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NAVARA RICE

A Success Story

P Narayanan Unny

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Trust for Advancement of Agricultural Sciences (TAAS)

GOAL

Harnessing the potential of agricultural science for the welfare of the people.

MISSION

Promoting growth and advancement of agriculture through scientific partnerships, policy advocacy and public awareness.

OBJECTIVES

- To act as a 'Think Tank' to deliberate on key issues relating to agricultural research and innovation for development (ARI4D) and influence policy decisions
- To organize workshops, conferences, brainstorming sessions, seminars, policy dialogues and special lectures on emerging issues and new developments in agricultural sciences
- To disseminate knowledge among stakeholders through publication of proceedings, policy papers and success stories
- To confer awards to the scientists of Indian and foreign origin for their outstanding contributions to Indian agriculture
- To facilitate the scientific interactions and partnership building of non-resident Indian agricultural scientists with Indian scientists

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Foreword

Navara rice having numerous nutritional and medicinal properties is endemic to Kerala. Unlike other rice varieties, which are white in colour, *Navara* is deep red and cultivated in the Palghat region for more than 2,000 years. In the past 4 -5 decades, it had reached a stage of near extinction. Considering its importance particularly in various *Ayurvedic* treatments, Shri P Narayanan Unny - a third-generation marketing executive-turned-farmer, left his good job to save and conserve this valuable landrace. After years of strenuous efforts, he could evaluate, purify the seeds and gradually moved into large scale cultivation of pure *Navara* rice in his 115 year old 18 acre farm, popularly known as '*Navara* Eco Farm'. This farm is now getting wider recognition both nationally and globally

In 12th century *Ayurvedic* text, *Ashtangahridayam*, the white *Navara* rice is described to be medicinally superior. However, the black-glumed variety is preferred more by the physicians. As per published ancient treatises, it has several uses, for example, boiled *Navara* is a good weaning food for infants, particularly those with low weight. Broth made by adding *Navara* rice to meat is recommended to pregnant women as it increases the weight of the foetus. Cooked with milk and herbs, it can treat internal wounds. *Navara* rice bran oil is used in the cervical spondylosis, low backache, paralysis, and rheumatoid arthritis. Its gruel is beneficial in preventing diabetes. *Navara* rice whole grains can lower the cholesterol levels and reduce the risk of heart disease. The most important *Navara Kizhi* (*Navara Potli* therapy treatment), a specialty treatment using this landrace to cure neuromuscular disorders, for which Kerala is known to attract tourists from all over the country. In view of above properties, in today's health-conscious world market, *Navara* rice could assume an important role.

This success story brought out by TAAS gives an insight into the background, current status of cultivation of *Navara* rice, major challenges facing its production, ensuring geographical indication, branding, organic certification, public awareness,

and the training of farmers initiated by Shri P Narayanan Unny over the past two and a half decades. I am hopeful that this publication entitled **"*Navara* Rice - A Success Story"** will arouse specific interest among the farmers throughout India to conserve all our valuable landraces and traditional varieties possessing unique traits of food, economic and social value.

RS Paroda

Preface

This document is indeed a story of reviving the nearly extinct *Navara* rice wherein I spent most of my time. *Navara* is a traditional medicinal and health rice of Kerala, India. This rice has been mentioned in '*Sushruta Samhita*' dating back to 2200-2400 years (400-200 BC), as '*Shastika* rice'- a rice that matures in 60 days. *Navara* is used for treatment of various ailments in Kerala *Ayurveda* system of *Panchakarma* in '*Navara Kizhi*' and *'Navara Theppu'* (as the name itself indicates, *Navara* being the main ingredient). This is useful in the treatment of arthritis, paralysis, polio in children, and muscle degeneration. *Navara* is endemic to Kerala and is important from the traditional point of view, but slowly its cultivation across Kerala had been dwindling from the late 1960s. Also, we experienced a time when pure seeds of *Navara* were not easily available with farmers to use in treating various ailments.

After the demise of my father in December 1994, I consciously made a decision to take up farming and took up the management of the family farm after winding up the business of selling HCL computers. This was not an easy decision for two reasons: i) people in Kerala were moving away from farming, especially rice farming, ii) my business was much profitable. When I look back now, I realize that it was a bold decision which changed everything in my life including the way I live, eat and think. I was taking up rice farming as a livelihood, and thus, my journey with *Navara* rice started. My family farm is at *Karukamani Kalam*. It is situated on the banks of river "*Shokanashini*" (destroyer of sorrows) a tributary of *Bharathapuzha* at Chittur of Palakkad District (Kerala), India. *Navara* Eco Farm (NEF), is a family run farm which is more than 115 years old. My father Sri M Ramachandra Menon had developed it over a span of more than 50 years of his life. He was ably supported by his elder brother Sri M Kelukkutty Menon, an agricultural graduate and one of the first rice specialists at Pattambi Rice Research Station, Palakkad. I decided to continue with the good work which they have done in developing the farm and helping the farming community. I got tremendous support from my immediate

family members, namely, my uncle Mr M Kelukkutty Menon, his wife Mrs Ambika Menon, my mother Mrs Sulochana Amma, wife Rema Devi, and two younger sisters, Dr Ramani (husband Dr Manoj Kumar) and Mrs Indira Ramani (husband Mr KN Ramani). On the farm, we had farm workers who had been working with us for the last three generations. When we started focusing on *Navara* rice, a new group of workers joined. Their support was of extreme value in NEF. I acknowledge my deep gratitude to all the supporters.

As rice cultivation in Kerala was a losing proposition for the farmers at that time, I made a plan to value-add and focus on cultivating Kerala's specialty rice - the unique medicinal and health rice - *Navara* and the indigenous varieties of *Palakkadan Matta* rice. *Palakkadan Matta* rice was a popular rice variety among farmers and consumers. Many among my farmer friends were already cultivating the *Palakkadan Matta* rice. Hence, it was logical that we formed a group and supported each other to take this rice variety forward. But, *Navara* rice was a different game altogether. *Navara* rice was available mostly as 'red rice' in the name of *Navara*. The original *Navara* rice was rarely available. Neither the sellers nor the buyers were able to distinguish *Navara* rice from varieties of so called 'red rice'. Some traders were selling 'red rice' varieties as *Navara* and were earning good money in the name of pure *Navara*. I found that only a few old farmers, *Ayurvedic* practitioners, etc. were able to differentiate between the two types. I wanted to go in-depth and decided to do an unofficial survey myself to understand the real situation prevailing for *Navara* cultivation in the state. I went around many places in Kerala, contacted farmers and discussed with them and came to the conclusion that almost nobody was cultivating *Navara* for a livelihood. Some of the farmers who were doing *Navara* cultivation in a small portion of their land for their own use, possess seeds which were mixed with other varieties. Pure *Navara* seeds were almost impossible to get. *Navara* was on the verge of extinction. Unless some real, sustained and focused effort is put in by someone, *Navara* was going to be a mere history rather than that in real life. Looking into the pros and cons of its not being a profitable venture but having utility in curing various ailments, I finally decided to revive its cultivation and popularization.

It was a path breaking effort which almost made me bankrupt. There was no revenue earning from the farm for the first five years when I took up the *Navara* program. Some of my farmer friends advised me to stop this madness and return to normal farming. But my family and many of my friends supported me tremendously during these trying times. Their kind words and appreciations pushed me forward with the task in hand. Government officials also supported

me later which boosted my confidence a great deal. First three years were spent on purifying the *Navara* seeds. I went around and collected seeds from some farmers who were growing a little amount of *Navara rice*. Although I put in lot of time and effort in collecting seeds, the quantity I could collect was very small and with impurities mixed with other seeds. I had grown these seeds through multiple crop cycles without taking out any proceeds, just for the purpose of making the quantity of seeds large enough to make it viable for cultivation. Further, it was a painstaking job to separate *Navara* seeds from the rest of paddy seeds by expert hands. The efforts made me cheerful when I had with me small quantity of both golden-glumed *Navara* and black-glumed *Navara* seed separately. After five years of continuous efforts, success was achieved in getting pure seed of *Navara* rice varieties.

The compilation of **'*Navara* Rice - A Success Story'** is an earnest attempt by us to describe our journey towards development of *Navara* rice and '*Navara* Eco Farm' from scratch to now having a highly recognized status. I am sure, this publication will be of immense use to farming community, policy makers, researchers, young entrepreneurs, and all those who are interested in *Navara* rice cultivation, use and conservation.

P Narayanan Unny

Acronyms and Abbreviations

ABS	Access and Benefit Sharing
ACIAR	Australian Centre for International Agricultural Research
APAARI	Asia- Pacific Association of Agricultural Research Institutions
APO	Asian Productivity Organization
APO-NPC	Asian Productivity Organization-National Productivity Council
AU	Authorized User
AYUSH	Ayurveda, Yoga and Naturopathy, Unani, Siddha and Homeopathy
BARC	Bangladesh Agricultural Research Council
BI	Bioversity International
CIAL	Cochin International Airport Limited
CIAT	International Center for Tropical Agriculture
CII	Confederation of Indian Industries
CISSA	Centre for Innovation and Social Action
COVID	Corona Virus Disease
CSIR	Council of Scientific and Industrial Research
CSIR-RRL	CSIR-Regional Research Laboratory
DIPP	Department for Industrial Promotion and Policy
DPIIT	Department for Promotion of Industry and Internal Trade
EXIM	Export Import
FAO	Food and Agriculture Organization of the United Nations

FAO-RAP	FAO- Regional Office for Asia and the Pacific
GI	Geographical Indication
GM	Genetically Modified
GoI	Government of India
GoK	Government of Kerala
IAS	Indian Administrative Service
IAC	International Agrobiodiversity Congress
IBC	Indian Biodiversity Congress
IBE	Indian Biodiversity and Expo
ICAR	Indian Council of Agricultural Research
ICAR-IISR	ICAR-Indian Institute of Spices Research
IFOAM	International Federation of Organic Agriculture Movements
IGAU	Indira Gandhi Agricultural University
INTACH	Indian National Trust for Art and Cultural Heritage
IPR	Intellectual Property Rights
IRTC	Integrated Rural Technology Centre
ISPGR	Indian Society of Plant Genetic Resources
ITAB	Institut Technique de l'AgricultureBiologique
KAMCO	Kerala Agro Machinery Corporation
KAU	Kerala Agricultural University
KFSA	Kerala Fire Service Association
KINFRA	Kerala Industrial Infrastructure Development Corporation
KSBB	Kerala State Biodiversity Board
KSC	Kerala Science Congress
KSCSTE	Kerala State Council for Science Technology and Environment
KSIDC	Kerala State Industrial Development Corporation
MoA&FW	Ministry of Agriculture and Farmers' Welfare
MoC&I	Ministry of Commerce and Industry

MoES	Ministry of Earth Sciences
MoH&FW	Ministry of Health and Family Welfare
MoS&T	Ministry of Science and Technology
MP	Member of Parliament
MSSRF	MS Swaminathan Research Foundation
NABARD	National Bank for Agriculture and Rural Development
NASC	National Agricultural Science Centre
NBA	National Biodiversity Authority
NBC&F	National Biodiversity Congress and Expo
NEF	*Navara* Eco Farm
NGO	Non-Government Organization
NIFTEM	National Institute of Food Technology Entrepreneurship and Management
NIIST	National Institute for Interdisciplinary Science and Technology
NPC	National Productivity Council
NRFS	*Navara* Rice Farmers Society
PAO	Principal Agriculture Officer
PPV&FRA	Protection of Plant Varieties and Farmers' Rights Authority
RATTC	Regional Agricultural Technology Training Centre
RGCB	Rajiv Gandhi Centre for Biotechnology (RGCB)
RT	Responsible Tourism
SHM	State Horticulture Mission
TAAS	Trust for Advancement of Agricultural Sciences
UN	United Nations
UNDP	United Nations Development Programme
UNF	Unnys Navara Farm
USA	United States of America
VIBHA	*Vigyan Bharati*

1 Background

Rice plays an important role in many aspects of human life across all sections of the society and is a staple food of Kerala. Made from rice '*Choroonu*' - the first solid food is given to the newly-born babies six months after the birth during '*Annaprashan* (अन्नप्राशन). Young children are introduced to the world of letters, '*ezhuthinu-iruthal*' by making the baby write the first letter of the *Malayalam* alphabet (by an elderly person) on a plate full of rice. *'Vishu'* festival starts with sowing of rice on the first day of *Medam* which falls usually on the 14th or 15th of April every year under *Malayalam* calendar. As per ritual, '*Onam*', a ten-day long harvest festival of Kerala is celebrated with floral arrangements in front courtyard of a house, followed by consuming freshly harvested rice (*Puthari*). The only war festival in Kerala *'Kongan Pada'* commemorates the victory of the people of Chittur (the rice bowl of Palakkad, Kerala) over the neighbouring '*Kongu*' king; the legend goes that the winner gets fertile rice land from his kingdom. This festival is claimed to have a history of over one thousand years. Further, rice is used to decorate the faces of '*Kathakali*', '*Koothu*' and '*Ottamthullal*' artists. These faces are world renowned art forms of Kerala which are used also in '*Kalamezhuthu*' art form. And, the specialty rice of Kerala, '*Navara',* is used in *Ayurveda* for treatment of arthritis, paralysis, neurological disorders and polio; and even during performing the last rites wherein they put rice grains into the mouth of the deceased in the last rites rituals known as '*Vaykkariyiduka*', a custom followed in Kerala state.

Considering that usage of rice pervades all aspects of human life in Kerala, it would be naturally presumed that, over the years, there would have been a major thrust by all stakeholders to increase rice production in the state, if not for trade, to at least meet its own domestic consumption. However, it is pertinent to note that Kerala is not self-sufficient as far as rice production is concerned and it imports rice from other states to meet its domestic consumption. The area under rice cultivation presently is approximately 25 per cent of the area cultivated in 1970s. Main reasons for reduction in rice production are fragmented landholdings, increase in cost of production, unremunerative price of the produce and migration of farm labour to more lucrative jobs.

2

The Near-forgotten *Navara* Rice

Rice is an indispensable part in the life of Indian masses and their rituals as it signifies prosperity, fertility, and abundance. Many of the Indian festivals like *Onam, Pongal*, and *Bihu* coincide with the harvest season of rice. Offering rice to deities and traditions like throwing rice over married couple signifies good fortune and luck while in *Annaprashana* (अन्नप्राशन), the first feed of new-born is prepared by boiling rice in milk, undoubtedly proving the significance of rice in Indian culture. It is the staple food of almost half of the world population. The cultivation of rice is estimated to have started about 6,500 years ago and there are two domesticated and about twenty-two wild varieties available. Depending on the variety, rice provides a varied amount of energy, fiber, protein, and minerals and is the most cultivated grain of the world. Kerala has a rich tradition in rice farming. However, for the past over 50 years, many traditional varieties have either become extinct or are not grown on a significant scale. This is largely due to shifts in crop cultivation patterns towards high yielding varieties, which had adversely impacted local landraces including medicinal *Navara* rice. This resulted in significant decline from approximately 2,000 acres to less than 50 acres. The main objectives of program were to revive *Navara* rice cultivation by: i) pure line selection of *Navara* seeds, ii) conservation of this unique rice variety; iii) carry out *Navara* rice farming organically without the use of any chemicals and retain its medicinal properties; iv) demonstrate the financial viability of cultivating *Navara* rice and encourage other farmers in the area to cultivate this rice variety; and v) obtain 'GI' registration for *Navara* rice.

Numerous varieties of rice are categorized into *Sali* and *Vrihi*. Among *Vrihi, Sastika* rice, also called as *Navara* is considered as the best. It is believed that *Navara* grown in upland areas is more potent in qualities. Recently *Navara* (नवरा) and *Palakkadan Matta* (पालक्कडां मट्टा) were granted the GI tag status and have been in cultivation for more than 2,000 years for its immense health benefits. *Sashti* in Sanskrit means sixty, which indicates the quick maturing span of *Sastika* rice, which

is sixty days. Called *Navara* in Dravidian languages, it is truly a medicinal wonder grown in Kerala, because of its unique healing properties. It is sweet in taste, cold in potency, easily digestible, invigorating, pacifying all three *doshas*(cough, *vaat*, *pitta*) and providing stability. *Navara* is an unpolished variety and is extensively used in various *Ayurvedic* treatments.

Navara is an endemic landrace to the region and is at the brink of extinction. Because of its medicinal value, it is often equated to gold by the Kerala farmers; also known as 'gold with fragrance' as it can fetch a good price for farmers because of its limited availability and amazing benefits. *Sastika* is of two types, the black-glumed variety and the golden yellow glumed variety. Used traditionally in many forms because of its proven health benefits, *Navara* is acclaimed in the management of neuromuscular diseases and auto-immune disorders. During the *Karikadaka* season, *Ayurveda's* special monsoon therapy to rejuvenate the body, rice gruel made of *Navara* rice, fortified with a mixture of herbs, called *Karkidaka kanji* or *Marunnu kanji* is used to provide strength and immunity against ailments common during the monsoon. Nourishing and easily digestible, it is an indispensable part of the monsoon therapy as it aids in the cleansing process. *Sastika tailam* extracted from the bran of *Navara* rice is beneficial in curing neurological disorder and the wasting of muscles. *Navara* rice is comparatively more expensive as it is a low yield crop and is usually cultivated in very restricted areas. It is a golden cash crop for farmers as its limited availability and amazing benefits fetch a good price.

In *Ayurveda* system, *Navara* rice is used in two processes, namely, *Navara Kizhi* (नवरा किझी) and *Navara Theppu* (नवरा थेप्पु). *Navara* rice is cooked in medicinal decoction and cow's milk and made into boluses. These boluses are kept on optimal temperature by repeatedly dipping in a hot mixture of herbal decoction and milk, and are used to gently massage over the body. *Navara Theppu* is another modification of *Navara Kizhi* for elderly and children who cannot withstand much heat, in which rice paste cooked with an herbal decoction is directly applied over the skin and massage is done in a specific manner. Both these procedures help in rejuvenating, improving complexion, calming the senses and neurological conditions, and relieving arthritis.

Navara rice is a major source of nourishment for babies and in diabetic treatment. While there have been no conclusive studies on whether *Navara* rice helps in treating diabetes, a broth made from it is safe to consume for diabetic patients. While normal white rice has a glycaemic index of around 75, *Navara* rice is closer to 60, making its consumption safer for diabetic patients. Porridge or *kanji*

made out of *Navara* rice is extremely beneficial for babies, especially when they are in the weaning phase. *Navara* rice is a rich source of iron for babies and also helps underweight babies in gaining weight. Finally, since it is low in glycaemic index, it takes longer time to breakdown and keeps the baby's stomach full for a longer period. *Navara* rice is envisioned as a health and medicinal rice.

Two kind of rices- *Navara* and *Palakkadan Matta* (Fig. 1,2) are endemic to Kerala and at the near extinction stage. According to ancient *Ayurvedic* scriptures, *Ashtanga Samgraha* of *Vaghbhata* (7th century AD), and *Sushruta Samhita* (400-200 BC), '*Navara*' is known as one of *Shastikas,* which is a variety of rice that matures in 60 days (generally, rice takes upwards of 90 days to mature). *Shastikas* are sweet in taste and helps in digestion. Two varieties of *'Navara' paddy* rice are cultivated (Fig. 3), one is the black-glumed and another is golden yellow-glumed (Fig. 4, 5). The color of the husked *Navara* rice grains is deep red / purple for both black-glumed and golden yellow-glumed varieties. Traditional farming (*Paramparagat Krishi*) procedure and processes are used to cultivate *Navara* rice to ensure that the intrinsic medicinal values and nutrients are not lost by the use of chemical pesticides and fertilisers. The method of cultivation of the medicinal rice, therefore, has to be necessarily organic. This type of farming would result in higher labor costs as well as lower yields. The organic method of cultivation of this rice contributes to ecosystem services such as the conservation of biodiversity, ecology and water. It helps in protecting the environment which, in turn, contributes towards reduction of global warming, while ensuring that no chemical residues are left in the soil or water.

Fig. 1. *Navara rice grains*

Fig. 2. *Palakkadan Matta rice grains*

Fig. 3. *Navara rice cultivation: A field view*

Fig. 4. *Navara rice cultivation near pond*

Fig. 5. *Black-glumed Navara rice*

Navara is famous for its use in the ancient Indian system of medicine (*Ayurveda*). *Ayurveda* relies on herbal medicines and massages and has increasingly gained repute across the world as a complimentary system of medicine. *Navara's* various forms such as the grains (Fig. 1), golden yellow *Navara* rice (Fig. 6), bran (Fig. 7),

powder (Fig. 8), root, flakes (Fig. 9), and hay (Fig. 10); are used in the treatment of different ailments in *Ayurveda*. *Navara Kizhi* (नवरा किझी) and *Navara Theppu* (नवरा थेप्पु) are the two major treatments in the *Panchkarma* method of treatment in 'Kerala *Ayurveda*' for treating patients with arthritis, paralysis and neurological disorders. In *Navara Kizhi* (or *Pindasweda* in Sanskrit),

Fig. 6. *Golden yellow Navara rice grain*

Fig. 7. *Navara rice bran*

Navara rice is boiled in *Kurunthotti kashayam* (a decoction of *Sida* root and milk,then enclosed in cloth pouches (*Kizhis*) and is used for massaging. In *Navara Theppu*, light warm paste of boiled *Navara* rice is applied on the body. Here again, the rice is boiled in *kurunthotti kashayam*. Various forms of *Navara* have distinctive and unique therapeutic uses in *Ayurveda*.

2.1 As Healthy Food

Fig. 8. *Navara rice powder*

Navara rice is a natural energizer, it is advised for the people of all ages to increase general health. *Navara* rice is suggested for underweight babies. Many diabetic patients have claimed that *Navara* rice has a low glycaemic index and is suitable as a diabetic rice. We have *Navara* rice customers who are diabetic and who have vouched that their blood sugar level is not going up even after using *Navara* rice regularly. Scientific studies have also shown that consuming

Fig. 9. *Navara rice flakes*

Fig. 10. *Navara rice hay*

Navara rice without removing the bran does not adversely impact diabetic patients.

Many Institutions and research laboratories have procured *Navara* rice from *Navara* Eco Farm (NEF) for their studies (Annexure V). Regional Research Laboratory, National Institute for Interdisciplinary Science and Technology (NIIST), Kerala Agricultural University, Rajiv Gandhi Centre for Biotechnology are among the institutions which have done chemical analysis of NEF *Navara* rice and products. Department of Botany, Govt. Victoria College, Palakkad and Kerala State Council for Science Technology and Environment have jointly conducted a study on medicinal rice landraces of Kerala in a 15 cent plot at NEF.

3

Establishing the *Navara* Farm

Navara Eco Farm (NEF) is situated on the pristine banks of river *'Shokanashini* (शोकनाशिनी)' (destroyer of sorrow) at Chittur of Palakkad district of Kerala. NEF is a family farm which is more than 115 year old. Palakkad-a rice bowl of Kerala and Chittur is the major rice producing area in the shadow of the Western Ghats. A unique feature of this farm is that it demarcates the boundary of the erstwhile states of Kochi and Malabar. Mr Moothedath Subbaraya Menon and his wife Mrs Palode Madasseri Nanikutty Amma were the first-generation farmers of this family who developed and managed this farm. The main crop of the farm was rice. They meticulously chronicled the activities of the farm. These chronicles proved to be invaluable to Mr Unny when he embarked on the journey to cultivate *'Navara'* rice. Later, both the first-generation elder son, Mr M Kelukutty Menon, elder brother of Mr MRC Menon, who was one of the first rice specialists at Rice Research Station, Pattambi, Palakkad (Kerala); and Mr MRC Menon, the second son, were committed to rice farming. The combination of an elder brother (Agricultural Scientist) and younger brother, a keen practicing farmer, helped in developing the farm systematically.

After taking over the farm in 1995, Mr Unny made a long-term plan focusing on specialty rice varieties, converting the farm into an integrated one, adopting organic farming methods, addressing biodiversity, ecology, environmental and conservation issues. The entire farm and its products are certified organic from year 2007, the farm has taken leadership in forming rice clusters for *Navara* and *Palakkadan Matta* varieties of rice and registering these varieties as Geographical Indication (GI) through farmer led initiatives. Unny explains: "With each generation, the area under cultivation was getting smaller and less economically viable. In my father's days, people would work on the rice fields for all 365 days of the year, but in due course of time, people's interest in rice farming came down drastically, the land and work force got fragmented and certain varieties reached to its extinction stage". Mr Unny was conferred the "*Plant Genome Saviour Community Recognition*

Award" by Protection of Plant Varieties and Farmers' Rights Authority (PPV&FRA), Ministry of Agriculture and Farmers' Welfare (MoA&FW), Government of India for the efforts made by him to conserve *Navara* rice.

The two brothers successfully carried out crop diversification by growing sugarcane, coconut trees intercropped with arecanut and cocoa, and fruits, such as mango, jackfruit, banana, guava, papaya, sapota, grapes, *jamba* and *jamun*. They also carried out work on value-addition such as the instituting scientific irrigation system (covering the entire farm in the year 1960), conversion of sugarcane into jaggery and coconut into *copra* and coconut oil. The quickstick *(Gliricidia sepium),* a medium size tree which is used as green manure was first introduced in this area, and in this farm also. Subsequently, farmers in the neighbourhood also acknowledged the importance of this green manure. NEF took the leadership to distribute cuttings and help farmers save on cost of fertilizers. As far back in the year 1967, they instituted a novel inter-state marketing initiative such as selling the value-added jaggery from the sugarcane grown on the farm, in the nearby town of Pollachi (Tamil Nadu).

Working of an agricultural scientist along with a practicing farmer was an ideal situation. The duo developed NEF into a reputed and integrated farm. After the demise of Mr MRC Menon in 1994, the third-generation farmers of the family took over the management of the farm. Presently, NEF is an integrated farm growing approximately 124 agricultural crops including specialty rice-*Navara* and the popular rice *Palakkadan Matta*, vegetables, spices, medicinal plants and trees, coconut, several fruits and other trees. NEF maintains an herbarium of about 200 plants. The entire farm is 'Certified Organic' for India, European Union and the United States Department of Agriculture from the year 2007 onwards (Annexure I). We retained the European Union and US Department of Agriculture certificates till 2020 and discontinued subsequently. Mr Unny runs the farm now. His father Shri M Rama Chandra Menon (MRC Menon) developed and managed the farm for over fifty years of his life. A one-man farming crusade championed by Mr Unny strives to bring back the cultivation of *Navara* rice, which was fast losing its significance. NEF spreads over an area of about 18 acres and also contains numerous other crops like coconut, mango, pomegranate, medicinal herbs, spices, bamboo and vegetables. The eco-farm is completely organic and certified.

Starting from the late 1960s, cultivation of rice in Kerala had started to dwindle due to many reasons: (i) land ceiling act made holdings economically unviable, (ii) cost of production of rice increased, (iii) rice farmers could not get remunerative prices for the product due to many reasons, (iv) farm workers were moving to other

less laborious and more remunerative jobs, and (v) migration of farm labour due to opening up of the Middle East job market from the 1970s. All the above reasons led to the decrease of rice production in Kerala. It was in this scenario that Unny took the decision to take-up the management of the family farm.

Many scientific studies have been undertaken with *Navara* products from NEF. Regional Research Laboratory (National Institute for Interdisciplinary Science and Technology (NIIST), Kerala Agricultural University, Rajiv Gandhi Centre for Biotechnology are among the institutions which have done chemical analysis of NEF *Navara* Rice. Department of Botany, Government Victoria College, Palakkad and Kerala State Council for Science Technology and Environment have jointly conducted a study on medicinal rice land races, Kerala in a 15 cent plot at NEF. Many scientists, students, officials of various government departments and agencies visit NEF regularly.

3.1 Infrastructure Development

NEF is spread over approximately 18 acres and is cultivating rice, sugarcane, coconuts, mangoes, jackfruits, guava, arecanuts, plantains and tamarind. As mentioned earlier, the farm is located close to *Shokanashini* river (a tributary of the famous *Bharatha Puzha* of Kerala). It has a pond (Fig. 11) of about 2,000 sq m which helps in providing water during summer for irrigation. In the year 1960, a unique irrigation system was developed at the farm. This helped pumping water from the river to the farm area for irrigation. A pump house was built near the river at one end of the farm. A 10-horsepower motor was placed there. A water tank with 40 feet height was also constructed near the pump house. An underground pipe system travels 250 m from the tank to the open sump at the house. From this sump, water is directed to the pond, stored and used for irrigating rice fields. Another outlet from the open sump is used to irrigate crops like coconut, mangoes, jackfruit, grapes, and plantains in the field at the level of the house. Water from the pond after irrigation is let out to the river *Shokanashini* from the

Fig. 11. *Pond at Navara farm*

other end of the field. When the plug of the delivery pipe at the riverside is removed, water flows through the channel to irrigate the coconut garden there. This unique irrigation system (Fig. 12) makes sure that water from the river is taken for irrigation of the farm and after use, remaining water is let back to the river. It is an indigenous irrigation system devised 62 years ago with a vision to conserve the rare resource of water.

Fig. 12. *Irrigation system developed at Navara farm*

3.2 Support Received from Family and Friends

The initial support and training in agriculture was imbibed from the family. Mrs M Nanikutty Amma (Unny's grandmother) was a conscientious agriculturist who helped set-up the farm and provided initial training on rice cultivation, various varieties and cycles of rice cultivation and the relative merits of cultivating specific varieties of rice. Family members helped a great deal in developing the farm (Fig.13). Far ahead of their times, they scientifically developed the land, experimented on different rice varieties and their methods of cultivation and understood the merits of organic cultivation and its contribution towards maintaining and sustaining biodiversity, preserving soil quality and optimum utilization of resources including water. They diversified into other areas of agriculture also, such as growing other crops and developing various by-products from the produce. To obtain financial

Fig. 13. *Unny's family members*

advantage, they carried out forward and backward integration of the supply-chains of rice and its by-products. There were many individuals, government and non-government organizations (NGOs), institutions, authorities, media and many others, who were very supportive in various activities on conservation, cultivation, commercialization and consumption of *Navara* rice.

3.3 Community Leadership

With sustained effort, by the year 2006, *Navara* Eco Farm had started growing over 72 varieties of farm products including rice, vegetables, fruits, medicinal trees and plants, spices, etc. The farm has taken leadership in forming rice clusters for '*Navara*' and '*Palakkadan Matta*' varieties of rice and later registering these varieties as Geographical Indication (GI). Mr VS Achuthanandan, the then Hon'ble Chief Minister of Kerala (Fig. 14) visited NEF in 2007 along with Mr NN Krishnadas, the then Member of Parliament, Palakkad. Both of them were very supportive of organic farming and the activities carried out at this farm towards conservation of *Navara* rice and biodiversity.

Fig. 14. *Chief Minister of Kerala, Shri. VS Achuthanandan with Mr. Unny, family and friends*

4

Navara Rice Revival Program

Kerala has a rich tradition in rice farming. However, for the past over 50 years, many traditional varieties have either become extinct or are not grown on a significant scale. This is largely due to shifts in crop diversification/crop cultivation patterns towards high yielding varieties, which had adversely impacted local medicinal *Navara* rice resulting in significant decline from approximately 2,000 acres to less than 50 acres. The main objectives of this program were to revive its cultivation by: i) selecting pure lines of *Navara*, ii) conservation of this unique rice variety; iii) doing *Navara* rice farming organically without the use of any chemicals and retain the medicinal properties of this unique medicinal rice; iv) demonstrating the financial viability of *Navara* rice cultivation and encouraging other local farmers to cultivate this rice variety; and v) obtaining 'GI' registration for *Navara* rice

'Navara' was traditionally cultivated organically. Because of its poor yield and difficulties in controlling pests and diseases, conventional method of farming was adopted by farmers. As *Navara* is a medicinal rice, *Navara* Eco Farm decided to adopt only organic farming methods lest it might affect the medicinal properties. Moreover, as *Navara* rice powder, bran and root is also used in *Ayurvedic* treatments, and health rejuvenation therapies, any chemical or pesticide residue in the course of conventional farming might not yield the desired results. The *Ayurveda* physicians and others in the field of *Ayurveda* always opine for organic farming. But conversion to organic farming in *Navara* rice turned out to be risky, laborious and costly. NEF completely eliminated the usage of chemical fertilizers and chemical pesticides at the farm. Hence, all the products coming out of NEF are free of residues of chemical fertilizers and chemical pesticides.

4.1 Purification of *Navara* Seeds

When we started the work at the farm to continue with rice cultivation focusing on *Navara*, we faced many challenges. First was the non-availability of pure *Navara* seed. By 1990's, *Navara* seed available with farmers got mixed with seeds of other

varieties of rice. Usually, *Navara* is cultivated after the monsoons, during summer and after the main rice crops are harvested. Earlier, *Ayurveda* centres used to cultivate *Navara* in their fields for use in medical treatment. Mainly due to the unviable rice cultivation scenario in Kerala by the 1990's, most of the Ayurveda centres stopped cultivation of *Navara* and depended on local farmers or traders of herbs for their requirement of *Navara*. The yield of *Navara* is very low and the market was mainly the *Ayurveda* treatment centres. In view of this, only a few farmers used to cultivate *Navara* in small areas which were located near *Ayurveda* treatment centres. And farmers hoped to sell whatever small quantities of excess *Navara* they had after their home consumption, to the nearby *Ayurveda* centres. Owing to very small land holdings, poor yield, low demand and unremunerative price of *Navara*, rice farmers used to cultivate *Navara* in the same plot along with other varieties of rice. So, mixing of seeds occurred in the field. Hence, we started purifying *Navara* seed at our farm which took us two and a half to three years.

4.2 Area under *Navara* Cultivation

Starting from the pure seeds produced in 15 cents area, we increased our area of *Navara* cultivation to 40 cents during the next crop. Next season, the area was increased to one acre. At this point of time, we used to cultivate the *Palakkadan Matta* rice in other plots for rice. In the third season, to our dismay, we found seeds of *Palakkadan Matta* got mixed in the one acre plot where only Navara was cultivated. We found out this mixture of seeds occurred from the earlier season *Palakkadan Matta* rice cultivated in that plot. Before the next season, we physically separated the *Navara* seed from the *Matta* rice and used these seeds for cultivation in 2 acres and left the other 6 acres of rice plots fallow for fear of mixing of seeds again. Then, during the next season, we had pure *Navara* seeds for sowing and expanded the area to 4 acres.

4.3 Plant Genome Saviour Community Recognition Award

Protection of Plant Varieties and Farmers' Right Authority (PPV&FRA), Ministry of Agriculture and Farmers' Welfare (MoA&FW), Government of India has the responsibility to provide an effective system for protection of plant varieties, the rights of farmers and plant breeders, and to encourage the development of new varieties of plants. It is considered necessary to recognize and protect the rights of the farmers' in respect of their contribution made at any time in conserving, improving and making available plant genetic resources for the development of the new plant varieties, and to protect Plants Breeders' Rights to stimulate investment for research and development.

Both '*Navara*' and '*Palakkadan Matta*' were the first agricultural products in India to be registered as GI through farmer-led initiatives. In 2008, three groups and the individual application of Mr Unny were selected for "Plant Genome Saviour Community Recognition Award". The excerpts of Plant Genomic Saviour Community Award is given below. Mr Unny was conferred with this prestigious award by the Protection of Plant Varieties and Farmer's Right Authority (PPV&FRA), MoA&FW, GoI by the then Hon'ble Union Minister for Agriculture & Farmers' Welfare Shri. Sharad Pawar ji in a brief and elegant function at New Delhi on 12 February 2009 (Fig. 15, 16). PPV&FRA recognized Mr Unny's efforts to conserve traditional *Navara* rice

Protection of Plant Varieties and Farmers' Rights Authority, MoA&FW, Government of India

Plant Genome Savior Community Recognition conferred to

Mr P. NARAYANAN UNNY

Excerpts

"The Protection of Plant Varieties and Farmers' Rights Authority recognizes Sh P Narayanan Unny, Navara Eco Farm, Karukamani Kalam, PO Pallakad, Kerala for the efforts in conservation of Traditional Navara Rice land races, selection and purification of superior quality Black and Golden Yellow Glumed Navara Rice varieties"

Fig. 15. *Plaque of Recognition for Navara Rice*

Fig. 16. *Mr Unny receiving Genome Savior Award-2008 from Union Agriculture Minister, Mr Sharad Pawar in presence of Mr T Nandakumar, Secretary (Agriculture), GoI*

land race and selection of black- and golden yellow-glumed lines. This is a national recognition and award for the outstanding work done in *Navara* rice.

A further recognition on '*Navara* rice conservation' was the appointment of Mr P Narayanan Unny as one of the member of PPV&FRA by MoA&FW from the year 2009 for a period of three years vide the Gazette of India, Part II, Section III, Sub-Section (ii) dated 1 December, 2009.

4.4 Geographical Indication (GI) for *Navara* Rice

This was the period (starting from 1990's) when value-added Indian agricultural products like turmeric, *neem* and even the *basmati* rice of India, were taken outside India, patented and sold, which was though stopped through long and hard battle. As part of the conservation of the *Navara* rice of Kerala, efforts were made to protect this invaluable treasure from biopiracy. Mr Unny explored ways to convert the farm as an enterprise. He held discussions with the Confederation of Indian Industries (CII), Kerala State Council, and with the help of CII Kerala, farmer clusters could start the work of registration of *Navara* rice as a GI. The initial meeting was held on 9th October 2004 at NEF farm. Apart from farmers, the other participants were, CII Kerala Chairman Mr TR Raghulal of Elite Foods, food processing panel Chairman Mr Navas Meeran of Eastern Condiments, rice miller Mr Vinod Manjila of the Double Horse Group, Mr Antony of the Pavizham Group, Dr PV Balachandran from the Kerala Agricultural University, Mr Vanajadalakshan from the Department of Agriculture, and Mr George Podippara from the '*Mathrubhumi'* Newspaper. Mr G Anand, the then Director, CII Kerala, who was the motivator of this initiative also attended the meeting. There was threadbare discussion about the predicament of rice farmers of Palakkad (Kerala) and how rice farming can be made remunerative to the farmers. The example of the tomato farmers of USA having bumper production in one of the seasons was discussed. At that time, the prices in the markets for tomatoes plummeted due to surplus production. The price was not even enough to meet the cost of transportation of the product to the market, and the farmers were about to dump the produce as waste, then someone suggested that why not try to value-add tomatoes instead of selling just as a commodity. Thus, was born the product 'tomato ketchup' - a major breakthrough for tomato farmers.

In case of rice farmers of Palakkad (Kerala), value-adding the process by registering them as GI was discussed. GI is a new tool to empower the producer communities. GI came into vogue as part of WTO's Trade Related Intellectual Property Rights (TRIPS) in 1995. In India, The Geographical Indications of Goods

(Registration and Protection) Act, 1999 was promulgated and all the provisions of the Act came into force from 15 September 2003. The meeting at our farm on 9 October 2004 decided to put up *Navara* rice and *Palakkadan Matta* to obtain GI status to empower the farming communities. Mr Unny was entrusted with the responsibility. Thus, a group of farmers at the southernmost part of India initiated steps for GI registration of *Navara* and *Palakkadan Matta* (Fig 17). The *Navara* Rice Farmers Society made an application for registration to the GI office at Chennai along with an application fee (Rs 5,000), and a statement of case. The GI registry requested us to present our case at the GI office at Chennai.

Fig. 17. *First farmers' meet with CII,KAU, Dept. of Agriculture representatives and rice millers for registering Navara and Palakkadan Matta and rices as a GI on 9 October 2004*

Mr Unny and an attorney through the CII Kerala office, presented the case before a Consultative Committee comprising of the Registrar of GI, a retired judge for the legal matters, a horticulture scientist and a specialist on rice. The main parameters for a product to be registered for GI are: i) uniqueness of the product, and ii) its history and geography. The uniqueness of *Navara* is that it is medicinal rice used in Kerala Ayurveda *Panchakarma* for medical treatment. To substantiate the uniqueness of *Navara*, the photos and videos of *Navara* rice were provided. Also, a copy of the ancient *Ayurveda* scripture, '*Sushruta Samhita*' and geographical maps of places in nine districts of Kerala where *Navara* was cultivated traditionally, were provided. After presentation and discussions, the committee's response was positive. The next step was publishing the application in the GI journal for awareness of the people and to know if there is any objection. In the case of *Navara* rice and *Palakkadan matta* rice, no objection was raised by any one and we received the GI certificate in November 2007 with retrospective effect from the date of application. It took us 3 years to complete the process.

Fig. 18. *GI certificate of Navara rice and Palakkadan Matta rice released by Hon'ble Chief Minister of Kerala Mr VS Achuthanandan in March 2008*

The long wait had paid off and we are proud to state that *Navara* and *Palakkadan matta* landraces of rice are the first agricultural products in India to be registered as Geographical Indication Registry Code (GI Code) under a farmer-led initiative- (Fig 18). The Department of Post, Government of India as part of *Atma Nirbhar Bharat* Project, released special covers of *Navara* rice (Fig. 34, 35) on the Philately day (13 October 2021).

4.5 Public Awareness Efforts

As we noticed, pure *Navara* rice was mostly not available. Many of the 'red rice' varieties were sold in the market under the name of *Navara* rice. General public were being taken for a ride as they were unable to distinguish between the original and duplicate rice. We wanted to provide the purest *Navara* rice to our customers without any middle man tampering it or mixing it with other rice varieties. The solution was to pack the products and sell them under the brand name UNF. The packaged products under the brand UNF were much appreciated by customers and critics alike. This assured them that the product was not tampered with, was of the highest quality and Government compliances were followed.

Likewise, the knowledge about the importance and uses of *Navara* was almost lost among the general public. As part of creating awareness among public, NEF developed a website, www.navara.in. The awareness was created through print

and media and Mr Unny was invited for conferences, meetings, workshops, trade fairs, and interviews by AIR, *Doordarshan* and contributed articles in the magazines, and books. Mr Unny participated in about 190 events within Kerala, other parts of India and in other countries. We would like to mention here with immense gratitude the opportunity to showcase *Navara* outside India was provided by Dr RS Paroda, Chairman, Trust for Advancement of Agricultural Sciences (TAAS) during the International Symposium on Sustainable Agricultural Development and Use of Agrobiodiversity in the Asia-Pacific Region held at Suwon, Republic of Korea from 11-15 October 2010; and in the Agri- Food Innovations Conference in Taiwan in 2016. Wherever possible, Mr Unny made discussions and presentations on the work on *Navara* rice and familiarized participants of such programs on its importance, uses and benefits of the *Navara* rice.

In 2011, Mr Unny was provided a stall by the Ministry of Agriculture and Farmers' Welfare (MoA&FW), Government of India, at the India International Trade Fair, New Delhi. It was a wonderful experience. People from all parts of India including men, women, and children visited our stall at which only one product, *Navara* rice, was displayed. We had converted paddy to rice without removing the bran and the color of *Navara* rice is deep red or purple. People from all over the country could see a unique type of rice with such a color for the first time. Immediately on the first sight they asked,' Is this flax seed?', When I replied that this was the *Navara* rice, they could not easily believe. '*Ye lal chaval hai kya* (यह लाल चावल है क्या ?)'. We had also kept some *Navara* rice in a glass bowl for people to see, feel and taste. After seeing, feeling and tasting the *Navara* rice, they had a close look at the packing which contained all the details of *Navara* rice, including its uses, benefits and the price of the product, etc. We had packing of 250 g,500 g, and 1 kg. The price for 250 g at that time was Rs. 99/. That was almost a surprise for many of the visitors. They asked '*Dhai sau gram ko ninyanabe kya* (ढाई सौ ग्राम को निन्यानबे क्या ?)-'Ninety-nine rupees for only two-fifty grams? They were enterprising enough to experiment and buy only one packet of 250 g to start with.

There was another interesting experience from a conference abroad. In 2009, Mr Unny was invited to showcase the organic cultivation of *Navara* rice by the International Federation of Organic Agriculture Movements (IFOAM) in the USA. After the presentation of the work on *Navara*, there was an interaction with the participants. One of the participants shared a view that in the US and the West, there is a disease 'wheat protein gluten allergy' from the wheat in their diet and

that they might look at rice as an alternative. Such experiences were very valuable lessons. Thus, by working slowly but steadily, we could create awareness among the general public about the *Navara* rice and make it popular. NEF has been working on creating public awareness about *Navara* rice and its uses and benefits, cultivation practices and supplying seeds, grain, root, bran to different agencies to study its health, medicinal and nutritional benefits. Besides Kerala, NEF has participated in various programs across the country and abroad showcasing '*Navara*' products and different aspects of the work carried out at the farm. Farm visits were also organized and large number of Government officials, researchers and students including farmers participated (Annexure III).

(a) Conferences, workshops, and seminars

Mr Unny participated and presented a papers at the National Dialogue on 'Farmer-led Innovations towards Plant Variety Improvement and Conservation: Protecting Farmers' Rights, Geographical Indication, Appellation of Origin in the National Context' organised by the PPV&FRA and TAAS during 2006 at the National Agricultural Science Complex, NASC, New Delhi (Fig. 19); State Farmers' Day Celebration-South Indian Agri Fest-Police Maidan-Kannur (Kerala) in August 2015; the 3rd National Biodiversity Congress and Expo 2017 organized by the Kerala State Biodiversity Board, Government of Kerala during February, 2017. State Horticulture Mission, Kerala also showcased NEF programs and activities (Annexure II & III).

Fig. 19. *Mr Unny speaking at the National Dialogue organized by PPV&FRA and TAAS in November 2006*

NEF has, as part of its marketing initiative and outreach programs for prospective customers and stakeholders, with the support of central government, state government and other agencies, participated in the following International Conferences/ Workshops/ Exhibitions.

Mr P Narayanan Unny gave a detailed presentation during IFOAM program at Santa Fe, USA on 'Organic Farming at *Navara* Eco Farm' with special reference to the methods adopted with respect to *Navara* rice cultivation, the medicinal properties and benefits of *Navara* rice and also a brief overview of the '*Navara* Project' undertaken to revive this traditional and endangered rice variety (Fig. 20). The participants from Food and Agriculture Organisation (FAO); University of Lima, Peru; Animals Committee, USA; Organic Farming Research Federation, USA; Life Network, Kenya; ECO- PB, Germany; KFSA, South Korea, Coffee Research Institute, Tanzania; Swedish University of Agri. Breeding Company, Sweden; *Navadanya*, India; University of Hanover, Germany; ITAB- France and representatives from the Netherlands, Samoa and Croatia attended.

Fig. 20. *Mr Unny in discussion during IFOAM meeting at Santa Fe, New Mexico, USA*

Mr Unny gave a presentation on "Agrobiodiversity Conservation through Organic Cultivation of *Navara* Rice" at the International Symposium on 'Sustainable Agricultural Development and Use of Agrobiodiversity in the Asia-Pacific Region' organised by Rural Development Administration jointly with Asia-Pacific Association of Agriculture Research Institutions (APAARI) and the Bioversity International (BI) at Suwon, South Korea during October 2010 wherein

Fig. 21. *Mr Unny with Dr Raj Paroda at Suwon (South Korea)*

(Fig. 21, 22). Dr Raj Paroda, Chairman, TAAS, India and the then Executive Secretary APAARI; Dr S Attaluri, Coordinator and, Mr PK Saha, Liaison Officer, APAARI; FAO-RAP Thailand; and representatives from Australian Centre for International Agricultural Research (ACIAR); Bangladesh Agricultural Research Centre (BARC); and Department of Agriculture, Ministry of Primary Industries, Fiji participated (Annexure II).

Fig. 22. *Mr Unny at International Symposium on Agrobiodiversity at South Korea, 2010 Suwon, South Korea*

Awareness about *Navara* rice was also created through National Webinar on Implementation of Access to Plant Genetic Resources and Benefit Sharing (ABS) conducted by UNEP-GEF Project, Alliance of Bioversity International and International Center for Tropical Agriculture (CIAT), New Delhi and Indian Society of Plant Genetic Resources (ISPGR), New Delhi during August 2020; and 'Biodiversity Conclave' as part of the India International Science Festival 2020, organized by the Ministry of Science & Technology (MoS&T), Ministry of Earth Sciences (MoES) and Ministry of Health & Family Welfare (MoH&FW), Government of India in collaboration with *Vigyan Bharati* (VIBHA) by the CSIR during December 2020.

(b) *Navara Utsav*

During September 2011, '*Navara Utsav*-2011' was jointly organised by NABARD and *Navara* Foundation at Thiruvananthapuram (Fig. 23-28). Protection of Plant Varieties and Farmers' Rights Authority (PPV&FRA) provided the support for the *Utsav*. The *Utsav* was organized by *'Navara* Foundation' with financial support from PPV&FRA, Government of India; Kerala State Industrial Development Corporation (KSIDC); Kerala Industrial Infrastructure Development Corporation (KINFRA), Kerala State Council for Science Technology and Environment (KSCSTE), and Kerala State Biodiversity Board (KSBB). Prof MS Swaminathan graced the occasion as the Chief Guest and the luminous attendees included Dr RR Hanchinal, the then Chairman PPV&FRA, Dr RC Agrawal, the then Registrar General, PPV&FRA, and Shri PH Kurian, IAS, Principal Secretary (Industries and IT), Government of Kerala; Ms Aruna Sunder Raj, Managing Director, KSIDC; Mr MG Radhakrishnan, Editor, Asianet News; Mr NN Krishadas, Member of Parliament from Palakkad, among others. At this *Utsav*,

Fig. 23. *Meeting at NEF during Navara Utsav - January 2012*

Fig. 24. *Supporters of NEF - Sri PH Kurian, Dr RR Hanchinal, Dr RC Agrawal and Sri MG Radhakrishnan*

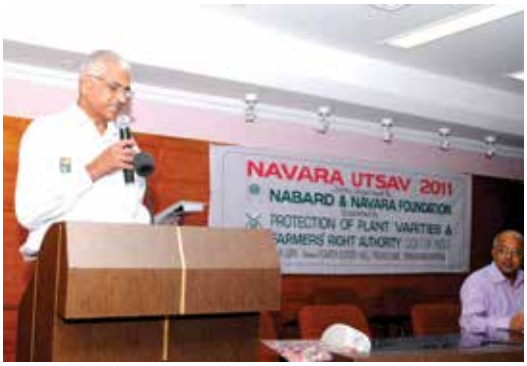


Fig. 25. *Navara Utsav during September 2011 and January 2012 at NEF*

Fig. 26. *Dr PL Gautam, Chairperson, PPV&FRA; Drs SK Datta, Former DDG (Crop Sciences), ICAR), RC Agrawal, then Registrar General, PPV&FRA, and Shri P Narayan Unny during Navara Utsav January 2012*

Fig. 27. *Release of PPV&FRA Brochure in Malayalam by the then Chairperson, Dr PL Gautam*

the 'Chittur Declaration' was made by Prof MS Swaminathan which stated 'Calling for the immediate attention of everybody around the world in order to initiate immediate steps for conservation and propagation of *Navara* to ensure its benefits for coming generations' (Fig. 28, Annexure III).

Fig. 28. *Prof MS Swaminathan along with other dignitaries in 'Navara Utsav, 2014'*

(c) Farm visits and training programs

The then Chief Minister of Kerala, Mr VS Achuthanandan and Member of Parliament Mr NN Krishnadas visited NEF on 2 November, 2007; and Prof MS Swaminathan visited NEF in July 2014. A large number of farmers visited the farm to get first-hand knowledge about the uses and benefits as well as the cultivation practices for growing and conserving *Navara* rice (Annexure II). Mr Unny attended training on 'Cultivation and Utilisation of Medicinal Plants' conducted by Department of Plantation crops and Spices, College of Horticulture, KAU, Mannuthy, Thrissur during 15-18 December 2003. Mr Unny has been very instrumental in training masses for *Navara* rice propagation (Fig. 29). Several training programs were conducted at and by NEF: i) five training programs – two for farmers and three for Department officials were organized at the Regional Agricultural Technology Training Centres (RATTC), Malampuzha, Palakkad (Kerala) in April, 2007, ii) training on *Navara* farming was organized for 20 agricultural officers at the RATTC), Vyttila, Kochi (Kerala) in July 2007, and iii) Research Extension Interface for Palakkad district (Kerala) was organized at *Navara* Eco Farm during January 2008. Awareness was also created through the supply of *Navara* seeds, rice grain,

Fig. 29. *Participants attending training courses*

bran and soil from the farm to KAU, CSIR-Regional Research Laboratory, National Institute for Interdisciplinary Science and Technology (NIIST), University of Kerala; Indian Council of Agricultural Research (ICAR); Department of Botany, Government Victoria College, Palakkad; Rajiv Gandhi Centre for Biotechnology (RGCB) and a few other institutions (Annexure III).

(d) Radio broadcasts and TV interviews

Mr Unny made tremendous efforts for creating awareness through radio broadcasts and TV interviews about *Navara* rice, its importance and uses specifically in treating various ailments.

5

Challenges in *Navara* Cultivation

Navara rice is a seasonal crop and is cultivated only during the summer. It is not possible to grow it in cooler season as the plant is very fragile and lodging occurs even with dew. Therefore, effectively only one crop is taken in a year. Another crop is taken essentially production of seeds. The possibility of cultivating a third crop exists, depending on conducive weather conditions and availability of adequate water. Although cultivation is done twice a year, or even three times, revenues accrue generally, only from one crop per year. It is also to be noted that the seed viability reduces after six months.

5.1 Major Challenges of Organic Farming

(a) Availability of manure

Manure for organic farming was not easily available in adequate quantity. Hence, NEF started growing plants for green manure, along with green leaves obtained from the farm. We were keen to utilize the natural resources available at the farm itself as the source for manure for *Navara* cultivation through the following: i) the farm had a dairy set-up and the available cow dung and urine were collected and used as organic manure for the farm. Cow urine is also said to have properties which can alternatively be used as an organic pesticide, ii)main source of organic manure is the *daincha* (*Sesbania bispinosa*) plants which are grown in the field before start of rice cultivation. Once the plant grows in about forty-five days, the field is ploughed and the cut plants gets mixed with soil which would be left to dry. On the same field *Navara* is cultivated, iii) on the fences of the farm, *Gliricidia* plants are grown which serve a dual purpose – they provide a good covered biofence and also as a manure for *Navara,* as and when required, the branches and leaves from the fence are cut and used as a manure, and iv)during the initial stages of field preparation, we also prepare and use vermicompost and also *panchagavya* (पंचगव्य).

(b) Pest control

(i) ***Use of cards:*** Pest control in organic *Navara* rice farming is a major challenge. *Trichogramma* cards are used to control leaf roller (Fig. 30) and stem borer attacks in the organic *Navara* crop.

Fig. 30. *Use of Trichogramma card for pest control*

(ii) ***Use of tulsi and marigold:*** The pests including the rice bug (*Leptocorisa acuta)* attack the crop from the flowering stage (ear head) of the rice to the grain-formation stage. The rice bugs multiply into thousands in a period of a week to ten days. So, initially for the 15 cents and later, up to 2 acres of the *Navara* crop, NEF has grown *tulsi* (*Ocimum sanctum)* and marigold (*Tagetes* spp) (Fig. 31) on the ridges to control these pests as these plants have a pest repellent property and thus, NEF was able to control pests to a certain extent.

Fig. 31. *Pest control using marigold and tulsi*

(iii) ***Use of nets to control rice bug:*** Although NEF followed the established methodology of planting marigold and *tulsi* to control rice bugs, these pests multiplied so fast that the entire crop of 4 acres was completely destroyed. Seeing the failure of controlling the rice bug, NEF devised a cotton net of conical shape, fitted to an aluminium round frame with a handle (Fig. 32) which was used to capture the pests. NEF also trained its work force to use this device. Collecting of pests using nets was done twice daily, once in the morning (06.30- 09.30 am) and the second in the afternoon (03.30- 06.00 pm) when the pests used to feed on the juice.

Fig. 32. *Using nets for pest control*

iv) ***Rodents menace:*** Rodents do extensive damage to the crop. Rats have burrows on the bunds. Once grain formation starts, rats shred the plants and take the grains for storage and consumption in their burrows. Rats multiply rapidly and hence cause a strong risk of damage to plants. NEF workers were trained to identify these burrows using hoes and destroy them manually.

(c) Mechanization

NEF initiated mechanization for transplanting and harvesting of rice in 2000. The Kerala Agro Machinery Corporation (KAMCO) which did machine transplanting of rice at the farm suggested that NEF should go only for a small area (25 cents or 50 cents) as a pilot project and then use larger area during the next season. However, NEF decided to go for the entire area of 8 acres in one go and KAMCO agreed to the proposal. Raising mat nursery for transplanting (Fig. 33) and the methodology of mechanical transplanting, were new experience to us. On the day of the transplanting, KAMCO arranged a meeting at our farm where their officials, the local *panchayat* president, agriculture officer and farmers participated. Almost all the farmers who witnessed the process on the first day were curious to understand the methodology. Many farmer friends and neighbors came to see the machine expressed their opinion that the spacing of 30 cm between rows and 20 cm between seedlings will drastically reduce yield and this experiment will lead to a huge financial loss. In the beginning, we were apprehensive about low production but the KAMCO officials were confident about a good production. As

Fig. 33. *Use of mechanization for preparation of mat nursery and transplanting*

we watched the rice plants grow, we could see that the harvest would be good. We decided to use combined harvesters which was also a novelty in our area. There were negative comments that machine harvested paddy will not have a ready market and will fetch lower prices and that this paddy cannot be used for seeds. These apprehensions disappeared as we were offered 10 per cent higher price for machine harvested paddy as it was bagged by the machine, was clean and free from stones. The seed from the machine harvested paddy was also very good.

This experiment was successful in *Palakkadan Matta* and NEF continued this till 2001. NEF started focusing on the work on *Navara* in 2001 in a big way and tried to mechanize *Navara* cultivation also. But, transplanting *Navara* rice using machines was not successful as the seedlings of *Navara* were weak and too fragile for the fingers of the machine to hold them. Hence, NEF switched to direct sowing. Use of combined harvester was also not successful. Under the circumstances, NEF had to employ its work force for harvesting *Navara* and discontinued machine transplanting and use of combined harvesters for some time. However, after more experimentation and by changing the crop calendar for harvest and trying different methods for preparing mat nursery for *Navara,* machine transplanting

and harvesting using combined harvester were made possible from 2019 onwards. Mechanization was introduced for weeding also. Wherever possible, NEF is using modern technologies in conserving traditional seeds and plants.

5.2 Low Yield of *Navara* Rice

To ensure that the intrinsic medicinal and nutritional properties of the *Navara* rice are retained, it is grown organically without the use of chemicals pesticides and fertilizers. The organic method of cultivation contributes to ecosystem services such as conservation of biodiversity, conservation of ecology and water and environment protection contributing to mitigation of global warming. More importantly, it ensures that no chemical residues are left in the soil, water or in the food-chain. But conversion to organic farming in *Navara* rice turned out to be risky, laborious and costly as the yield is very low. Our observation over the years is that the yield is lower by about 20 per cent or more when organic methods of cultivation are carried out *vis-a-vis* chemical fertilizers, and ii) organic *Navara* rice cultivation is labor intensive and results in substantially higher cost of production. Additionally, in Kerala, availability of farm labor is quite uncertain and unpredictable, as they prefer to work in other areas fetching more wages with certainty of job round the year.

5.3 Limitation of Cultivating High Yielding Varieties

Farmers opting to cultivate '*Navara*' have the limitation of growing high yielding rice varieties and thus lose revenues drastically on account of low yields compared to the yield from high yielding varieties. Shortage of water during summer in Kerala, when *Navara* rice cultivation is undertaken, poses a threat to its production. Poor financial viability is another important factor that has led to a shift to other farming activities. Fragmentation of rice fields has put the rice farmers at a disadvantage as the holdings have become economically non-viable. While the cost of production of rice has increased multifold during the last five decades, but the price of the end product has not risen proportionately.

5.4 Destruction by Protected Birds and Animals

The peacocks and wild boars which are declared as protected species by the Government destroy the crops in the field heavily. As these are protected species, the farmers are helpless in controlling them and have been suffering heavy losses frequently since 2006.

5.5 Vagaries of Weather

For more than a decade now, the weather has become unpredictable. In Palakkad, the rice farming calendar is based on the south-west and north-east monsoons. During the last decade, the onset of the south-west monsoon has been so unpredictable that all the activities of rice farmers based on the *njattuvela* (an ancient cycle of 13½ days calculated on the movement of stars) has gone haywire resulting in huge losses to rice farmers. The pattern of rain has also changed considerably. In the past, there used to be steady rains for days together which helped the rice crop as well as raising the water table in the wells and ponds. This helped in irrigation of rice fields after monsoon, also enhancing drinking water availability. Now a days, the pattern is changed unpredictable rainfall with heavy showers for a few hours (including cloud bursts) during the monsoon season causing floods and severe damage to crops.

6

Scaling-up *Navara* Rice Cultivation

6.1 Scaling- up the Cultivation and Production across Community

When we could increase the area of *Navara* cultivation, we had to stagger the sowing of *Navara* with a gap of about 15 days between two sowings. This helps to control rice pests in an effective way. Out of a total area of about 8 acres of *Navara* field, we had sown about 3 acres on 1st of January, another 3 acres on the 15th and the balance of about 2 acres on 30th January. Thus, we were able to manage the pests more effectively. There was a risk from the weather also. The season for *Navara* cultivation is after the monsoons, starting from the November end, December or January. In one of the seasons, we had sown *Navara* during the late November. Flowering started in December end and rice pests had started to attack. We started control of pests using nets. After some time in the morning, we noticed that the cloth of the net was not opening when waved. This, we found out, was due to the water from the dew drops of the winter. In one of the seasons in December, we noticed that a portion of the *Navara* crop had lodged in one of the plots. We had no clue why this had happened. Foxes used to visit our fields those days. First, we thought they might have run through the field and that part of the field was damaged. But that was not the reason. It was the dew during the winter that caused it. Thus, we learned that *Navara* was susceptible to even slight variations in weather and the crop calendar is to be planned accordingly.

Bottom-line is the most important incentive for scaling-up. Farmers are knowledgeable, have wealth of experience and have common sense. No rule or regulation can tie them down to an unremunerative profession like rice farming in Kerala. A lot of work is being carried out on conservation of this unique germplasm, creating awareness about its uniqueness, qualities and benefits of *Navara*, value-addition, linking to markets, etc., simultaneously, in spite of many challenges. To

scale-up production, adequate support from government agencies is required. All aspects including infrastructure, cultivation, procurement, storage, primary processing, packaging, branding, testing, marketing, advertising, policy support for organic certified, GI registered agricultural products and legal support against infringement are essentially needed.

From a national viewpoint and its utility, it is a vital requirement that farmers are encouraged to cultivate endemic and endangered crop like *Navara* and other traditional crops even if they are economically unviable and lead to significant financial stress for the farmers. It is also very important that farmers play a critical role as conservers of bioresources and related traditional knowledge. The following points need priority attention:

1. To incentivize the farmers and communities involved in conservation of bioresources that provide various benefits to the society, conserve genomic resources and agrobiodiversity, a monetary incentive model needs to be identified and implemented and should reach individual farmers/ farmer communities as compensation for the losses borne by them.
2. Appropriate funding needs to be provided annually to the farmers who undertake cultivation of *Navara* rice and other ancient rice varieties and encourage them to produce products which are traditional, unique and widespread medicinal applications in addition to direct consumption and to further encourage organic farming and cultivation methods having very beneficial spin offs such as conservation of ecology and environment and maintain biodiversity contributing to ecosystem services. Also, there is a need to formulate policies that lead to self-sufficiency in production and financial independence to the farmers for a foreseeable period in future.
3. Since *Navara* rice also has GI registration, this will ensure encouragement for promoting the products that are endemic and unique to that region -'Vocal for Local'.
4. A research centre needs to be identified and tasked with the following to help farmers who endeavor to cultivate *Navara* rice:
    (i) Study the existing soil composition and identify means to enrich the same without the use of chemical fertilizers and pesticides to enhance the yield of *Navara*.
    (ii) Introduce suitable policies to compensate the damage caused to crops by endangered species such as peacocks and wild boars.

(iii) Identification of other crops that could be cultivated during the intervening months/period when *Navara* rice is not cultivated and when the farm is unused so that maximum possible revenue could accrue to farmers.

6.2 Promoting Organic Pest Control Measures

Although no pesticides were used at the farm, the attack of stem borer and leaf roller was effectively controlled by using *Trichogramma* cards. But controlling the rice pests (of the hopper family) was a major challenge. Different methods were used simultaneously for controlling the pests in the rice field. Initially up to one acre, we could effectively control the pests by planting *tulsi* (*Ocimum sanctum*) and marigold on the ridges of the rice field. These plants and their flowers acted as pest repellents. When the area was increased up to 2 acres, planting marigold and *tulsi* alone was not effective to repel pests. Further, I started bringing on motorbike the leftover stale fish from the fish market near the railway station, just 5 km away from our farm and started to spread the fish in the rice fields which controlled the rice pests effectively due to foul smell of fish. Subsequently, trolling was banned by the government and the entire *Navara* rice crop was severely infested with pests affecting grain formation adversely. We tried to feed the straw to the cows but they did not eat due to foul smell from the rice pests and thus, we incurred huge monetary loss.

Taking the clue from people in the west catching butterflies using nets, we devised a net with an aluminium ring attached to an aluminium handle connected with screws. A conical shaped net of cloth was stitched and fixed to the metal frame. When this is waved, the cloth opens and the pests will be caught in the net. We trained our work force to use this. This turned out to be a long and laborious process. Rice pests feed on the juice of the rice before the grains are formed. To effectively control the pests and save the crop, our work force had to work in 2 shifts- from 7.00 -9.30 am and 3.30 - 6.00 pm and that too continuously for 20-25 days in one life cycle of the crop. The usual practice of spraying chemical pesticide only once in the life cycle of the crop takes only about 20 minutes to spray one acre of rice field. One person can spray pesticide in about 10 acres in about 3 hours whereas manual control using nets has to be done for 20-25 days continuously. Thus, we could effectively control the rice pest using this method and seeing the success, farmers of the neighbouring areas also adopted this method for controlling the pests.

6.3 Organic Certification of the Farm

NEF is an integrated farm growing 'specialty rice' varieties like *Navara* and *Palakkadan Matta*, seasonal fruits, vegetables, medicinal plants and tree species using eco-friendly methods. No chemical pesticides or fertilizers are used from the year 2003 onwards. *Ayurveda* practitioners and others were also of the opinion that *Navara* should be cultivated without using any chemical pesticides or fertilizers. Studies showed that there is an improvement in nutritional value of *Navara* by adopting organic farming methods. The results obtained for *Navara* samples collected from NEF by the Postgraduate Department of Botany, Government Victoria College, Palakkad, Kerala are given in Tables 1, 2. Therefore, it was decided to

Table 1: Variation in protein content with organic cultivation in *Navara*

Landrace	Season	Cultivation Practice	Protein mg/g	%
Oryza sativa cv *navara*	September 2004	During conversion to Organic	25.90	2.59
O. sativa cv *navara*	February 2005	During conversion to Organic	34.67	3.46
O. sativa cv *navara*	September 2005	During conversion to Organic	36.13	3.61
O. sativa cv *navara*	March 2006	Organic	27.09	2.71
O. sativa cv *navara*	September 2006	Organic	26.31	2.63
O. sativa cv *navara*	February 2007	Organic	33.43	3.34

Table 2: Variation in total amino acid content

Landrace	Season	Cultivation Practice	Amino Acid mg/g	%
Oryza sativa cv *navara*	September 2004	During conversion to Organic	0.74	0.074
O. sativa cv *navara*	February 2005	During conversion to Organic	0.77	0.077
O. sativa cv *navara*	September 2005	During conversion to organic	0.77	0.077
O. sativa cv *navara*	March 2006	Organic	0.79	0.079
O. sativa cv *navara*	September 2006	Organic	0.75	0.075
O. sativa cv *navara*	February 2007	Organic	0.79	0.079

adopt only organic farming methods to retain the medicinal properties of *Navara* rice. As *Navara* bran, root and hay are also used in *Ayurveda*, any chemical or pesticide residue in the course of conventional farming will be a health hazard. NEF started the process for getting the farm certified as 'Organic' in 2003. The farm was certified organic for annual crops like rice, vegetables, bananas, papaya in 2006 and the entire farm including perennial crops like coconut, mango, jackfruit, spices like tamarind, cinnamon, ginger, turmeric and medicinal plants and trees like *tulsi, vathamkolli, neem, vilwa, pathimugam* and other trees, creepers - were all certified in 2007 (see Annexure I). Developing the farm with more product range like spices, medicinal plants and trees - Unny started cultivating medicinal plants - *Aloe vera* and trees like *koovalam (Vilwa*, *Pathimugham)* during 1998, the bark of which is a natural food colourant, *vathamkolli*, *nagadandi,* arrowroot (*Maranta arundinacea*), and spices including cinnamon, red sandal, ginger and turmeric. Teak was also planted.

NEF is one of the pioneer organic certified integrated farms, especially specialty rice. By adopting this organic method, we contributed to ecosystem services like biodiversity conservation, conservation of ecology and environment. In one study, we could see that the use of water for *Navara* rice farming had come down by 25-30 per cent. This is a huge saving of this major resource, especially when availability of water is coming down world over. We are able to provide pesticide residue free products from the farm. Our colleagues could impart knowledge on organic farming methods especially in rice farming to neighbouring farmers and farm workers. We were converting *Navara* paddy to rice without removing the bran. It is found that rice bran contains nutrients, but when bran is removed in milling (when rice is polished), these nutrients are lost.

6.4 Special Covers of GI Registered *Navara* Rice

The Philately documents has authentic history, culture, personalities and of their societies. Department of Posts, Government of India promotes philately through a series of Commemorative Postage Stamps, Definitive Postage Stamps, Special Covers, Pictorial Cancellations and other philatelic items. In the series, *Navara* Rice has been granted Geographical Indication Registry Code (GI Code). Details are given in Table 3. Department of Post, Government of India as part of *Atma Nirbhar Bharat* Project, released special covers of *Navara* rice (Fig. 34, 35) on the Philately day (13 October 2021).

Table 3. Details of GI Tag for *Navara* Rice

Application Number	17
Geographical Indications	*Navara* Rice
Status	Registered
Applicant Name	*Navara* Rice Farmers Society
Applicant Address	Karukamanikalam, Chittur College, P.O., Palakkad – 678 104, Kerala
Date of Filing	25 November 2004
Class	30
Goods	Agriculture
Geographical Area	Kerala
Priority Country	India
Journal Number	17
Availability Date	20 June 2007
Certificate Number	40
Certificate Date	23 November 2007
Registration Valid Upto	24 November 2024

Fig. 34, 35. *Special covers of Navara rice on Philately Day 13 October 2021*

7

Navara Rice Attracting Tourism

Navara Eco Farm (NEF) is being showcased as a destination for visitors of varied tastes. It has become a good tourist destination for students from schools, colleges, universities, IPR and GI experts, agricultural scientists, farmers, conservationists, travellers, media persons, environmentalists, and celebrities. NEF is featured in Kerala Tourism's official website *www.keralatourism.org*. NEF is also a recognised unit under the Responsible Tourism (RT) Mission, an initiative by the Department of Tourism, Government of Kerala.

Navara rice is a health-food rice. Farming is hazardous in Kerala and cultivation of the '*Navara* rice' creates an extra degree of risk. It has a nutty, earthy flavor and supersedes even virtuous brown rice in nutritional value. Originally the filling food of south India's poor farmers and laborers, the unusual grain is now starting to feature in the restaurants of Mumbai's luxury hotels as well. It is generally served as a side dish or in a traditional porridge with Keralan coconut fish curry, but due to its glutinous consistency, the chefs are also beginning to use it to create a rose-colored 'risotto'. Highly nutritious, red rice has been cultivated in Kerala for more than 2,500 years. But in the past 50 years, *Navara*, which grows between November and January, has come to the verge of extinction. But now it is enjoying a revival due to its use in various ways. To understand and see by himself the revival of *Navara* rice in and around Kerala's Palakkad hillocks, tourists are attracted to travel and trace *Navara* rice along sea coast. ITC Maratha, a five-star Hotel in Mumbai, says the *Navara* variety, which Mr Unny grows organically at *Navara* Eco Farm, is a deeper shade of red, close to purple. It has been cultivated in Palakkad's rice belt, and is believed by locals to combat ailments from snakebites to liver disease, and also using *Navara potli* in curing arthritis, and in *panchakarmas*, toning, de-stressing and rejuvenating body system.

7.1 *Navara Kizhi* (*Navara Potli*) Therapy

Navara Kizhi (*Navara*- medicated rice; *Kizhi*- Bolus or *Potli*) is known as *Shashtika Shali Pinda Sweda* in Sanskrit where *Shashtika* means 60, *Shali* means rice, *Pinda* means poultice, and *Sweda* means sweat (Fig 36). It is an *Ayurvedic* treatment, and is one of the most popular sweat inducing therapies which is used to relieve pain and stiffness in the muscles and soft tissues, nourish and strengthen the joints, muscles while providing relief from pain. There are many varieties of *Kizhi* in *Ayurveda* and the name is given based on the ingredients tied within the poultice. The main ingredient in the *Navara Kizhi* is *Navara* rice. The *Navara*

Fig. 36. *Navara Potli (Navara Kizhi) therapy*

rice is cooked in a mixture of cow's milk and herbal decoctions are tied in the poultice. The treatment begins by massaging warm herbal oils into the affected area to prepare and soften the tissue ready for the *Navara Kizhi* application. It is a type of massage that induces sweat and provides strength to the muscles while rejuvenating and re-energizing your body. The *Navara Kizhi* is massaged over the affected area or the whole body as required. The poultice is dipped into warm milk and herbal decoctions throughout the treatment. This is a gentle massage and the *Kizhi is* are applied in circular and long strokes on the body. *Ayurvedic* herbal medicine and dietary restrictions may also be prescribed if necessary. It is recommended to cure neuromuscular disorder, arthritis, muscle and joint pain, muscle wasting, and degeneration of the joints. Benefits of '*Potli* Massage Therapy' include relief in pain and inflammation, improving blood circulation, in relaxing muscles and relief in muscle tension, promoting detoxification, enhancing joint mobility, alleviating stress and anxiety, boosting the immune system, and improving skin health and complexion. Tourists' are attracted to visit the state

of Kerala especially for *Navara Potli* therapy from within India and from all over the world. Kerala's equable atmosphere, the regular bounty of woodlands (with an abundance of herbs and therapeutic plants), and the cool rainstorm season (June-November) are most appropriate for *Ayurveda's* therapeutic and remedial packages. It is probably the only state in India where *Ayurveda* is used as a mainstream medicine.

Mr Unny feels proud of his 8 acres of paddy fields as the world's largest *Navara* rice farm. His mission to rescue this fragile heritage rice began about 25 years ago, after he gave up his successful business as a computer salesman to take over the family farming. For his outstanding contributions in conserving *Navara* rice, he has been given a "Genome Savior" award by the Government of India. "We are promoting this as a wellness rice (Figs. 36-38)," says Mr Unny, "but we are not looking to cash in on whatever is new. This rice has been used for thousands of years – it just was not being farmed recently". The grain might have anti-cancer properties due to its antioxidant content which needs to be investigated scientifically. *Navara* rice is being used currently in a study by the Kerala State Council for Science Technology and Environment (KSCST&E) to investigate the properties of medicinal rices in Kerala. Mr Unny has made tremendous efforts in conserving nearly extinct *Navara* rice (Fig. 37).

Fig. 37. *Unny conserving nearly extinct Navara rice*

7.2 Main attractions of *Navara* Eco Farm

The main attractions of the *Navara* Eco Farm from a tourist point of view are:

- There is an arrangement for a guest house accommodation inside the farm itself. The farm also has arrangements to provide local breakfast, lunch or dinner for the visitors. These facilities can be availed on prior intimation.
- Farm with rice fields and variety of plants and trees gives a soothing effect for any visitor. We conduct 'guided site tours of the farm' for the visitors.

Further, each tree in the farm is labelled and the guide will be able to provide information on its nature, uses and importance. The farm provides a good backdrop for photo sessions.

- The guided tour also includes the visit to the *Shokanashini* river.
- The tools and implements which were used for cultivation during the olden times at the farm are showcased for information and enhancing the knowledge of visitors.
- Various cultivation related activities do keep happening throughout the year at the farm. Visitors are encouraged to participate in these farm activities.
- Interaction of visitors with neighbouring farmers is also arranged to understand the methods and practices of farming adopted by them.

8

Branding of *Navara* Eco Farm Products

The farm launched the UNF (Unnys *Navara* Farm) brand for '*Navara* Eco Farm' in 2008. The logo of the brand is the image of a person seated in a thatched hut with a lantern (Figs. 38,39). During 1960s, when rice farming was a lucrative profession, paddy field owners were considered as the richest of the society. In the same society, there were people who could not afford to buy rice. Some of them used to come and steal/harvest the ripe paddy at night. To protect the crop from such losses, the owner/employee of the field used to keep vigil of the crop at night by staying in a thatched structure. From 1970s onwards, farmers had moved away from rice farming, workers did not have continuous work in rice fields due to very small holdings and there is no relevance for night surveillance post. But, NEF selected this as the logo to represent that the farm is engaged in protecting Kerala's and India's traditional seeds and plants from biopiracy. NEF is now selling its products under the brand name "UNF" (Fig 39) and the brand name is printed on boxes and pouches (Fig. 40).

Fig. 38. *Branding of NEF products with brand name –UNF*

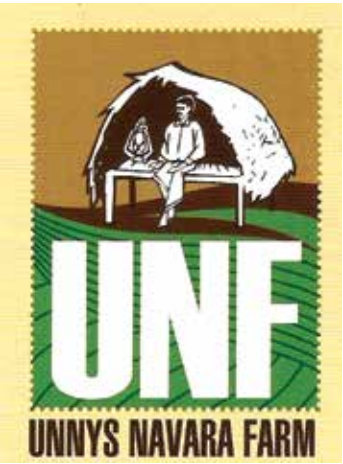


Fig. 39. *Navara Eco Farm logo*

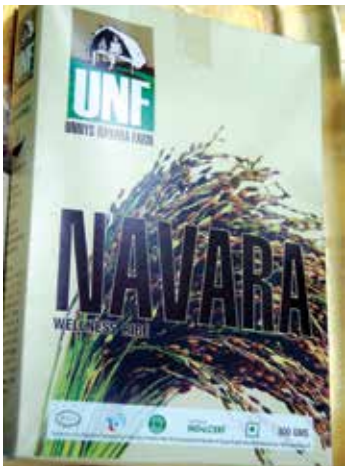


Fig. 40. *Branding pouch and box*

8.1 Showcasing of Products

As a small land holding farm, NEF did not have adequate funds to advertise or go for mass publicity. The method we adopted instead was to showcase the entire product range in meetings, conferences, workshops, study missions and trade fairs to which we were invited. This was indeed a slow process, but we continued using this method. We launched the brand in 2008. By 2016, we could successfully create market for *Navara* rice at a reasonably good price.

At the ancestral house located in the farm, visitors can closely observe traditional farming implements, seeds of *Navara* and other rice varieties and literature on various farm products. Visitors who are interested in various farming tasks available at a particular period of the year, like sowing, weeding, harvesting, etc. can experience here. The farm also has an enchanting walkway, perfect for leisurely strolls and familiarizing oneself with diverse varieties of trees and plants.

9 Economics, Promotion and Management

The current production of *Navara* in NEF is approximately 5,000 kg per year and NEF produces 2,000 kg of *Palakkadan Matta* rice per year. The other produces include 24,000 coconuts, 2,000 kg of mangoes; and 1,000 kg of tamarind per year.

9.1 Economics of *Navara* Rice Production

Navara rice is cultivated in 8 acres of land at Unny's farm. The rice is cultivated twice every year. The average yield of paddy per acre per season is 300 kg. The total paddy is then converted to rice and other value-added products such as 'rice flakes' and 'rice powder'. Approximately 180 kg of rice after value-addition is obtained from total 300 kg of paddy (Table 4).

Table 4. Production and revenue from *Navara* rice

Product name	Product quantity (kg)	Sale price per kg (Rs)	Total sale price/ acre (Rs)
Rice	90	520	46,800
Rice flakes	60	720	43,200
Rice powder	30	640	19,200
Total	**180**		**1,09,200**

In addition to this the other bye-products of the paddy, such as hay, also generates revenue. Hay production per season is 1,200kg which provides revenue of Rs 8,000/- per season for 8 acres of paddy grown, that is Rs 1,000.00 per acre per season. The hay is used as cattle feed.

Cost of production

(a) Ploughing- tractor rent for 6 hrs @ Rs 1,200- per hr. = Rs 7,200.00

(b) Transplantation

- Cost of mat for mat nursery – Rs 500.00
- Preparation of land for nursery – Rs 1,500.00
- Labor charges for protecting fence for nursery – Rs 1,000.00
- Protection fence material for nursery – Rs 1,000.00
- Cost of seed 30 kg per acre @ Rs 300/kg. = Rs 9,000.00
- Watering/maintaining nursery for 12 days- labor – Rs 12,000.00
- Transplanting cost (through machine) – Rs 7,000.00

(c) Organic manure collection and application

- Cutting green leaves and branches from ridges of *Gliricidia* and other plants from different parts of the farm – 6 mandays @ Rs 750.00= Rs 4500.00
- Bundling, carrying and spreading green leaves in the field – 20 woman days @ 500.00 = Rs 10,000.00

(d) Pest control activity

- Raising marigold nursery and planting marigold and *tulsi* on the ridges of *Navara* field – 8 woman days @Rs 500 - Rs 4,000.00
- *Trichogramma* cards for 8 weeks – Rs900.00
- Cost of procuring *Trichogramma* cards from nearest Krishi Bhavan- Rs 400.00
- Cost of crackers for scaring away peacocks – Rs 2,500.00
- Charges for manhours used to burst crackers and scare away peacocks- Rs 3,125.00
- Maintenance of nets for catching pests – Rs 400.00
- Pest control for 25 days with 4 women- Rs 6,250.00
- Placing *Trichogramma* cards in the field for 8 weeks – Rs 1,000.00

(e) Weed Control – for 30 man days – Rs 15,000.00

(f) Harvesting, carrying the produce to the farm, threshing, winnowing, cleaning of paddy – 20 woman days - Rs 10,000.00

(g) Drying of paddy for storage: 6 woman days – Rs 3,000.00

Total cost per acre: Rs 1,00,275.00 (Rs One lakh two hundred and seventy-five only).

Revenue generated

- Production – Approximately. 300 kg of paddy per acre
- *Navara* rice – 180 kg of rice and value-added products are obtained after converting 300 kg of paddy
- Sale price of rice and value-added products Rs. 1,10,200.00
- Net profit /acre is Rs 9,925.00 per crop.

The yield per acre is low and hence the profit is also negligible. However, the crop is not grown for profit but the main aim is the revival and re-establishment of near extinct and endemic *Navara* rice variety which is essentially needed now onwards to use in curing different ailments by Ayurvedic methods.

9.2 Value-addition

Since its inception, NEF has been working consistently in adding value to the processes followed, product enhancements, creating value-added products, branding products and providing quality assured products. Adding value to the products, and quality enhancement were achieved through adoption of organic farming and obtaining organic certification for the entire farm. This, in turn, greatly enhanced the quality of the *Navara* rice produced by retaining its medicinal properties. This also ensured that the soil and water quality was not adversely affected due to use of chemical pesticides and fertilizers.

Obtaining geographic indication (GI) registration for *Navara* ensured that this unique and endangered medicinal rice variety which is truly a treasure of Kerala was conserved and due recognition accorded to it. It also ensured that authentic *Navara* rice would reach the consumer, as long as it is purchased from the Registered Proprietor or an Authorized User of the GI. This will also ensure that the farmer (producer) would get at least a proportion of the premium in the price that the GI registered product has in the market.

Several value-added products from *Navara* were produced, such as *Navara* rice, rice powder and rice flakes. The products were converted from paddy to rice, rice flakes and rice powder without removing the bran. This was because 'bran' has the nutritional constituents and when bran is removed, these nutritional constituents would be lost. Rice powder, used as baby food and for preparation of typical Kerala breakfast dishes such as *Puttu, Pathiri, Kozhukatta* has been branded and marketed. Rice flakes as breakfast cereal has also been introduced in the market. These rice flakes can also be used as snacks.

9.3 Promotion and Uses

Navara paddy was being extensively used for "*Navara Kizhi*" and was popularly known among Keralites for its therapeutic benefits. However, the medicinal uses of *Navara* rice were not very popular. So, the following activities were carried out to enhance the value of *Navara* rice and also popularizing it.

(a) Branding of *Navara* rice and its products was done and awareness created after overcoming the initial challenges.

(b) Website (www.navara.in) along with content was developed. While developing content, particular attention was paid to bring out the facts regarding the origin of rice, the special characteristics and medicinal properties of rice, its uses in *Ayurveda*, where *Navara* rice was mentioned in ancient Indian scriptures and texts, etc.

(c) The product was registered as GI and this initiative was purely a farmer- led initiative.

(d) The promotion of *Navara* rice enhanced through agricultural conferences, meetings, workshops, trade fairs, interviews by AIR, *Doordarshan* and other print and visual media which created awareness among the public and other stakeholders about *Navara* rice, its cultivation and its benefits.

(e) *Navara* rice, *Navara* rice flakes and *Navara* rice powder were displayed in various agricultural workshops/conferences, trade fairs and exhibitions.

(f) *"Navara Utsav"* were organized in the years 2011, 2012 and 2014 which were graced by eminent personalities, including Prof MS Swaminathan.

9.4 Efforts for Export

In our journey to conserve *Navara* rice, we have not left any stone unturned. This is true in the case of market linkage of *Navara* rice also. After organic certification and GI registration, we started to brand 'UNF' and market *Navara* rice, rice flakes and rice powder from 2008 onwards. We had created our website and had been promoting it by whatever means possible. In 2008 itself, we got an enquiry for export. We were about to start the process of registering as an exporter, when the Government of India came out with a ban on the export of non-*basmati* rice. This was because that year, the country's rice production was sufficient only for our consumption. So. if exports were allowed. it would affect the trade balance. The irony was that *Navara* is an organic certified, GI registered product, both status provided by the Ministry of Commerce & Industry

(MoC&I), Government of India (GoI), and the same Ministry has put a ban on non-*basmati* rice export, some could not cater to the export enquiries. We made a representation to the GoI explaining our predicament. In this we said that *Navara* and *Palakkadan Matta* were specialty rices consumed by Keralites in the Middle East, USA and Europe. For the people of Europe and USA, Indian rice was only *basmati*. The efforts of a small group of rice farmers in the southernmost part of India to conserve, popularize and promote unique rices of Kerala faced a major challenge due to government policy.

In 2010, the government allowed export of non-*basmati* organic rice with a ceiling of 10,000 tons a year. Enquiries subsequent to this also, we did not make any efforts to export on our own, fearing similar or any other change in government policies, which our small group of farmers has no control over. We have tried online sales through our website from 2015 onwards. In 2017, the GST regime, again put our marketing efforts out of track as initially there was confusion on the implementation and penalties for non-compliance. In our case again, till the GST, we were registered with the Kerala Value Added Tax (KVAT), where there was no tax in Kerala and turnover limit for KVAT registration was Rs 10,00,000 (Rupees ten lakh a year). Our annual turnover never exceeded Rs 10,00,000 in the said period. In July 2017, when the GST came into force, we migrated to GST. Under the GST, the annual turnover limit was Rs 20,00,000, and still Kerala did not have tax for rice, but there was confusion on taxes for branded products. In any case, we were required to register and give returns three times a month online and for delay in submission, the penalty was minimum of Rs 10,000 though there was no tax for the product nor it was exceeding the annual turnover limit. There was an added risk of our missing the deadline for submission of returns if there was a choke on the Internet (again, on which we had no control). Our tax consultant suggested that under these circumstances, we should better opt out of the GST, which we did in October 2017. In 2022, there was again a new amendment to the GST where small packings below 25 kg are taxable whereas above 25 kg packing, there is no tax. Small farmers and farmer groups like ours are put into a lot of difficulties due these new policies and policy shifts with very short notice. As we are working on tight shoe string budgets, even the loss on inventory costs for labels, packages, printing, etc, was unbearable. We are not in a position to afford an office with accountants, online provisions etc. and are dependent on outsourcing these services. Despite such volatile situations, we could export some quantities of NEF's *Navara* rice through an exporter in Mumbai. Then, there was COVID-19 which severely affected our operations.

Our group, our supporters and well-wishers will not lose heart since our conviction about the value of *Navara* rice has been reinforced with our experience and feedback from customers on the qualities and uses of this invaluable treasure during the COVID-19 times when it was used to cure ailments. We are in the midst of strategizing positioning *Navara* for the global market, post COVID-19. We foresee a bright future for this wonderful product.

9.5 Sustainable Management of *Navara* Rice

The Access and Benefit Sharing (ABS) framework and protocol are important for ensuring that farmers are encouraged to cultivate endangered crop varieties. It is an accepted fact that it is extremely difficult to assess the actual as well as potential economic value of resources before arriving at appropriate terms of benefit sharing. It is also a well-established fact that absence of clarity can put the fairness and equity elements of benefit sharing at risk. Traceability is another important aspect. It is, therefore, recommended that the measures mentioned in the succeeding paragraphs be implemented to mitigate the above-mentioned risks and ensure benefit sharing to the crop growers.

To help identify agricultural products for which the funding support is to be provided, parameters like traditional products endemic to the region and GI registered products of India will ensure that encouragement is given to the products that are endemic and unique to the region (Vocal for Local). The process of providing the funds should be by direct transfer to the bank accounts of the farmers/producers. With respect to the quantum of benefits to be provided, the smallholder farmers maybe given Rs 1,00,000/per acre/year for non-organic and additional 75 per cent per acre for certified organic farms. Medium farm holding farmers may be given Rs 65,000 acre/year for non-organic and additional 75 per cent per acre for certified organic farms. The farmers having large farm holdings be provided, Rs 25,000/acre/year for non-organic and additional 75 per cent per acre for certified organic farms. An additional amount of 10 per cent should also be provided every year on account of escalation. The additional 75 per cent has been suggested for farms with organic certification, as in addition to ensuring chemical free produce despite resulting in low yield, the organic method of farming also helps provide ecosystem services such as conservation of biodiversity, natural resources, ecology and environment besides addressing issues related to global warming.

Since *Navara* rice is GI registered, it would be the best to channelize all sales through *Navara* Rice Farmers Society (NRFS). GI legal framework should also

ensure punitive action against infringement. Additionally, it will not always be possible to monitor the end user pricing and quantities. So, it is recommended that, an additional 3 per cent access and benefit sharing (ABS) cess be added and this amount be credited back to the society, who will then distribute the proceeds among its farmer members, in proportion to the quantity supplied by each farmer. All these transactions need to be audited.

10 Impact of the Work

10.1 Adoption of *Navara* Cultivation

Navara Revival Program envisioned conservation, cultivation, commercialization and consumption of *Navara* rice. Through our relentless work, we could develop a successful model for *Navara* rice. By participating in various awareness programs and by conducting programs ourselves and by participating in exhibitions and trade fairs, we were able to spread this model in various parts of Kerala.

In our work of *Navara* Revival Program, we made a concerted and coordinated effort in successfully developing the model. To motivate other farmers to adopt *Navara* cultivation, economic or medicinal value for people's welfare - the government should support the '*Navara* Revival Program'. Support for cultivation as suggested by us in the scaling-up section in the form of ecosystem services and then support infrastructure facilities for primary processing for procurement, transportation, storage, drying, value-addition, testing, packing, branding and marketing. Support is also needed to meet the newer challenges like destruction of the *Navara* crop from attack of wild animals. Climate change is also a major threat. Unpredictable weather has turned the cultivation calendar haywire causing huge losses to farmers. While making policies, the governments should take into consideration the plight of farmers. Farmers should be represented in government's policy making bodies.

10.2 Establishment of *Navara* Rice Farmers' Society

Mr P Narayanan Unny was able to take leadership to form *Navara* Rice Farmers' Society (NRFS). *Navara* was the first agricultural product in India to be registered as GI under a farmer-led initiative. This has helped in empowering farmers by accruing better prices for *Navara*. Consumers were also benefitted as they were assured of getting authentic *Navara* rice. Similar approach was adopted for other agricultural products for which GI registration was undertaken e.g., *Palakkadan*

Matta rice. The interns at the farm have acknowledged that their NEF experience helped them achieve faster progress in their career.

10.3 Registering as Authorized User [AU]

Navara Rice Farmers' Society was the pioneer in Kerala in registering as Authorized User (AU) in 2011. During the challenging COVID-19 pandemic times, NRFS could facilitate33 AU applications for *Navara* rice. Since during the initial days of COVID-19 pandemic from March 2020 to June2021,there were no opportunities to travel or meet with officers or farmers, NRFS sent letters to the concerned Principal Agriculture Officers (PAO) of nine designated districts where *Navara* was cultivated traditionally and also sent an email to the Director of Agriculture, Kerala offering services to work with the concerned PAO offices in creating awareness about AU registration and registering as AU through online methods.

11 Lessons Learnt

There were many challenges ahead, after the decision was taken to cultivate/ conserve *Navara* rice organically. All these challenges could be overcome with hard work and persistence. There was resistance from even own farm workers and neighborhood farm owners. However, slowly but steadily, the transformation occurred and we were able to convince them with the benefits of organic farming, and particularly of *Navara* rice. Water is still a challenge, due to unpredictable weather, and the dependence of farming on weather! Mechanization of some processes have brought down the challenges of availability of labor slightly, still timely availability of manpower is a major issue. Pest control and weeding in organic farming of rice are major problems, and can be resolved only by timely availability of manpower. There is lack of awareness in the general public about the uses and benefits of organic *Navara* rice. For creating awareness among the public on qualities, benefits and uses of *Navara* products and organic and GI certified *Navara* rice, NEF created a website which provides all the needed information. Also, the experience gained through participation in the seminars, conferences, workshops, exhibitions / trade fairs, and study missions were shared with the fellow farmers. The last mile connectivity with the market is a major challenge for any agricultural product. NEF could address this in an innovative way by carrying the products (rice, rice flakes and rice powder) to the conferences, workshops, exhibitions, and seminars for creating awareness through display and also attempting online marketing.

11.1 Key Factors of Success

Purifying *Navara* seed, organic certification of the farm and GI registration of *Navara,* awareness creation and market linkage were the key factors of success. The branding – 'UNF' was created in 2008 which actively promoted *Navara* rice and its value-added products under this brand name. Supplying material to various agencies for studies on *Navara* rice and organic farming also greatly

helped towards awareness creation and promoting *Navara* rice cultivation. Other important factors of success included:

- ***Awareness programs :*** Participated and conducted in awareness programs to inculcate benefits and uses of organic *Navara* rice to the general public.
- ***Focused marketing:*** Relentless efforts were made to create market for organic *Navara* rice and its various products
- ***Value-added products:*** Several value-added products were introduced such as rice, rice flakes and rice powder for wider use.
- ***Biodiversity conservation:*** Biodiversity was maintained by developing the farm to an integrated one with about 124 agricultural products of different crops.
- ***Water conservation:*** Organic farming reduces water consumption by about 25-30 per cent, which in turn helps conserve ecology and environment.
- ***Climate change and global warming:*** Maintaining biodiversity, optimum use of water, conservation of water, conservation of ecology and environment are all contributing to positively address global warming and in turn to the climate change.
- ***Success of NEF model:*** Most importantly, NEF has been able to carry on with this model successfully for 16 years in certified organic farming and 19 years after registering *Navara* as a GI.
- ***Organic cultivation and conservation initiatives:*** The lessons learnt from *Navara* program have significant potential to help many comparable organic cultivation and endangered crop variety conservation initiatives.

(a) Though expensive and labor intensive, it is possible to revert to organic methods of farming and to conserve native plant species in an ecologically sustainable and commercially viable model.

(b) The package of practices developed by our farm for *Navara* cultivation can and are being applied to the organic cultivation of other crops – from coconuts to mangoes to melons to cinnamon to tomatoes.

(c) In the period of transition (from existing to organic cultivation), farmers need to adopt a phased approach to ensure that they balance out the requirements of the cultivation process while ensuring income and livelihood. As this project has indicated, this is achievable with basic and profound planning.

(d) Reviving traditional agricultural products requires a professional approach to awareness creation and brand building.

(e) For such initiatives to be sustainable and gain critical mass following, community wide efforts need to be undertaken for acceptability of a larger farmer base. This needs to involve farmers, governments, consumers, research establishments, financial institutions and trade and industry bodies and media.

A summary of the overall project from 2003 to 2009 (status from in conversion tocertified organic) is given in Table 5:

Table 5: Summary of the *Navara* Revival Program

Year	2003	2004	2005	2006	2007	2008	2009
Stage	**Conversion phase**				**Organic**		
Navara cultivated land (acre)	2	4	10	10	10	10	10
No of crops/year	1	2	2	2	2	2	2
Yield (kg/acre)	112	200	300	350	400	400	400
Frequency of irrigation (no./month)	4	4	4	3	3	3	3
Pest incidence (Leaf rollers/ Stem borers) attack	Every crop	Every crop	Every crop	Every crop	Every alternate crop	Every alternate crop	Every alternate crop

Subsequently, in 2013, a chemical analysis of *Navara* rice (Table 4) from this farm was done by ICAR-National Rice Research Institute (NRRI), Cuttack, with the permission from the Director General, Indian Council of Agricultural Research. The result is given in Table 6.

11.2 Specific Suggestions

There may be many invaluable products which are not being paid any attention. Also,there will be products or services to be discovered in future. The following important suggestions need to be considered for making any program successful with impact on the ground:

- We have to first identify the product or service as done in the case of the *Navara* rice and proceed accordingly.

Table 6: Chemical analysis of red pericarp rice sample

S. No	Parameter	Content
1	Crude Protein (%)	9.02 ± 0.71
2	Amylose (%)	22.80
3	Gamma-oryzanol (mg/100g)	25.60
4	DPPH free radical scavenging activity (%) (antioxidant activity)	85.00
5	Iron (ppm)	8.37 ± 0.19
6	Zinc (ppm)	19.57 ± 0.53
7	Manganese (ppm)	4.12 ± 0.45
8	Copper (ppm_	4.16 ± 0.12

Note: The red pericarp rice sample contains normal amount pf protein, amylose, iron, zinc, manganese and copper. It has moderately high amount of gamma oryzanol (25.60 mg%) compared to 2-70 mg% reported in rice grains and good free radical scavenging activity (85%). *The Kjeldahl method was used for crude protein determination. Amylose content was used with I-KI reagent. Gamma oryzanols were determined by measuring the absorbance of the iso-propanol extract in the UV region. The antioxidant activity was determined using DPPH. The minerals were determined with an atomic absorption spectrophotometer.*

- There is need to make a plan of the growth path of the product for a foreseeable future. While we make the plan, we will have to give space for newer and unexpected challenges like COVID- 19 pandemic.
- As pure seeds of landraces are not available, seed purification process needs to be done at the farm. The cultivation process should be got certified as organic for the stamp of quality of the product as was done in case of *Navara* rice.
- To empower farmers and for the authenticity of the product, the latest tool, GI registration needs to be used. Various value-added products need to be developed using the certified organic and GI registered land race following the example of *Navara* rice
- Also, there is an urgent need to establish strong market linkage for efficient delivery of the product and fetching the best competitive price so as to benefit the farmers.
- While working on any agriculture product or service from now on, attention needs to be given as to what extent it is going to affect the climate change . Most importantly, we should always keep a close eye on the bottom line.

Acknowledgement

Prof MS Swaminathan, the world-renowned agricultural scientist and former Member of Parliament, Rajya Sabha, had shown keen interest in the activities of '*Navara* Eco Farm right from 2004 onwards and he constantly inspired and motivated for cultivation and conservation of organic '*Navara*' rice. During the 'International Year of Rice', NEF had a stall at the Regional Agricultural Research Station, Pattambi (Kerala) wherein Prof Swaminathan visited and encouraged Mr Unny to promote the medicinal virtues of *Navara* rice and make Kerala the world leader in its production, use and marketing. He graced '*Navara Utsav 2014*' held at the Government College, Chittur, and released the "Chittur Declaration". He further made a point to visit *Navara* Eco Farm in 2014 after the '*Navara Utsav 2014*'. With Prof Swaminathan, a guiding light for the project, MS Swaminathan Research Foundation (MSSRF) has always been a source of inspiration and great support throughout the activities of NEF for which we are highly grateful to him and also acknowledge the support provided by Dr Anil Kumar from MSSRF, Kalpetta.

Mr NN Krishnadas, Member of Parliament (MP) from Palakkad (Kerala), also supported the cause of conservation of *Navara* rice, organic farming, market linkage and in awareness creation. Mr PI Suvrathan, Retired Secretary, Ministry of Food Processing Industries (MoFPI), GoI, once visited '*Navara* Eco Farm, and was very supportive of the activities of the farm, especially the organic farming procedures. Mr T Nandakumar, Former Secretary, Ministry of Agriculture and Farmers' Welfare (MoA&FW), GoI highly appreciated especially its value-addition initiatives and the efforts made to spread awareness of '*Navara*' cultivation processes and benefits to farmers. Mr PH Kurian, Former Additional Chief Secretary, Government of Kerala who visited the Farm during '*Navara Utsav* 2014', has also been a constant source of inspiration and encouragement. Late Dr S Nagarajan, Former Chairperson, PPV&FRA after recognizing the work on '*Navara*' conservation provided a podium to showcase *Navara* rice at the 'Farmer-led Innovations' meeting held at New Delhi in 2006. During his tenure, '*Navara Utsav* 2012' was conducted by NEF' at Chittur (Kerala) by the PPV&FRA under the then Chairman Dr PL Gautam. Again, '*Navara Utsav* 2014' was

organized at the Government College Chittur, Palakkad District, Kerala where Dr RR Hanchinal, Former Chairperson along with Dr RC Agrawal, then Registrar General, PPV&FRA were also present. The PPV&FR Authority has been a source of inspiration and a great support to NEF and the support provided is duly acknowledged.

Dr Raj Paroda, an internationally acclaimed agricultural scientist, Chairman, Trust for Advancement of Agricultural Sciences (TAAS) and Former Secretary, DARE, and DG, ICAR also supported its activities. Later, APAARI too helped showcase the agrobiodiversity of the farm at the Agrobiodiversity meeting in Suwon, Republic of Korea; and supported NEF to participate at the 'Agri-Food Innovation Conference' in Taiwan. Dr Paroda has been a constant source of inspiration and motivation for *Navara* work. TAAS has requested NEF to write a Success Story on '*Navara* Rice' and I am highly grateful for getting this opportunity. Mr MG Radhakrishnan, my schoolmate and long-term friend, an acknowledged senior media person and author, Mr K Narendran, another schoolmate and long-term friend and a senior IT professional; 'Dr Rajnikant, *Padma Shri*' awardee and General Secretary of Human Welfare Association, Varanasi; and Mr KC Shashidhar, Former CGM, NABARD have bestowed great support to *Navara* conservation, creation of awareness on *Navara* rice and its benefits and marketing efforts. Confederation of Indian Industries (CII), Kerala Chapter has helped in issuance of 'GI' tag to it and in its awareness program. Mr Mukundan Unni, Former Deputy Director, Department of Agriculture, Kerala has encouraged and motivated NEF activities. Mr Girish and Ms Sonia of 'IDIOM' designed the packaging of 'UNF'.The State Horticulture Mission, Kerala (SHM-K) provided support especially in the area of market linkage. I would like to express my sincere thanks to all of them for their tremendous support.

We owe sincere thanks to Prof Suresh Kumar KA, Head, Department of Botany, Government College, Chittur and Mr Hari of 'Invis Multimedia' for the support and promotion of its activities and 'Eco-tourism', respectively. Sincere thanks are also due to Mr K Rupesh Kumar, State Coordinator under Kerala Tourism; friends and their families and professionals from various areas such as farming, industries, software, web-designing, accounts and legal matters, who have rendered support to *Navara* program Further, Ministries and Departments of Government of India and Government of Kerala, several autonomous bodies, scientists, agriculture officers, officers of several organizations and institutions, private and public, people's representatives and trade bodies, media, print, visual and the All India Radio, all have supported UNF wholeheartedly and their support is greatly acknowledged.

P Narayanan Unny
Director, NEF

Annexure I

Scope Certificate

Certificate No. ORG/SC/1012/001923

Mr. P.Narayanan unny
Navara Ecofarm , Karukamani Kalam, Chittoor College.P.O.,
Palakkad, Kerala-678104

Accreditation No.under NPOP
NPOP/NAB/0034

This is to certify that the product(s) and area(s) of the mentioned organisation inspected by Telangana State Organic Certification Authority are in accordance with requirements of

India's National Programme for Organic Production Standards
(Considered equivalent to Council regulation (EC)No. 834/2007(Category A & F) and Swiss Organic Farming Ordinance for unprocessed plant products originating in India)

For the following process,
Production
this Certificate is issued.

This certificate is valid from 17/12/2022 until 17/12/2023

This certificate is valid for those product(s) and area(s) that are specified in the annexe ORG/SC/1012/001923 A.

The validity of this certificate solely depends on the continued compliance with the required standards and is subject to annual surveillance inspections.

Authorised By:
Dr. K. Keshavulu
Director
Issued Date: 10/03/2023

(253) 00890431620120320230000611

Telangana State Organic Certification Authority,
HACA Bhawan, 1st Floor. 5-10-193, Opp. Public Garden, Hyderabad, Hyderabad, Telangana-500004

Annexure II

Conferences, Seminars, Workshops/ Trainings

International

- Advanced Agri Business Management Course for Executives and Managers was attended by the Manager- Strategy- *Navara* Eco Farm. This course was organized by APO-NPC at Bali, Indonesia. The participation was supported by APO NPC.27 February-03 March 2017.
- 'International Conference on Plasticulture and Precision Farming-2005'- Chanakyapuri, New Delhi-Participation.17-21 November 2005.
- 2nd International Rice Congress' held at National Agricultural Science Centre (NASC), New Delhi. 9-13 October 2006.
- 6th Commonwealth- India Small Business Competitiveness Development Programme-Kochi-EXIM Bank; 25-30 March 2007
- State Horticulture Mission (SHM), Kerala provided a stall at Biotech India 2013 International Organic Trade Fair held at Bengaluru.14-16 November 2013.
- First International Agrobiodiversity Congress- Science, Technology, Policy & Partnership, New Delhi, organised by the Indian Society of Plant Genetic Resources (ISPGR) & Biodiversity International (BI) at New Delhi. 6-9 November, 2016
- 'VAIGA 2016'-International Workshop on Agro- Processing and Value-addition, Kanakakunnu Palace, Thiruvananthapuram (Kerala). 1-5 December 2016.

National

- Workshop on Biodiversity and Bioresources Conservation Awareness-NBA Chennai and ICAR-Indian Institute of Spices Research (ICAR-IISR), Kozhikode (Kerala). 21 January 2006.
- 'National Conference on Agrobiodiversity' organised by National Biodiversity Authority (NBA) at Chennai.12-15 February 2006.

- Oral presentation - 'National Seminar on Medicinal, Aromatic and Spices Plants-Perspective and Potentials'- Thakur Chhedi Lal Barrister College of Agriculture and Research Station, IGAU, Bilaspur (CG). 18-19 December 2006.
- National Workshop on IPR in Agriculture and Engineering Research', Kongu Engineering College, Perundurai, Erode (Tamil Nadu). 17 November 2007.
- NIFTEM-Food for Health-Functional Food, Nutraceuticals, Organic Food-Coimbatore (Tamil Nadu). 21-23 May 2008 .
- First Indian Biodiversity Congress (IBC) 2010-Indian Biodiversity and Expo (IBE2010) - Exhibitor - Chandrasekharan Nair Stadium, Thiruvananthapuram (Kerala). 27-31 December 2010.
- National Biodiversity Fest 2016. New Delhi. 18-24 February 2016.
- 'National Seminar on Organic Farming in *Navara* Rice and Impacts on Sand Mining' conducted by Department. of Botany, Government College, Chittur (Kerala). 17 December 2004.
- "First National Biodiversity Congress & Expo-2012" - [NBC&F-2012], Kanakakkunnu Palace, Thiruvananthapuram (Kerala). 21-30 December 2012.
- *Polima Karshi kotsavam*', Palakkad (Kerala). 4-7 January, 2013.
- Rural Innovators Meet-2013' Palakkad, organised by the Kerala State Council for Science Technology and Environment (KSCSTE) and Integrated Rural Technology Centre (IRTC) at IRTC Jubilee Campus, Mundur, Palakkad-Exhibitor. 21-23 March 2013.
- '*Karshakanum Aakam Kodeeswaran*' at '*Niravu Haritha Samruthi* - 2013', Mala, Thrissur (Kerala). 24 May 2013.
- 'National Workshop on Outscaling Farm Innovation', organised by the TAAS, ICAR, and APAARI at NASC Complex, New Delhi 3-5 September 2013.
- '5th National Honey, Mango Festival-2014' Kanakakkunnu, Thiruvananthapuram - State Horticulture Mission – Kerala, provided a stall to NEF. 5-11 May 2014.
- National Biodiversity Congress, Kanakakkunnu, Thiruvananthapuram (Kerala) - as Exhibitor 23-27 February, 2015-
- Regional Organic Farming Seminar & Exhibition - Department of Agriculture, Government of Kerala - JM Mahal, Palakkad (Kerala). 25 November 2006.
- 'Organic Farming in *Navara*' as part of training program on "Organic Input Production and Quality Control" JDA-RATTC - Vyttila (Kerala). 26 July 2007

- 'Workshop on GM Crops and Biodiversity Conservation'- Thiruvananthapuram (Kerala) - sponsored by the Kerala State Biodiversity Board (KSBB). 10-11 April 2008.
- 'Farming for Export Meet' at Cochin International Airport Limited (CIAL), Kochi (Kerala). 2-3 June, 2009.
- State Level Workshop on 'Scaling up of Successful Models for Food Security', at Maria Rani Centre, Gandhi Puram, Sreekariyam, Thiruvananthapuram (Kerala); sponsored by UNDP/Planning Commission (now NITI Aayog) and Kerala State Planning Board; and organised by Mithra Niketan Krishi Vigyan Kendra, Thiruvananthapuram (Kerala). 16-17 December 2009.
- Annam National Food & Agro Biodiversity Festival' Baby Marine Ground, Kozhikode. Organiser,CISSA, provided a stall. 11-15 February 2010.
- North Malabar Tourism Workshop on Opportunities' - by Bekal Resorts Development Corporation. 15-16 December 2016.
- ICAR Training–cum-Workshop on IP & Technology Management. Theme – Protection of GIs, at ICAR-National Bureau of Fish Genetic Resources, Lucknow. 18-20 December 2008.
- Awareness cum Training Program of PPVFRA – *Agali Panchayat* Community Hall, Agali, Kerala – Lecture on 'Role of Farmers in Conservation of Plant Genetic Resources' (in Malayalam). 4 November 2011.

Annexure III

Farm Visits

- Agricultural Officers, RATTC Malampuzha (Tamil Nadu). April 2007.
- Farmers and Extension workers of the Office of the Assistant Director of Agriculture, Thalikkulam, Thrissur (Kerala). 14 June 2007.
- Mr Lambert Joseph, Director, MSME Development Institute, 21 September 2007.
- Field visit by students of Master of Business Administration (MBA) Program in PSG Institute of Management, PSG College of Technology, Peelimedu, Coimbatore (Tamil Nadu). 24 February 2013.
- Students and Staff, Botany Association, Government College, Chittur, Palakkad (Kerala). 8 December 2011.
- Ms Anjali Pathak, Author of *'Annam Brahma'*
- Assistant Director Agriculture, Malappuram district, with an Agriculture Officer and 9 farmers visited as part of Exposure visit under *Bharatiya Prakritik Krishi Paddhati* (BPKP) program. 16 November 2021.

Annexure IV

Awareness Programs

- All India Radio, Thrissur (Kerala): Experience of Organic Farming in *Navara* Paddy - Interview in Malayalam. 14 March 2006.
- All India Radio, Thrissur (Kerala): Cultivation of *Navara-nellu* - Interview in Malayalam. 3 October 2007.
- All India Radio, Kozhikode (Kerala). 23 June 2008.
- *Krishi Darshan* Program by *Doordarshan Kendra*, Thiruvananthapuram (Kerala). 17 July 2009.
- *Krishi Darshan* Live Phone-in Program as Subject Expert, *Doordarshan Kendra*, Thiruvananthapuram (Kerala). 9 July 2011.
- *Navara Nelkrishi –Ulpadanavum Vipananavum* - Discussion. All India Radio, Thrissur (Kerala). 5 October 2011.
- State Level Awareness Program on PPVFR Act by the PPV&FRA at ICAR-Central Tuber Crops Research Institute (CTCRI), Sreekariyam, Thiruvananthapuram (Kerala). 20 November 2012.
- Talk on 'Organic Cultivation and Conservation of *Navara* Rice' - LV Vaidyanathan Commemoration Lecture at Government Victoria College, Palakkad (Kerala). 4 December 2012. *Krishi Darshan* program. Doordarshan Kendra, Thiruvananthapuram (Kerala). 2 October 2014.
- *Mannarivu* – An Intellectual Siphoning between Peasant & Pupil – Org by *Bhoomithra Sena* Club, Government College, Chittur (Kerala). NEF/ Department of Botany, Government college, Chittur (Kerala), and 'Mannu', Kerala. 22 July 2015.
- All India Radio, Thiruvananthapuram (Kerala). 20 June 2016.

Annexure V

Supply of *Navara* Seeds and Other Materials

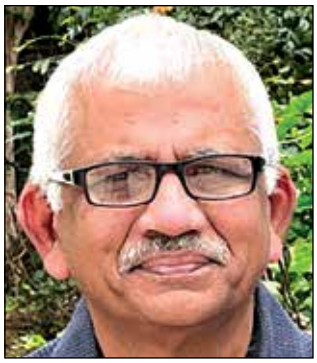
Seeds and other materials have been supplied to the following organisations, institutes and individuals for their respective projects:

- 'Collection and evaluation of medicinal rice landraces of Kerala' project by Post Graduate Department of Botany, Government. Victoria College and Kerala State Council for Science, Technology and Environment, Kerala, for a period of 3 years (extended to 5 years) was conducted at *Navara* Eco Farm, 20 May 2005 .
- NEF provided 20 kg *Navara* grains for research purposes for Rajiv Gandhi Centre for Biotechnology (RGCB), Thiruvananthapuram (Kerala). 05 April 2006 .
- CSIR-Regional Research Laboratory (CSIR-RRL), Thiruvananthapuram (Kerala). NEF supplied 1 kg each of *Navara* rice and bran and hand pounded rice for their research. 17 April 2006.
- Department of Agronomy, College of Agriculture, Kerala Agricultural University, Vellayani, Thiruvananthapuram (Kerala). Supplied black-glumed *Navara* seeds for one of the PhD students of the department undertaking a research project on black glumed *Navara* 27 December 2006.
- Department of Agricultural Research & Education (DARE), GoI and ICAR – Biochemical Analysis of *Navara* Rice provided by NEF (Letter from Dr S Ayyappan, then DG, ICAR). 11 October 2013.
- Department of Biochemistry, University of Kerala, Karyavattom, Thiruvananthapuram (Kerala) provided root and grain of black and golden yellow-glumed *Navara* for project on 'Anti-inflammatory effect of *Navara*' by Ms Saritha Kumari CH for MPhil (Biochemistry). 11 May 2006 .
- Department of Biochemistry, University of Kerala, Karyavattom, Thiruvananthapuram (Kerala) provided root and grain of black-glumed *Navara* again for project on 'Anti-inflammatory effect of *Navara*' by Ms Saritha Kumari CH for MPhil (Biochemistry). 4 September 2006

- Shiny Mary Varghese, Maya C Nair and Lavanya D, Department of Botany, Government Victoria College, Palakkad (Kerala) – Effect of organic farming in the nutraceutical value of medicinal rices of Kerala result analysis of the *Navara* black – milled rice, Hand-milled and Rice bran. 17 June 2008.
- Provided *Navara* rice and Bran, Regional Research Laboratory of National Institute for Interdisciplinary Science & Technology (NIIST), Industrial Estate, Thiruvananthapuram (Kerala), 16th July 2008
- Provided *Navara* grain of golden yellow-glumed for Project by Ms Shalini V, M Phil (Biochemistry) in Department of Biochemistry, University of Kerala, Thiruvananthapuram (Kerala). 21 Nov 2008 & 26 March 2009.
- Ten (10) kg *Navara*rice for research to National Institute for Interdisciplinary Science & Technology (NIIST), Thiruvananthapuram (Kerala). 29 July 2009.
- Soil sample (500 g) provided to Ms Smitha KP, Ph D student, Department of Agriculture Extension, College of Agriculture, Kerala Agriculture University, Vellayani, Thiruvananthapuram (Kerala) for research on environmental concerns in the Development Projects on Rice Farming under Decentralised Planning. 9 April 2010.
- Provided 500 g *Navara* rice bran to Ms Smitha Mohanlal, National Institute for Interdisciplinary Science & Technology (NIIST), Thiruvananthapuram (Kerala). 6 May 2010.
- Data collection on the GI status and related work done in case of *Navara* rice. IPR, WTO & TRIPS Agreement – Impact on Protection of Bioresources & Traditional knowledge – A Case study in India by Ms Mythili PR, PhD student with Amrita School of Biotechnology, Amrita Vishwa Vidyapeetham, Kalpana PO, Kollam (Kerala). 22 Oct 2011.
- Provided 500 g seed sample of *Navara* rice to Mrs Ranjini M, Department of Botany, Sree Neelakantha, Government Sanskrit College, Pattambi (Kerala) for MSc Dissertation on 'Medicinal cum Aromatic rice landraces of Kerala'. 21 Jan 2012.
- Provided 5 kg *Navara* seed to Ms Jyotsna Baskaran, PG student, Department of Agronomy, College of Agriculture, Vellayani, Kerala Agricultural University, Thiruvananthapuram (Kerala). 22 Sept 2012.
- Provided 2.5 kg *Navara* rice, 2 kg bran for research purpose to NIIST, Thiruvananthapuram (Kerala). 8 April 2013.
- Ms Lal Preethi SS, Research student, Department of Biochemistry, University of Kerala, Karyavattom, Thiruvananthapuram (Kerala). 25 July 2016.

- Provided Black *Navara* seed to Dr P Sukumari, Professor and Head, Department of Agronomy, College of Agriculture, Vellayani, Thiruvananthapuram (Kerala) for two PhD students for conducting experiment as part of thesis. 17 January 2008.
- Provided to Dr R Senthil Kumar, Associate Professor (Agriculture Extension), College of Cooperation and Banking, Vellanikkara, Thrissur (Kerala) for Ms Rekha CR at NRFS on Work Experience Program on Project work on topic 'Value-Chain Management in *Navara* Rice in Palakkad District'. 26 April 2013.

About the Author



P Narayanan Unny

Mr P Narayanan Unny (popularly known as Unny), born to Mr M Ramachandra Menon and Mrs Sulochana Amma, on 23 October 1957 is a Commerce graduate. His uncle Mr M Kelukutty Menon, one of the first rice specialists at Rice Research Station, Pattambi, Palakkad, Kerala and his father Mr MRC Menon were committed to rice farming. The combination of the duo helped a great deal in developing the farm systematically. Later, Mr Unny took to farming in 1995 – running family farm after father's demise in 1994. After taking over the farm's management over 25 years ago, Mr Unny decided to turn his attention to conserving native rice varieties in the region. He figured out that many of the traditional varieties are fast becoming extinct. In his words "I desired to work on conserving this specific rice because, apart from being a traditional variety, it is well known among the local farmers. After years of strenuous efforts, I was able to collect and segregate enough seeds and gradually moved into cultivating solely *Navara* rice in my 12 acre farm". '*Navara* is a medicinal rice variety and its cultivation was almost extinct due to non-availability of pure seeds, low yield and high production cost. The speciality is that this is the only organically grown *Navara* rice farm in the region," says Mr P Narayanan Unny, a third-generation marketing executive-turned-farmer, running the everyday activities of the farm. He started mechanization of rice cultivation using transplanters and combined harvesters from the year 2000 onwards, and developed the farm as an integrated one producing coconuts, medicinal trees and plants, spices, vegetables, and fruits. He has taken steps for "Organic Certification" of the farm in the year 2003. During this time, he turned to organic farming in a serious manner and gradually evolved the concept of '*Navara* Eco Farm'. 'The journey was not easy,' says Mr Unny and adds 'conserving the variety proved almost impossible because sourcing pure seeds seemed uphill task. The entire farm '*Navara* Eco Farm is certified organic from year 2007. He formed clusters of *Navara* rice farmers and *Palakkadan Matta* rice farmers and with the guidance and help of Confederation of Indian Industries (CII) got these rice varieties registered as Geographical Indicator (GI). These were the first agricultural products in India to be registered as GI under a farmer-led initiative. *Navara* is a '*shastika*' rice variety, endemic to certain parts of Kerala and

used in *Ayurveda* treatment for arthritis, paralysis, and polio. *Navara* has also been used as a nutritious food. But because of low yield and challenges in cultivation, this unique medicinal rice was on the verge of extinction. NEF did conservation of *Navara* rice starting from seed purification and developing organic farming methodology. Added to this were problems faced during conversion to organic farming. According to him, conversion to organic farming in *Navara* rice was not very remunerative but his interest pulled him on. NEF consciously maintains biodiversity. It is home to varieties of animals, birds, butterflies, plants and flowers. The activities of the farm are in tune with ecology and environment. NEF maintains an herbarium of 200 plants under his guidance. Value-added organic certified, GI registered *Navara* paddy to *Navara* rice, beaten rice, and rice powder are marketed under the brand name NEF.

Mr Unny participated in 181 seminars, workshops, conferences, study missions, trade fairs and exhibitions at state, national and international level. He had made presentations at IFOAM at Santa Fe, NM, USA (August 2009), at International Symposium on 'Sustainable Agriculture Development and Use of Agrobiodiversity in the Asia-Pacific' at Suwon, South Korea (October 2010); at "Multi-country Observational Study Mission on 'Branding Local Specific Agricultural Products through the Use of Geographical Indications' at Tokyo (May, 2015); on 'Geographical Indicators' in Bhutan on the theme 'Food, handicrafts and GI: Towards the Emergence of a New Rural Development Paradigm' (August 2015; Agri Food Innovation program (Taiwan) in year 2016; Rural Tourism Network Program in Lao PDR (2016); Thaifexat Thailand (2017); also at ICAR, SAUs and Biodiversity seminars. Several awards and recognitions were conferred on him by the State, and Central Governments and other leading agriculture institutions which seem to prove the importance of his work. The Protection of Plant Varieties and Farmers' Rights Authority (PPV&FRA) conferred the second annual 'Plant Genome Saviour Community Recognition Award' on him. He is President, *Navara* Rice Farmers Society; Chairman, *Navara* Foundation; Director, Centre for Studies on *Navara* Rice; and Chairman-*Palakkadan Matta* Farmers' Producer Company Ltd. He had been the Member of PPV&FRA, GoI from 2009-2012.

For details, interested readers can contact: Mr Narayanan Unny at Navara Eco Farm, Karukamani Kalam, Chittur College PO, Palakkad (Kerala), India- 678 104, Phone: 04923-221177; Mobile: 09447277749; Email: unnysfarm@gmail.com; website: www.navara.in

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