrafts	Organic rice, Organic vegetables All kinds of Organic Products and Medicines

#### **4.2.6 Consumers**

A consumer is one that buys goods for consumption. The consumer is an individual who pay some amount of money or the thing required to consume goods and services produced. Thus a consumer plays a vital role in the marketing of a product. They are the important actor in the value chain because; the taste, preference and demand of the consumers will affect the marketing of the products.

**Table 4.13 Socio economic characteristics of consumers**

<b>Variables</b>	<b>Category</b>	<b>Navara (n=30)</b>	<b>Rakthashali (n=30)</b>
<b>Gender</b>	Male	14 (46.67)	20 (66.67)
	Female	16 (53.33)	10 (33.33)
<b>Total</b>		30 (100)	30 (100)
<b>Age</b>	25-35	13 (43.33)	18(60)
	35-45	10 (33.33)	9 (30)
	45-55	7 (23.34)	3 (10)
<b>Total</b>		30(100)	30(100)
<b>Education</b>	SSLC	7 (23.33)	8 (26.67)
	Higher Secondary	16 (53.33)	0
	Graduation	7 (23.34)	18 (60)
	PG	0	4 (13.33)
<b>Total</b>		30(100)	30(100)
<b>Occupation</b>	Business	10 (33.33)	13 (43.33)
	Private job	20 (66.67)	17 (56.67)
<b>Total</b>		30	30
<b>Annual income</b>	50000-100000	14 (46.67)	6 (20)
	Above 100000	16 (53.33)	24 (80)
<b>Total</b>		30(100)	30(100)

Source: compiled from primary data

\*figure in the parenthesis indicate percentage to total

Table 4.13 revealed that, female (53.33 per cent) were the potential consumers for Navara rice. Among the Rakthashali consumers, 66.67percent of respondents were male. Most of the respondent for both Navara (43.33 per cent) and Rakthashali (60 per cent) were comes under the 25-35 age category followed by 35-45 and 45-55 age categories. Education qualification for Navara consumer respondents was higher secondary (53.33 per cent), for Rakthashali consumers; their education qualification was graduation (60 per cent). Nowadays people are aware about the quality and medicinal properties of medicinal rice, thus they are ready to buy these type of rice. With regard to the occupation of both Navara (66.67 per cent) and Rakthashali (56.67 per cent) consumer respondents were doing private sector jobs.



#### 4.2.6.1 Purchasing details

Purchase details include periodicity of purchase and source of purchase of both Navara and Rakthashali consumers were given in the table 4.14.

**Table 4.14 Purchasing details of consumers**

<b>Particulars</b>	<b>Category</b>	<b>Navara rice (n=30)</b>	<b>Rakthashali rice (n=30)</b>
<b>Periodicity of Purchase</b>	Twice in a month	18(60)	16(53.33)
	Monthly	12(40)	14(46.67)
<b>Total</b>		<b>30 (100)</b>	<b>30(100)</b>
<b>Source of purchase</b>	Direct from farmers	20(66.67)	12(40)
	Retailers	10(33.33)	18(60)
<b>Total</b>		<b>30(100)</b>	<b>30 (100)</b>
<b>Quantity purchased (in Kg.)</b>	1-5	14(46.67)	2(6.66)
	5-10	16(53.33)	11(36.67)
	10-15	0	17(56.67)
<b>Total</b>		<b>30(100)</b>	<b>30(100)</b>
<b>Form of consumption</b>	Rice	<b>30(100)</b>	<b>30(100)</b>

Source: compiled from primary data

\*figure in the parenthesis indicate percentage to total

It is clear from the table 4.14 that the periodicity of purchase for both Navara rice (60 per cent) and Rakthashali rice (53.33 per cent) were comes under twice in a month category. 66.67 per cent of Navara consumers were purchase the product directly from farmer. Most of the consumers (53.33 per cent) were purchasing 5-10 kg rice. The consumers were consuming it in the rice form. Among the Rakthashali consumers, 60 per cent of the consumer respondents were purchase product from retailers. 56.67 per cent consumers were purchasing 10-15 kg of rice and also using in the form of rice.

#### 4.2.6.2 Satisfaction towards Navara / Rakthashali rice

Customer satisfaction is a term used to describe a scenario when an exchange meets the needs and expectations of its user. It captures the provision of goods or services that fulfill the customer's expectations in terms of quality and service in relation to the price paid. To know the satisfaction towards the Navara and Rakthashali rice, 3 point scale selected highly satisfied, satisfied and no

opinion

**Index range defining satisfaction towards Navara / Rakthashali rice**

	<b>Navara rice (n=30)</b>	<b>Rakthashali rice (n=30)</b>	<b>Total (n=30)</b>
Highly satisfied	Greater than 94	Greater than 83	Greater than 86
Satisfied	70-94	63-83	67-86
No opinion	Less than 70	Less than 63	Less than 67

**Table 4.15 Satisfaction of consumers towards Navara / Rakthashali rice**

Factors	Navara rice (n=30)		Rakthashali rice (n=30)		Total (n=60)	
	Price	75	83.33	68	75.55	143
Taste	79	87.77	70	77.77	149	82.77
Nutrient value	88	97.77	72	80	160	88.88
Freshness	77	85.55	67	74.44	144	80
Hygiene	72	80	72	80	144	80
Availability	65	72.22	49	54.44	114	63.33
Shelf life	52	57.77	59	65.55	111	61.66
Chemical pesticide free	83	92.22	70	77.77	153	85
Composite index /score	<b>591</b>	<b>82.07</b>	<b>527</b>	<b>73.19</b>	<b>1118</b>	<b>77.63</b>

Source: compiled from primary data

From the table 4.15, Satisfaction level of the consumers with respect to Navara rice and Rakthashali rice shows that “nutrient value” with a composite index of 97.77 is the most influencing component followed by chemical free pesticide, hygiene, taste and freshness.

H0: there is no significant difference between the factors affecting the satisfaction among the consumers of Navara and Rakthashali rice

H1: there is significant difference between the factors affecting the satisfaction among the consumers of Navara and Rakthashali rice

### Test statistics

	Price	Taste	Nutrient value	Freshness	Hygiene	Availability	Shelf life	Chemical pesticide free
Chi-Square	1.545	5.316	11.023	4.322	.083	6.448	2.240	7.597
Df	1	1	1	1	1	1	1	1
Asymp. Sig.	.214	.021	.001	.038	.773	.011	.134	.006

It is revealed that the factors price, taste, freshness, hygiene, availability, chemical pesticide free and shelf life were found significant. So the null hypothesis is accepted. That is there is no significant difference between the factors affecting the satisfaction among the consumers of Navara and Rakthashali rice

However in K W H test there was statistically significant difference in factor “nutrient value” between the satisfaction among consumers of Navara and Rakthashali rice,  $H = 11.023$ ,  $p = .001$  with a mean rank score of 36.17 for Navara rice and 24.83 for Rakthashali rice.

#### 4.2.6.3 Constraints faced by the consumers

Problems faced by consumers like non availability of required quantity, timely availability, less shelf life, high price and price fluctuation

#### Index range defining satisfaction towards Navara / Rakthashali rice

	Navara rice (n=30)	Rakthashali rice (n=30)	Total (n=30)
Highly satisfied	Greater than 78	Greater than 80	Greater than 79
Satisfied	29-79	33-80	30-79
No opinion	Less than 29	Less than 33	Less than 30

**Table 4.16 Constraints faced by the consumers**

Constraints	Navara rice (n=30)		Rakthashali rice (n=30)		Total (n=60)	
Non-availability of required quantity.	30	33.33	33	36.66	63	35
Non – availability of good quality product.	30	33.33	30	33.33	60	33.33
Non- availability of product.	50	55.56	54	60	104	57.77

Less shelf life of the product.	47	52.22	49	54.44	96	53.33
High price of the product	90	100	90	100	180	100
Price fluctuation	44	48.88	50	50	89	49.44
Composite index /score	<b>291</b>	<b>53.88</b>	<b>306</b>	<b>56.66</b>	<b>592</b>	<b>54.81</b>

Source: compiled from primary data

From the table 4.16, Major constraint faced by the consumer respondents both for Navara and Rakthashali rice were high price of the product followed by non- availability of product, less shelf life of the product and price fluctuation.

Test statistics

	<b>Non-availability of required quantity.</b>	<b>Non – availability of good quality product</b>	<b>Non-availability of product</b>	<b>Less shelf life of the product</b>	<b>High price of the product</b>	<b>Price fluctuation</b>
Chi-Square	3.105	.000	1.341	.273	.000	2.403
Df	1	1	1	1	1	1
Asymp. Sig.	.078	1.000	.247	.601	1.000	.121

The Kruskal Wallis test done to check there is any difference in the constraints in both Navara and Rakthashali rice. After the test, the Kruskal Wallis test revealed that there is no significant difference in constraints faced by the consumer in both Navara and Rakthashali rice.

This section includes about the various chains and actors involved in the value chain of Navara rice and Rakthashali rice, the actors were farmers, processor, retailers and consumers. Socio economic characteristics of the farmers, processor, retailers and consumers. Production and productivity, institutional linkages, satisfaction and constraints faced by the consumers

### Session III

#### 4.3 Price spread efficiency and factors influencing it in value chain of medicinal rice

Agriculture marketing plays a vital role in agricultural development which is a pre requisite for development in other sector and for the overall development of the economy. An efficient marketing is necessary in the economy of all countries, in general and of agricultural countries, in particular. The marketing efficiency depends on costs, margin and price spread. Price spread (PS) is the difference between the actual price received by the producer seller (PNP), the price paid by the consumers (RP).

$$PS = RP - PNP$$

Market efficiency indicators were used to understand the efficiency of these marketing channels. For this price spread and modified market efficiency index put forward by Acharya's has been used. Acharya's method suggests that market efficiency is the ration of price received by the farmer to marketing cost and margin. A higher ratio signifies higher efficiency.

##### 4.3.1 Cost of cultivation of medicinal rice

The cost of cultivation was calculated by using different components of cost.

##### 4.3.1.1 Cost of inputs in medicinal rice incurred by the farmers

The cost incurred for the production includes input cost, transportation cost and marketing cost. The details were given below:

**Table 4.17 Cost involved for inputs by farmers**

Particulars	Navara rice (₹./Kg)	Rakthashali rice (₹./Kg)
Imputed land cost	1.26	1.04
Seed	1.00	1.47
Organic manures	1.33	1.46
Machinery	0.19	0.17
Labour	0.71	1.06
<b>Total</b>	<b>4.5</b>	<b>5.2</b>

Source: compiled from primary data

\*figure in the parenthesis indicate percentage to total

Inputs are the most important factors for the cultivation for both the Navara and Rakthashali farmers, so they were ready to spend money for getting these inputs for cultivation. Both the Navara and Rakthashali farmers having own land for cultivation, thus imputed land cost are taken for cost calculation. The farmers were highly conscious about the quality of seed for the cultivation, so they were keeping some quantity from their cultivation for seed purpose.

Table 4.17 indicate that the cost components of Navara and Rakthashali farmers. The cost components of the Navara farmers include: organic manures of ₹ 1.33/ Kg, imputed land cost of ₹1.26/Kg, seed cost of ₹1.00/Kg, labour cost of ₹ 0.71/Kg and machinery cost of ₹ 0.19/Kg. In the case of Rakthashali farmers, cost components include: organic manures of ₹ 1.46/ Kg, imputed land cost of ₹ 1.04/Kg, seed cost of ₹1.47/Kg, labour cost of ₹ 1.06/Kg and machinery cost of ₹ 0.17/Kg.

**Table 4.18 Cost involved in transportation by farmers**

Particulars	Navara rice (₹/Kg)	Rakthashali rice (₹/Kg)
<b>Seed</b>		0.28
<b>Organic manures</b>	0.30	0.38
<b>Loading/ unloading</b>	0.10	0.12
<b>Total cost</b>	<b>0.40</b>	<b>0.80</b>

Source: compiled from primary data

\*figure in the parenthesis indicate percentage to total

From table 4.18, it indicates the cost involved in the transportation by farmers. Rakthashali farmers pay highest transportation cost when compared to the Navara farmers. The total cost involved for the transportation for Navara and Rakthashali farmers were ₹ 0.40/Kg and ₹0.80/Kg respectively. The cost components include seed, organic manures and loading & unloading charges. The Navara farmers pay ₹ 0.30/Kg as transportation cost for organic manures and ₹ 0.10/Kg for loading and unloading charges. In the case of Rakthashali farmers, they pay ₹0.28/Kg as transportation cost for seed, ₹0.38/Kg for organic manures and ₹ 0.12/Kg for loading and unloading.

**Table 4.19 Harvesting cost incurred by the farmers**

Particulars	Navara rice (₹/Kg)	Rakthashali rice (₹/Kg)
<b>Harvesting</b>		
<b>Labour cost</b>	0.64	0.87
<b>Machinery</b>	0.26	0.43
<b>Post harvest</b>		
<b>Labour cost</b>	0.10	0.22

<b>Machinery</b>	0.31	0.40
<b>Transportation cost</b>	0.30	0.64
<b>Loading/unloading</b>	0.10	0.17
<b>Total</b>	<b>1.73</b>	<b>2.76</b>

Source: compiled from primary data

Table 4.19 shows the harvesting cost incurred by the farmers. In the case of harvesting, the Rakthashali farmers incurred high cost compared to the Navara farmers. The Rakthashali farmers facing difficulties like high labour cost, high transportation cost. Because of these the reasons they incur highest cost compared to the Navara farmers. The total harvesting cost for Navara and Rakthashali farmers was ₹1.73/Kg and ₹ 2.76/Kg respectively. Harvesting cost components having to phases like: harvesting cost and post harvesting cost. In the harvesting phase, the Navara farmers incurred ₹ 0.64/Kg for labour cost and ₹0.26/ Kg for machinery cost. While Rakthashali farmers incur ₹0.87/Kg for labour cost and ₹0.43/Kg for machinery cost. In post harvesting phase, Navara farmers incur ₹ 0.10/Kg for labour cost, ₹0.31/Kg for machinery cost, ₹ 0.30/Kg for transportation and ₹ 0.10/Kg for loading/unloading charge. In the case of Rakthashali farmers, they incur ₹0.22/Kg for labour cost, ₹ 0.40/Kg for machinery cost, ₹ 0.64/Kg for transportation and ₹ 0.17/Kg for loading/ unloading charge.

**Table 4.20 Marketing cost incurred by the farmers**

<b>Particulars</b>	<b>Navara rice (₹/Kg)</b>	<b>Rakthashali rice (₹/Kg)</b>
<b>Conversion charge</b>	3.5	4
<b>Transportation</b>	0.40	1.93
<b>Loading/ unloading</b>	0.10	0.24
<b>Total</b>	<b>4</b>	<b>6.18</b>

Source: compiled from primary data

\*figure in the parenthesis indicate percentage to total

From the table 4.20, it is found that conversion charge, transportation and loading/unloading were the cost incurred by the farmers during marketing stage. The transportation cost for Navara farmers and Rakthashali farmers was ₹0.40/Kg and ₹1.93/Kg respectively. In the case of loading/unloading charges, Navara farmers incur ₹0.10/Kg and Rakthashali farmers incur ₹ 0.24/Kg. The marketing cost was higher for Rakthashali farmers of ₹6.18/Kg than Navara farmers (₹4/Kg). This is because, the Rakthashali farmers not having enough consumers in the surrounding. Thus they have to go to

market. The distance and loading/unloading charges were the major component for this high cost.

#### 4.3.1.2 Cost incurred by the processor

There is only one processor engaged in the value chain of medicinal rice. Rakthashali farmers were sold their produce to processor for marketing. The marketing cost incurred for processor includes land and building, electricity bill, furniture and labour.

**Table 4.21 Cost incurred by the processor**

Particulars	Rakthashali rice (₹/Kg)
Land and building	0.89
Electricity bill	0.38
Furniture	7.68
Labour	2.61
<b>Total</b>	<b>11.56</b>

Source: compiled from primary data

\*figure in the parenthesis indicate percentage to total

From the table 4.21, indicate the marketing cost incurred for processor engaged in the Rakthashali marketing includes land and building, electricity bill, furniture and labour. The processor incurs highest cost for furniture of ₹ 7.68/Kg followed by labour cost of ₹2.61/Kg, land and building cost of ₹ 0.89/Kg and electricity bill of ₹0.38/Kg. The total cost incurred for the procurement was ₹ 11.56/Kg.

#### 4.3.1.2.1 Cost of procurement for processor

The procurement cost incurred for processor includes labour cost and transportation cost.

**Table no 4.22 Cost incurred by processor for procurement**

Particulars	Rakthashali rice (₹/Kg)
<b>Labour(loading/unloading)</b>	0.21
<b>Transportation</b>	0.48
<b>Total</b>	<b>0.69</b>

Source: compiled from primary data

The procurement cost for processor includes labour and transportation. The total cost incurred for procurement was ₹ 0.69/Kg.



### 4.3.1.3 Cost incurred by the retailers

The cost of retailers includes investment cost and marketing cost. The details were given in the table 4.23

**Table 4.23 Investment Cost incurred by the retailers for medicinal rice**

Particulars	Navara rice (₹/Kg)	Rakthashali rice (₹/Kg)
Land and building rent	0.26	0.29
Electricity bill	0.04	0.03
Furniture	0.52	0.29
Labour	0.29	0.24
<b>Total</b>	<b>1.12</b>	<b>0.85</b>

Source: compiled from primary data

\*figure in the parenthesis indicate percentage to total

The table 4.23 revealed that the retailers who are engaged in Navara rice marketing pay highest investment cost of ₹ 1.12/Kg. With respect to the retailers who are engaged in the Rakthashali rice marketing, they incur investment cost of ₹0.85/Kg. Furniture cost was the highest investment cost incurred by both Navara (₹0.52/Kg) and Rakthashali (₹0.29/Kg) retailers. The other investment cost includes labour, land and building rent and electricity bill. Labour cost is the next major cost incurred by both Navara (₹0.29/Kg) and Rakthashali (₹0.24/Kg) retailers.

**Table 4.24 Marketing cost for retailers**

Particulars	Navara rice (₹/Kg)	Rakthashali rice (₹/Kg)
Transportation	0.49	0.31
Labour cost (loading/unloading)	0.42	0.30
<b>Total</b>	<b>0.91</b>	<b>0.61</b>

Source: compiled from primary data

\*figure in the parenthesis indicate percentage to total

From the table 4.24, it is clear that major components in the marketing cost include labour cost and transportation. The retailer engaged in Navara rice marketing pay highest cost for marketing of ₹ 0.91/Kg compared to retailers engaged in Rakthashali rice marketing (₹0.61/Kg).

**Table 4.25 Total marketing cost and margin of actors in medicinal rice**

Particulars	Navara rice		Rakthashali rice		
	Channel I Per Kg	Channel II Per Kg	Channel I Per Kg	Channel II Per Kg	Channel III Per Kg
<b>I. Farmer</b>					
a. Production cost	4.5	4.5	5.2	5.2	5.2
b. Transportation cost	0.40	0.40	0.80	0.80	0.80
c. Harvesting cost d.	1.73	1.73	2.76	2.76	2.76
d. Cost- marketing	4	4	-	6.18	6.18
<b>Total cost</b>	<b>10.63</b>	<b>10.63</b>	<b>8.76</b>	<b>14.94</b>	<b>14.94</b>
<b>Selling price for farmer</b>	<b>80</b>	<b>120</b>	<b>90</b>	<b>80</b>	<b>110</b>
<b>Margin per quintal</b>	<b>69.37</b>	<b>109.37</b>	<b>81.24</b>	<b>65.06</b>	<b>95.06</b>
<b>II. Miller</b>					
e. purchase price (paddy)			90		
f. purchase cost (paddy)			0.69		
g. investment cost			11.56		
<b>Total cost</b>			<b>102.25</b>		
<b>Selling price of barn and husk</b>			<b>5.46</b>		
<b>Net cost</b>			<b>96.79</b>		
<b>Selling price</b>			<b>150</b>		
<b>Margin received by miller</b>			<b>53.21</b>		
<b>III. Retailer</b>					
h. Purchase price	80			80	
i. Purchase cost	0.91			0.61	
J. Investment cost	1.12			0.85	
<b>Total cost</b>	<b>82.03</b>			<b>81.46</b>	
<b>Selling price</b>	<b>120</b>			<b>120</b>	
<b>Margin received by Retailer</b>	<b>37.97</b>			<b>38.54</b>	

Source: compiled from primary data

The table 4.25 indicates that there is large gap in margin received by Navara farmer while selling to

retailers and directly to consumers. The Navara farmers earn a margin of ₹109.37/Kg in channel II and ₹69.37/Kg in channel I. The farmers earn comparatively higher margin when they sold their produce directly to consumers. Because of this reason, the farmers were highly interested in selling their produce directly to the consumers. So the farmers were not interested in involving middlemen in the marketing for their produce.

In the case of Rakthashali rice farmers, they earn a margin of ₹ 95.06/Kg in channel III, ₹ 81.24/Kg in channel I and ₹65.06/Kg in channel II. The farmers were getting a comparatively higher margin when they sold their produce directly to the consumers. When they were involving processors and retailers, they get a small margin, so the farmers were not much interested in involving the middlemen in the marketing channel.

**Table 4.26 Marketing cost and margin of actor in Navara rice channel**

Particulars	Navara rice			
	Channel I Rs./Kg	Channel I producers share in consumer rupee	Channel II Rs./Kg	Channel II producers share in consumer rupee
<b>Producers net price</b>	<b>80</b>	<b>66.67</b>	<b>120</b>	<b>100</b>
Cost incurred				
1.Farmer	10.63	8.86	10.63	8.86
2.Processor				
3.Retailers	2.03	1.69		
<b>Total cost</b>	<b>12.66</b>	<b>10.55</b>	<b>10.63</b>	<b>8.86</b>
Margin earned				
1.Farmers	69.37	57.81	109.37	91.14
2.Processor				
3.Retailers	37.97	31.64		
<b>Total margin</b>	<b>107.34</b>	<b>89.45</b>	<b>109.37</b>	<b>91.14</b>
<b>Consumer price</b>	<b>120</b>	<b>100</b>	<b>120</b>	<b>100</b>

Source: compiled from primary data

The table 4.26 shows the net price received by the Navara farmers in different marketing channels. Among the two channels in the Navara rice marketing the maximum price received by the farmer in

channel II with ₹120/Kg. The producers share in consumer rupee was found higher in channel II with 100 per cent followed by channel I with 66.67 per cent. In channel I, the producers share in consumer rupee with respect to margin earned by the farmers was 57.81 per cent and 31.64 per cent for retailers. In the case of channel II, the producers share in consumers rupee with respect to margin earned was 109.37 per cent for farmers

**Table 4.27 Marketing cost and margin of actor in Rakthashali rice channel**

Particulars	Rakthashali rice					
	Channel I Rs./Kg	Channel I producer s share in consumer Rupee	Channel II Rs./Kg	Channel II producers share in consumer Rupee	Channel III Rs/Kg	Channel I II producers share consumerin Rupee
<b>Producers net Price</b>	<b>90</b>	<b>60</b>	<b>80</b>	<b>66.66</b>	<b>110</b>	<b>100</b>
Cost incurred						
1.Farmer	8.76	5.84	14.94	12.45	14.94	13.58
2.Processor	6.79	4.53				
3.Retailers			1.46	1.21		
<b>Total cost</b>	<b>15.55</b>	<b>10.37</b>	<b>16.4</b>	<b>13.66</b>	<b>14.94</b>	<b>13.58</b>
Margin earned						
1.Farmers	81.24	54.16	65.06	54.21	95.06	86.42
2.Processor	53.21	35.47				
3.Retailers			38.54	32.12		
<b>Total margin</b>	<b>134.45</b>	<b>89.63</b>	<b>103.6</b>	<b>86.33</b>	<b>95.06</b>	<b>86.42</b>
<b>Consumer price</b>	<b>150</b>	<b>100</b>	<b>120</b>	<b>100</b>	<b>110</b>	<b>100</b>

Source: compiled from primary data

The table 4.27 shows the net price received by the Rakthashali farmers in different marketing channels. The net price received by Rakthashali farmers was higher in channel III (₹110/Kg) followed by channel I (₹90/Kg) and channel II (₹80/Kg). In channel III, the producers share in consumer rupee with respect to cost incurred show higher for farmer with 13.58per cent. As in the

case of channel II, the farmers incur 12.45 per cent share and retailers incur 1.21 per cent share. The producers share in consumer rupee with respect to margin earned by the farmer was higher in channel III with 86.48 per cent. Followed by channel II with 54.21 per cent and channel I with 54.16 per cent

For the farmer, the producers share in consumer rupee with respect to margin shows less in channel I and channel II when compare with channel III. In this channel the farmers sell their produce directly to the consumers. They avoid the involvement of middlemen in the value chain of Rakthashali rice.

#### **4.3.2 Price spread and marketing efficiency of medicinal rice**

Price spread is the difference between the price paid by consumers and the net price received by the producer. More than 50 percentage price spread should be good for the functioning of the market. The efficiency indicates overall performance of marketing channel.

There are two type of channel in Navara rice and three type of channel in Rakthashali rice

#### **Marketing channel for Navara rice**

##### **Channel I**

Farmers' → retailer → consumers

##### **Channel II**

Farmer → consumers

#### **Marketing channel for Rakthashali rice**

##### **Channel I**

Farmer → processor → consumers

##### **Channel II**

Farmer → retailer → consumer

##### **Channel III**

Farmer → consumer

**Table 4.28 Marketing efficiency index in channel**

Particulars	Navara rice		Rakthashali rice		
	Channel I	Channel II	Channel I	Channel II	Channel III
Price received by farmer	80	120	90	80	110
Price paid by consumer	120	120	150	120	110
<b>Price spread</b>	<b>40</b>	<b>0</b>	<b>60</b>	<b>40</b>	<b>0</b>
Marketing cost	12.66	10.63	15.55	16.4	14.94
Marketing margin	107.34	109.37	134.45	103.6	95.06
<b>Marketing efficiency</b>	<b>0.6</b>	<b>1</b>	<b>0.6</b>	<b>0.6</b>	<b>1</b>

Source: compiled from primary data

From the table 4.28, it is clear that channel II is more efficient than channel I for Navara farmers. Whereas the marketing efficiency is 0.6 for channel I. As the number of actors increases the total cost and margin in marketing increases along the actors and in turn reduce the marketing efficiency. For Rakthashali rice farmers, the efficient marketing channel was channel III. The marketing efficiency is lower in channel I and channel II.

Thus the marketing efficiency is higher in channel II for Navara farmers and channel III in Rakthashali farmers. The farmers in both the channel sold their produces to the consumer directly.

#### 4.3.2 Factors influencing price spread efficiency

Choice of a particular value chain by the actors are analysed based on income of actors in the chain, availability of inputs, promptness of payment, holding capacity and product acceptability norms.

##### A) Income of the actors

The value addition at different level shows how much is the cost and margin of an actor in the business. The entry into a specific chain by an actor at a point depends on the revenue benefit receivable. The below table shows the revenue benefits of each actors in the five channel of marketing.

**Table no 4.29 Margin received by each channel of Navara and Rakthashali rice**

Particulars	Navara rice		Rakthashali rice		
	Channel I	Channel II	Channel I	Channel II	Channel III
Farmers	69.37	109.37	81.24	65.06	95.06
Processor			53.21		

Retailers	37.97			38.54	
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Source: compiled from primary data

The margin earned by a Navara farmer is higher only if they sell directly to consumers. In the area of study more than 60 per cent of farmers sell their product directly to consumers. The reason for high margin while selling directly to consumers is mainly because the farmers is not paying for transportation and labour charges for loading and unloading.

In the case of Rakthashali farmers, the margin earned by farmer is higher in channel III followed by channel I and channel II. The channel I include processor. The farmers not incurred any loading and unloading charges and transportation cost, the processor himself collecting the product from the farmers. This is the reason for higher margin in this channel. In channel III the farmers sell their products directly to consumers.

It is clear that majority of farmers are selling their product directly to consumers, since the margin received is higher than other channels. So we can conclude that income is important factor in choice of value chain.

### B) Availability of inputs

Farmers required different inputs like seed, organic manures and tools and machinery at adequate level on time. Availability of inputs is given in the below table for Navara and Rakthashali rice cultivation.

**Table no 4.30 Input availability of farmers**

Particulars	Navara farmers (n=30)			Rakthashali farmers (n=30)		
	Krishi Bhavan	Fellow farmers	Self	Krishi Bhavan	Fellow farmers	Self
Seed			30 (100)		12 (40)	18(60)
Organic manures			30 (100)		9 (30)	21(70)
Tools and machinery	12 (40)	8(26.67)	10 (33.33)		18 (60)	12 (40)

Source: compiled from primary data

\*figures in the parenthesis indicate per cent to total

Maximum numbers of farmers are contacting Krishi Bhavan and fellow farmers for inputs like seed, organic manures and tools & machinery. The main organic manures were cow dung, cow urine and green leaf manures. Majority of Navara and Rakthashali farmers using seed from own source for the next cultivation in order to preserve the quality of seed. The farmers and the consumers were conscious about the quality and nutrient value of the rice. So the farmers keeping some portion of paddy after the production taking place.

### **C) Holding capacity of farmers**

A farmer with a holding capacity has the advantage of keeping their product till the market turns favorable for them. The following table shows the holding capacity of the farmers.

**Table no 4.31 Holding capacity of farmers**

<b>Particulars</b>	<b>Navara farmers</b>	<b>Rakthashali farmers</b>
With storage capacity	11(36.67)	4(13.33)
Without storage capacity	19(63.33)	26(86.67)
Total	30(100)	30(100)

Source: compiled from primary data

\*figures in the parenthesis indicate per cent to total

Farmer in the value chain is most affected depending on the perishability and holding capacity of the produce. In the area of study, 63.33 per cent of Navara farmers and 86.67 Rakthashali farmers were without storage facility. When the farmer is unable to keep the product they choose to sell it through processor, retailers and consumers.

For a processor and retailer, they have the advantage of large storage compared to farmers. They can store tones of product and supply to the market depending on demand. So the ability of a farmer to store the product also influences choosing a particular channel for marketing.

### **D) Time require for price realization**

Time required for receiving payment by farmer is one of the important factors affecting choice of value chain. The below table shows the time required for the returns in the surveyed group of farmers.



**Table no 4.32 Time required for payment by farmers.**

<b>Particulars</b>	<b>Navara farmers</b>	<b>Rakthashali farmers</b>
Spot	25 (83.33)	17(56.67)
0-1 week	5 (16.67)	13(43.33)
Total	30(100)	30 (100)

Source: compiled from primary data

\*figures in the parenthesis indicate per cent to total

It is clear from the table that, majority of the Navara (83.33 percent) and Rakthashali farmers (56.67 per cent) get price for their product on the spot. The retailers and processor get an average credit period of one week. There for the time required for price realisation is important factor for choosing a chain in the marketing.

#### **E) Product acceptability norms**

Product acceptability norms means the criteria's fixed by the purchasing actors in buying a product. These norms play a major role in sale of farmer, processor, and retailers in the value chain. In the case of Navara and Rakthashali rice, there is no such norms are included. Most of the farmers were directly selling their produce to the consumers. The consumers are already aware about the quality and nutrient content of the rice, because they were the regular consumers of the farmers. Same in the case of processor and retailers, they were aware about the quality and nutrient content of the rice, since they were purchasing it from the farmers for long time.

All these are the major factors that influencing the selection of a profitable value chain. The farmers considering these factors while selecting a particular value chain for marketing their produce. The price spread efficiency indicates the overall performance of a value chain. From the study it can be concluded that increase in the number of actors in a value chain decreases market efficiency by adding to marketing cost and marketing margin.

## Session IV

### 4.4 Constraints and possible solutions at different levels in the value chain

In this section the problems faced by different actors in the value chain was examined. For finding out the intensity of the problem faced by each actor the index method was used. The data related the problems like production, procurement, harvesting, transportation and marketing were collected in 3 point Likert scale. The data analysed with the help of indices and Kruskal Wallis test.

#### 4.4.1 Problems faced by farmers

Problems faced by farmers in different levels of cultivation like pre- production, production, harvesting, processing, and marketing of Navara rice and Rakthashali rice were discussed under this head.

##### 4.4.1 (a) problems faced by farmers in pre-production stage

Input supply, labour shortage, inadequate credit and inadequate information were the major problems faced by the farmers in pre-production stage. The extent of different problems faced by the farmers in pre-production stage is depicted below.

**Table 4.33 Indicator of interpretation of problem index**

Interpretation	Navara Rice (30)	Rakthashali Rice(30)	Total (60)
Highly felt	Greater than 98	Greater than 99	Greater than 98
Moderately felt	75– 98	69– 99	75– 98
Least felt	Less than 75	Less than 69	Less than 75

**Table4.34 Problem faced by farmers in pre -production**

Problems	Navara Rice (N=30)		Rakthashali rice (N=30)		Total (N=60)	
	Score	Index	Score	Index	Score	Index
Lack of good quality materials	80	89	79	88	159	88
High price of seed	81	90	73	81	154	85
Non-availability of seeds	84	93	83	92	167	93
Lack of good quality manures and Pesticides	81	90	76	84	157	87

Lack of availability of organic manures	90	100	90	100	180	100
High price of organic manures and pesticides	81	90	86	95	167	93
Shortage of labour	87	97	90	100	177	98
Lack of scientific information	66	73	52	56	118	65
Inadequate credit	54	60	55	61	109	60
Composite	<b>704</b>	<b>87</b>	<b>684</b>	<b>84</b>	<b>1388</b>	<b>86</b>

Source: compiled from primary data

From the table 4.34, it shows that the major problem faced by the Navara farmers in the pre-production stage was lack of availability of organic manures. This is the highly felt problem among the selected Navara farmers. The other problems like lack of good quality materials, high price of seed, non-availability of seeds, lack of good quality organic manures and pesticides, high price of organic manures and pesticides and shortage of labour were moderately felt problems. In the case of Rakthashali farmers, lack of availability of organic manures and shortage of labour were the highly felt problems among the farmers followed by high price of organic manures and non-availability of seeds.

Test statistics

	Lack of good quality materials	High price of seed	Non-availability of seeds	Lack of good quality manures and Pesticides	Lack of availability of organic manures	High price of organic manures and pesticides	Shortage of labour	Lack of scientific information	Inadequate credit
Chi-Square	.988	4.271	.097	1.733	.000	1.921	3.105	12.183	.109
Df	1	1	1	1	1	1	1	1	1
Asymp. Sig.	.320	.039	.756	.188	1.000	.166	.078	.000	.741

The Kruskal Wallis test on the data for pre- production constraints revealed that the factors like lack of good quality material, high price of seeds, non-availability of seeds, lack of good quality organic manures and pesticides, lack of availability of organic manures, high price of organic manures and pesticides, shortage of labour, and inadequate credit were not found significant. That is there is no significant difference between problems faced by the Navara and Rakthashali farmers in pre-production stage.

However in Kruskal Wallis H test, there shows a statistically significant difference in lack of scientific information ( $H=12.183$ )  $p= .001$  between problems faced by the Navara and Rakthashali farmers in pre-production stage. In Malappuram the farmers were in connection with the institutions like Krishi Bhavan, but the farmers felt that they didn't get much information regarding the details like seed availability, organic manures availability, processing techniques and marketing practice of Rakthashali rice.

#### 4.4.1 (b) Problems faced by farmers in production stage

The major variables were attack of pest and diseases lack of adequate irrigation facility, non-availability of labour, high cost of irrigation, inadequate fund, high cost of labour, lack of knowledge about the application of inputs, lack of awareness regarding source of supply of inputs, natural calamities and inadequate extension supports.

**Table 4.35 Indicator of interpretation of problem index**

	Navara Rice (30)	Rakthashali Rice(30)	Total (60)
Highly felt	Greater than 97	Greater than 95	Greater than 95
Moderately felt	66-97	64-94	65-95
Least felt	Less than 66	Less than 64	Less than 65

**Table no 4.36 Problem faced by farmers in production**

Problems	Navara Rice (N=30)		Rakthashali rice (N=30)		Total (N=60)	
	Score	Index	Score	Index	Score	Index
Attack of pest and diseases	75	83	80	89	155	86
Lack of adequate irrigation facility	73	81	73	81	146	81
Non-availability of labour	62	69	61	68	123	68
High cost of irrigation	58	64	53	59	111	62
Inadequate fund	61	67	79	88	125	69
High cost of labour	82	91	61	68	161	89
Lack of knowledge about the application of inputs	90	100	81	90	171	95

Lack of awareness regarding source of supply of inputs	90	100	90	100	180	100
Natural calamities	52	58	54	60	106	58
Inadequate extension supports	88	98	87	97	175	97
Total	734	81	719	79	1453	81

Source: compiled from primary data

From the table 4.36, it is clear from the table that lack of knowledge about the application of inputs, lack of awareness regarding source of supply of inputs and inadequate extension supports were the highly felt production problems faced by the Navara farmers followed by high cost of labour and attack of pest and diseases.

With respect to Rakthashali farmers, lack of awareness regarding source of supply of inputs and inadequate extension supports were the highly felt problems faced by the farmers in the production stage followed by lack of knowledge about the application of inputs and attack of pest and diseases.

### Test Statistics

	Attack of pest and diseases	Lack of adequate irrigation facility	Non-availability of labour	High cost of irrigation	Inadequate fund	High cost of labour	Lack of knowledge about the application of inputs	Lack of awareness regarding source of supply of inputs	Natural calamities	Inadequate extension supports
Chi-Square	1.686	.012	.128	1.447	6.475	24.115	10.412	.000	.366	.215
Df	1	1	1	1	1	1	1	1	1	1
Asymp. Sig.	.194	.914	.721	.229	.011	.000	.001	1.000	.545	.643

The Kruskal Wallis H test on the data for production constraints revealed that there was statistically significant difference in high labour cost ( $H=21$ )  $p = .001$  between the problem faced by Navara and Rakthashali farmers in rice cultivation in production stage. The farmers in Palakkad district were finding difficult to pay higher cost for labour compared to the farmers in Malappuram district.

However the problems like attack of pest and diseases, lack of adequate irrigation facility, non-availability of labour, high cost of irrigation, inadequate fund, high cost of labour, lack of

knowledge about the application of inputs, lack of awareness regarding source of supply of inputs, natural calamities and inadequate extension supports were found significant, that is there is no significant differences between the problem faced by Navara and Rakthashali farmers in rice cultivation in production stage.

#### 4.4.1 (c) Problems faced by farmers in processing stage

During processing stage, variables which are affecting the farmers were non-availability of good machineries, wastage on processing, inadequate technology, high labour cost, government policies on processing, lack of proper market information, unawareness of processing techniques, distance to processing unit and quality of processed products.

**Table no 4.37 Indicator of interpretation of problem index**

	Navara Rice (30)	Rakthashali Rice(30)	Total (60)
Highly felt	Greater than 88	Greater than 85	Greater than 87
Moderately felt	56-88	55-85	56-87
Least felt	Less than 56	Less than 55	Less than 56

**Table no 4.38 Problem faced by farmers in processing**

Problems	Navara Rice (N=30)		Rakthashali rice (N=30)		Total (N=60)	
	Score	Index	Score	Index	Score	Index
Non-availability of good machineries	72	80	70	78	142	78.
Inadequate technology	68	75	69	76	137	76
Wastage on processing	88	98	75	83	163	90
High labour cost	70	77	56	62	126	70
Unawareness of processing techniques	73	81	75	83	148	82
Lack of proper market information	70	78	71	79	141	78
Government policies on processing	60	66	70	77	130	72
Distance to processing unit	46	51	45	50	91	50
Quality of processed products	37	41	39	43	76	42
Total	584	72	570	70	1154	71

Source: compiled from primary data

From the table, the major problem faced by the Navara farmers was wastage on processing followed by unawareness of processing techniques and non-availability of good machineries.

In the case of Rakthashali farmers, the major problems faced by the farmers were wastage on processing and unawareness of processing techniques.

Test statistics

	Non-availability of good machineries	Inadequate technology	Wastage on processing	High labour cost	Unawareness of processing techniques	Lack of proper market information	Government policies on processing	Distance to processing unit	Quality of processed products
Chi-Square	.282	.081	13.640	9.671	.263	.256	3.468	.066	.335
Df	1	1	1	1	1	1	1	1	1
Asymp. Sig.	.595	.776	.000	.002	.608	.613	.063	.798	.563

It is revealed that the problems like non-availability of good machineries, inadequate technology, high labour cost, government policies on processing, lack of proper market information, unawareness of processing techniques, distance to processing unit and quality of processed products were found significant. That is there is no significant difference between the problems faced by the Navara and Rakthashali farmers in the processing stage.

The Kruskal Wallis H test shows that there was a statistically significant differences in wastage on processing between the problem faced by the Navara and Rakthashali farmers in the processing stage, ( $H=13.640$ ) with a mean rank score of 37 for Navara rice and 24 for Rakthashali rice.

#### 4.4.1 (d) Problems faced by farmers in harvesting stage

For the period of harvesting, the major problems faced by the farmers were: Lack of availability of labour, crop loss by animal attack, inadequate availability of machines, non availability of machineries in time, shortage of labour, wastage at the time of harvest, high labour cost and lack of trained labours.

**Table no 4.39 Indicator of interpretation of problem index**

	Navara Rice (30)	Rakthashali Rice(30)	Total (60)
Highly felt	Greater than 81	Greater than 80	Greater than 80

Moderately felt	69-81	68-80	69-80
Least felt	Less than 69	Less than 68	Less than 69

**Table no 4.40 Problem faced by farmers in harvesting**

Problems	Navara Rice (N=30)		Rakthashali rice (N=30)		Total (N=60)	
	Score	Index	Score	Index	Score	Index
Lack of availability of labour	64	71	62	69	126	70
Crop loss by animal attack	64	71	62	69	126	70
Inadequate availability of machines	79	88	76	84	155	86
Non-availability of machineries in time	70	78	65	72	135	75
Shortage of labour	68	75	68	75	136	75
Wastage at the time of harvest	70	78	72	80	142	79
High labour cost	66	73	66	73	132	73
Lack of trained labour	62	69	61	68	123	68
Total	543	75	532	74	1075	75

Source: compiled from primary data

It is clear from the table 4.40, inadequate availability of machines was the highly felt problem faced by the Navara farmers in the harvesting stage followed by wastage at the time of harvest, shortage of labour, non-availability of machineries in time, crop loss by animal attack and lack of availability of labour.

In the case of Rakthashali farmers, the major problems felt by the farmers were inadequate availability of machines and wastage at the time of harvest followed by shortage of labour and non-availability of machineries in time

Test statistics

	Lack of availability of labour	Crop loss by animal attack	Inadequate availability of machines	Non-availability of machineries in time	Shortage of labour	Wastage at the time of harvest	High labour cost	Lack of trained labour
Chi-Square	.728	.728	.607	2.185	.000	.282	.000	.345
Df	1	1	1	1	1	1	1	1



Asymp Sig.	.393	.393	.436	.139	1.000	.595	1.000	.557
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The Kruskal Wallis H test revealed that the problems lack of availability of labour, crop loss by animal attack, inadequate availability of machinery, non-availability of machineries in time, shortage of labour, wastage at the time of harvest, high labour cost and lack of trained labour were found significant, that is there is no significant difference between the problems faced by the Navara and Rakthashali farmers in harvesting stage.

#### 4.4.1(e) Problems faced by farmers in marketing stage

Marketing is the final step in the process. Income of the farmers depends on the marketing of their produce. For identifying the major problems faced in marketing stage, exploitation by intermediaries, price fluctuation, lack of demand, difficulties in identifying potential consumers, lack of fair price, high cost of packaging, lack of storage, high transportation cost, and government regulations, these variables were taken into consideration.

**Table 4.41 Indicator of interpretation of problem index**

	Navara Rice (30)	Rakthashali Rice(30)	Total (60)
Highly felt	Greater than 89	Greater than 87	Greater than 85
Moderately felt	59-89	68-87	71-85
Least felt	Less than 59	Less than 68	Less than 71

**Table 4.42 Problem faced by farmers in marketing**

Problems	Navara Rice (N=30)		Rakthashali rice (N=30)		Total (N=60)	
	Score	Index	Score	Index	Score	Index
Exploitation by intermediaries	57	63	64	71	121	67
Price fluctuation	77	85	71	79	148	82
Lack of demand	78	87	73	81	151	84
Lack of storage	65	72	79	88	144	80
Lack of fair price	78	87	68	78	146	81
High cost of packaging	76	84	71	79	147	82
Difficulties in identifying potential Consumers	78	86	78	87	156	85

High transportation cost	78	87	77	85	154	86
Government regulations	46	51	55	61	101	56
Total	633	78	636	78	1269	78

Source: compiled from primary data

From the table it is clear that, in the marketing stage the problems like high transportation cost, lack of fair price, difficulties in identifying potential consumers and price fluctuation were moderately felt by the Navara farmers.

In the case of Rakthashali farmers, the highly felt marketing problems were difficulties in identifying potential consumers and lack of storage followed by high transportation cost.

#### Test statistics

	Exploitation by intermediaries	Price fluctuation	Lack of demand	Lack of storage	Lack of fair price	High cost of packaging	Difficulties in identifying potential Consumers	High transportation cost	Government regulations
Chi-Square	1.442	2.615	.067	11.780	6.674	1.655	.000	.067	3.285
Df	1	1	1	1	1	1	1	1	1
Asymp. Sig.	.230	.106	.795	.001	.010	.198	1.000	.795	.070

The Kruskal Wallis H test revealed that there was statistically significant difference in the problem lack of storage between the Navara and Rakthashali farmers in marketing stage, ( $H=11.780$ ),  $p=.001$  with a mean rank score of 23.82 of Navara rice and 37.18 for Rakthashali rice. Most of the farmers were storing their produce in their home itself because of the rent and distance to storage place.

However the problems like exploitation by intermediaries, price fluctuation, lack of demand, Lack of fair price, high cost of packaging, difficulties in identifying potential consumers, high transportation cost and government regulations were found significant. That there is no significant difference in problems faced by Navara and Rakthashali farmers in marketing stage.

#### 4.4.2 Problems faced by processors

The problems faced by processor were collected on 3 point likert scale. The problems related to procurement, product, processing and marketing were analysed.

**Table 4.43 Indicator of interpretation of problem index**

Highly influencing	Greater than 62
Moderately influencing	35-62
Least influencing	Less than 35

**Table no 4.44 Problems faced by processors**

Sl. No	Particulars	Score	Index
<b>A) Procurement related</b>			
1	Lack of procurement	2	33
2	Non-availability of product	3	50
3	High transportation cost for procurement	3	50
4	High storage expenses	2	33
5	Lack of storage facility	3	50
6	High labour cost	3	50
	<b>Composite index</b>	<b>16</b>	<b>44</b>
<b>B) Product related</b>			
1	Non- availability of good quality product	2	33
2	Low shelf life of the product(moisture content)	2	33
3	Non- availability of product in time	3	50
4	Requirement of more space	2	33
	<b>Composite index</b>	<b>9</b>	<b>37</b>
<b>C) Processing related</b>			
1	Non- availability of good machineries	4	67
2	Wastage on processing	4	67
3	Inadequate technology	4	67
4	High labour cost	4	67
5	Government policies on processing	2	33
6	Lack of proper market information	2	33
	<b>Composite index</b>	<b>20</b>	<b>55</b>
<b>D) Marketing related</b>			
1	Inadequate demand	2	33
2	Price fluctuation	4	67
3	High price	4	67

4	Wastage on transportation	3	50
5	High transportation cost	4	67

Source: compiled from primary data

Problems faced by the processors were pointed out by the respond processors. Non-availability of good machineries, wastage on processing, inadequate technology and high labour cost were the major problems faced by the processor in processing stage. Price fluctuation, high price and high transportation cost were the problems highly influencing the processor during marketing of the products. The other problems were moderately influencing the processor during all the stages

#### 4.4.3 Problems faced by retailers

The problems faced by retailers were collected on 3 point likert scale under four variables. They are procurement related, product related, processing related and marketing related.

**Table 4.45 Indicator of interpretation of problem index**

Highly felt	Greater than 63
Moderately felt	39-63
Least felt	Less than 39

**Table no 4.46 Problems faced by retailers**

Sl. No	Particulars	Score	Index
<b>A) Procurement related</b>			
1	No timely procurement	6	40
2	No timely procurement in quantity	9	60
3	High transportation cost for procurement	5	33
4	High storage expenses	7	47
5	Lack of storage facility	8	53
6	High labour cost	8	53
	<b>Composite index</b>	<b>43</b>	<b>48</b>
<b>B) Product related</b>			
1	Non- availability of good quality product	6	40
2	Low shelf life of the product(moisture content)	8	53
3	Non-availability of product	13	87
4	Requirement of more space	10	67

	<b>Composite index</b>	<b>37</b>	<b>62</b>
<b>C) Processing related</b>			
1	Non-availability of good machineries	8	53
2	Wastage on processing	7	47
3	Inadequate technology	7	47
4	High labour cost	8	53
5	Government policies on processing	7	47
6	Lack of proper market information	7	47
	<b>Composite index</b>	<b>44</b>	<b>49</b>
<b>D) Marketing related</b>			
1	Price fluctuation	6	40
2	High price of product	10	67
3	Inadequate demand	5	33
4	Wastage on transportation	9	60
5	High transportation cost	7	47
6	Regulatory constraints	6	40
7	Import and export policies	9	60
8	Lack of proper storage	10	67
	<b>Composite index</b>	<b>62</b>	<b>52</b>

Source: compiled from primary data

The table revealed that non-availability of product and requirement of more space were the highly felt problem faced by the retailer in the product stage. The composite index in problems related to product shows 62 which state that these problems were moderately influencing the retailers. The problems influencing the retailer in marketing stage were high price and lack of proper storage. The composite index was 52, which states that these problems were moderately influencing the business of retailer. All the problems under the four heads like procurement, product, processing and marketing were moderately influencing the business of retailers.

#### **4.4.4 Constraints faced by the consumers**

Problems faced by consumers like non availability of required quantity, non-availability of product in time, less shelf life, high price and price fluctuation.

**Table no. 4.47 Index range defining satisfaction towards Navara / Rakthashali rice**

	Navara rice (n=30)	Rakthashali rice (n=30)	Total (n=30)
Highly felt	Greater than 78	Greater than 80	Greater than 79
Moderately felt	29-79	33-80	30-79
No opinion	Less than 29	Less than 33	Less than 30

**Table 4.48 Constraints faced by the consumers**

	Navara rice (n=30)		Rakthashali rice (n=30)		Total (n=60)	
	Score	Index	Score	Index	Score	Index
Lack availability of required quantity.	30	33	33	37	63	35
Lack of availability of good quality product.	30	33	30	33	60	33
Lack of availability of product.	50	55	54	60	104	58
Less shelf life of the product.	47	52	49	54	96	53
High price of the product	90	<b>100</b>	90	<b>100</b>	180	<b>100</b>
Price fluctuation	44	49	50	50	89	49
Composite index /score	<b>291</b>	<b>54</b>	<b>306</b>	<b>57</b>	<b>592</b>	<b>55</b>

Source: compiled from primary data

From the table 4.48, High price of the product was the major constraint faced by Navara consumers followed by lack of availability of product and less shelf life of the product. In the case of Rakthashali consumers, the highly felt problem was high price followed by lack of availability of product, less shelf life of the product and price fluctuation.

Composite index shows high price was the only major constraint faced by the consumer respondents both for Navara and Rakthashali rice followed by lack of availability of product and less shelf life of the product.

The Kruskal Wallis test was done to check there is any difference in the constraints in both Navara and Rakthashali rice. After the test, the Kruskal Wallis test revealed that there is no significant difference in constraints faced by the consumer in both Navara and Rakthashali rice.

The above section describes the value chain mapping, various chains and actors involved in the value chain, price spread efficiency and constraints and possible solutions in the value chain. Based on these details, summary of findings and conclusion is represented in chapter V.

## CHAPTER V

### SUMMARY OF FINDING AND CONCLUSION

The present study titled “value chain analysis of medicinal rice in Kerala” focuses on the objectives viz; to map the value chain of Navara rice and Rakthashali rice of Kerala, to identify and explore the various chains and actors involved in the value chain, to analyse the price spread efficiency and factors influencing it, and to identify the constraints and possible solutions at different levels in the value chain. The primary data for the study were collected from 60 farmers (30 Navara farmers from Palakkad district and 30 Rakthashali farmers from Malappuram district) and the other actors in the value chain were five retailers, two millers, one processor, and sixty consumers (30 Navara rice consumers and 30 Rakthashali rice consumers). The tools such as value chain mapping tool, percentage analysis, indices, Kruskal Wallis test, price spread, marketing efficiency and marketing margin were used for analysing the objectives

#### **5.1. Major findings from value chain mapping are as follows:-**

The global approach suggested by Gereffi and Korzeniewicz (1994) and Kaplinsky (1999) is used to map the value chain of medicinal rice.

#### **Mapping of core process in the value chain of medicinal rice**

- The core process in the value chain of medicinal rice includes input supply, production process, procurement, processing, marketing and consumption.

#### **Mapping of actors involved in the value chain of medicinal rice**

- Krishi Bhavan, farmers, millers, processors, retailers, consumers and organic certifying agency were the major actors involved in the value chain of Navara rice. In the case of Rakthashali rice Krishi Bhavan, farmers, millers, processors, retailers and consumers were the actors involved in the value chain.
- Krishi Bhavan provides advisory services and information for farmers. The farmers have been greatly depended on fellow farmer colleague to get specific inputs like cow dung, cow urine and green leaf manures.
- Farmers require inputs like seeds, cow dung, cow urine, green leaf manures, machinery, technology and information for cultivation of medicinal rice.



- Krishi Bhavan and farmer colleagues were the main source of input for farmers
- Majority of the farmers have been preserving seeds for the next season by adopting indigenous practice and sometimes procure from colleague farmers
- INDOCERT is the certification agency providing organic certification for the Navara rice farmers.

### **Mapping of flow and volume of products in the value chain**

- Most of the Navara and Rakthashali farmers were using seeds from their own source. They preserve seeds for future cultivation in order to ensure the quality of the rice.
- All the Navara farmers collect organic manures like cow dung, cow urine and green leaf manures from farmer colleagues. The selected Navara farmers produce an average of 4923 kg /year paddy. After the production, farmers keep an average of 25.16 kg/year of their produce for self - consumption.
- The remaining portion was the marketed surplus of Navara farmers. This portion (100 per cent) was taken for conversion. After the conversion, 80 per cent sold directly to consumers and 20 per cent to the retailers.
- In the case of Rakthashali farmers, 70 per cent of the farmers are using organic manures like cow dung, cow urine and green leaf manures from own source and 30 per cent of farmers collected it from fellow farmers. The chosen Rakthashali farmers produce an average of 3108 kg /year of paddy. After the production, the farmers keep on an average of 9 kg of their produce for self-consumption.
- The remaining portion was the marketed surplus of Rakthashali farmers. From that the farmers were sold 42 per cent of the paddy to processor directly. The remaining 58 per cent was taken for conversion into rice to the millers and then sold 50 per cent to retailers and 50 per cent to consumers.

### **Mapping of knowledge, information and services in the value chain**

- The flow of knowledge, information and services in the value chain of Navara and Rakthashali rice viz; the information regarding the pure rice seeds, organic manures like cow dung, cow urine, green leaf manures and cultivation practices and methods were mostly exchanged through farmer to farmer communication. The farmers were communicated about

the production details to the processor, retailers and to the consumers. The open market sales, sales through supplyco, padasekarasamithi, and cooperatives are not prevailing in the study area.

- The major source of information related to market price and demand of the product were Krishi Bhavan, processors and retailers for Navara and Rakthashali farmers. The processor and retailers have close relation with farmers because they are directly procuring the products from farmers. The consumers are the end users, they communicate about the demand, price and preference of the product to the retailers and farmers.

### **Mapping of linkages in the value chain**

- Navara rice cultivators having good linkage with Krishi Bhavan. They provide information and advisory services to farmers. The farmers having connection with other farmers in the area, they exchange theorganic manuresand other cultivation ideas each other. The miller, retailers and consumers were considered as the major source of information related to market price and demand of the product.
- In the case of Rakthashali rice cultivators, the farmers were mostly linked with Krishi Bhavan for availing information and advisory service. The farmers linked with the colleague farmers for getting the seeds and organic manures like cow dung, cow urine and green leaf manures. The farmers have good linkage with processor, retailers and consumers; they are the major source of information related to market price and demand of the product.

### **Mapping of geographical flow of product**

- With respect to geographical flow of the rice, the production of Navara rice taken place under different areas viz; Pallasana, Alathur, Chittur, Koduvayoor and Thathamangalam in Palakkad district. After the production, farmers approach the miller located at Koduvayoor for converting the paddy to rice. The farmers sold their product to the retailers located at Pallasana and Kunnathurmedu in Palakkad district and in Thrissur town and the consumers spread over different places of Palakkad and Thrissur district of Kerala.
- In the case of geographical flow of Rakthashali, the production ofrice was taken place under different areas namely; Arikode, Angadipuram, Chemmad, Kulattur, Perinthalmanna, Kottakal, Manchery and Kondotty in the Malappuram district. After the production, the farmers keep some portion of paddy for self-consumption. The farmers then sold a portion

of their produce to processor located at Angadipuram, the processor then sold it to the end user. The remaining surplus was taken to the miller located at Wandoor for the conversion of paddy into rice. The farmers sold a portion of rice to the retailers who are located at Perinthalmanna and Kottakal in the Malappuram district and the rest was sold directly to the consumers with in the Malappuram district.

### **Mapping of value addition at different levels of value chain**

- The marketing channels for Navara rice includes channel I - farmer- retailer- consumer, channel II- farmer- consumers and the marketing channels for Rakthashali rice includes channel I - farmer- processor- consumer, channel II- farmer- retailer- consumer and channel III- farmer-consumer.
- The total cost incurred for Navara farmer in the channel I was ₹10.63/Kg. The farmers were sold the produce to retailers at ₹80/Kg. The farmers were incurred a margin of ₹69.37/Kg. The farmers were not much interested in involving middlemen in the chain because of the low margin. The retailers earn a margin of ₹37.97/Kg. In the second channel the farmers earn a margin of ₹109.37/Kg. The farmers were mainly focused on the sale of their produce to consumers directly.
- The Rakthashali farmers incurred high margin in channel III of ₹95.06/Kg followed by ₹81.24/Kg in channel I and ₹65.06/Kg in channel II.

### **Mapping the constraints and possible solutions**

- The farmers were facing different constraints at each stage of the cultivation of the medicinal rice and their perceived problems includes; Lack of availability of organic manures, shortage of labour, lack of knowledge about the application of inputs, lack of awareness regarding source of supply of inputs, wastage on processing, inadequate availability of machineries, high transportation cost and lack of storage. The possible solution suggested by the respondents was the Krishi Bhavan has to provide training classes to inform about the new technologies in the market.
- The major problems perceived by the processor were high transportation cost, high labour cost, wastage on processing, inadequate technology, price fluctuation and high price of the product. The possible solution suggested by the respondents was the processors should be updated about the new technologies and new machineries which will minimize the wastage while processing.

- Lack of availability of product in time, lack of storage, high price of the product were the major constraints perceived by the retailers.
- The major constraints perceived by the consumers were high price of the product and unavailability of product.

## **5.2 Analysis of various chains and actors involved in the value chain**

Various value chain actors of Navara and Rakthashali were as follows. The actors involved in the value chain of medicinal rice were; farmers, processor, retailers and consumers.

### **Farmers**

- Farmers were the prime actors in the medicinal rice cultivation. In the case of Navara farmers, 53.34 per cent of the farmers were under the age group of above 45 followed by 13.33 per cent of the respondents under the age group of 25-35. The youngsters were also ready for adopting the agricultural fields as their occupation, because they are aware about the nutritional and medicinal properties of this kind of rice. For Rakthashali rice, 70 per cent of the respondents come under the age group of above 45 years.
- In the case of experience in cultivation, 50 per cent of Navara farmers doing cultivation for a period of 5-10 years. While 53.33 per cent of Rakthashali rice farmers doing cultivation over the period of 5-10 years.
- The major reasons for cultivating the Navara rice were large demand, high market value and medicinal properties. In the case of Rakthashali rice, preserving traditional variety, large demand, medicinal property of rice and high market value were identified as the major reasons for the cultivation.
- Out of the 30 respondents from Navara farmers, 46.67 per cent of farmers belong to large farmer category followed by 30 per cent small farmers and 23.33 per cent marginal farmers. In the case of Rakthashali farmers 53.33 per cent of the farmers come under the category of small farmers followed by marginal farmers(40 per cent)
- Average of total area under cultivation of Navara rice of a farmer was 7.06 acre and the average area under rice cultivation was 6.58 acre. For Rakthashali rice, the average total area under cultivation was 5.4 acre, and the average area under cultivation of the farmer respondent was 3.36 acre.

- The average production of the selected Navara farmers was 4923.3kg/year. In the case of Rakthashali farmers, the average production was 3108.3 kg/year.

### **Miller**

- The Navara farmers approaching millers for converting the raw paddy into rice and bring back the rice for marketing. The miller charges ₹3.5/ Kg as processing cost from farmers.
- With respect to Rakthashali farmers, the farmers approaching the miller for conversion and the miller charging ₹ 4/Kg as conversion cost.

### **Processors**

- There are no processors engaged in the value chain of Navara rice.
- In the case of Rakthashali rice, the farmers sold 42 per cent of their produce to processors. The processors procure paddy from the farmers at ₹90/ kg

### **Retailers**

- Three retailers who are engaged in Navara rice marketing were selected for the study. Two retailers were situated at Palakkad itself and one from Thrissur district. With respect to the Rakthashali rice marketing, two retailers were selected from the Malappuram district itself.
- The selected three retailers who are involving in Navara rice marketing were procured an average of 5733 kg/year of rice directly from the farmers at ₹80/kg. In the case of retailers who are engaging in marketing of Rakthashali rice, they were procuring an average of 8682 kg/ year of rice directly from farmer at ₹80/kg.
- After procuring the rice both retailers engaged in Navara and Rakthashali rice marketing, they sold the product directly to consumers at ₹120/kg.

### **Consumers**

- In the case of age, 43.33 per cent of Navara and 60 per cent of Rakthashali consumers were come under the age group of 25-35 followed by 35-45 and 45-55 age group categories. With respect to education qualification, 53.33 per cent of Navara consumer respondents have higher secondary as educational qualification. In the case of Rakthashali consumers, 60 per cent of the respondents were graduated.
- With respect to the periodicity of purchase, 60 per cent of Navara consumers and 53.33 per cent of Rakthashali consumers were comes under twice in a month category. In the case of

source of purchase, 66.67 per cent of Navara consumers and 40 per cent of Rakthashali consumers were purchase the product directly from the farmers.

- Out of the 30 respondents, 53.33 per cent of Navara consumers and 36.67per cent of Rakthashali respondents were purchasing on an average of 5-10 kg rice per month.
- Satisfaction level of the consumers with respect to Navara rice and Rakthashali rice shows that “nutrient value” with a composite index of 97.77 is the most influencing component followed by chemical pesticide free, hygiene, taste and freshness. The Kruskal Wallis test shows that there was statistically significant difference in factor “nutrient value” between the satisfaction among consumers of Navara and Rakthashali rice,  $H = 11.023$ ,  $p = .001$  with a mean rank score of 36.17 for Navara rice and 24.83 for Rakthashali rice.
- Major constraint faced by the consumer respondents both for Navara and Rakthashali rice were high price followed by unavailability of product, less shelf life of the product and price fluctuation.

### **5.3 Price spread efficiency in value chain of medicinal rice**

Price spread and modified market efficiency index by Acharya’s followed to understand the efficiency of marketing channels.

- Cost components of the Navara farmers include: imputed land cost of ₹1.26/Kg, seed cost of ₹1.00/Kg, organic manures of ₹1.33/Kg, labour cost of ₹0.71/Kg and machinery cost of ₹0.19/Kg. In the case of Rakthashali rice, cost components include: imputed land cost of ₹1.04/Kg, seed cost of ₹1.47/Kg, organic manures of ₹1.46/Kg, labour cost of ₹1.06/Kg and machinery cost of ₹0.17/Kg. The total cost incurred for both Navara farmers and Rakthashali farmers was ₹4.5/Kg and ₹5.2/Kg respectively.
- With respect to the cost involved in the transportation by farmers, the Navara farmers pay ₹0.30/Kg as transportation cost for organic manures and ₹0.10/Kg for loading/unloading charge. In the case of Rakthashali farmers, they pay ₹0.28/Kg as transportation cost for seed, ₹0.38/Kg for organic manures and ₹0.12/Kg for loading/unloading charge.
- The harvesting cost includes two major heads viz: harvesting cost and post harvesting cost. In harvesting cost, this includes labour cost and machinery cost. In the case of post harvesting cost, it includes: labour cost, machinery cost, transportation cost and loading/unloading cost. The Rakthashali farmers incur high harvesting cost of ₹2.73/Kg when compared with Navara farmers. They incur cost of ₹1.71/Kg.

- The marketing cost includes: conversion cost, transportation and loading/unloading charges. The conversion cost for Navara and Rakthashali rice was ₹3.5/Kg and ₹4/Kg respectively. The transportation cost for Navara farmers and Rakthashali farmers was ₹0.40/Kg and ₹1.93/Kg respectively. In the case of loading/unloading charges, Navara farmers incur ₹0.10/Kg and Rakthashali farmers incur ₹0.24/Kg.
- The marketing cost and investment cost incurred by the processor engaged in the Rakthashali marketing includes land and building, electricity bill, furniture, labour cost, loading/unloading cost and transportation cost. The processor incurs highest cost for furniture of ₹7.68/Kg followed by ₹2.61/Kg for labour cost, ₹0.88/Kg for land and building and ₹0.38/Kg for electricity bill. The total cost incurred for the procurement was ₹0.69/Kg
- The cost components for the retailers include investment cost and procurement cost. The retailers who are engaged in Navara rice marketing pay highest investment cost of ₹1.12/Kg. With respect to the retailers who are engaged in the Rakthashali rice marketing, they incur investment cost of ₹0.85/Kg. The marketing cost incurred for Navara retailers was ₹0.91/Kg and for Rakthashali the marketing cost was ₹0.61/Kg
- There are five marketing channels identified for the medicinal rice. For Navara rice, the channels were channel 1- farmers- retailers- consumers and channel 2- farmers- consumer. The channels includes in the Rakthashali rice was channel 1- farmers – processor- consumers, channel 2- farmers- retailer- consumers, and channel 3- farmers- consumers.
- The Navara farmers earn a high margin of ₹109.37/Kg in channel II. In channel I the Navara farmer get a low margin of ₹69.37/Kg while they sold rice to retailers. In the case of Rakthashali rice, the farmers earn high margin of ₹95.06/Kg in channel III followed by ₹81.24/Kg in channel I and ₹65.06/Kg in channel II.
- Among the two channels in the Navara rice marketing the maximum price received by the farmer in channel II with ₹120/Kg. The producers share in consumer rupee was found higher in channel II with 100 per cent followed by channel I with 66.67 per cent. In channel I, the producers share in consumer rupee with respect to margin earned by the farmers was 57.81 per cent and 31.64 per cent for retailers. In the case of channel II, the producers share in consumers rupee with respect to margin earned was 109.37 per cent for farmers.
- The net price received by Rakthashali farmers was higher in channel III with ₹110/Kg followed by channel I with ₹90/Kg and channel II with ₹80/Kg. In channel III, the producers

share in consumer rupee with respect to cost incurred show higher for farmer with 13.58 per cent. As in the case of channel II, the farmers incur 12.45 per cent share and retailers incur 1.21 per cent share. The producers share in consumer rupee with respect to margin earned by the farmer was higher in channel III with 86.48 per cent followed by channel II with 54.21 per cent and channel I with 54.16 per cent

- With respect to the marketing efficiency of Navara rice, the efficient marketing channel was channel II. For Rakthashali rice, the efficient marketing channel was channel III.
- Income of the actors, input availability of farmers, holding capacity of farmers, time required for price realisation are the major factors that influencing the selection of a profitable value chain. The farmers considered these factors while selecting a particular value chain for marketing their produce.

#### **5.4 Constraints and possible solutions at different levels in the value chain**

Problems faced by the different actors at different levels in the value chain were examined in this section.

##### **Farmers**

- The major problem faced by the Navara farmers in the pre-production stage was lack of availability of organic manures. This is the highly felt problem among the selected Navara farmers. The other problems like lack of good quality materials, high price of seed, unavailability of seeds, lack of good quality organic manures and pesticides, high price of organic manures and pesticides and shortage of labour were moderately felt problems.
- In the case of Rakthashali farmers, lack of availability of organic manures and shortage of labour were the highly felt problems among the farmers followed by high price of organic manures and pesticides and unavailability of seeds.
- Lack of knowledge about the application of inputs, lack of awareness regarding source of supply of inputs and inadequate extension supports were the highly felt problems faced by the Navara farmers in the production stage followed by high cost of labour and attack of pest and diseases.
- With respect to Rakthashali farmers, lack of awareness regarding source of supply of inputs and inadequate extension supports were the highly felt problems faced by the farmers in the production stage followed by lack of knowledge about the application of supply of inputs and attack of pest and diseases.



- The major problem faced by the Navara farmers in the processing stage was wastage on processing followed by unawareness of processing techniques and non-availability of good machineries.
- In the case of Rakthashali farmers, the major problems faced by the farmers were wastage on processing and unawareness of processing techniques.
- Inadequate availability of machineries was the highly felt problem faced by the Navara farmers in the harvesting stage followed by wastage at the time of harvest, shortage of labour, non-availability of machineries in time, crop loss by animal attack and lack of availability of labour.
- In the case of Rakthashali farmers, the major problem felt by the farmers were inadequate availability of machines and wastage at the time of harvest followed by shortage of labour and non-availability of machineries in time.
- In the marketing stage the problems like high transportation cost, lack of fair price, difficulties in identifying potential consumers and price fluctuation were moderately felt by Navara farmers.
- In the case of Rakthashali farmers, the highly felt marketing problems were difficulties in identifying potential consumers and lack of storage followed by high transportation cost.

### **Processor**

- The problems faced by the processors in the procurement stage includes, high transportation cost, lack of storage and high labour cost.
- Non-availability of good machineries, wastage on processing, inadequate technology and high labour cost were the major problems faced by the processor in processing stage.
- Price fluctuation, high price and high transportation cost were the problems highly influencing the processor during marketing of the products.

### **Retailers**

- Timely availability of product and requirement of more space were the problems faced by the retailer in the product related stage.
- High price of product and lack of proper storage were the problems highly influencing the retailer in marketing stage.

## **Consumers**

- High price was the major constraint faced by Navara consumers followed by lack of availability of product and less shelf life of the product.
- In the case of Rakthashali consumers, the highly felt problem was high price followed by lack of availability of product, less shelf life of the product and price fluctuation.
- The Kruskal Wallis test was done to check if there is any difference in the constraints in both Navara and Rakthashali rice. The test revealed that there is no significant difference in constraints faced by the consumer in both Navara and Rakthashali rice.

## **5.5 Conclusion**

The present study mapped the value chain of medicinal rice and also analysed the various actors involved in the value chain. The cost and margins involved for each value chain actors and the constraints faced by the actors at different levels were also identified in the study. The core process in the value chain of medicinal rice includes input supply, production process, procurement, processing, marketing and consumption. Krishi Bhavan and farmer colleagues were the main source of input for farmers. Majority of the Navara and Rakthashali farmers were using seeds from their own source. They preserve seeds for the next season in order to ensure the quality of rice. The major source of information related to market price and demand of the product were Krishi Bhavan, processor, retailers for Navara and Rakthashali farmers. The processor and retailers have close relation with farmers because they are directly procuring the product from farmers. The consumers are the end users, they communicate about the demand, price and preference of the product to the retailers and farmers. The Navara and Rakthashali farmers have good linkage with Krishi Bhavan, they provide information and advisory services to farmers. With respect to the geographical flow of the rice, the production of Navara rice taken place under different areas of Palakkad district and in the case of Rakthashali rice, the production taken place under different parts of Malappuram district. The study found out, five main channels in the value chain of medicinal rice in the field area. In the case of Navara rice, the zero level channel is more profitable for the farmers. For Rakthashali farmer, the profitable channel is processor and direct to consumers channel. Each member has facing different problems at each stage of value chain. Lack of scientific information, high labour cost, wastage on processing and lack of storage were the major problems faced by the farmers. The processor and retailers also confronting with many problems such as unavailability of good machineries, wastage on processing, inadequate technologies, high labour cost and lack of storage. The major constraints faced by the consumers were high price of the product. Farmers were

the prime actor in the value chain of Navara and Rakthashali rice. Large demand, high market value, medicinal properties and preserving traditional variety are the reasons of farmers for cultivating the medicinal rice. Both Navara and Rakthashali farmers were approaching the milers for converting the produce. There is no processor engaged in the value chain of Navara rice. Three retailers (two from Palakkad and one from Thrissur district) are engaged in the Navara rice marketing. In the case of Rakthashali two retailers (from Malappuram district) engaged in the marketing. Nutrient value (ci- 97.77) for Navara and Rakthashali is the most influencing component of satisfaction for the consumers. Regard to the market efficiency, channel I is more efficient for Navara rice and channel III is for Rakthashali rice

The study therefore concludes that the organisation like Krishi Bhavan should come forward with training and advisory services for improving the knowledge of the farmers. The government may support the farmers by providing new machineries at the subsidised rate and also educate the farmers about the new technologies and machineries prevailing in the market through the Krishi Bhavan. Government may take steps to provide storage spaces for the farmers to minimise the effects of price fluctuations. The middlemen involved in the marketing channel, they may either incur loss or get low margin. Because of this many farmers hesitated to come forward for the cultivation. Therefore, government may help the farmers to avoid private middlemen either through direct procurement or by getting the services of cooperative to market the produce.

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## *APPENDICES*

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**INTERVIEW SCHEDULE FOR SURVEYING PLAYERS IN THE VALUE CHAIN  
OF RAKTHASHALI AND NAVARA RICE**

**FOR FARMERS**

**Socio economic characteristics**

1. Name of the respondent :
2. Address :
3. Age
  - a) Below 30
  - b) 30-40
  - c) 40-50
  - d) 50-60
  - e) above 60
4. Sex
  - a) Male
  - b) female
5. Education
  - a) Below SSLC
  - b) SSLC
  - c) Higher secondary
  - d) Graduation
  - e) PG
6. Occupation
  - a) Agriculture
  - b) Government employee
  - c) business
  - d) Others
7. Annual income of the family:
8. Whether the land is ancestral property : Yes/ No
9. How long have you been growing Rakthashali Rice / Navara Rice?
10. Why do you continue to grow Rakthashali Rice / Navara Rice?
  - a) Increasing demand
  - b) Medicinal properties of rice
  - c) High market value
  - d) Preserving traditional variety
  - e) Low cost of cultivation
  - f) others
11. Ownership of land used?
  - a) Owned
  - b) Leased
  - c) Both

12. Land holding position:

Particulars	Irrigated		Un irrigated	
	owned	Leased	Owned	Leased
Total area under cultivation in acre				
Area under rice cultivation				

13. Method of cultivation?

a) Traditional    b) Scientific    c) Organic    d) others (specify)

14. Details of cost of inputs:

Particulars	Quantity /acre	Price	Subsidy
Seed:			
Fertilizers: Organic Inorganic			
Pesticide			
Credit			
Tools and equipments			
Irrigation			
Advisory and technology services			
Insurance service			
Others (specify)			

15. Details of labour cost involved in cultivation:

Particulars	Male		Female	
	No. of days	Wage paid	No. of days	Wage paid
Land preparation				

Planting				
Fertilizer application				
Weeding				
Irrigation				
Others (specify)				

16. Transportation cost for input supply including unloading charges:

Particulars	Mode of transportation	Cost of transportation
Seed		
Fertilizers		
Labour		
Machineries		
Others (specify)		

17. Organizational support of farmers :

Organization	Purpose of contact	Information source about organization	Reason for choosing	Strength of contact			
				High	Medium	Low	No contact
Krishi Bhavan							
Local self Govt.							
Paddy Research Station							
Insurance company							

Bank							
PACS							
Others(specify)							

18. Details of Production details:

Yearly total production in Kg.	Self consumption if any	Marketed surplus	Productivity Kg/acre

19. Whether Storage facility is available: Yes/No

If yes, specify...

20. Mention the post harvest practices followed in Rakthashali Rice /Navara Rice cultivation

a) Storing b) Processing c) Packaging d) Grading e) others (specify)

21. Cost involved in harvesting

Harvesting cost		Cost involved in post harvest				
Labour	Machinery	Labour	Machinery	Storage		
				Transportation	Loading/unloading	Storing

22. Distribution of marketable surplus

Particulars	Quantity	Price	Transportation cost	Payment details	Time required for realization of price	Information source for best market channel
Direct to						

customers						
Direct to supply company						
Private millers						
Co-operatives						
Others (specify)						

23. Are you aware about the minimum support price fixed by Govt. : Yes/No

24. Are you satisfied with the price you are getting for your produce Yes/No

25. In what form do you sell the produce?

Sl. No	Form	Tick appropriately
1	Rice	
2	Paddy	
3	Others (specify)	

26. What are the major problems you faced in pre- production, production, harvesting and marketing stages:

Pre- production

Particulars	Yes/No	High	Moderate	Low
Lack of good quality materials				
High price of seed				
Non-availability of seeds				
Lack of good quality fertiliser and Pesticides				
Lack of availability of organic fertilisers				
High price of fertilisers and pesticides				
Shortage of labour				
Lack of scientific information				



Inadequate credit				
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### Production

Particulars	Yes/No	High	Moderate	Low
Attack of pest and diseases				
Lack of adequate irrigation facility				
Non-availability of labour				
High cost of irrigation				
Inadequate fund				
High cost of labour				
Lack of knowledge about the application of inputs				
Lack of awareness regarding source of supply of inputs				
Natural calamities				

### Harvesting

Particulars	Yes/No	High	Moderate	Low
Lack of availability of labour				
Crop loss by animal attack				
Inadequate availability of machines				
Non-availability of machineries in time				
Shortage of labour				

### Processing

Particulars	Yes/No	High	Moderate	Low
Non-availability of good machineries				

Inadequate technology				
Wastage on processing				
High labour cost				
Unawareness of processing techniques				
Lack of proper market information				
Government policies on processing				
Distance to processing unit				
Quality of processed products				

#### Marketing

Particulars	Yes/No	High	Moderate	Low
Exploitation by intermediaries				
Price fluctuation				
Lack of demand				
Lack of storage				
Lack of fair price				
High cost of packaging				
Difficulties in identifying potential Consumers				
High transportation cost				
Government regulations				

#### 27. Suggestion for improving production and marketing

Particulars	Suggestions
Input supply	
Labour availability	

Machinery availability	
Warehousing	
Financing	
Government regulations	
Transportation facility	

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**INTERVIEW SCHEDULE FOR SURVEYING PLAYERS IN THE VALUE CHAIN  
OF RAKTHASHALI AND NAVARA RICE**

**FOR RETAILERS**

1. Name of the respondent:
2. Address :
3. Age
4. Gender : Male/ Female
5. Education :
  - a) Below SSLC b) SSLC c) Higher Secondary d) Degree e) PG
6. Primary occupation :
  - a) Agriculture b) Business c) Others (Specify)
7. Nature of business:
  - a) Wholesaler b) retailer c) Processor
8. Type of ownership:
  - a) Individual b) Partnership c) Company d) Co-operatives
9. Mode of investment: Owned fund / Borrowed fund
10. Average monthly income from business:
11. Fixed cost and recurring cost involved in business:

Particulars	Amount	Average life span
Land & building Owned: If rented /leased initial deposit made: Monthly rent paid:		
Investment in furniture		
Investment in vehicle Owned:		

Monthly rent paid:		
Investment in warehouse Owned: If rented /leased initial deposit made: Monthly rent paid:		

**Details of business:**

12. How long you have been doing this business:
13. Why do you continue to do this business:  
a) High market    b) Family Business    c) Others (Specify)
14. Did you under gone any contract with suppliers: Yes/No  
If yes,  
a) type of contract :    Oral / Written  
b) Period of contract:  
c) Commission paid: Rs.  
d) Mode of payment: Spot/ Account payment/ Others (specify)

**Input details:**

15. In which form you procure the produce:  
a) Raw    b) half processed    c) Processed d) All type
16. Source of purchase and cost involved in purchase:

Sl. No	Actor	Information about the seller	Quantity purchased (quintal )	Price/ quintal	Mode of payment	Frequency of purchase
1	Farmers					
2	Other village traders/agent					
3	Private millers					
4	Padashekara samithi					
5	Others (specify)					

17. Transportation cost for input supply:

Particulars	Mode of transportation	Cost of transportation
Paddy		
Insecticides		
Machineries		
Labours		
Driver charges		
Fuel and maintenance charge		
Others (specify)		

18. Cost of warehousing:

Particulars	Cost/kindle
Warehouse rent	
Insurance charge	
Insecticide cost	
Labour charge	
Transportation charge	
Others (specify)	

19. Organizational support for the respondent:

Organization	Purpose of contact	Information source about the organization	Strength of contact			
			H	M	L	NOC
Government institutions 1) 2) 3)						
KAU						
Private institution 1) 2)						

3)						
Agri-business organization						
Others (specify)						

H-High M- Medium L- Low

20. Cost of sales:

Particulars		Who bears cost	
		Own	Customer
Transportation cost	Loading/unloading Driver cost		
Packing	Packing materials: Labour cost: Machinery cost		
Promotion cost	Display board: Agents: Others:		

21. What are the factors affecting demand for your product:

Reasons	Yes/ No
Income of customer	
Market demand	
Taste and preferences	
Long cultivation period	

22. Who are the customers of your products

Sl. No	Actors	Location	Quantity sold	Price/ kindle
1	Retailers			
2	Other wholesaler			
3	Processing companies			
4	Marketing companies			
5	Supplyco			

6	Customers outside in India			
7	Customers outside Kerala			
8	Others (specify)			

23. What are the major problems faced in product, procurement, processing and marketing stages:

Procurement

Particulars	Yes/No	Very important	Important	No importance
No timely procurement				
No timely procurement in quantity				
High transportation cost for procurement				
High storage expenses				
Lack of storage facility				
High labour cost				

Product

Particulars	Yes/No	Very important	Important	No importance
Non- availability of good quality product				
Low shelf life of the product(moisture content)				
Non-availability of product				
Requirement of more space				

Processing

Particulars	Yes/No	Very important	Important	No importance
Non-availability of good machineries				
Wastage on processing				



Inadequate technology				
High labour cost				
Government policies on processing				
Lack of proper market information				

Marketing

Particulars	Yes/No	Very important	Important	No importance
Price fluctuation				
High price of product				
Inadequate demand				
Wastage on transportation				
High transportation cost				
Regulatory constraints				
Import and export policies				
Lack of proper storage				

24. What are the major areas where government intervene in your business

i) During procurement

- Price
- 
- 

ii) During processing

- Quality of product
- 
- 

iii) During marketing

- Price fixing , packaging
- Transportation

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**INTERVIEW SCHEDULE FOR SURVEYING PLAYERS IN THE VALUE CHAIN  
OF RAKTHASHALI AND NAVARA RICE**

**FOR PROCESSOR**

1. Name of the respondent:
- 2) Address :
- 3) Age
- 4) Gender : Male/ Female
- 5) Education :
  - b) Below SSLC    b) SSLC    c) Higher Secondary    d) Degree e) PG
- 6) Primary occupation :
  - b) Agriculture    b) Business c) Others (Specify)
- 7) Nature of business:
  - b) Wholesaler    b) retailer c) Processor
- 8) Type of ownership:
  - b) Individual    b) Partnership    c) Company    d) Co-operatives
- 9) Mode of investment: Owned fund / Borrowed fund
- 10) Average monthly income from business:
- 11) Fixed cost and recurring cost involved in business:

Particulars	Amount	Average life span
Land & building		
Owned:		
If rented /leased initial deposit made:		

Monthly rent paid:		
Investment in furniture		
Investment in vehicle Owned: Monthly rent paid:		
Investment in warehouse Owned: If rented /leased initial deposit made: Monthly rent paid:		

**Details of business:**

12) How long you have been doing this business:

13) Why do you continue to do this business:

b) High market    b) Family Business    c) Others (Specify)

14) Did you under gone any contract with suppliers: Yes/No

If yes,

e) type of contract : Oral / Written

f) Period of contract:

g) Commission paid: Rs.

h) Mode of payment: Spot/ Account payment/ Others (specify)

**Input details:**

15) In which form you procure the produce:

b) Raw    b) half processed    c) Processed    d) All type

16) Source of purchase and cost involved in purchase:

Sl. No	Actor	Information about the seller	Quantity purchased (quintal)	Price/ quintal	Mode of payment	Frequency of purchase
1	Farmers					
2	Other village traders/agent					

3	Private millers					
4	Padashekara samithi					
5	Others (specify)					

17) Transportation cost for input supply:

Particulars	Mode of transportation	Cost of transportation
Paddy		
Insecticides		
Machineries		
Labours		
Driver charges		
Fuel and maintenance charge		
Others (specify)		

18) Cost of warehousing:

Particulars	Cost/quintal
Warehouse rent	
Insurance charge	
Insecticide cost	
Labour charge	
Transportation charge	
Others (specify)	

19) Organizational support for the respondent:

Organization	Purpose of contact	Information source about the organization	Strength of contact			
			H	M	L	NOC
Government institutions 1) 2) 3)						
KAU						
Private institution 1) 2) 3)						
Agri-business organization						
Others (specify)						

H-High M- Medium L- Low

**Processing details:**

20) Type of products of your institution:

- 
- 

21) Cost of processing:

Product	Cost involved

22) Cost of sales:

Particulars		Who bears cost	
		Own	Customer
Transportation cost	Loading/unloading Driver cost		
Packing	Packing materials: Labour cost: Machinery cost		
Promotion cost	Display board: Agents: Others:		

23) What are the factors affecting demand for your product:

Reasons	Yes/ No
Income of customer	
Market demand	
Taste and preferences	
Long cultivation period	

24) Who are the customers of your products

Sl. No	Actors	Location	Quantity sold	Price/ quintal
1	Retailers			
2	Other wholesaler			
3	Processing companies			

4	Marketing companies			
5	Supplyco			
6	Customers outside in India			
7	Customers outside Kerala			
8	Others (specify)			

25) What are the major problems faced in product, procurement, processing and marketing stages:

Procurement

Particulars	Yes/No	Very important	Important	No importance
Lack of procurement				
Non-availability of product				
High transportation cost for procurement				
High storage expenses				
Lack of storage facility				
High labour cost				

Product

Particulars	Yes/No	Very important	Important	No importance
Non- availability of good quality product				
Low shelf life of the product(moisture content)				
Non- availability of product in time				
Requirement of more space				

### Processing

Particulars	Yes/No	Very important	Important	No importance
Non- availability of good machineries				
Wastage on processing				
Inadequate technology				
High labour cost				
Government policies on processing				
Lack of proper market information				

### Marketing

Particulars	Yes/No	Very important	Important	No importance
Inadequate demand				
Price fluctuation				
High price				
Wastage on transportation				
High transportation cost				
Lack of proper storage				

26) What are the major areas where government intervene in your business

- i) During procurement
  - Price
  - 
  -
- ii) During processing
  - Quality of product
  -



- 
- iii) During marketing
  - Price fixing , packaging
  - Transportation
  -

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**INTERVIEW SCHEDULE FOR SURVEYING PLAYERS IN THE VALUE CHAIN  
OF RAKTHASHALI AND NAVARA RICE**

**FOR CONSUMERS**

1. Name of the respondents:
2. Address:
3. Age:
4. Sex: Male / Female
5. Educational qualification:
  - a) Below SSLC b) SSLC c) HSE d) Graduation e) Post Graduation
6. Annual income: In Rs.
7. Occupation:
  - a) Govt. employee b) Professional c) Business d) Agricultural labour e) Others  
(specify)
8. How long you have been consuming Rakthashali rice or Navara rice?
9. Are you aware about the medicinal uses of Rakthashali rice or Navara rice? Yes/No  
If yes, list out the medicinal uses that you know
  - 
  - 
  -
10. What reasons do you attribute for Rakthashali rice or Navara rice consumption?
  - a) Taste b) Flavour c) Medicinal properties d) Others (specify)
11. Which quality of Rakthashali rice or Navara rice that preferred by you?

- a) Colour b) Taste c) smell d) Medicinal uses e) Others (specify)
12. From where do you purchase Rakthashali rice or Navara rice?  
a) Farm gate b) Traders c) ayurvedic shops d) Others (specify)
13. In which form you are consuming?  
a) Raw b) Processed c) Others (specify)
14. At what price do you purchase Rakthashali rice or Navara rice? Rs.
15. How much quantity of Rakthashali rice or Navara rice do you purchase from the source? Kg.
16. Frequency of purchase:  
a) Weekly b) Fortnightly c) Monthly
17. How did you feel about the taste of Rakthashali rice or Navara rice?  
a) Very good b) Good c) Medium d) Not good
18. Did you face any difficulties in purchasing of Rakthashali rice or Navara rice? Yes/No  
If yes, specify the problems:
- - 
  -
19. Whether you have an adequate awareness on how to use this rice? Yes/No
20. Rating of Rakthashali rice or Navara rice by consumers (put tick mark)

Sl. No	Attributes	SA	A	NO	DA	SDA
1	Quality of rice					
2	Medicinal uses					
3	Taste and energy					
4	Flavour					
5	Reasonable Price					
6	Availability					
7	Nutrient content					
8	Packaging					

9						
---	--	--	--	--	--	--

(SA- Strongly Agree, A- Agree, NO- No Opinion, DA- Disagree, SDA- Strongly Disagree)

21. Suggestion if any.....

*ABSTRACT*

**VALUE CHAIN ANALYSIS OF MEDICINAL RICE IN KERALA**

**By**

**Sreeja K Nair**

**(2016-15-002)**

**ABSTRACT OF THE THESIS**

**Submitted in partial fulfillment of the requirement for the degree of**

***Master of Science in Co-operation & Banking***

**(Rural Marketing Management)**

**Faculty of agriculture**

**Kerala Agricultural University, Thrissur**



**Department of Rural Marketing Management**

**COLLEGE OF CO-OPERATION, BANKING AND MANAGEMENT**

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**VELLANIKKARA, THRISSUR, 680656**

**KERALA, INDIA**

**2020**

## ABSTRACT

Value chain is a business model that describes the full range of activities needed to create a product or services. A value chain comprises the steps that involve bringing a product from conception to distribution, and everything in between- such as procuring raw materials, manufacturing functions and marketing activities. The value chain work best when their actors cooperate to produce high quality products and generate income for all participants along the chain.

The present study entitled “Value chain analysis of medicinal rice in Kerala was undertaken with the objectives viz., to map the value chain of Navara rice and Rakthashali rice of Kerala, to identify and explore the various chains and actors involved in the value chain, to analyse the price spread efficiency and factors influencing it, and to identify the constraints and possible solutions at different levels in the value chain.

The area of the study confined to Palakkad and Malappuram districts of Kerala. The selection of districts has been made based on the highest number of Navara rice farmers and Rakthashali rice farmers respectively. Both primary and secondary data were collected from Palakkad and Malappuram districts of Kerala. Primary data were collected from 60 farmers (30each from the selected districts) and 60 consumers (30each from the selected districts) using snowball sampling. Sample from the rest of the actors in the value chain was selected based on the information received from farmers, processors, marketers and consumers. Secondary data were collected from Department of Agriculture, Kerala, KVKs, District and Block level offices in the two districts of Kerala and relevant KrishiBhavan. The data were collected using pre-tested interview schedule. The collected data were analysed with the help of value chain mapping tool (global approach), modified market efficiency (Acharya’s approach), percentage analysis, index method and Kruskal Wallis test.

The mapping of medicinal rice value chain revealed that the core process involved in the value chain of medicinal rice includes input supply, production process, procurement, processing, marketing and consumption. Farmers, millers, organic certifying agency, retailers, consumers and Krishi Bhavan were the major actors involved in the value chain of Navara rice. Whereas farmers, millers, processors, retailers, consumers and Krishi Bhavan were the major actors involved in the value chain of Rakthashali rice. The main sources of information were Krishi Bhavan and fellow farmers for Navara and Rakthashali farmers. These rice varieties were sold within the various places of Palakkad, Malappuram and

Thrissur districts of Kerala.

The analysis of various chains and actors involved in the value chain highlighted that there was two marketing channel for Navara rice and three for Rakthashali rice in the study area.

The identified marketing channels are:

Navara rice

Farmers → Retailers → Consumers

Farmers → Consumers

Rakthashali rice

Farmers → Processor → Consumers

Farmers → Retailers → Consumers

Farmers → Consumers

The Navara farmers produce on an average of 4923 kg paddy in a year. After the production, the farmers keep an average of 25.16 kg/year of paddy for self-consumption and also for seed purpose. The remaining portion was taken for converting paddy into rice and then sold to retailers and consumers. In the case of Rakthashali farmers, they produce an average of 3108kg of paddy in a year, after the production the farmers were preserve an average of 9 kg/year paddy for self consumption and for seed purpose. It was found that Navara farmers were earning a high margin of ₹ 109.37/Kg per farmer in channel II. In the case of Rakthashali rice, the farmers were earning a high margin of ₹ 95.06/Kg per farmer in channel III followed by ₹81.24/Kg per farmer in channel I and ₹65.06/Kg per farmer in channel II.

No advance sales contract is taking place in the case of Navara and Rakthashali rice marketing. Consumers of both Navara and Rakthashali rice expressed nutrient value were the highly satisfied component with a composite index of 88.88 followed by chemical pesticide free, taste and freshness.

The price spread efficiency in the value chain showed that, the increase in the number of intermediaries in a value chain decreases the market efficiency through increasing cost and margin of intermediary. The percentage of producers share in consumer rupee is better for lesser intermediary chain. Among the two channels in the Navara rice marketing, channel I is least efficient with market efficiency of 0.6. Channel II is most efficient channel with market efficiency 1. The producers share in consumer rupee was found to be higher in channel II



(100) followed by channel I (66.67). In the case of marketing channels of Rakthashali rice, channel I and channel II were least efficient with market efficiency with 0.6. The producers share in consumer rupee was found to be higher in channel III (100) followed by channel II (66.66) and channel I (60). The only channel which gives maximum return to farmer is the channel of marketing directly to consumers. The major factors influencing the choice of selecting the channels were income of the actors and holding capacity of farmers. The entry into a specific chain by an actor depends on the revenue benefit receivable. When the farmer is unable to keep the product they choose to sell it through processor, retailers and consumers. So the ability of a farmer to store the product also influences choosing a particular channel for marketing.

The identified constraints faced by the farmers were the lack of availability of organic fertilisers, shortage of labour, lack of knowledge about the application of inputs, lack of awareness regarding source of supply of inputs, wastage on processing, inadequate availability of machines, lack of storage and high transportation cost. For processor, the major problems faced by them include high transportation cost, high labour cost, wastage on processing, inadequate technology, price fluctuation and high price of the product. Lack of availability of product in time, lack of storage and high price of the product were the major problems faced by the retailers. High price of the product and unavailability of product were the major problems faced by the consumers.

The study therefore concludes that the organisation like Krishi Bhavan should come forward with training and advisory services for improving the knowledge of the farmers. The government may support the farmers by providing new machineries at the subsidised rate and also educate the farmers about the new technologies and machineries prevailing in the market through the Krishi Bhavan. Government may take steps to provide storage spaces for the farmers to minimise the effects of price fluctuations. The middlemen involved in the value chain results in loss or get low margin to the farmers. Because of this many farmers hesitated to come forward for the cultivation. Therefore, government may help the farmers to avoid private middlemen either through direct procurement or by getting the services of cooperative to market the produce. Even though there is high demand for the medicinal rice because of its medicinal properties, due to the price fluctuation, interference of middleman and the risk associated with the natural calamities, the farmers are reluctant to cultivate medicinal rice in a large scale. Only with the proper intervention of government through KrishiBhavan on the

above mentioned areas can attract the farmers to come forward for the large scale cultivation of medicinal rice.

