RATIONALISATION OF INDIGENOUS TECHNICAL KNOWLEDGE ON PRODUCTION MANAGEMENT IN THE FARM PRODUCTION SYSTEMS OF PALAKKAD DISTRICT

By

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THESIS

Submitted in partial fulfilment of the requirement for the degree of

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DECLARATION

I hereby declare that the thesis entitled **"Rationalisation of Indigenous Technical Knowledge on production management in the farm production systems of Palakkad district"** is a bonafide record of research work done by me during the course of research and the thesis has not previously formed the basis for the award to me of any degree, diploma, associateship, fellowship or other similar title, of any other university or society.

Vellanikkara
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Rajesh P.

CERTIFICATE

Certified that the thesis entitled **"Rationalisation of Indigenous Technical Knowledge on production management in the farm production systems of Palakkad district"** is a record of research work done independently by Mr. Rajesh P. under my guidance and supervision and that it has not previously formed the basis for the award of any degree, diploma, associateship or fellowship to him.

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Rajesh

Rajesh P.

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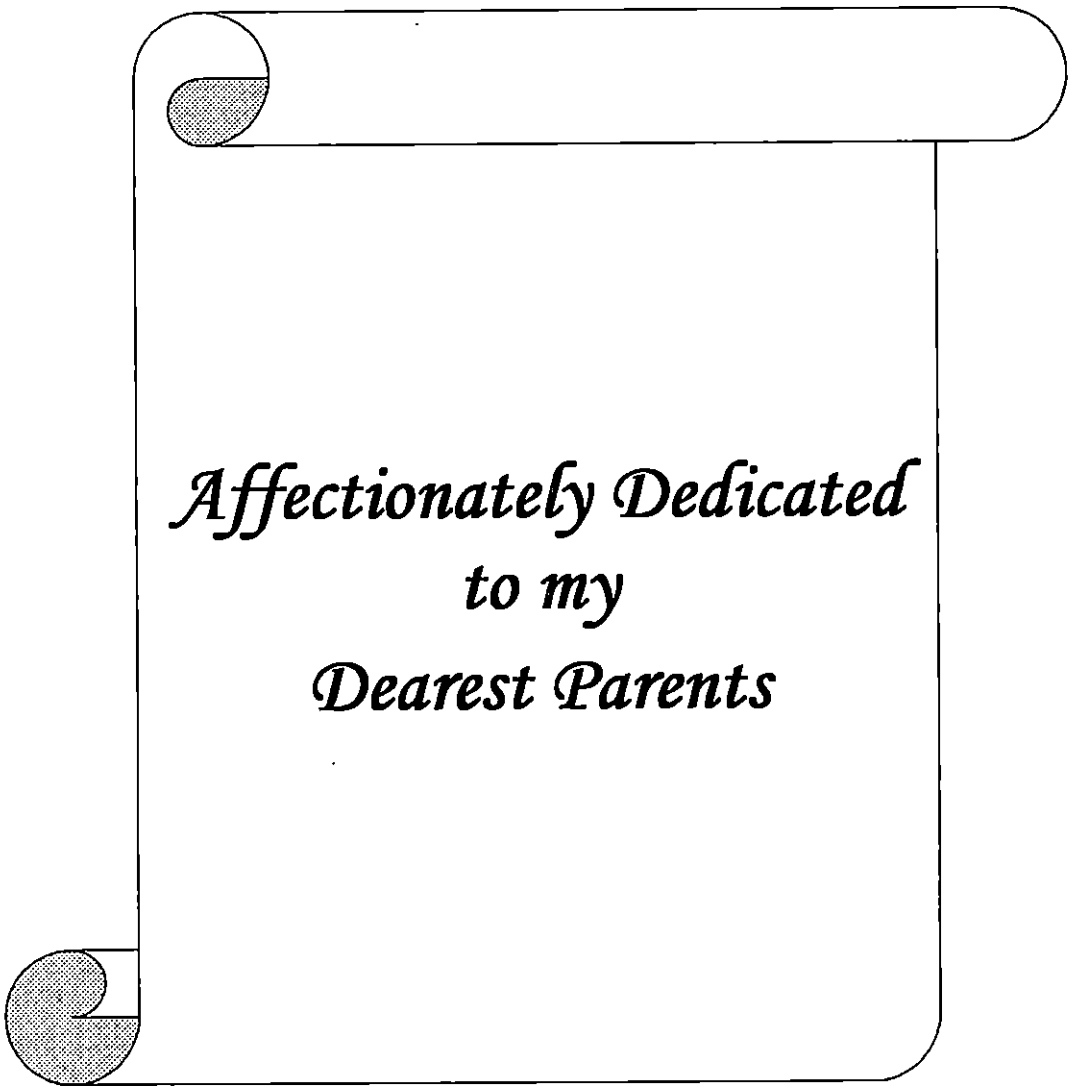
LIST OF ABBREVIATIONS

ITK	-	Indigenous Technical Knowledge
KAU	-	Kerala Agricultural University
KIW	-	Key Informant Workshop
KIF's	-	Key Informant Farmer's
PE	-	Perceived Effect
SR	-	Scientific Rationality
FSS	-	Farmer Sub System
ESS	-	Extension Sub System
RSS	-	Research Sub System
RCS	-	Rice based Cropping System
PCS	-	Plantation (including spices) based Cropping System
SCS	-	Seasonal based Cropping System
ACS	-	Annual based Cropping System
HMFS	-	Homestead based Mixed Farming System


Affectionately Dedicated
to my
Dearest Parents


INRODUCTION

INTRODUCTION

Farmers all over the world have a wealth of information of their own environment and have evolved suitable indigenous farming systems and practices. The value of these indigenous knowledge systems in facilitating sustainable development was now being widely recognized. Indigenous knowledge is not static. It can be seen as dynamic and ever changing accumulation of collective experiences of generation, which was not uniformly spread throughout the community. If indigenous knowledge is to be brought in to focus and popularized, systematic studies are essential.

Indigenous technical knowledge has two connotations. One was concerned with traditional technologies and the other with respect to modern technologies either, developed indigenously or imported and adapted to indigenous conditions.

Traditional technologies are very much in tune with the cultural ethos and environmental conditions of the country. For a developing country like India with an outstanding record of science and technology, traditional technologies certainly worth up gradation and modernization and they can certainly meet considerable portion of the demands in agriculture and animal husbandry.

Considerable attention was being paid to the farmer's wisdom/indigenous/ local knowledge systems in different parts of the world. For some, this knowledge provides a basis for identifying ecologically sustainable options for resource use. For others, these were cheap sources for identifying ideas, which had considerable scope for commercial exploitation after value addition. Indigenous knowledge has undergone evolutionary process and was built from thousands of years of experience. Traditional wisdom was time tested and understanding the dimensions of technology of clienteles helps in ascertaining the degree and direction of change through formal research (Verma and Singh, 1969).

Indigenous Technical Knowledge (ITK) was recognized as a possible key to low external input sustainable agriculture that contributes both to sustainable

agricultural production for the farmers, as well as a source of knowledge that can add on to the existing science based knowledge of the researchers.

Research was showing relevance on ITK as a resource that provide a basis for sustainable and environmentally sound approaches to agriculture and natural resource management. Indigenous knowledge systems evolved in different parts of the world that is now recognized as a valuable resource, which is needed to be identified, analyzed and documented to facilitate exchange of knowledge.

Identifying, documenting and incorporating indigenous knowledge systems into agricultural extension organizations were essential to achieve sustainable agricultural development.

Under these circumstances the study was undertaken with the following objectives:

1. To collect ITK of farmers in farm production management in Palakkad district.
2. To rationalize the collected ITK in farm production management in Palakkad district.
3. To evaluate the collected ITK in farm production management in Palakkad district.
4. To document the collected ITK in farm production management in Palakkad district.

Scope of the study

The documentation will benefit the present and future generations. The viability of the ITK system can be highlighted by an evaluation by the respondents. The rationalization test would give confidence to all the related subsystems. The feedback given by the study would help the research system in designing projects and farm trials. The ITK can be blended with modern technology and can be used efficiently. The methodologies used like Participatory Learning and Action (PLA) and Key Informants Workshop (KIW) would help to standardize useful tools for

further studies. Abstracting science underlying indigenous knowledge system would help us to understand concepts and practices depicting the ecologically sustainable options of resource use. The results of the study would accelerate the technological change through reoriented research where in eco friendly traditional technology can be integrated with productive modern technology to evolve economically efficient, socially acceptable and sustainable food production technology.

Limitations of the study

The study has been confined to a small region and conducted within a short period of time, the conclusions were restricted to the conditions prevailing there and any attempt at generalization may be done with utmost care. Indigenous Technical Knowledge was much complex and entwined with the cultural aspects of the society. It requires a multidisciplinary approach using advanced data collection techniques. Localization of indigenous practices has affected the general applicability of each practice to different locations. The study was based on opinion of respondents, which may not be free from individual biases and prejudices. There could be some distortion in the interpretation of the responses of the respondents though maximum care was given from the part of the researcher to collect the information with out any bias and loss.

Presentation of the thesis

Besides the present introduction chapter, the second chapter viz., the review of literature deals with the review of selected important and related studies in the field of present investigation. The third chapter presents the materials and methods used in the study. The fourth chapter contains results of the study. The fifth chapter is presented with discussion on the results and the last chapter summarizes the study with implications and suggestions for future research.


REVIEW OF LITERATURE

REVIEW OF LITERATURE

A theoretical framework will form a clear concept about indigenous technical knowledge and its allied aspects. It was based on extensive review of literature. They were described under the following main heads:

2.1 DEFINITION OF INDIGENOUS TECHNICAL KNOWLEDGE

The definitions of indigenous knowledge according to many authors are cited below:

Haskell (1981) defined indigenous technical knowledge as a system finely tuned and adapted both biologically and socially to counter the process of what are often harsh and inimical environments and often represents hundreds or thousands of years of adaptive evolution in which the vagaries of climate, the availability of land and water, the basic needs of people and their animals for food, shelter and health have been amalgamated in a system which has allowed society to exist and develop in the face of tremendous odds.

Carter (1988) opined that indigenous knowledge is highly localized and restricted. Local environmental factors and cultural conditions govern the evolution of indigenous knowledge.

Wang (1988) has defined indigenous technical knowledge as the sum total of knowledge and practices, which are based on people's accumulated experience in dealing with situations and problems in various aspects of life and such knowledge, and practices are special of a particular culture.

Altieri (1991) defined indigenous knowledge as the accumulated knowledge, skills and technology of local people, derived from the direct interaction of human beings and their environment.

Reijntjes *et al*(1992) defined indigenous technical knowledge as the knowledge of people living in certain area, generated by their own and their ancestors' experience and including knowledge originating from else where which has been internalized by local people.

Preetha (1997) has defined indigenous practices as resource saving, site specific, farmer devised technologies experimented and adopted by themselves that were simple to practice, flexible in use and sustainable in effect.

According to Grenier (1998) indigenous knowledge refers to unique, traditional, local knowledge existing within and developed around the specific conditions of men and women indigenous to a particular geographical area.

Sulaja (1999) defined ITK as the farmers' practical knowledge about their local production system, their farming techniques and their skills to manage the natural resource to gain the basic needs with sustainability and this is a dynamic ever changing accumulation of collective experiences of generation.

Babu (2000) defined IK as derived through trial and error with many crops and practices, sharing of knowledge within many farming families and furthermore, the practices are crop, climate and soil specific.

ITK can be operationally defined as age-old technologies which are found and developed by farmers through trial and error and which are done with the use of locally available materials, which cause minimum damage to the atmosphere and to the soil.

2.2 STUDIES ON IMPROTANCE OF INDIGENOUS TECHNICAL KNOWLEDGE

Studies conducted by various researchers on indigenous knowledge in different areas are mentioned under this sub heading.

_Rudramoorthy (1964) pointed out that a judicious combination of folk knowledge and scientific knowledge will help to speed up the adoption of improved practices by farmers

Faniram and Areola (1976) reported that in the field of crop production and the management the soil, the knowledge and experience of local farmers were unrivaled and no alternative system of food production was found as competent as farmers' technical knowledge.

Lightfoot (1987) has identified three activities to be included in the method of study of indigenous practices viz., detecting indigenous methods, identifying participants in the activity and monitoring the process.

Verma and Dhukia (1991) have stated that IK was mainly inherited through the socio-cultural system, and was maintained and developed through the oral tradition, folk tales, proverbs etc.

The knowledge of climate and its implications for agriculture possessed by indigenous small farmers in predominantly non literate communities was relevant to planning agricultural development. The time of farm operations synchronizes with farmer's perceptions and predictions of weather even though they may not be able to explain details of the meteorological factors responsible for the phenomena. (Osunade, 1994)

Vasu (1994) opined that much of traditional agricultural practices have very little of modern technology *per se*, but they epitomize the scientific technological wisdom of generation after generation, and as such they have been naturalized and environmentalized where as most of know-how based on modern

science and technology were sophisticated, if not complicated. He concluded that simplicity was the essence of IK.

Chakraborthy (1995) concluded that a compromise between traditional agriculture and modern high input technology has to be worked out to feed the country and to conserve adequate resources for future generations. He also suggested the methods of recycling and utilization of some indigenous low cost resources supplemented with chemical and biogenic substances to boost up yield in different cropping systems taking adequate care to soil health and environmental sanitation.

Nandini (1995) reported that the adoption of indigenous soil and water conservation practices by the respondents ranged from 8.33 to 100 percent. All the respondents followed summer ploughing since it pulverized the soil for better retention of moisture. A range of 40 to 87.5 percent adoption was found in practices like manuring, earthern bunding, stonewall construction, growing cover crops and intercropping.

Preetha (1997) identified 80 practices of rice farmers of Thrissur district like *kundakoothal* of seedlings and swing basket, counterpoise bucket lift, *chakram* and *ara*, *petti* and *para* etc. for water management

Sinha (1997) found that ambitious use of agrochemicals destroyed the agricultural ecosystem. The farmers and the agricultural scientists have realized this and have revived their age-old traditional techniques of natural farming and were working to find economically cheaper and ecologically safer alternatives to agrochemicals

From the above studies it could be inferred that the importance of indigenous technologies were now accepted by the scientific community and they were supporting indigenous technologies.

2.3 COLLECTION OF ITK PRACTICES IN THE FARM PRODUCTION SYSTEMS

Many people emphasized the importance of collection of ITK practices. The following review supports the need for collection of ITK.

Chakravarthy (1982) collected information on various labour extensive indigenous farm practices viz., use of indigenous wooden plough, the use of bow traps to kill rats and digging field burrow to rats were followed more by small and medium farmers than by big farmers. Cattle penning and green leaf manuring was followed more by big farmers than other categories of farmers.

Kanagsabapati (1991) collected information of many practices such as neem cake dissolved in cows urine and use of ash or red earth for storage of pulse grains that were reported as effective traditional practices.

Berks and Folke (1994) argued that in order to ensure a more socially and ecologically sound approach to development it was necessary to collect, document, understand, respect and utilize local knowledge system.

Chittiraichelvan (1994) suggested that with the collection and documentation of farmer's indigenous/ traditional knowledge, the technologies developed get refined, the problems get restated and scientific solutions were evolved.

Rajesekaran and Warren (1994) opined that collection and documentation of ITK can be used to fulfill socio-economic needs and conserve biodiversity at the same time.

Manju (1997) identified and collected 47 indigenous practices followed by vegetable farmers of Thrissur district. She used a pre-tested structured interview schedule for collecting data from farmers, extension workers and scientists. The data was collected by personal interview by the researcher using final interview schedule.

Preetha (1997) used key informant interviewing to collect indigenous practices in rice farming. Key informants were selected with the help of agricultural officers. The interviewing was accomplished with a checklist of open-ended questions on different farming practices in rice cultivation.

Sulaja (1999) used a semi structured interview schedule for collecting data on indigenous skills from identified farmers and key informants.

Bhople and Darbha (2000) collected details on indigenous grain storage practices adopted in rural households in Akola district in Maharasthra. It included various storage structures like bamboo structures, wooden structures and earthern pots.

Mandal and Chauhan (2001) collected ITK practices in animal nutrition like feeding of refuses of vegetables and rice polish to increase milk production, feeding of rice polish, oil cake, straw mixed with fermented rice water to keep cattle in healthy condition, giving of country liquor/ Mahua liquor for keeping cattle active and feeding of cooked rice polish/ broken rice to increase milk production.

From the above review it could be clearly understood that the collection of ITK was very important because ITK once lost will be lost forever as it was passed on from generation to generation orally.

2.4 RATIONALIZATION OF ITK PRACTICES IN THE FARM PRODUCTION SYSTEMS

Rationalization was defined as the process of bringing in to conformity with reason (Oxford, 1983)

From the above definition we can conclude that rationality is things or practices that were explainable with scientific reasons or establishing based on long time experience.

Supe and Singh (1969) inferred that the act of an individual was considered as rational to the extent he justified his selection of most effective means from among the available alternatives on the scientific criteria for achieving maximum ends.

Nand and Kumar (1980) opined that the scientists should investigate the rationality of each one of the technical beliefs held by farmers so that they can clearly accept or reject a technical belief.

Gupta (1987) opined that in order to derive scientific value out of indigenous practices, crucial observation was essential and ITK practices were put in to proper scientific testing thereby the very frontier of science could be extended.

Padaria and Singh (1990) opined that identification of scientifically sound traditional practices would be helpful to the scientists in technology blending programme and generation of low cost, location specific and appropriate technology by modifying the recommended technology so as to make it more readily acceptable. They also reported that plant protection specialists do not consider most of the traditional practices scientifically rational.

According to Gnanadeepa (1991) who has identified and categorized certain traditional beliefs some traditional beliefs may be rational and scientists have scientifically proven some of them.

Kanagsabapati (1991) conducted a case study on traditional practices in dry land agriculture and also tried to collect possible scientific explanation.

Reddy *et al.* (1991) opined that even though farmers have their own reasons for the practices followed, they were not bound by economic or social factors, but largely by scientific reasoning.

An attempt was made by Talwar and Singh (1991) to study the rationality of indigenous seed and grain practices. They were of the opinion that ITK has

undergone evolutionary process. In recent years, the recording and networking of local knowledge has gained momentum and the efforts were being made to seek possible explanations and scientific principles involved in local practices.

Meera (1995) opined that comprehending the science underlying indigenous practices would help us to understand the concepts and practices depicting the elements of sustainability to integrate with modern information system for efficient resource management.

Preetha (1997) opined that most of the traditional practices lacked scientific basis, thus there was an urgent need to validate local knowledge.

In an in depth study in the hill of Nepal, Subedi (1997) revealed that in most cases, farmers local knowledge concurred with formal experimental results.

Tripatti *et al.* (1997) reported 170 traditional veterinary practices among peoples of northern plains of UP and found many of the beliefs to be scientific. They opined that this would help in integrating indigenous knowledge system with formal research.

Verma *et al.* (1997) explored several areas where traditional practices have supported modern technical know how and they called for deliberate attempt on the part of educational institutions to find out the scientific relevance of these traditional practices for continuous use.

Kashem and Islam (1999) revealed that farmers' attitude towards use of ITK was positively related to their rationality at 1% level of probability.

Kashyap *et al.* (2000), while highlighting the potential of indigenous knowledge systems as a foundation for sustainable development, has established participatory methodology as a tool to compile and explain the scientific reasoning and adaptability of ITKs.

Kurup (2000) opined that the rich culturally conditioned indigenous knowledge systems if subjected to scientific scrutiny could benefit mankind in many ways.

Somasundaram and Netajiseethraman (2000) developed a five point continuum to judge the rationality of indigenous knowledge. The continuum was as follows rational based on scientific evidence, rational based on experience, irrational based on experience and irrational based on scientific evidence with scores 4, 3, 2 and 1 respectively

From the above review it was clearly understood that the scientists through extension workers, if scientifically rationalized, could give ITKs, back to farmers with confidence.

2.5 EVALUATION OF ITK PRACTICES IN THE FARM PRODUCTION SYSTEMS

The following reviews give the definitions of evaluation according to some scientists.

Torchim and William (1999) defined evaluation as the systematic assessment of some object. Evaluation was the systematic acquisition and assessment of information to provide useful feedback about some object.

Sanders and James (1999) defined evaluation as the systematic investigation of the usefulness or quality of an article.

Boryz *etal.* (2002) defined evaluation as the examination of effectiveness of an intervention with the means of empirical research

From the above review, evaluation can be operationally defined as the systematic investigation to assess the value of an object or a practice so that it can be further recommended with evidence of its performance.

Narasimham (1981) opined that before the problems arising from the modernization of agricultural technology were considered, the status of folk knowledge and practices must be evaluated, only then it could be comprehensively updated

Padaria and Singh (1990) submitted the documented indigenous practices for rationality testing by the scientist on a five point continuum – very rational (VR), Rational (R), undecided (U), irrational (IR) and very irrational (VIR) with scores 5,4,3,2 and 1 respectively.

Titilosa (1990) proposed a method to evaluate the incorporation of ITK on agriculture to development projects in less developed countries, so that the benefit of traditional farmers' resource management technique, as dictated by the environment and other social conditions can be harnessed and improved upon.

Verma *et al.* (1997) opined that indigenous knowledge of a society developed out of usage and current wisdom was a treasure trove that needs to be scientifically evaluated and documented. They also added that integration of scientific and indigenous wisdom would help to develop need-based technologies, which will be helpful to the rural folks.

Rahul (1998) found that the traditional varieties of unirrigated wheat cultivated by traditional methods shown to have a cost advantage over high yielding varieties and were superior in terms of taste, nutrition as well as soil quality improvement and reduced demand for water.

Chandra *et al.* (2000) opined that it was imperative that we should collect, document and evaluate indigenous technologies so that the scientific basis/ principle behind them could be properly understood. Once it was done it will be easier to further refine an upgrade them by blending with modern scientific knowledge.

Suresh and Hegde (2002) called for urgent need to evaluate local knowledge since most of traditional knowledge lack scientific basis.

From the above reviews, it was understood that evaluation of ITK was a must because only after evaluation the various traits of ITK can be known and only after this, it can be recommended to the farmers.

2.6 DOCUMENTATION OF ITK PRACTICES IN THE FARM PRODUCTION SYSTEMS

Documentation refers to something written, inscribed etc., which furnishes evidence or information upon any subject or prove or support by documentary evidence. (Oxford, 1983)

From the above literature, documentation can be operationally defined as the process of making some collected material in a form so that it can be used whenever we feel the need for referring to it.

The following reviews stress the need for the documentation of ITK practices:

Knight (1980) has called for the systematic documentation of traditional farmers knowledge into and "information bank" from which agronomists, extension workers and other farmers can draw enlightenment.

Essers *et al.* (1989) reported that locally available resources have been specially apparent in the area of sustainable agriculture. Professionals in the field feel the need to systematize and document their methodologies. He concluded with the power and flexibility of locally produced knowledge.

Gupta (1990) listed the reasons for documenting indigenous knowledge as to understand scientific rationale, to accelerate technological change, to enable better understanding of technology development of newer concept, to increase awareness among younger generation and develop appreciation of traditional systems and to revive and restore pride among farmers themselves.

Chittiraichelvan and Raman (1991) reported that documentation of ITK assumes greater importance to understand the scientific rationale, to accelerate technical change, to enable better understanding of technology development and to increase awareness among youth and pride among farmers.

Sanghi (1991) documented a number of farm management practices evolved by farmers to face the harmful effects of natural calamities, after conducting a comprehensive study about the traditional farming practices for risk management in rain fed agriculture.

Sandoval (1992) had attempted on documentation of ITK and belief systems in cultivation of sweet potato in Bukidon.

Colchester and Ghai (1994) emphasized the need for documentation of ITK because traditional systems of land use have proved to be more environmentally appropriate.

Mathias (1995) called for recording and documentation of indigenous knowledge through field studies, literature studies and workshops. He also emphasized to make information available through documents, audio visuals, artifacts, networking, databases, print- mass media, demonstration plots, exhibits, museums and other media.

Bheemappa and Hosmani (1997) documented the farmer's practices for protection of pulse seeds from storage pests using split seed coat pieces of cashew, leaves of moringa and camphor.

Gupta and Pal (1997) suggested an alternative model for technology generation and transfer. The new paradigm starts with farmers' ITK and was supplemented by objective constraint analysis, restatement of the problem, objective setting and formulation of hypothesis rather than by literature survey and conventional approach. Technologies emerging from this model were eco-friendly, culturally compatible and low cost in nature. The need for documentation of ITK was strongly advocated for the smooth functioning of the suggested model.

Sunil (1998) pointed out that indigenous knowledge has every possibility of being lost if not properly documented because it was transferred from generation to generation orally.

Faroquee *et al.* (1999) tried to document the traditional knowledge of Bhotiya pastoralists of Kumaon Himalaya and suggested the immediate need for value addition in these sectors in order to save them from extinction and to add the income of the people.

Prakash *et al.* (1999) documented *ITK* of tribal farmers in North Eastern hill region of India which included bamboo drip irrigation, winnowing of paddy, storing of maize cobs, insect pest and disease management, use of pine leaves for insect pest control in paddy and management of bio-physical resources.

Sulaja (1999) suggested that a systematic documentation of the indigenous skills was inevitable to conserve the old farming traditions and wisdom of the farmers from being extinct and lost forever.

Chandra *et al.* (2000) documented many indigenous technologies in water management followed by farmers in North India, South India and Western India like farm field bunding with earthern bunds, using of sand filled bags to control flow of water and percolation tanks in rain fed areas for recharging ground water.

Kurup (2000) emphasized the urgent need for documenting the fast vanishing biopharmacological traditional knowledge of tribal communities.

Lakshmanan (2000) opined that indigenous knowledge data collected should be scientifically and systematically documented and analyzed and evolve intensive research.

Kashyap *et al.* (2000) opined that the indigenous knowledge was on the verge of extinction mainly due to its oral tradition as well as due to the introduction of resource intensive modern technologies and they recommended for proper documentation on indigenous technologies.

Mandal and Chauhan (2001) opined that a permanent record of peoples' traditional wisdom was necessary in a form and may be accessible to outsiders, otherwise such indigenous practices would be lost and cannot be regained at any cost.

Ravikumar *et al.* (2002) documented nine ITK practices followed by livestock owners. Majority were based on herbal plants which were locally available and they found that adoption percentage of such practices were higher.

From the above studies, the importance and need for documentation of ITK in farm production systems are clearly understood.


MATERIALS & METHODS

MATERIALS AND METHODS

The present investigation was undertaken with the main objective of "Rationalization of ITK in Production Management in Farm Production Systems of Palakkad District". This chapter explains the procedures and methods adopted for the study. This chapter comprises the following sub captions.

3.1 RESEARCH DESIGN

Keeping in view the objectives of the study and the perusal of available literature shows that most of the attributes included in the study were *expost facto* in nature and in *expost facto* studies the chance for manipulation by the researcher is very less. So *expost facto* research design was considered as the appropriate design for the study. Kerlinger (1964) defined *expost facto* research as systematic empirical enquiry in which the researcher does not have direct control over the independent variables because their manipulation have already occurred or because they were inherently manipulated.

3.2 LOCALE OF THE STUDY

The locale of the study was Palakkad district. It was purposively selected with the following criteria

1. This district was having wide crop diversity
2. Maximum representation of crop production systems
3. It encompasses five agro eco zones out of the 13 agro eco zones in Kerala
4. Area under total food grains was the highest in Palakkad district.

3.3 DESCRIPTION OF THE STUDY AREA

Palakkad district occupies the central east position in Kerala state. The boundaries of the district were Coimbatore district in the east, Malappuram in the north and Thrissur in the south. Most of the people belong to rural area where agriculture was the main occupation. Except Attappadi area of Mannarkkad thaluk, the entire area falls under midland region. There are a number of agricultural institutions like the Regional Agricultural Research Station, Soil Testing Laboratory, Fertilizer Quality Control Laboratory, Mushroom laboratory and Agricultural Engineering Workshop.

'Rice bowl of Kerala" is the synonym for Palakkad. The net cultivated area of the district is 284 lakh hectares, ie.,64% of the geographical area . Major portion of the cultivable land is used for raising food crops. All food crops together account for about 80% of the gross cropped area and paddy alone accounts for about 60% of it. The area under rice cultivation in the district is 28 % of the total area in the state. Coconut, groundnut, sugarcane, pepper, banana and cashew are some of the major cash crops raised. About 80 % of the rural populations of this district are agriculturists or agricultural laborers.

3.4 SELECTION OF THE SAMPLE

The selection of the sample includes the selection of the study area and the selection of respondents.

3.4.1 **Selection of the study area**

Out of the 13 development blocks available in the district, five blocks were selected with the following criteria:

1. Highest agricultural predominance in the block.
2. Presence of atleast three farm production systems out of five envisaged in the study viz., rice based, homestead based mixed farming, plantation crops including spices, seasonal crops and annual crops.
3. Each block should represent one agro ecozone.
4. Four panchayats were selected within each block based on the first two criteria. Thus 20 panchayats were selected.

3.4.2 **Selection of respondents**

The objectives of the study necessitated the involvement of three types of respondents viz.,

1. Farmers
2. Extension personnel and
3. Scientists.

These three groups were referred as Farmers Sub System (FSS), Extension Sub System (ESS) and Research Sub System (RSS) respectively.

1. Farmers Sub System (FSS)

Under FSS five Key Informant Farmers (KIF) were selected from each panchayat with the help of extension personnel of respective panchayats through the personal judgment of Extension officer. Thus a total of 100 KIF were selected for the study.

2. Extension Sub System (ESS)

From each panchayat two-extension personnel viz., Agricultural Officer and Agricultural Assistant were selected. Thus 40 respondents were selected for the study. Additional samples of 30 Veterinary doctors were selected from various panchayats as respondents for evaluation of ITK items collected in animal husbandry.

3. Research Sub System (RSS)

RSS comprised the scientists representing various disciplines of Agricultural Sciences. This multidisciplinary team of 20 agricultural researchers drawn from research stations and KVK of the Palakkad district were selected for the study.

3.5 COLLECTION OF ITK

As the prime objective of the study is to collect ITK from the field, with regard to the production management of various farm production systems of Palakkad *district*, Agricultural Scientists were consulted to delineate various categories under each production system like indigenous land preparation and cultural practices, water management, seeds, seedlings, sowing, manuring, adjustment to season, time and method of planting, water management, weather forecasting, weed management etc. were listed down for each crop (APPENDIX I). After enlisting these categories 100 KIF were interviewed with the help of an interview schedule to collect various ITKs under each category by which an exhaustive list of ITK's were collected under each category.

3.6 RATIONALIZATION OF ITK BY RESEARCH SUB SYSTEM (RSS)

The list of ITK's collected under various categories of production systems were categorized and circulated among 20 scientists as a questionnaire with request to furnish a scientific reasoning so as to rationalize the ITK's (APPENDIX II)

3.7 EVALUATION OF ITK BY KEY INFORMANT FARMERS (KIF)

The collected list of ITK's were presented to 100 Key Informant Farmers and asked them to give their response in range of zero to 10 based on their belief, adopting such practices by them or willing to adopt in future. Thus scores ranging from zero to 10 were collected from 100 KIFs. For this purpose "Key Informants Workshop" was conducted in three blocks of Mannarkkad, Pattambi and Sreekrishnapuram of Palakkad district (APPENDIX III)

3.8 EVALUATION OF ITK BY EXTENSION SUB SYSTEM (ESS)

The same lists of ITK's were circulated among extension personnel in the form of a questionnaire to assign a score ranging from 0 to 5 based on their 'perceived effect' and 'scientific rationality for evaluation of ITKs.

3.9 DOCUMENTATION OF ITK PRACTICES

From the rationalization of the ITKs by the scientists and evaluation of ITKs by FSS and ESS, ITKs selected were documented. The ITK's that were not scientifically rationalized were also documented and furnished in the appendix for future research works (APPENDIX IV)

3.10 TOOLS USED FOR THE STUDY

Interview Schedule and Questionnaires were used to collect data from farmers, Extension personnel and Scientists.

3.11STATISTICAL TOOLS USED

Correlation analysis

This was done to find the relationship between the scores of FSS and ESS assigned for the ITK's under each crop.

3.12CROPS INCLUDED UNDER VARIOUS CROPPING SYSTEMS

1. Plantation crops including spices- Coconut, ginger and pepper
2. Seasonal crops- Vegetables like Cow pea, ashgourd, bittergourd, chilly and pumpkin
3. Rice based cropping system- Rice
4. Homestead based mixed farming- Cow
5. Annual crops- Tapioca and banana

3.13 OPERATIONALISATION OF CONCEPTS AND DEFINITIONS:

Indigenous Technical Knowledge (ITK)

It refers to the age-old practices developed by forefathers or local elders as well as contemporary farmers/peers, which were passed over from generation to generation. This knowledge was dynamic in nature and was specific to a particular geographical area.

Plantation including spices based Cropping Systems

Plantation crops like coconut and spices like ginger, pepper etc were included in this cropping system in which plantation crops were the base crops and the spaces among these crops were used for other crops.

Seasonal based Cropping System

The crops, which were seasonal in nature, were included in this system. Vegetables like cucurbitaceous crops, chilly and cowpea were listed.

Rice based Cropping System

Rice based cropping system was a cropping system in which rice will be the base crop and other crops like cowpea etc were used for rotation

Homestead based Mixed Farming System

It was a special type of agricultural production system with a number of annual or perennial crops grown around the home in conjunction with livestock and poultry. In this study livestock was stressed.

Annuals based Cropping System

Crops of one-year duration viz., banana and tapioca included in this study constituted the annuals based cropping system

Farmer Sub System (FSS)

The key informant farmers representing all the five-farm production systems of various panchayats who formed the farmer respondents of the study constitute the FSS.

Extension Sub system (ESS)

The Agricultural Officers (AOs) and Agricultural Assistants (AAs) of the selected Krishibhavans (Grama Panchayat level agricultural offices) and the veterinary doctors of selected panchayat constitute the ESS.

Research Sub System (RSS)

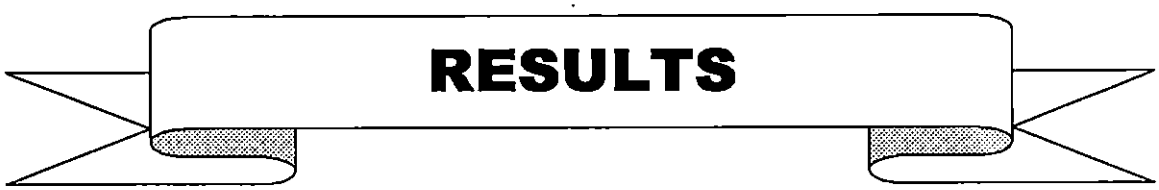
The scientists of both agriculture and veterinary disciplines from Kerala Agricultural University who formed the researcher respondents of the study constitute the RSS.

Perceived effect

It was the perception of a person about the effect of a particular ITK practice.

Scientific rationality

It refers to the scientific reasoning which supports the use of a peculiar indigenous practice.


RESULTS

RESULTS

The results of the study in accordance with the objectives set earlier are presented in this chapter. As the objectives of the study comprise of four parts namely collection, rationalization, evaluation and documentation of ITK, the result is presented in that order under each crop. Evaluation has two parts namely the evaluation by the Key Informant Farmers and evaluation by extension personnel.

PLANTATION CROPS INCLUDING SPICES.

Plantation crops including spices included three crops viz. coconut, ginger and pepper. The results are presented under each crop according to the objectives of the study.

A. Coconut

1. Seed selection

a. Collection of ITK practices for seed selection

Table 1a Collection of ITK practices

No. of practices collected	No. of practices Rationalized	No. of practices not rationalized
6	3	3

It is evident from table 1a that out of six ITK practices collected under seed selection of coconut crop, three ITK practices were rationalised by the scientists. The results of rationalization are presented in table 1b.

b. Rationalization of ITK practices for seed selection

Table1b Rationalization of ITK practices by scientists

Sl. No	ITK	Rationality
1	Coconuts from the middle of the bunch are selected	They were not affected much by shocks during transport and harvest
2	Detecting functional eye by floating the nut in water	The portion which comes up when dipped in water is the position of functional eye
3	Those nuts, which float with stalk portion up, will sprout earlier	Well-developed nut both in terms of endosperm and husk. The uniform shape help the nut to float in this manner

c. Evaluation of ITK practices for seed selection

Table 1c Evaluation of ITK practices by farmers and extension personnel

Sl No	Sample Group	Correlation coefficient
1	FSS & ESS (PE)	0.514**
2	FSS & ESS (SR)	0.512**

** Significant @ 1% level of probability

From the table 1c it is evident that the perceived effects and scientific rationality of ITK by ESS and the belief about ITK by the FSS were positively and significantly correlated. Hence, it is inferred that scores assigned by the FSS and ESS were in full agreement with each other.

2. *Seed treatment*

a. Collection of ITK practices

Table 2a Collection of ITK practices

No. of practices collected	No. of practices Rationalized	No. of practices not rationalized
3	3	0

A perusal of table 2a showed that out of three ITK practices collected for seed treatment practice in coconut all were rationalized by scientists. The results of rationalization are presented in table 2b.

b. Rationalization of ITK practices

Table 2b Rationalization of ITK practices by scientists

No	ITK	Rationality
1	Soaking seeds in water for more than one month after drying in shade	Fibre will become soft and emergence of leaf will become easier
2	Removal of some husk at the eye portion of coconut	Emergence of the leaves was made easier by removal of some husk portion
3	Nuts were brought down with the help of ropes	If nuts fall on hard ground, the endosperm gets injured resulting in defective seedling

c. Evaluation of ITK practices by FSS and ESS

Table 2c Evaluation of ITK practices by farmers and extension personnel

Sl No	Sample Group	Correlation coefficient
1	FSS & ESS (PE)	0.514**
2	FSS & ESS (SR)	0.512**

** Significant @ 1% level of probability

From the above table it is observed that the perceived effects and scientific rationality of the ESS and the belief of the FSS are positively and significantly correlated. It shows that the FSS and ESS are in agreement about the effectiveness of the practices and the rationalization of scientists about these practices.

3. *Seedling selection*

a. Collection of ITK practices

Table 3a Collection of ITK practices

No. of practices collected	No. of practices Rationalized	No. of practices not rationalized
3	2	1

From the above table 3a it is evident that out of three practices collected in seedling selection of coconut scientists rationalized two among them. The results of rationalization are presented in table 3b.

b. Rationalization of ITK practices

Table 3b Rationalization of ITK practices by scientists

No	ITK	Rationality
1	Select seedling with higher collar girth	The seedling with high collar girth was believed to be early bearers
2	Those seedlings with *Narola* were healthy and early bearers. *Narola* refers to the leaf having a fibre connecting the leaflets along the margin	*Narola* was seen in well-managed seedlings. So seedlings with *narola* were believed to be highly productive

c. Evaluation of ITK practices

Table 3c Evaluation of ITK practices by farmers and extension personnel

Sl No	Sample Group	Correlation coefficient
1	FSS & ESS (PE)	0.514**
2	FSS & ESS (SR)	0.512**

** Significant @ 1% level of probability

Table 3c showed that the FSS and ESS are in agreement about the perceived effect of the ITK practices. The scores given by the FSS and ESS were positively and significantly correlated, moreover, the scientific rationalization were also in agreement with FSS and ESS.

4. *Sowing of seeds*

a. Collection of ITK practices

Table 4a Collection of ITK practices

No. of practices collected	No. of practices Rationalized	No. of practices not rationalized
3	3	0

From table 4a it is evident that out of three ITK practices collected in sowing of coconut seeds all the three were scientifically rationalized and the results of the rationalization are presented in table 4b.

b. Rationalization of ITK practices

Table 4b Rationalization of ITK practices by scientists

No	ITK	Rationality
1	Sowing in slanting position	Prevent water stagnation in the depression near functional eye
2	Planting seeds with eye portion down for 2 weeks and then in normal position	The embryo will be in full contact with the liquid endosperm till it emerges out
3	Planting seed nuts in poly bags or medium sized pots	Damage to the roots during transplanting was avoided so that the seedling establishes easily

c. Evaluation of ITK practices

Table 4c Evaluation of ITK practices by farmers and extension personnel

Sl No	Sample Group	Correlation coefficient
1	FSS & ESS (PE)	0.514**
2	FSS & ESS (SR)	0.512**

** Significant @ 1% level of probability

From table 4c, it is evident that the perceived effects and scientific rationality of ITK by ESS and the belief about ITK by the FSS were positively and significantly correlated. Hence, it was inferred that scores assigned by the FSS and ESS were in full agreement with each other.

5. *Water management*

a. Collection of ITK practices

Table 5a **Collection of ITK practices**

No. of practices collected	No. of practices Rationalized	No. of practices not rationalized
5	5	0

Table 5a showed that all the five ITK practices collected in water management aspect of coconut crop were scientifically rationalized and the results of rationalization are presented in table 5b.

b. Rationalization of ITK practices

Table 5b Rationalization of ITK practices by scientists

No	ITK	Rationality
1	Drip irrigation using clay pot and thread. *(Thiriyittu nanakkal).*	Water loss was decreased and ensures continuous availability of water
2	Burial of Pseudo stem of Banana in the basin of the palm	The water holding capacity was increased and organic matter content also increases
3	Burial of Salvinia *(Salvinia molesta)* and Eichornia *(Eichornia crassipus)* in the basin	It increases water holding capacity
4	Plant banana around coconut seedling	It will prevent direct sunlight and give moist atmosphere and gives enough water to the seedling
5	Arranging coconut husk inside planting pit	It increases water-holding capacity and supplies potassium

c. Evaluation of ITK practices

Table 5c Evaluation of ITK practices by farmers and extension personnel

Sl No	Sample Group	Correlation coefficient
1	FSS & ESS (PE)	0.514**
2	FSS & ESS (SR)	0.512**

** Significant @ 1% level of probability

It is evident from the above table that the FSS and ESS were in perfect agreement about the effectiveness the ITK items. The scores given were positively and significantly correlated. Hence, the items rationalized were scientific.

6. *Manuring*

a. Collection of ITK practices

Table 6a Collection of ITK practices

No. of practices collected	No. of practices rationalized	No. of practices not rationalized
3	3	0

Table 6a showed that all the three ITK practices collected in manuring of coconut crop were supported with scientific reasons and the results are presented in table 6b.

b. Rationalization of ITK practices

Table 6b Rationalization of ITK practices by scientists

No	ITK	Rationality
1	Clay from bottom of ponds is a good manure	Riverine alluvium is a good manure
2	Application of common salt in the planting pit	If salt is applied, it results in soil dispersion, hence more root penetration and increased productivity
3	Application of a mixture of sand, salt and ash in the pit before transplanting	Salt application result in soil dispersion. Ash provides potassium. Sand makes root penetration easier and so the productivity increases

c. Evaluation of ITK practices

Table 6c Evaluation of ITK practices by farmers and extension personnel

Sl No	Sample Group	Correlation coefficient
1	FSS & ESS (PE)	0.514**
2	FSS & ESS (SR)	0.512**

** Significant @ 1% level of probability

A perusal of table 6c showed that the scores given by the ESS and FSS are positively and significantly correlated. Hence, it was inferred that the farmers and extension personnel were in agreement regarding the perceived effects and scientific rationality of the ITK items. Since all the items supported with scientific reasons the ITK practices was rational.

7. Adjustment to season

a. Collection of ITK items

Table 7a **Collection of ITK practices**

No. of practices collected	No. of practices rationalized	No. of practices not rationalized
3	3	0

From the table 7a it is evident that all the three ITK practices collected under adjustment to season in coconut crop were scientifically rationalized and results of rationalization are presented in table 7b.

b. Rationalization of ITK items

Table 7b Rationalization of ITK practices by scientists

No	ITK	Rationality
1	Transplanting at *'Katti koombu'* stage	At this stage the roots do not pierce the outer cover of seeds. Rooting occur directly in transplanted pits
2	Transplanting during *Karkidakavaarcha.*	This was the period when southwest monsoon was ceased and northeast monsoon was yet to begin. At this time soil was sufficiently wet after SW monsoon and NE monsoon was not so meagre that irrigation was not required
3	Transplanting in *Kumba Bharani.*	Second half of February and first half of march. So the seedling will establish before heavy monsoon

c. Evaluation of ITK items

Table 7c Evaluation of ITK practices by farmers and extension personnel

Sl No	Sample Group	Correlation coefficient
1	FSS & ESS (PE)	0.514**
2	FSS & ESS (SR)	0.512**

** Significant @ 1% level of probability

From the above table it is understood that the scores given by FSS and ESS were positively and significantly correlated. These items were also supported with scientific reasons by scientists and hence it was inferred that farmers, extension personnel and scientists were of the same opinion about the practices and the farmers had maximum belief on all ITK practices.

8. *Plant protection*

a. Collection of ITK practices

Table 8a Collection of ITK practices

No. of practices collected	No. of practices rationalized	No. of practices not rationalized
6	5	1

From table 8a it is understood that five out of six ITK practices collected under plant protection aspect of coconut crop were scientifically rationalized. The practices and their rationality have been presented in table 8b.

b. Rationalization of ITK practices

Table 8b Rationalization of ITK practices by scientists

No	ITK	Rationality
1	Planting chilly seedling along with coconut seed nuts planted in the nursery will decrease incidence of weeds	Smothering effect of chilly plants on weeds might be the possible reason
2	Burning of waste from coconut tree in the basins improves seed set, gives potash and decrease incidence of pests and diseases	Carbon dioxide comes from the smoke. It increases rate of photosynthesis and thus improves yield and the smoke also decreases mite attack
3	Planting arrowroot in coconut nursery decrease incidence of termites.	The root exudates of arrow-root were found to have some repellent effect on termites
4	To decrease weeds, use tamarind leaves for mulching	Allelopathic effect
5	Burning of waste from coconut tree in the basins improves seed set, gives potash and decrease incidence of pests and diseases	Smoke has got insect repelling property, more over ash gives potassium

c. Evaluation of ITK practices

Table 8c Evaluation of ITK practices by farmers and extension personnel

Sl No	Sample Group	Correlation coefficient
1	FSS & ESS (PE)	0.514**
2	FSS & ESS (SR)	0.512**

** Significant @ 1% level of probability

A perusal of table 8c showed that the scores given by the ESS and FSS were positively and significantly correlated. Hence, it was inferred that the farmers and extension personnel were in agreement regarding the perceived effects and scientific rationality of the ITK items. All the items identified were scientific.

9. *Methods to increase yield*

a. Collection of ITK practices

Table 9a Collection of ITK practices

No. of practices collected	No. of practices rationalized	No. of practices not rationalized
7	7	0

Table 9a showed that out of seven ITK practices for increasing yield of coconut crop all the items were scientifically rationalized and the results of rationalization are presented in table 9b.

b. Rationalization of ITK practices

Table 9b Rationalization of ITK practices by scientists

No	ITK	Rationality
1	Smoking in coconut gardens will increase the yield	Smoke has got some hormones that improves seed set
2	Toddy tapping increases yield of coconut	It gives a rest to the palm and later there will be rejuvenating effect for the palm
3	Cultivation of betel vine in coconut gardens increases yield of coconut	Betel vine roots add organic matter to the rhizosphere
4	Removal of old roots will increase yield	It results in formation of new roots, which were more vigorous
5	Fixing of bee hives in coconut gardens increase the pollination and thus increases yield	Bees were good pollinators they increase rate of pollination and hence the yield increases
6	Dig the coconut basin to a depth of 30 cm and 1 m.diameter and fill the pit with chaff rice grains @ 10 baskets /plant. Repeat it every year	This increases productivity as water scarcity during summer months was prevented because a rice chaff grain reduces bulk density of soil, increasing water-holding capacity. Addition of silica rich materials increases productivity
7	Application of decomposed hay in the basin increases yield of coconut palm	It increases water-holding capacity

c. Evaluation of ITK practices

Table 9c Evaluation of ITK practices by farmers and extension personnel

Sl No	Sample Group	Correlation coefficient
1	FSS & ESS (PE)	0.514**
2	FSS & ESS (SR)	0.512**

** Significant @ 1% level of probability

From the above table it is seen that the scores given by FSS and ESS are positively and significantly correlated. These items were also substantiated with scientific reasons by scientists and hence it was inferred that farmers, extension personnel and scientists are of the same opinion about the practices.

The rationalized as well as evaluated ITK items which were found scientific above is presented here as documentation for further verification as well as for field recommendation for farmers.

d. Documentation of ITK practices in **coconut**.

Seed selection

1. Coconuts from the middle of the bunch were selected.
2. Detect the functional eye by floating the nut in water.
3. Those nuts, which float with stalk portion up, will sprout earlier.

Seed treatment

4. Remove some husk at the eye portion of coconut.
5. Soaking seed nut in water for one month after drying in shade.
6. Nuts are brought down with the help of ropes.

Seedling selection

7. Select seedling with higher collar girth.
8. Those seedlings with *Narola* are healthy and early bearers.

Sowing of seeds

9. Sow in slanting position.
10. Plant the seeds with eye portion down for 2 weeks and then in normal position.
11. Plant the seed nuts in poly bags or medium sized pots.

Water management

12. Practice drip irrigation using clay pot and thread. *(Thiriyittu nanakkal).*
13. Burial of Pseudo stem of Banana in the basin of the palm.
14. Burial of Salvinia *(Salvinia molesta)* and Eichornia *(Eichornia crassipus)* in the basin.
15. Plant banana around coconut seedling.
16. Arranging coconut husk inside planting pit.

Manuring

17. Clay from bottom of ponds act as a good manure.
18. Apply of common salt in the planting pit.
19. Apply a mixture of sand, salt and ash in the pit before transplanting.

Adjustment to season

20. Transplant during at *'Katti koombu'* stage.
21. Transplanting at *Karkidakavaarcha.*
22. Transplant during in *Kumba Bharani.*

Plant protection

23. Plant chilly seedling along with coconut seed nuts planted in the nursery to decrease incidence of weeds.
24. Burn of waste from coconut tree in the basins.
25. Plant arrowroot in coconut nursery decrease incidence of termites.
26. Tamarind leaves are used for mulching.
27. Burning waste from coconut tree in the basins.

Methods to increase yield

28. Smoking in coconut gardens will increase the yield.

29. Toddy tapping increases yield of coconut.
30. Cultivation of betel vine in coconut gardens increases yield of coconut.
31. Removal of old roots will increase yield.
32. Fixing of bee hives in coconut gardens increases yield.
33. Dig the coconut basin to a depth of 30 cm and 1 m.diameter and fill the pit with chaff rice grains @ 10 baskets /plant. Repeat it every year.
34. Application of decomposed hay in the basin increases yield of coconut palm.

The ITK practices, which were not able to rationalize, by the scientists are presented in Appendix ( ) for the benefit of further researchers/ scientists to substantiate/ find reasoning so as to incorporate in the package of practices after proper scientific reasoning.

B. **Ginger**

1. *Seed treatment*

a. Collection of ITK practices

Table 10a Collection of ITK practices

No. of practices collected	No. of practices rationalized	No. of practices not rationalized
2	2	0

From table 10a it is observed that all the ITK practices were rationalized for seed treatment and the results of rationalization are presented in table 10b.

b. Rationalization of ITK practices

Table 10b Rationalization of ITK practices by scientists

1	Smoking ginger seeds spread in *panal* leaf for some days will enhance sprouting	Smoke contains some hormones in gaseous form which enhance sprouting
2	Dip ginger seeds in cow dung slurry and store in *panal* leaves to improve sprouting	Cow dung contains some bacteriophages that improves pest and disease resistance

c. Evaluation of ITK practices

Table 10c Evaluation of ITK practices by farmers and extension personnel

Sl No	Sample Group	Correlation coefficient
1	FSS & ESS (PE)	0.514**
2	FSS & ESS (SR)	0.512**

** Significant @ 1% level of probability

A perusal of above table showed that the scores given by the ESS and FSS were positively and significantly correlated. Hence, it was inferred that the farmers and extension personnel were in agreement regarding the perceived effects and scientific rationality of the ITK items.

2. *Seed storage*

a. Collection of ITK practices

Table 11a Collection of ITK practices

No. of practices collected	No. of practices rationalized	No. of practices not rationalized
3	3	0

From table 11a it is evident that out of three practices collected under seed storage practices of ginger crop all the three were scientifically rationalized and the results of rationalization are presented in table 11b.

b. Rationalization of ITK for seed storage

Table 11b Rationalization of ITK practices by scientists

Sl. No	ITK	Rationality
1	For storage of dried ginger fill lemon grass and ginger layer by layer	Lemon grass has got repellent action
2	Storing ginger seeds in the leaves of *Panal* for safe storage	*Panal* leaves has got insecticidal property
3	Safe storage of dry ginger *(Chukku)* was assured by mixing rhizome with dried leaf powder of *Kakalavankku* (Jatropa), *Karinochi (Vitex negundo)*, Neem and *Vayambu* rhizome powder.	All these plants were found to have repellent action

c. Evaluation of ITK practices

Table 11c Evaluation of ITK practices by farmers and extension personnel

Sl No	Sample Group	Correlation coefficient
1	FSS & ESS (PE)	0.514**
2	FSS & ESS (SR)	0.512**

** Significant @ 1% level of probability

From the table 11c it is observed that the scores given by FSS for belief and the scores given by ESS for perceived effect and scientific rationality were positively and significantly correlated. This showed that the rationale behind the farmers strong belief in following the practices.

3. *Methods to increase yield*

a. Collection of ITK practices

Table 12a Collection of ITK practices

No. of practices collected	No. of practices rationalized	No. of practices not rationalized
1	1	0

From table 12a it is evident that the single practice collected under methods to increase yield in ginger was scientifically rationalized and that practice with its rationale is presented in table 12b.

b. Rationalization of ITK practices

Table 12b Rationalization of ITK practices by scientists

Sl. No	ITK	Rationality
1	Mulch ginger plants with leaves of banana and neem. This increases corm size	Organic matter enhances moisture and this results in increase size of corms

c. Evaluation of ITK practices

Table 12c Evaluation of ITK practices by farmers and extension personnel

Sl No	Sample Group	Correlation coefficient
1	FSS & ESS (PE)	0.514**
2	FSS & ESS (SR)	0.512**

** Significant @ 1% level of probability

A perusal of table 12c showed that the scores given by the ESS and FSS are highly and significantly correlated. Hence, it was inferred that the farmers and extension personnel are in agreement regarding the perceived effects and scientific rationality of the ITK items. All the items were supported with scientific reasons in which farmers had great belief.

The collected practices after rationalization by scientists and evaluation by FSS and ESS are documented under each crop for further verification and for blending with modern technologies.

d. Documentation of ITK practices in **ginger**

Seed treatment

1. Smoking ginger seeds spread in *panal* leaf for some days.
2. Dip ginger seeds in cow dung slurry and store in *panal* leaves.

Seed storage

3. For storage of dried ginger fill lemon grass and ginger layer by layer.
4. Storing ginger seeds in the leaves of *Panal* for safe storage.
5. Dried ginger *(Chukku)* is stored by mixing rhizome with dried leaf powder of *Kakalavankku* (Jatropa), *Karinochi (Vitex negundo)*, Neem and *Vayambu* rhizome powder.

Methods to increase yield

6. Mulch ginger plants with leaves of banana and neem.

C. **Pepper**

1. *Methods to increase yield*

a. Collection of ITK practices

Table 13a Collection of ITK practices

No. of practices collected	No. of practices rationalized	No. of practices not rationalized
1	1	0

From table 13a it is seen that in case of pepper crop only a single ITK practice was collected for pepper and that was scientifically rationalized. The practice collected with its rationale is presented in table 13b.

b. Rationalization of ITK practices

Table 13b Rationalization of ITK practices by scientists

1	Planting of ginger, turmeric and kacholam in pepper gardens increases yield of pepper	Added manuring increases yield

c. Evaluation of ITK practices

Table 13c Evaluation of ITK practices by farmers and extension personnel

Sl No	Sample Group	Correlation coefficient
1	FSS & ESS (PE)	0.514**
2	FSS & ESS (SR)	0.512**

** Significant @ 1% level of probability

From the table 13c it is observed that the scores given by FSS and ESS for belief and perceived effect respectively are positively and significantly correlated. It was evident that the farmers and extension personnel were of same opinion about the ITK practices rationalized by scientists.

2. *Other cultural practices*

a. Collection of ITK practices

Table 14a Collection of ITK practices

No. of practices collected	No. of practices rationalized	No. of practices not rationalized
3	3	0

Table 14a showed that three practices were collected and scientists rationalized all of the. The ITK practices along with their rationality are presented in table 14b.

b. Rationalization of ITK practices

Table 14b Rationalization of ITK practices by scientists

1	Dipping pepper for one minute in boiled water	Chlorophyll get denatured and it gives shining black colour and thus increases market value
2	Put the harvested pepper in sunlight for one day. It will make threshing easier	It will make the stalk softened.
3	Allow pepper vines to move along land to another support without cutting form mother plant	It will help in root establishment at the nodal region of the vine so that the region in contact with soil increases and tolerance increases

b. Evaluation of ITK practices

Table 14c Evaluation of ITK practices by farmers and extension personnel

Sl No	Sample Group	Correlation coefficient
1	FSS & ESS (PE)	0.514**
2	FSS & ESS (SR)	0.512**

** Significant @ 1% level of probability

From table 14c it is concluded that the scores given by FSS for belief and the scores given by ESS for perceived effect and scientific rationality were positively and significantly correlated. The results showed that the farmers had a high belief in the ITK practices that was substantiated by the positive and significant correlation.

c. Documentation of ITK practices in **pepper**

Methods to increase yield

1. Plant of ginger, turmeric and kacholam in pepper gardens.

Other cultural practices

2. Dipping pepper for one minute in boiled water to give shining black colour.

3. Put the harvested pepper in sunlight for one day to make threshing easier.

4. Allow pepper vines to move along land to another support without cutting form mother plant.

4.2 SEASONAL CROPS

A. **Cow pea**

1 *Seed treatment*

a. Collection of ITK practices

Table 15a Collection of ITK practices

No. of practices collected	No. of practices rationalized	No. of practices not rationalized
4	3	1

From table 15a it is seen that three out of four ITK practices were rationalized by scientists and the ITK practices with their rationality are presented in table 15b.

b. Rationalization of ITK practices

Table 15b Rationalization of ITK practices by scientists

No	ITK	Rationality
1	Drying pods for 4-6 days	To decrease excess moisture in the seeds
2	Subjecting pods under storage to sunshine to protect from attack of storage pests	Presence of light and heat decreases humidity. Humidity favours storage pests
3	Subjecting seeds to natural cold treatment during *Makaram.*	Seasoning of seeds for better performance in field

c. Evaluation of ITK practices

Table 15c Evaluation of ITK practices by farmers and extension personnel

Sl No	Sample groups	Correlation coefficient
1	FSS & ESS (PE)	0.293*
2	FSS & ESS (SR)	0.394*

*- Significant @ 5 % level of probability

From table 15c it is observed that positive and significant correlation was there between scores given by FSS and ESS for ITK items. This showed that the farmers belief on ITK practices were accepted by extension personnel through scientific reasoning given by scientists.

2. *Seed storage*

a. Collection of ITK practices

Table 16a Collection of ITK practices

No. of practices collected	No. of practices rationalized	No. of practices not rationalized
13	11	2

Table 16a showed that out of 13 ITK practices followed for seed storage in cowpea scientists rationalized 11 practices and the practices along with their rationality are presented in table 16b.

b. Rationalization of ITK practices

Table 16b Rationalization of ITK practices by scientists

No	ITK	Rationality
1	Storing seeds with split seed coat pieces of cashew	The oil has heat conservation and pungent effect which repels storage pests
2	Mixing moringa leaves with stored seeds	Pungency repels pests
3	Mixing neem leaves with stored seeds	Azadiractin has got repellent action
4	Mixing seeds with pepper seeds	The pungent odour of pepper avoids storage pests
5	Mixing cowpea seeds with ash obtained by burning husk of cowpea	The ash acts as abrasive and kills the storage pests
6	Cowpea seeds were stored with powdered seeds of *Kadalavanakku* (Castor) to prevent insect attack	Castor has got repellent action
7	During storage of seeds put some garlic in the container. It will prevent insect attack	The pungent smell of garlic acts as repellent
8	Storing of cowpea seeds in clay pots along with sand will prevent insect attack	Sand has got abrasive effect it destroys the cutin layer of insects
9	To avoid cowpea seeds from attack of storage pests keep it mixed with ground castor seeds	Castor has got repellent action
10	Storing seeds with neem leaves and red chilly will prevent insect attack	Neem and chilly has got repellent action
11	Mixing cowpea seeds and cereal seeds with turmeric powder if found to check storage pests	Turmeric has got repellent action

c. Evaluation of ITK practices

Table 16c Evaluation of ITK practices by farmers and extension personnel

Sl No	Sample Groups	Correlation coefficient
1	FSS & ESS (PE)	0.293*
2	FSS & ESS (SR)	0.394*

*- Significant @ 5% level of probability

A perusal of table 16c showed that the scores given by FSS for belief and ESS for perceived effect and scientific rationality were positively and significantly correlated. It was inferred that there was an agreement in the opinion of farmers and extension personnel on ITK practices that was rationalized by scientists.

3. Manuring

a. Collection of ITK practices

Table 17a Collection of ITK practices

No. of practices collected	No. of practices rationalized	No. of practices not rationalized
4	4	0

From table 17a it is evident that all the four ITK practices collected were rationalized by scientists and the practices along with their rationale are presented in table 17b.

b. Rationalization of ITK practices

Table 17b Rationalization of ITK practices by scientists

No	ITK	Rationality
1	Neem cake application has both fertilizer effect and plant protecting effect	It supplies plant nutrients. Azadiractin repels pests and nematodes causing diseases and increases desirable microorganisms
2	Green leaf manuring with thick leaves of mango, jack, cashew etc. more preferred because the residual effect lasts for longer	The leaves disintegrate slowly releasing nutrients slowly and lasts for more days and it improve soil aeration and soil structure more than thin leaves
3	Add fresh cow dung at the time of flowering in cowpea	Good organic manure
4	Manuring with a mixture of fresh cow dung and green leaves.	Organic manuring reduces pest incidence

c. Evaluation of ITK practices

Table 17c Evaluation of ITK practices by farmers and extension personnel

Sl No	Sample groups	Correlation coefficient
1	FSS & ESS (PE)	0.293*
2	FSS & ESS (SR)	0.394*

*- Significant @ 5 % level of probability

It is evident from table 17c that the scores given by FSS and ESS were positively and significantly correlated. It was inferred that farmers belief on ITK practices and extension personnel's perception were of same regarding the practices rationalized by scientists.

4. *Plant protection*

a. Collection of ITK practices

Table 18a Collection of ITK practices

No. of practices collected	No. of practices rationalized	No. of practices not rationalized
2	2	0

Two practices that were collected under plant protection aspect in cowpea and scientists rationalized the two (Table 18a). The ITK practices along with their rationality are presented in table 18b.

b. Rationalization of ITK practices

Table 18b Rationalization of ITK practices by scientists

No	ITK	Rationality
1	Dusting of wood ash over cowpea to ward of pests	The wood ash has got abrasive effect it kill the insect
2	Dusting of fine sand over cowpea	Fine sand has got abrasive effect. It punctures the cuticle layer

c. Evaluation of ITK practices

Table 18c Evaluation of ITK practices by farmers and extension personnel

Sl No	Items correlated	Correlation coefficient
1	FSS & ESS (PE)	0.293*
2	FSS & ESS (SR)	0.394*

*- Significant @ 5 % level of probability

A perusal of table 18c showed that the scores for belief given by farmers and scores given by extension personnel for perceived effect and scientific rationality were positively and significantly correlated. This showed that farmers and extension personnel were similar opinion about the practices rationalized by the scientists.

5. *Methods to increase yield*

a. Collection of ITK practices

Table 19a Collection of ITK practices

No. of practices collected	No. of practices rationalized	No. of practices not rationalized
2	2	0

From table 19a it is inferred that all the two ITK practices collected in increasing yield of crop in cowpea were rationalized by scientists and the practices along with their rationality is given in table 19b.

b. Rationalization of ITK practices

Table 19b Rationalization of ITK practices by scientists

1	Pinching tip of vines	It was believed to enhance branching by removing apical dominance
2	Removal of excess leaves to induce early flowering. Middle leaves retained	It reduces excessive vegetative phase

c. Evaluation of ITK practices

Table 19c Evaluation of ITK practices by farmers and extension personnel

Sl No	Items correlated	Correlation coefficient
1	FSS & ESS (PE)	0.293*
2	FSS & ESS (SR)	0.394*

*- Significant @ 5 % level of probability

From the above table it is inferred that positive and significant correlation was there between scores given by FSS and ESS for ITK items. This showed that the farmers and extension personnel had no difference in opinion regarding these ITK practices.

d. Documentation of ITK practices in cowpea

Seed treatment

1. Dry pods for 4-6 days.
2. Subject pods under storage to sunshine.
3. Subjecting the seeds to natural cold treatment during *Makaram.*

Seed storage

4. Store seeds with split seed coat pieces of cashew.
5. Mix neem leaves with stored seeds.
6. Mix seeds with pepper seeds.
7. Mix cowpea seeds with ash obtained by burning husk of cowpea.
8. Cowpea seeds were stored with powdered seeds of Kadalavanakku (Castor).
9. During storage of seeds put some garlic in the container.
10. Store cowpea seeds in clay pots along with sand.
11. To avoid cowpea seeds from attack of storage pests keep it mixed with ground castor seeds.
12. Store seeds with neem leaves and red chilly.
13. Mix cowpea seeds with turmeric powder.

Manuring

14. Neem cake application has both fertilizer effect and plant protecting effect.
15. Green leaf manuring with thick leaves of mango, jack, cashew etc.
16. Add fresh cow dung at the time of flowering in cowpea.
17. Manuring with a mixture of fresh cow dung and green leaves.

Plant protection

18. Dusting of wood ash over cowpea
19. Dusting of fine sand over cowpea.

B. Ash gourd

1. *Seed treatment*

a. Collection of ITK practices

Table 20a Collection of ITK practices

No. of practices collected	No. of practices rationalized	No. of practices not rationalized
1	1	0

From table 20a it is evident that single practice was collected under seed treatment aspect of ashgourd and it was rationalized by scientist and the practice with its rationality is presented in table 20b.

b. Rationalization of ITK practices

Table 20b Rationalization of ITK practices by scientists

No	ITK	Rationality
1	Treating seeds of ash gourd with cow dung slurry. This will induce good germination and increase vigorous seedlings	It provides readily available additional nutrients to the sprouting seeds. Some bacteriophages present in cow dung kill bacteria

c. Evaluation of ITK practices

Table 20c Evaluation of ITK practices by farmers and extension personnel

Sl No	Sample groups	Correlation coefficient
1	FSS & ESS (PE)	0.293*
2	FSS & ESS (SR)	0.394*

*- Significant @ 5 % level of probability

From table 20c it is inferred that there is positive and significant correlation was there between scores given by FSS and ESS for ITK items. This showed that the farmers and extension personnel had no difference in opinion regarding these ITK practices followed by farmers.

2. *Seed storage*

a. Collection of ITK practices

Table 21a Collection of ITK practices

No. of practices collected	No. of practices Rationalized	No. of practices not rationalized
4	4	0

From table 21a it is understood that out of the four practices collected under seed storage aspect of ashgourd all were rationalized by scientists and the practices with its rationale are presented in table 21b.

b. Rationalization of ITK practices

Table 21b Rationalization of ITK practices by scientists

No	ITK	Rationality
1	After rubbing with wood ash, the seeds were stored over smoke in kitchen	Ash has got abrasive action, which destroys the cuticle of pests. Smoke has got repellent action
2	Keeping seeds with bird pepper *(Kanthari)* fruits to avoid pest attack during storage	The pungency of bird pepper repels storage pests
3	Keeping seeds in unopened fruits. Fruits were hanged using ropes	Natural protection from all pests inside unopened fruits
4	Smoking seeds by hanging above 'Aduppu'	The smoke avoids pests

c. Evaluation of ITK practices

Table 21c Evaluation of ITK practices by farmers and extension personnel

Sl No	Sample groups	Correlation coefficient
1	FSS & ESS (PE)	0.293*
2	FSS & ESS (SR)	0.394*

*- *Significant @ 5 % level of probability*

From table 21c it is inferred that positive and significant correlation is there between scores given by FSS and ESS for ITK items. This showed that the farmers and extension personnel had no difference in opinion regarding these ITK practices.

3. Land preparation

a. Collection of ITK practices

Table 22a Collection of ITK practices

No. of practices collected	No. of practices rationalized	No. of practices not rationalized
3	3	0

From table 22a it is understood that all the three practices identified under land preparation practice of ash gourd were rational. The practices along with their rationality are given in table 22b.

b. Rationalization of ITK practices

Table 22b Rationalization of ITK practices by scientists

No	ITK	Rationality
1	Land kept for three days after preparation	If done in summer it will help to eliminate weed growth and resting stages of insects and pathogens were destroyed when exposed to sunlight
2	Liming at first digging act as soil ameliorant and resist fungal diseases	It will adjust the P^H to neutral level. This will avoid fungi, which multiply at acid p^H
3	Burning basins before sowing	Field sanitation practice. It also gives ash which was a source of potassium

c. Evaluation of ITK practices

Table 22c Evaluation of ITK practices by farmers and extension personnel

Sl No	Items correlated	Correlation coefficient
1	FSS & ESS (PE)	0.293*
2	FSS & ESS (SR)	0.394*

*- Significant @ 5 % level of probability

It is evident from table 22c that the scores given by FSS and ESS were significantly and positively correlated. It is inferred that farmer and extension personnel were of same opinion regarding the practices.

d. Documentation of ITK practices in **ashgourd**

Seed treatment

1. Treat seeds of ash gourd with cow dung slurry.

Seed storage

2. Rub with wood ash and store over smoke in kitchen.

3. Keep seeds with bird pepper (Kanthari) fruits.
4. Keeping seeds in unopened fruits.
5. Smoking seeds by hanging above 'Aduppu'.

Land preparation

6. Land kept for three days after preparation.
7. During first digging itself liming should be done.
8. Burning basins before sowing.

C. Bittergourd

1. *Seed storage*

a. Collection of ITK practices

Table 23a Collection of ITK practices

No. of practices collected	No. of practices rationalized	No. of practices not rationalized
2	2	0

From table 23a it is understood that two practices were collected in seed storage aspect and both these practices were scientifically rationalized and the practices along with their rationality are presented in table 23b.

b. Rationalization of ITK practices

Table 23b Rationalization of ITK practices by scientists

No	ITK	Rationality
1	Preservation of bitter gourd seeds by covering with a paste of cow dung and then fixed on the wall of kitchen or over hearth	This protects the seeds from high temperature and help to maintain optimum moisture level
2	Covering bitter gourd fruits (for seed purpose) with teak leaves	Oily nature of teak leaves repels the raindrops falling and prevents the fruit from rotting it also prevents fruit fly

c. Evaluation of ITK practices

Table 23c Evaluation of ITK practices by farmers and extension personnel

Sl No	Items correlated	Correlation coefficient
1	FSS & ESS (PE)	0.293*
2	FSS & ESS (SR)	0.394*

*- Significant @ 5 % level of probability

A perusal of table 23c showed that the scores given by the FSS and ESS were positively and significantly correlated. From this it was evident that the farmers and extension personnel were in agreement with the ITK practices followed by the farmers.

2. *Plant protection*

a. Collection of ITK practices

Table 24a Collection of ITK practices

No. of practices collected	No. of practices rationalized	No. of practices not rationalized
3	1	2

Only one practice among the three is rationalized for plant protection aspect of bittergourd (Table 24a). The rationalized practice along with its rationality is presented in table 24b.

b. Rationalization of ITK practices

Table 24b Rationalization of ITK practices by scientists

1	Intercropping of bitter gourd with elephant foot yam will decrease stunting of bitter gourd	Elephant foot yam can tolerate shade moreover soil aeration can be improved by growing elephant foot yam

c. Evaluation of ITK practices

Table 24c Evaluation of ITK practices by farmers and extension personnel

Sl No	Items correlated	Correlation coefficient
1	FSS & ESS (PE)	0.293*
2	FSS & ESS (SR)	0.394*

*- Significant @ 5 % level of probability

It is evident from table 24c that the scores given by FSS and ESS were positively and significantly correlated. It is inferred that farmer and extension personnel were of same opinion regarding the practices.

3. *Methods to increase yield*

a. Collection of ITK practices

Table 25a Collection of ITK practices

No. of practices collected	No. of practices rationalized	No. of practices not rationalized
3	3	0

It is understood from table 25a that all the three practices collected under methods to increase yield in bittergourd were rationalized by scientists and the practices along with their rationality are presented in table 25b.

b. Rationalization of ITK practices

Table 25b Rationalization of ITK practices by scientists

No	ITK	Rationality
1	Smoking under *Pandal* enhances fruit set, reduces pest attack and adds fertility to soil	Smoke has got some gaseous element which improves fruit set and it has got pest repelling action and the ash improves fertility
2	Placing wet bundle of straw over bitter gourd seeds. This was to enhance germination	It always keeps the seeds moist
3	. Burning basins before sowing	Field sanitation practice kill insects and pests

c. Evaluation of ITK practices

Table 25c Evaluation of ITK practices by farmers and extension personnel

Sl No	Items correlated	Correlation coefficient
1	FSS & ESS (PE)	0.293*
2	FSS & ESS (SR)	0.394*

*- Significant @ 5 % level of probability

From table 25c it is inferred that positive and significant correlation was there between scores given by FSS and ESS for ITK items. This showed that the farmers and extension personnel had no difference in opinion regarding these ITK practices.

4. *Seedlings*

a. Collection of ITK practices

Table 26a Collection of ITK practices

No. of practices collected	No. of practices rationalized	No. of practices not rationalized
3	3	0

Three practices were collected under seedling method in bittergourd and all these practices were found to be rational by scientists. (Table 26a). The practices along with their rationality are presented in table 26b.

b. Rationalization of ITK practices

Table 26b Rationalization of ITK practices by scientists

No	ITK	Rationality
1	Raising seedlings of bitter gourd in jack leaf cones	This helps in proper establishment of crops after transplanting
2	Wet soil after mixing with wood ash and cow dung was taken in a banana sheath and seeds were sown in it	This provides nutrients and maintains moisture for germinating seeds
3	Raising of seedling in loose soil and then it was transplanted	It avoids root damage while transplanting and help in easy establishment

c. Evaluation of ITK practices

Table 26c Evaluation of ITK practices by farmers and extension personnel

Sl No	Items correlated	Correlation coefficient
1	FSS & ESS (PE)	0.293*
2	FSS & ESS (SR)	0.394*

*- Significant @ 5 % level of probability

From table 26c it is inferred that the scores given by the FSS and ESS were positively and significantly correlated. This showed that the belief scores of farmers and perceived effect and scientific rationality scores of extension personnel were in agreement.

d. Documentation of ITK practices in **bittergourd** crop.

Seed storage

1. Preserve bitter gourd seeds by covering with a paste of cow dung.
2. Covering bitter gourd fruits (for seed purpose) with teak leave.

Plant protection

3. Intercropping of bitter gourd with elephant foot yam will decrease stunting of bitter gourd.

Methods to increase yield

4. Smoke under *Pandal* to enhance fruit set.
5. Place wet bundle of straw over bitter gourd seeds.
6. Burn basins before sowing.

Seedlings

7. Raising seedlings of bitter gourd in jack leaf cones.
8. Wet soil after mixing with wood ash and cow dung was taken in a banana sheath and seeds were sown in it.
9. Raising of seedlings in loose soil.

D. **Chilly**

1. *Seed treatment*

a. Collection of ITK practices

Table 27a Collection of ITK practices

No. of practices collected	No. of practices rationalized	No. of practices not rationalized
2	1	1

From table 27a it is understood that out of the two practices collected under seed treatment in chilly only one was rationalized by scientists and the practice along with its rationale is presented in table 27b.

b. Rationalization of ITK practices

Table 27b Rationalization of ITK practices by scientists

No	ITK	Rationality
1	Chilly seeds if soaked in starch water will increase germination	Starch helps to retain moisture and provides food for beneficial microorganisms

c. Evaluation of ITK practices

Table 27c Evaluation of ITK practices by farmers and extension personnel

Sl No	Sample groups	Correlation coefficient
1	FSS & ESS (PE)	0.293*
2	FSS & ESS (SR)	0.394*

*- Significant @ 5 % level of probability

It is evident from table 27c that the belief scores of farmers and scores given by extension personnel for perceived effect and scientific rationality were significantly and positively correlated. This showed that the FSS and ESS are of same opinion regarding the ITK practice.

2. *Plant protection*

a. Collection of ITK practices

Table 28a Collection of ITK practices

No. of practices collected	No. of practices rationalized	No. of practices not rationalized
2	1	1

Two practices were collected under plant protection aspect of chilly crop and scientists rationalized one practice (Table 28a). The results of rationalization are presented in table 28b.

b. Rationalization of ITK practices

Table 28b Rationalization of ITK practices by scientists

No	ITK	Rationality
1	Growing Marigold in chilly plots reduce nematode	Roots of marigold has got some exudates which has got nematicidal property

c. Evaluation of ITK practices

Table 28c Evaluation of ITK practices by farmers and extension personnel

Sl No	Sample groups	Correlation coefficient
1	FSS & ESS (PE)	0.293*
2	FSS & ESS (SR)	0.394*

*- Significant @ 5 % level of probability

From table 28c it is inferred that significant and positive correlation was there between scores given by FSS and ESS for ITK items. This showed that the farmers and extension personnel had no difference in opinion regarding these ITK practices.

d. Documentation of ITK practices in **chilly** crop.

Seed treatment

1. Chilly seeds are soaked in starch water will increase germination.

Plant protection

2. Growing Marigold in chilly plots reduce nematode.

E. Pumpkin

1. *Methods to increase yield*

a. Collection of ITK practices

Table 29a Collection of ITK practices

No. of practices collected	No. of practices rationalized	No. of practices not rationalized
1	1	0

Only one ITK practice was collected under methods to increase yield in pumpkin, which was scientifically rationalized (Table 29a). The practice and its rationality are presented under table 29b.

2.5.1.2 Rationalization of ITK practices

Table 29b Rationalization of ITK practices by scientists

No	ITK	Rationality
1	During planting of pumpkin if fresh cow dung was applied to internodes	It will improve rooting in the internodes

2.5.1.3 Evaluation of ITK practices

Table 29c Evaluation of ITK practices by farmers and extension personnel

Sl No	Sample groups	Correlation coefficient
1	FSS & ESS (PE)	0.293*
2	FSS & ESS (SR)	0.394*

*- Significant @ 5 % level of probability

From table 29c it is inferred that the scores given by FSS for belief and ESS for perceived effect and scientific rationality were correlated and hence it is evident that the farmer and the extension personnel were of same opinion regarding the ITK.

d. Documentation of ITK practices in **pumpkin.**

Method to increase yield.

1. During planting of pumpkin if fresh cow dung was applied to internodes it will increase the growth rate and flowering increases.

4.3 RICE BASED CROPPING SYSTEM

1. *Seed selection*

a. Collection of ITK practices

Table 30a Collection of ITK practices

No. of practices collected	No. of practices rationalized	No. of practices not rationalized
6	4	2

Six ITK practices were collected in seed selection aspect of rice crop and among these practices scientists rationalized four practices (Table 30a). The results of rationalization are presented in table 30b.

b. Rationalization of ITK practices

Table 30b Rationalization of ITK practices by scientists

No	ITK	Rationality
1	Rice for seed purpose was threshed soon after harvest	If threshed soon after harvest the vitality was maintained for long time
2	Seeds were collected from areas of good soil depth	In these types of soil the grain weight was more hence good seed
3	For testing viability of seeds it was just broken into two pieces	The rationality of the practice was that by breaking the seed the presence of viable embryo can be seen
4	Avoid seeds at the bottom of the heap for sowing. It was found to have less sprouting capacity	I. Moreover anaerobic condition at the bottom which affects the germination

c. Evaluation of ITK practices

Table 30c Evaluation of ITK practices by farmers and extension personnel

Sl No	Sample groups	Correlation coefficient
1	FSS & ESS (PE)	0.392*
2	FSS & ESS (SR)	0.442**

**- Significant @ 1 % level of probability

*- Significant @ 5 % level of probability

From the table 30c it is evident that the perceived effects and scientific rationality of ITK by ESS and the belief about ITK by the FSS were positively and significantly correlated. Hence, it is inferred that scores assigned by the FSS and ESS were in full agreement with each other.

2 *Seed treatment*

a. Collection of ITK practices

Table 31a Collection of ITK practices

No. of practices collected	No. of practices rationalized	No. of practices not rationalized
6	6	0

All the six ITK practices collected under seed selection of rice six were rationalized by scientists (Table 31a). The results of rationalization are presented in table 31b.

b. Rationalization of ITK practices

Table 31b Rationalization of ITK practices by scientists

No	ITK	Rationality
1	Put an egg in water and add common salt till the egg floats. Dip seeds in this water for some time. This will increase sprouting	The salt water has got fungicidal property and it will help in the removal of chaffy grains
2	One week before sowing give a heat treatment to seeds by spreading in sunlight. This will increase germination percentage	By heat treatment revitalization of metabolites takes place and it kills storage pests and help in control of diseases hence germination percentage increases
3	*"Mampoo kaanikkkal"* – helps to retain viability in the store. This involves spreading seeds in courtyard exposing it to wind, sun and snow for three days in the month of *'Kumbam'* (Feb-March).	During this treatment the seeds absorb dew (moisture) and this increases viability of the seeds
4	Dipping rice seeds in salt water before sowing	Salt water has got anti fungal properties
5	Seed treatment- seeds were dipped in water mixed with cow dung for 6 hrs. Then water was drained and seeds were heaped in baskets. Small twigs with leaves of gooseberry were placed over and covered with gunny bags. A weight was placed over this and watered to hasten germination	Seeds absorb nutrients from cow dung and cow dung solution was found to have some hormones. Gooseberry leaves were believed to generate heat thus helping in emergence of vigorous buds
6	Dip seed in water of temperature 50 ^{0} C for 10 minutes. Then dip in cold water for 24 hrs. Then tie it in sacks and keep for another 24 hrs. This will increase germination percentage	The rationality of the practice was that in case of tall indica where dormancy was a problem this type of seed treatment was given. It control pests and diseases on grains and enable selection of immersed seeds

c. Evaluation of ITK practices

Table 31c Evaluation of ITK practices by farmers and extension personnel

Sl No	Sample groups	Correlation coefficient
1	FSS & ESS (PE)	0.392*
2	FSS & ESS (SR)	0.442**

**- Significant @ 1 % level of probability

*- Significant @ 5 % level of probability

From the table 31c it is evident that the perceived effects and scientific rationality of ITK by ESS and the belief about ITK by the FSS were positively and significantly correlated. Hence, it is inferred that scores assigned by the FSS and ESS were in full agreement with each other.

3 *Seed storage*

a. Collection of ITK practices

Table 32a Collection of ITK practices

No. of practices collected	No. of practices rationalized	No. of practices not rationalized
6	4	2

From table 32a it is understood that out of six ITK practices collected under seed storage of rice crop scientists rationalized four and the result of rationalization are presented in table 32b.

b. Rationalization of ITK practices

Table 32b Rationalization of ITK practices by scientists

No	ITK	Rationality
1	Seeds in store were mixed with fruits of ' *Karim cheru*' (*Holigarna arnottiana*) to ward off storage pests	The seeds have got some repellent action
2	Seeds were stored in *Vallam* and mixed with leaves of Neem to control pests	That neem leaves has got some insecticidal property
3	Neem leaves were burned in the store for smoking seeds	Smoke has got repellent action and neem has got insecticidal property
4	Along with stored paddy seeds put neem leaves/ *Karinochi (Vitex negudo).*	*Karinochi* and neem was found to have repellent action

c. Evaluation of ITK practices

Table 32c Evaluation of ITK practices by farmers and extension personnel

Sl No	Sample groups	Correlation coefficient
1	FSS & ESS (PE)	0.392*
2	FSS & ESS (SR)	0.442**

**- Significant @ 1 % level of probability

*- Significant @ 5 % level of probability

From table 32c it is evident that the perceived effects and scientific rationality of ITK by ESS and the belief about ITK by the FSS are positively and significantly correlated. Hence, it is inferred that scores assigned by the FSS and ESS was in full agreement with each other.

4 *Land preparation*

a. Collection of ITK practices

Table 33a Collection of ITK practices

No. of practices collected	No. of practices rationalized	No. of practices not rationalized
1	1	0

Single ITK practice in land preparation were collected in rice crop and scientists rationalized the same. (Table 33a). The results of rationalization are presented in table 33b.

b. Rationalization of ITK practices

Table 33b Rationalization of ITK practices by scientists

No	ITK	Rationality
1	In preparation of nursery expose to sunlight for 12 hrs after draining water. Then sow sprouted seeds. This will prevent deep placement *(Cheeruthinnal)* of seeds	If the nursery was kept of some time after leveling the mud get settled so that seeds will not be placed deeply which result in early germination. It also increases spreading of grains

c. Evaluation of ITK practices

Table 33c Evaluation of ITK practices by farmers and extension personnel

Sl No	Sample groups	Correlation coefficient
1	FSS & ESS (PE)	0.392*
2	FSS & ESS (SR)	0.442**

**- Significant @ 1 % level of probability

*- Significant @ 5 % level of probability

From table 33c it is inferred that the scores given by the FSS and ESS were positively and significantly correlated. This showed that the belief scores of farmers and perceived effect and scientific rationality scores of extension personnel were in agreement.

5 *Manuring*

a. Collection of ITK practices

Table 34a Collection of ITK practices

No. of practices collected	No. of practices rationalized	No. of practices not rationalized
5	5	0

Out of five ITK practices collected under manuring practices in rice all were rationalized by scientists. (Table 34a)

b. Rationalization of ITK practices

Table 34b Rationalization of ITK practices by scientists

No	ITK	Rationality
1	Application of ash increases grain yield and application of cow dung increases straw yield	Ash supplies potassium so yield increases and cow dung supplies nitrogen which increases vegetative growth
2	If cashew leaves were used as green manure especially in *Poonthal Padangal* it improves soil structure	The rationality was that any green manure improves soil structure and hence increases productivity
3	In areas of Iron toxicity add mango leaves and twigs as green manure	Rationality was that green manure reduces iron toxicity nothing peculiar about mango leaves
4	Add cowpea seeds along with rice seeds when sowing in water less condition *(Podivita)* at the rate 12.5 kg/ ha	That it increases the availability of green manure and overall yield increase
5	Add calotropis, as green manure. It can decrease incidence of pests and diseases	It has got repellent properties

c. Evaluation of ITK practices

Table 34c Evaluation of ITK practices by farmers and extension personnel

Sl No	Sample groups	Correlation coefficient
1	FSS & ESS (PE)	0.392*
2	FSS & ESS (SR)	0.442**

**- Significant @ 1 % level of probability

*- Significant @ 5 % level of probability

It is evident from table 34c that the perceived effects and scientific rationality of ITK by ESS and the belief about ITK by the FSS were positively and significantly correlated. Hence, it is inferred that scores assigned by the FSS and ESS were in full agreement with each other.

6 *Adjustment to season*

a. Collection of ITK practices

Table 35a Collection of ITK practices

No. of practices collected	No. of practices rationalized	No. of practices not rationalized
2	2	0

Table 35a showed that out of two ITK practices collected under adjustment to season in rice crop all were rationalized by scientists. The results of rationalization are presented in table 35b.

b. Rationalization of ITK practices

Table 35b Rationalization of ITK practices by scientists

No	ITK	Rationality
1	Sowing seeds in *'Karutta Pakasham'* decrease incidence of *Chazhi* , *(Leptocorisa acuta)*	It asynchronises the milking stage of grains and life cycle of the pests
2	Avoid planting during *Pooyam Njattuvela* (July 18- August 2) to decrease the incidence of gallfly and shoot borer	It asynchronises the most susceptible stage of rice with the most damaging stage of insect

c. Evaluation of ITK practices

Table 35c Evaluation of ITK practices by farmers and extension personnel

Sl No	Sample groups	Correlation coefficient
1	FSS & ESS (PE)	0.392*
2	FSS & ESS (SR)	0.442**

**- Significant @ 1 % level of probability

*- Significant @ 5 % level of probability

From table 35c it is inferred that the scores given by the FSS and ESS were positively and significantly correlated. This showed that the belief scores of

farmers and perceived effect and scientific rationality scores of extension personnel are in agreement.

7 *Plant protection*

a. Collection of ITK practices

Table 36a Collection of ITK practices

No. of practices collected	No. of practices rationalized	No. of practices not rationalized
4	2	2

It is evident from table 36a that under plant protection aspect of rice two practices were rationalized among the four collected.

b. Rationalization of ITK practices

Table 36b Rationalization of ITK practices by scientists

No	ITK	Rationality
1	Before transplanting the seedlings were uprooted and then heaped. This heaping generates heat. This reduces pest incidence this practice was called *'Kunda koottal'*	It generates heat kill eggs and larvae of pests especially of stem borer and case worm
2	To decrease damage due to rodents hang white plastic bags and split pseudo stem of banana in rice fields	The white colour has got a scaring effect, which wards off rodents

c. Evaluation of ITK practices

Table 36c Evaluation of ITK practices by farmers and extension personnel

Sl No	Sample groups	Correlation coefficient
1	FSS & ESS (PE)	0.392*
2	FSS & ESS (SR)	0.442**

**- Significant @ 1 % level of probability

*- Significant @ 5 % level of probability

It is evident from table 36c that the perceived effects and scientific rationality of ITK by ESS and the belief about ITK by the FSS were positively and significantly correlated. Hence, it is inferred that scores assigned by the FSS and ESS were in full agreement with each other.

8. *Methods to increase yield*

a. Collection of ITK practices

Table 37a Collection of ITK practices

No. of practices collected	No. of practices rationalized	No. of practices not rationalized
2	2	0

All the two ITK practices collected under methods to increase yield rationalized by scientists (Table 37a). The practices and their rationality are presented in table 37b.

b. Rationalization of ITK practices

Table 37b Rationalization of ITK practices by scientists

No	ITK	Rationality
1	During transplanting if seedlings were transplanted in a slanting manner	It increases the number of tillers and hence yield increases
2	Harvesting of rice before reaching complete maturity will decrease grain fall	Before reaching of full senescence if harvested the grain falling will be less

c. Evaluation of ITK practices

Table 37c Evaluation of ITK practices by farmers and extension personnel

Sl No	Sample groups	Correlation coefficient
1	FSS & ESS (PE)	0.392*
2	FSS & ESS (SR)	0.442**

**- Significant @ 1 % level of probability

*- Significant @ 5 % level of probability

From table 37c it is inferred that the scores given by the FSS and ESS were positively and significantly correlated. This showed that the belief scores of farmers and perceived effect and scientific rationality scores of extension personnel were in agreement.

9 *Other cultural practices*

a. Collection of ITK practices

Table 38a Collection of ITK practices

No. of practices collected	No. of practices rationalized	No. of practices not rationalized
1	1	0

Only one practice that was collected under other cultural practices was rationalized by the scientists (Table 38a). The ITK practice and its rationale are presented in table 38b.

b. Rationalization of ITK practices

Table 38b Rationalization of ITK practices by scientists

No	ITK	Rationality
1	Sprinkling of common salt in nursery beds @ 2kg/cent makes the uprooting of seedlings easier	Deflocculation of soil takes place hence the soil loosens and it helps for easy uprooting of seedlings

c. Evaluation of ITK practices

Table 38c Evaluation of ITK practices by farmers and extension personnel

Sl No	Sample groups	Correlation coefficient
1	FSS & ESS (PE)	0.392*
2	FSS & ESS (SR)	0.442**

**- Significant @ 1 % level of probability

*- Significant @ 5 % level of probability

It is evident from table 38c that the perceived effects and scientific rationality of ITK by ESS and the belief about ITK by the FSS were positively and

significantly correlated. Hence, it was inferred that scores assigned by the FSS and ESS were in full agreement with each other.

d. Documentation of ITK practices in **rice** crop.

Seed selection

1. Rice for seed purpose was threshed soon after harvest.
2. Seeds were collected from areas of good soil depth.
3. For testing viability of seeds it was just broken into two pieces.
4. Avoid seeds at the bottom of the heap for sowing.

Seed treatment

5. Put an egg in water and add common salt till the egg floats. Dip seeds in this water for some time.
6. One week before sowing give a heat treatment to seeds by spreading in sunlight.
7. "Mampoo kaanikkkal" – helps to retain viability in the store. This involves spreading seeds in courtyard exposing it to wind, sun and snow for three days in the month of 'Kumbam' (Feb-March).
8. Dipping rice seeds in salt water before sowing.
9. Seeds were dipped in water mixed with cow dung for 6 hrs. Then water was drained and seeds were heaped in baskets. Small twigs with leaves of gooseberry were placed over and covered with gunny bags. A weight was placed over this and watered to hasten germination.
10. Dip seed in water of temperature 50 ^{0} C for 10 minutes. Then dip in cold water for 24 hrs. Then tie it in sacks and keep for another 24 hrs.

Seed storage

11. Seeds in store were mixed with fruits of ' Karim cheru' (*Holigarna arnottiana*) to ward off storage pests.
12. Seeds were stored in Vallam and mixed with leaves of Neem.
13. Neem leaves were burned in the store for smoking seeds.
14. Along with stored paddy seeds put neem leaves/ Karinochi (*Vitex negudo*)to decrease storage pests.

Land preparation

15. In preparation of nursery expose to sunlight for 12 hrs after draining water.

Manuring

16. Application of ash increases grain yield and application of cow dung increases straw yield.
17. If cashew leaves are used as green manure especially in Poonthal Padangal it improves soil structure.
18.. In areas of Iron toxicity add mango leaves and twigs as green manure.
19. Add cowpea seeds along with rice seeds when sowing in water less condition (Podivita) at the rate 12.5 kg/ ha.
20. Add calotropis, as green manure.

Adjustment to season

21. Sowing seeds in 'Karutta Pakasham' decrease incidence of Chazhi (*Leptocorisa acuta.)* .
22. Avoid planting during Pooyam Njattuvela (July 18- August 2) to decrease the incidence of gallfly and shoot borer.

Plant protection

23. Before transplanting the seedlings were uprooted and then heaped.
24. To decrease damage due to rodents hang white plastic bags and split pseudo stem of banana in rice fields.

Methods to increase yield

25. During transplanting seedlings were transplanted in a slanting manner.
26. Harvesting of rice before reaching complete maturity will decrease grain fall.

Other cultural practices

27. Sprinkling of common salt in nursery beds @ 2kg/cent makes the uprooting of seedlings easier.

HOMESTEAD BASED MIXED FARMING

1. *Methods to increase milk yield*

a. Collection of ITK practices

Table 39a Collection of ITK practices

No. of practices collected	No. of practices rationalized	No. of practices not rationalized
6	4	2

Out of six practices collected under methods to increase yield of milk in cows, scientists rationalized four practices (Table 39a). The ITK practices along with their rationality are presented in table 39b.

b. Rationalization of ITK practices

Table 39b Rationalization of ITK practices by scientists

No	ITK	Rationality
1	To increase fat content in milk give half-ounce Nallenna/ day	Any oil increases fat content in milk
2	Keep the time of milking fixed for getting good milk yield	It was in relation to secretion of the hormone oxytocin
3	Add some sweet substance to cattle feed to increase milk availability	It stimulates the secretion of the hormone oxytocin
4	Feeding mulberry leaves to cows increases milk yield	Green leaf feeding increases milk yield

c. Evaluation of ITK practices

Table 39c Evaluation of ITK practices by farmers and extension personnel

Sl No	Sample groups	Correlation coefficient
1	FSS & ESS (PE)	0.447**
2	FSS & ESS (SR)	0.542**

**- Significant @ 1% level of probability

From table 39c it was evident that the perceived effects and scientific rationality of ITK by ESS and the belief about ITK by the FSS were positively and significantly correlated. Hence, it was inferred that scores assigned by the FSS and ESS were in full agreement with each other.

2 *Animal protection*

a. Collection of ITK practices

Table 40a Collection of ITK practices

No. of practices collected	No. of practices rationalized	No. of practices not rationalized
11	8	3

Scientists rationalized eight out of 11 practices collected under animal protection. (Table 40a). The results of rationalization are presented in table 40b.

b. Rationalization of ITK practices

Table 40b Rationalization of ITK practices by scientists

No	ITK	Rationality
1	In case of breaking of horn apply turmeric along with charcoal	Turmeric has got antiseptic properties and charcoal absorbs moisture
2	To avoid drying of teats apply pig fat	It has got soothening effect and pig fat has got some medicinal properties
3	For coming out of placenta in cows give leaves of *Bamboosa bambos*	The leaves causes some irritation in the stomach which results in expulsion
4	In case if cows drink rubber milk to avoid coagulation give coconut oil	It results in formation of small globules of rubber which was easily excreted
5	In case of constipation in newborn calves give a teaspoon of castor oil	Castor oil was an irritant purgative
6	For coming out of placenta give unripe pineapple, mango leaves	All these creates an irritation in stomach resulting expulsion
7	When navel point of cow reaches the udder part then it was time for delivery	It depends on the breed
8	To protect cattle from attack of lice neem oil was applied over the body	Neem oil has got repellent action

c. Evaluation of ITK practices

Table 40c Evaluation of ITK practices by farmers and extension personnel

Sl No	Sample groups	Correlation coefficient
1	FSS & ESS (PE)	0.447**
2	FSS & ESS (SR)	0.542**

**- Significant @ 1% level of probability

It is evident from table 40c that the perceived effects and scientific rationality of ITK by ESS and the belief about ITK by the FSS were positively and significantly correlated. Hence, it was inferred that scores assigned by the FSS and ESS were in full agreement with each other.

3 *Delayed lactation*

a. Collection of ITK practices

Table 41a Collection of ITK practices

No. of practices collected	No. of practices rationalized	No. of practices not rationalized
6	5	1

Five out of six ITK practices collected under practices against delayed lactation was rationalized by the scientists (Table 41a). The practices along with their rationale are presented in table 41b.

b. Rationalization of ITK practices

Table 41b Rationalization of ITK practices by scientists

No	ITK	Rationality
1	Feeding calves with oil cakes results in delayed maturity	It result in fat accumulation
2	In case of delayed maturity give sprouted cowpea or *Cicer arietinum* or egg	The sprouts contain high concentration of vitamin E which was anti sterility vitamin
3	In case if cows were not showing heat symptoms give one handful of moringa leaves for one week. Then give one egg mixed with food	Moringa leaves contain vitamin E which was antwasterility vitamin
4	Give 200 ml gingelly oil mixed with 2 eggs three times in 4 days interval between each dose for those cows, which were not getting fertilized	Gingili has got meat tenderizing effect. All the muscles may get softened includes the vaginal muscles, which may result in fertilization
5	For cows which were not lactating cover their back with wet gunny bags	It was a reflux action

c. Evaluation of ITK practices

Table 41c Evaluation of ITK practices by farmers and extension personnel

Sl No	Sample groups	Correlation coefficient
1	FSS & ESS (PE)	0.447**
2	FSS & ESS (SR)	0.542**

**- Significant @ 1% level of probability

It is evident from table 41c that the perceived effects and scientific rationality of ITK by ESS and the belief about ITK by the FSS were positively and significantly correlated. Hence, it is inferred that scores assigned by the FSS and ESS were in full agreement with each other.

d. Documentation of ITK practices in homestead based mixed farming.

Methods to increase milk yield

1. To increase fat content in milk give half-ounce Nallenna/ day.
2. Keep the time of milking fixed.
3. Add some sweet substance to cattle feed.
4. Feeding the cows with mulberry leaves.

Animal protection

5. In case of breaking of horn apply turmeric along with charcoal.
6. To avoid drying of teats apply pig fat.
7. For coming out of placenta in cows give leaves of *Bamboosa bambos.*
8. In case if cows drink rubber milk to avoid coagulation give coconut oil.
9. In case of constipation in newborn calves give a teaspoon of castor oil.
10. For coming out of placenta give unripe pineapple, mango leaves.
11. When navel point of cow reaches the udder part then it is time for delivery.
12. To protect cattle from attack of lice neem oil was applied over the body.

Against delayed lactation

13. Feeding calves with oil cakes results in delayed maturity.

14. In case of delayed maturity give sprouted cowpea or Cicer arietinum or egg.
15. In case if cows were not showing heat symptoms give one handful of moringa leaves for one week. Then give one egg mixed with food.
16. Give 200 ml gingelly oil mixed with 2 eggs three times in 4 days interval between each dose for those cows, which are not getting fertilized.
17. For cows that are not lactating cover their back with wet gunny bags.

4.5 ANNUAL CROPS

A Banana

1. Adjustment to season

a. Collection of ITK practices

Table 42a Collection of ITK practices

No. of practices collected	No. of practices rationalized	No. of practices not rationalized
1	1	0

Single practice was collected under adjustment to season in banana and scientists rationalized it. (Table 42a). The practice and its rationality is presented in table 42b.

b. Rationalization of ITK practices

Table 42b Rationalization of ITK practices by scientists

No	ITK	Rationality
1	If *onam* was in the first half of *Chingam* plant banana in the starting of *Attam Njattkuvela* and if *onam* was in the second half of *Chingam* plant banana in the starting of *Chothi Njattuvela*	This was one easy method to synchronize next years harvest with *onam*. This ensures approximately ten months to next *onam*.

c. Evaluation of ITK practices

Table 42c Evaluation of ITK practices by farmers and extension personnel

Sl No	Items correlated	Correlation coefficient
1	FSS & ESS (PE)	0.828**
2	FSS & ESS (SR)	0.791**

**- significant @ 1 % level of probability

From table 42c it is evident that the scores given by the FSS for belief and ESS for perceived effect and scientific rationality were positively and significantly correlated. From this it is inferred that there was high level of agreement between farmers and extension personnel regarding these ITK practices.

2. *Other cultural practices*

a. Collection of ITK practices

Table 43a Collection of ITK practices

No. of practices collected	No. of practices rationalized	No. of practices not rationalized
4	2	2

Four practices were collected under other cultural practices in banana and only two practices were rationalized by scientists (Table 43a). The result of rationalization are presented in table 43b.

b. Rationalization of ITK practices

Table 43b Rationalization of ITK practices by scientists

No	ITK	Rationality
1	Covering banana bunch with 'Mullan payal' will improve the shape and look of the bunch and avoid attack of birds	It will prevent attack of birds
2	For speedy ripening of bunches put leaves of *Cassia fistula* along with bunches	Was due to ethylene gas that comes out that hastens ripening

c. Evaluation of ITK practices

Table 43c Evaluation of ITK practices by farmers and extension personnel

Sl No	Items correlated	Correlation coefficient
1	FSS & ESS (PE)	0.828**
2	FSS & ESS (SR)	0.791**

**- significant @ 1 % level of probability

From the above table, it is evident that the perceived effects and scientific rationality of ITK by ESS and the belief about ITK by the FSS were highly and significantly correlated. Hence, it is inferred that scores assigned by the FSS and ESS were in full agreement with each other.

3 *Methods to increase yield*

a. Collection of ITK practices

Table 44a Collection of ITK practices

No. of practices collected	No. of practices rationalized	No. of practices not rationalized
2	2	0

From table 44a it is understood that out of two ITK practices collected under methods to increase yield in banana both were rationalized by scientists. The results of rationalization are presented in table 44b.

b. Rationalization of ITK practices

Table 44b Rationalization of ITK practices by scientists

No	ITK	Rationality
1	Applying fermented groundnut cake to banana improves the yield	Groundnut cake was a form of concentrated organic manure
2	Do not allow growth of suckers till bunch emergence in Nendran	There will be diversion of energy and it will result in lessening of bunch weight

c. Evaluation of ITK practices

Table 44c Evaluation of ITK practices by farmers and extension personnel

Sl No	Items correlated	Correlation coefficient
1	FSS & ESS (PE)	0.828**
2	FSS & ESS (SR)	0.791**

**- significant @ 1 % level of probability

From the above table, it is evident that the perceived effects and scientific rationality of ITK by ESS and the belief about ITK by the FSS were highly and significantly correlated. Hence, it is inferred that scores assigned by the FSS and ESS were in full agreement with each other.

c. Documentation of ITK practices in banana

Adjustment to season

1. If *onam* was in the first half of *Chingam* plant banana in the starting of *Attam Njattkuvela* and if *onam* is in the second half of *Chingam* plant banana in the starting of *Chothi Njattuvela.*

Other cultural practices

2. Covering banana bunch with 'Mullan payal' will improve the shape and look of the bunch and avoid attack of birds. It will prevent attack of birds.
3. Put leaves of Kanikonna (*Cassia fistula*) along with bunches to hasten ripening.

Methods to increase yield

4. An increased yield can be achieved by applying fermented groundnut cake to banana.
5. Do not allow growth of suckers till bunch emergence in Nendran. There will be diversion of energy and it will result in lessening of bunch weight.

B Tapioca

1. Plant protection

a. Collection of ITK practices

Table 45a Collection of ITK practices

No. of practices collected	No. of practices rationalized	No. of practices not rationalized
6	4	2

From table 45a it is observed that out of six practices collected under plant protection practices of tapioca four were rationalized by scientists. The practices and its rationality are presented in table 45b.

b. Rationalization of ITK practices

Table 45b Rationalization of ITK practices by scientists

No	ITK	Rationality
1	To prevent attack of rats in tapioca field, plant turmeric between tapioca	Turmeric has got repellent action
2	Planting Chettikkoduveli between tapioca will prevent rat attack	The root extracts cause a burning sensation so the rats, which eat tapioca often, bite root of *chettikkoduveli* so the rats do not come to the field
3	To avoid attack by rodents in pine apple gardens plant tapioca at the border of the garden	The rats will eat tapioca in the border and go back
4	In tapioca application of fresh cow dung to the cut ends	It prevents drying up of setts

c. Evaluation of ITK practices

Table 45c Evaluation of ITK practices by farmers and extension personnel

Sl No	Items correlated	Correlation coefficient
1	FSS & ESS (PE)	0.828**
2	FSS & ESS (SR)	0.791**

**- significant @ 1 % level of probability

From the table 45c it is evident that the perceived effects and scientific rationality of ITK by ESS and the belief about ITK by the FSS were highly and significantly correlated. Hence, it is inferred that scores assigned by the FSS and ESS were in full agreement with each other

D. Documentation of ITK practices in tapioca.

Plant protection

1. To prevent attack of rats in tapioca field, plant turmeric between tapioca.
2. Planting Chettikkoduveli between tapioca will prevent rat attack.
3. To avoid attack by rodents in pine apple gardens plant tapioca at the border of the garden.
4. In tapioca application of fresh cow dung to the cut ends.


DISCUSSION

Chapter V
DISCUSSION

The discussion of the results obtained under the study "Rationalization on ITK in production management in farm production systems of Palakkad district" is presented in this chapter.

PLANTATION CROPS INCLUDING SPICES

A. Coconut

Kerala is the land of coconut trees and it is known as the 'Kalpravriksha' of the state. The name Kerala came from the Malayalam name of coconut 'Kera'. It is surrounded with numerous beliefs and rituals. There were a lot of traditional practices followed in this crop from time immemorial for protection and promotion of the crop. The strong belief of farmers on the different ITK practices followed by them generation after generation might be the reason attributed to the scientific rationality of the same and positive perception of extension personnel towards IT practices. The practices ranged from seed selection, seed treatment, seed storage, seed collection, seedling selection, sowing, land preparation, water management, manuring, and adjustment to season, plant protection and other cultural practices. The different ITK practices which were collected clearly indicated that the farming community, over the generations have developed these practices through careful trial and error methods weighing the 'pros' and 'cones'. Many of them were still in practice while many ITK practices were mere recollection of farmers and still a certain category of ITK practices have blended modified or attained newer uses through technology advancement. So the collection of ITK practices had already benefited the farmers and generally the mankind. This was in concurrence with the studies of Vijayalakshmi and Sunder (1994) who documented many practices, which were very popular in the past.

The positive and significant correlation obtained for the PE and SR by the farmers and extension personnel indicate the continued adoption of those ITK

practices extensively even today. The farmers might be practicing the ITK practices widely without being aware about its scientific reasoning but the results here is a clear indication that the practices followed by the farmers were having scientific rationality.

Among the various cropping systems taken, maximum numbers of ITK practices were collected from plantation crops including spices and in this, coconut occupied first position in the number of ITK. The reason was that coconut has been in cultivation for several generations and farmers have been able to observe through cultivation, the ideal methods of seed selection; seed treatment, seed collection, seedling selection, sowing, water management, manuring, adjustment to season, plant protection, methods to increase yield and other miscellaneous cultural practices. This was in conformity with the findings of Manju (1997) who collected various indigenous practices in coconut.

Various methods of selection of seed nuts in coconut like: nuts from the middle of the bunch, nuts with bottom portion round in shape and various methods to detect the functional eye such as by the position of smaller stalk or by floating of the nut in water. Most of the practices were still in use and this showed the farmers were confident about those technologies developed by their fore fathers through trial and error.

Among seed treatment methods in coconut, soaking of seed nuts in water were done for making fibre soft was considered as a rational practice. Removal of some husk at the eye portion was rational according to scientists, but farmers said that the chances for termite attack were very high, if husk was removed.

Methods for seedling selection in coconut. Seedling with higher collar girth, seedling with *Narola* and those seedlings that sprout earlier were found to be early bearers. These results were in confirmation with the findings of Manju (1996)

Methods for water management followed in coconut gardens. Methods like drip irrigation using clay pot and thread, burial of pseudo stem of banana in the basin of coconut palm, burial of Salvinia *(Salvinia molesta)* and Eicchornia

(Eicchornia crassipus) in the basin of palm, planting of banana around coconut seedling and arranging of coconut husk inside the basin. Scientists considered all these practices as rational. In case of burial of banana pseudo stem the presence of pseudo stem weevil was a problem. Some of the results were in concurrence with the studies of Manju (1996)

Manuring practices of coconut were given like application of clay obtained from bottom of ponds, application of common salt and application of a mixture of sand, salt and ash in the pit. These practices were supplemented by valid reasons and hence they were considered as rational practices

In case of coconut, transplanting was adjusted with season. Transplanting at *Kattikoombu* stage was supported by the reason that at this stage roots do not pierce outer cover of seeds and thus rooting occur directly in the transplanted pits. This was in concurrence with the findings of Manju (1996). Other practices like transplanting at *Karkidakavaarcha* and transplanting in *Kumba Bharani* were also found to be rational. This shows that farmers' traditional methods of adjustment to season have got its own importance and benefits

Production management will be incomplete without plant protection aspects. Various plant protection practices like planting of chilles in coconut nursery, burning of waste in coconut garden, planting of arrow root *(Marantha arundinaceae)* in coconut nursery, use of tamarind leaves for mulching and burning of waste in coconut basins. All these practices were found to be effective against insect pests and also give nutrients to the plants and hence rated as rational practices.

Various methods like smoking in coconut gardens, toddy tapping, and cultivation of betel vine in coconut gardens, removal of old roots of coconut tree and fixing of beehives. Incorporating chaff of rice grains to coconut basins and application of decomposed hay to coconut basins were found to increase yield of coconut palms. These were also studied by Manju, (1996).

All the items showed positive correlation at one per cent level of significance. It can be inferred that the farmers and the extension personnel were in agreement regarding their opinion about various items included in the study. This was in concurrence with the results of Kashem and Islam (1999) who revealed that farmers attitude towards ITK was positively related to their rationality at one per cent level of probability.

B. Ginger

Ginger is one of the important spice crop cultivated in Kerala which is the oldest spice crop with a distinct flavour and pungency. India is the largest grower of ginger and largest producer of dry ginger in the world. Kerala ranks first among the ginger producing states in India (60% area and 25% production). Ginger is an ingredient of many home remedies mainly used for digestive disorders and stomach diseases.

Since the crop is cultivated long before there are various ITK practices in this crop mainly for seed treatment and seed storage. Dipping of ginger seeds in cow dung slurry was done due to the antifungal property of cow dung. This was in concurrence with the study of Periera (1993) who reported the antifungal property of cow dung.

The storage of ginger seed material with lemon grass, *panal* leaves, dried leaf powder of *Kadalavanakku*, *Karinochi (Vitex negudo)*, neem *(Azadiracta indica*) and *vayambu* were listed out. These practices were done because of the repellant action of these plant products, which prevent storage pests. This result was in conformation with the finding of Abraham *et al.* (1972) who reported that some plant products when mixed with seed materials significantly reduced pest infestation.

All the items showed positive correlation at one per cent level of significance. It can be inferred that the farmers and the extension personnel were in agreement regarding their opinion about various items included in the study. This was in concurrence with the results of Kashem and Islam (1999) who revealed that

farmers attitude towards ITK was positively related to their rationality at one per cent level of probability.

In ginger, both seed treatment techniques were found as rational because scientists gave valid reasons for these practices. Smoking of ginger seeds enhances sprouting because smoke contains some gaseous hormones, which enhance sprouting. Dipping of ginger seeds in cow dung slurry was done due to the antifungal property of cow dung. This was in concurrence with the study of Periera (1993) who reported the antifungal property of cow dung.

Seed storage techniques of ginger were given in table 4. The storage of ginger seed material with lemon grass, *panal* leaves, dried leaf powder of *Kadalavanakku*, *Karinochi (Vitex negudo)*, neem *(Azadiracta indica)* and *vayambu* were listed out. These practices were done because of the repellant action of these plant products, which prevent storage pests. This result was in conformation with the finding of Abraham *et al.* (1972) who reported that some plant products when mixed with seed materials significantly reduced pest infestation.

All the items showed positive correlation at one per cent level of significance. It can be inferred that the farmers and the extension personnel were in agreement regarding their opinion about various items included in the study. This was in concurrence with the results of Kashem and Islam (1999) who revealed that farmers attitude towards ITK was positively related to their rationality at one per cent level of probability.

C. Pepper

Pepper is known as the king of spices. Pepper is used for many home remedies like bronchial diseases, for tooth pain, for fever and for diabetes. All these practices were found to be scientifically rational. These practices, which were developed by farmers through trial and error, were still now in use and farmers explained the reasons behind those practices.

The common practice of dipping pepper berries in boiled water, putting harvested pepper in sunlight for one day to make threshing easier, natural growth of pepper vines without cutting from mother plant and planting of ginger, turmeric and *Kacholam*, in pepper gardens to increase yield of pepper could be collected from farmers.

All these practices were found to be scientifically rational. These practices, which were developed by farmers through trial and error, were still now in use and farmers explained the reasons behind those practices.

All the items showed positive correlation at one per cent level of significance. It can be inferred that the farmers and the extension personnel were in agreement regarding their opinion about various items included in the study. This was in concurrence with the results of Kashem and Islam (1999) who revealed that farmers attitude towards ITK was positively related to their rationality at one per cent level of probability.

SEASONAL CROPS

ITK practices on seasonal crops viz., cowpea, bitter gourd, chilly, ash gourd and pumpkin could be collected from the study area due to their large-scale cultivation and promotion of ITK practices by Vegetable and Fruit Promotion Council Keralam (VFPCK). Maximum numbers of ITK practices for seed storage were collected in cowpea. The reasons attributed to a large number of ITK practices in cowpea were that they were the traditional crops of Kerala, easy growing and readily adaptable to existing environmental conditions and a favourite raw material for many eatables.

A. Cow pea

Cowpea is a crop of multiple uses. It is used as fodder, vegetable, pulse and green manure. In India cowpea has been known since the Vedic period and it is grown almost through out the country.

A large number of ITK practices could be collected from cowpea due to its large scale cultivation more over VFPCK is promoting ITK practices.

Cowpea though a native of Africa has been known since Vedic times. The knowledge on its nutritive value as a protein provider in combination with rice had resulted in large scale cultivation of cowpea. The limited number of seed treatment practices could be attributed to its high adaptability to natural conditions in the Palakkad region. The large number of practices is seed storage may be due to its high susceptibility in existing climate and natural conditions (extremes of weather which favour the growth of pests and diseases). The rationality behind so many practices and its use may be due to testing using locally available materials and plants, success in other crops, the one all

Various indigenous seed treatment practices were followed in this vegetable crop. Practices like drying of pods for 4-6 days; subjecting pods under storage to sunlight to protect from attack of storage pests; subjecting to natural cold treatment during *Makaram*; seed treatment with mustard oil against stored grain pest. Use of mustard oil against stored grain pest and solar drying of stored grains were in conformation with the finding of Surender *et al* (1998). All these practices were supported with valid reasons and hence considered as rational practices.

Storage of cowpea seeds with seeds of black pepper was found to avoid storage pests. This was in conformity with the findings of Pereria (1993) who reported that alkaloids in black pepper seeds were toxic to storage pests. Other methods like storing seeds with split seed coat pieces of cashew, mixing of neem leaves with stored seeds and storing with wood ash. Almost all the material mixed with seeds during storage was of pungent nature and this pungency provides a repellant action, which protect the stored seeds from storage pests. Use of neem and ash for storage of seeds was also reported by Surender *et al.* (1998).

Various indigenous manuring practices were followed in cowpea. Application of neem cake has got fertilizer effect and plant protection effect. Azadiractin repels pests and nematodes causing diseases and enhance desirable microorganisms. This was in confirmation with the results of Jyothimani (1994)

and Vivekanandan (1994). Other practices like green leaf manuring with thick leaves, adding of fresh cow dung at the time of flowering in cowpea and manuring with a mixture of green leaves and cow dung were also listed. All these practices supply plenty of organic manure to the growing plants. Organic manuring reduces pests and diseases. Due to the above reasons these practices were considered as rational.

Various indigenous methods used for plant protection were practiced in cowpea, which includes dusting of wood ash over plants and dusting of sand over plants. Wood ash and fine sand have got abrasive action that causes puncture of the cuticle layer and kills the insect.

Pinching the tip of vines to enhance branching was practiced in cowpea. This removes apical dominance and thus branching is enhanced and further results in increased yield.

All the items showed positive correlation at five per cent level of significance. It can be inferred that the farmers and the extension personnel were in agreement regarding their opinion about various items included in the study. This was in concurrence with the results of Kashem and Islam (1999) who revealed that farmers attitude towards ITK was positively related to their rationality at one per cent level of probability.

B. Ash gourd

Ashgourd is a common crop of Kerala used a vegetable. The rough and easy nature and the high adaptability in the Palakkad region might be the reason that can be considered for the rationalization of the common practices used in other crops also suited for ashgourd. The hanging of unopened fruits to ward of pests could be attributed to chemical repellants in the pericarp of the vegetable

Seed treatment in ash gourd was treating of seeds with cow dung slurry to induce good germination and it was considered as a rational practice because cow

dung provides readily available additional nutrients to sprouting seeds and some bacteriophages present in cow dung kills bacteria.

For storage of ash gourd seeds the seeds are rubbed with wood ash, storing of seeds with bird pepper seeds, seeds in unopened fruits and hanging over Aduppu were considered as rational practices.

Some indigenous land preparation practices were also explored in ash gourd. Those practices like keeping of land as such for three days after preparation, addition of lime at first digging and burning of basins before sowing were supported by sufficient scientific reasons and hence found rational. Keeping land fallow after digging and thus exposing to sunlight was in conformity with the studies of Singh (2002).

All the items showed positive correlation at five per cent level of significance. It can be inferred that the farmers and the extension personnel were in agreement regarding their opinion about various items included in the study. This was in concurrence with the results of Kashem and Islam (1999) who revealed that farmers attitude towards ITK was positively related to their rationality at one per cent level of probability.

C. Bittergourd

Indigenous seed storage practices were followed in bittergourd like preservation of bittergourd seeds by covering with a paste of cow dung and then fixed on the wall of kitchen. This protects the seeds from high temperature and helps to maintain optimum moisture level and hence considered as a rational practice and covering of bittergourd fruits for seed purpose with teak leaves was also followed and this is done because the oily nature of teak leaves repels the rain drops falling on fruits and prevents rotting.

Various methods for raising of seedlings in seasonal crops were collected. These methods were found to be effective and were practiced by farmers. These practices included raising of seeds of bittergourd in jack leaf cones which helps in

proper establishment after transplanting and seeds are sown in soil after mixing with wood ash and cow dung after spreading on a banana sheath were supported by statements for the reason of the use of specific practice and were considered as rational.

The basic need and thrust of any farmer was to get more productivity from their crop and hence these methods were of immense importance. Smoking under *pandals* in cucurbits like bitter gourd was found to increase fruit set because smoke has got some gaseous elements that increase fruit set, moreover smoke has got insect repellent action. Other practices like placing wet bundle of straw over bitter gourd seeds to enhance germination and burning of basins before sowing to kill insects were also practiced.

All the items showed positive correlation at five per cent level of significance. It can be inferred that the farmers and the extension personnel were in agreement regarding their opinion about various items included in the study. This was in concurrence with the results of Kashem and Islam (1999) who revealed that farmers attitude towards ITK was positively related to their rationality at one per cent level of probability.

D. Chilly

The cultivation of chilly in Palakkad is largely confined to the Kozhinjampara area in isolated tracts. The lesser number of ITK practices in this crop indicates its lesser importance among the farming community. The reason that may be attributed to the use of starch which helps in retaining moisture and food for beneficial microorganisms is a common practice which results in easy germination. This practice is commonly used in other crops also.

Soaking of chilly seeds in starch water to increase germination, which helps to retain moisture and provides food for beneficial microorganisms, was considered as a rational practice and growing of marigold in chilly plots were found to be effective.

All the items showed positive correlation at five per cent level of significance. It can be inferred that the farmers and the extension personnel were in agreement regarding their opinion about various items included in the study. This was in concurrence with the results of Kashem and Islam (1999) who revealed that farmers attitude towards ITK was positively related to their rationality at one per cent level of probability.

E. Pumpkin

During planting of pumpkin if fresh cow dung was applied to internodes it will increase the growth rate and flowering increases. It will improve rooting in the internodes.

All the items showed positive correlation at five per cent level of significance. It can be inferred that the farmers and the extension personnel were in agreement regarding their opinion about various items included in the study. This was in concurrence with the results of Kashem and Islam (1999) who revealed that farmers attitude towards ITK was positively related to their rationality at one per cent level of probability.

RICE BASED CROPPING SYSTEM

India is one of the oldest regions where domestication of rice has begun. This might be a reason attributed to the existence of large number of ITK practices in the crop. Rice has been the staple food of Kerala for many centuries. Its large rate of cultivation in the state can be contributed in the existence of many localized ITK practices in rice. The large acerage and absence of many crops in these times have forced the farmers to search for ways and means to grow rice in good sanitary conditions and increase the shelf life of paddy. Another reason attributed for so many storage practices may be due to the reason that the enhancement of shelf life was essential as rice was medium of exchange for purchase of other items namely clothing, oil, spices etc. (Barter system)

Many of the ITKs could have also reached Palakkad through communication from the neighboring state of Tamil Nadu, where rice had been in cultivation long before than in Kerala. The use of neem and cow dung could have been chiefly through this source where both were used abundantly in day to day life for various activities.

In RBS the major ITK practices were on seed selection, seed treatment, seed storage and manuring. The other important practices were of plant protection, methods to increase yield and adjustment to season. Most of these practices collected have a wider range of simplicity, practicability, observability, cost, triallbility, and compatibility with existing rice based cropping system and less labour intensive nature. These results were in conformity with the findings of Preetha (1997) who identified 80 indigenous practices of rice farmers of Thrissur district.

Seed was the most important input in any production process and hence utmost care must be taken in seed selection process. Rice for seed purpose was threshed soon after harvest. Seeds were collected from areas of good soil depth. Method to test viability of seeds and the like were supported with statements of reasoning and hence considered as rational practices.

Various seed treatment practices that include dipping of seeds in salt water, heat treatment, dipping in cow dung solution and covering with gooseberry leaves and hot water treatment. A practice called *'Maampookaanikkal'* which involves spreading of seeds in courtyard exposing it to wind, sun and snow for three days in the month of *Kumbham* was found to be very effective in maintaining viability of the seeds. This was in agreement with the finding of Preetha (1997). It was also in conformity with the results of Girija *et al* (1993) who found that seeds of long duration varieties were subjected to mid season moisture treatment to increase its viability. She found that imbibition of water and constant drying activates the metabolic process of old seeds and renews them.

Various indigenous seed storage practices in rice. Seeds were stored with fruits of *Karim cheru (Holigarna arnottiana).* It has got repellant action against

storage pests. The medicinal properties of *Karimcheru* were reported by Kirthikar and Basu (1935). Seeds were stored with leaves of neem. Azadiraction has got insect repellant properties. This was in concurrence with the findings of Jyothilakshmi (1994). Another method was storing of seeds with leaves of *Karinochi (Vitex negundo)*. It was in concurrence with the findings of Abraham *et al*, (1972). Most of the seed storage techniques have got scientific explanation so it was concluded that these methods were rational.

A single land preparation technique followed in rice. It was scientifically explained that if nursery was kept for some time after leveling the mud gets settled so that seeds will not be placed deeply which helps in easy germination and also increases spreading of grain. It was considered as a rational practice.

Indigenous manuring practices like application of ash to increase grain yield, application of cow dung to increase hay yield, application of green manure to improve soil structure and to reduce iron toxicity, sowing of cow pea seeds with rice and use of *Erukku (Calotropwas gigantia)* as green leaf manure to decrease incidence of pest and diseases were supported by scientific reasons. Hence these practices were considered as rational practices.

Various practices are of adjusting the crop with season so as to minimize the incidence of pests and diseases. The practices like sowing seeds in *Karutta paksham* to decrease incidence of chazhi and avoid planting during *Pooyam Njattuvela* to decrease incidence of gall fly and shoot borer. The interaction of crop pests with weather was an area, which requires further detailed study. Adjusting the sowing time and asynchronizing the most susceptible stage of the crop with the most damaging stage of the insect can avoid many diseases. According to Majumdar (1927) and Ingle (2002) various meteorological indicators were used for forecasting weather and pest management.

Various plant protection methods used in rice. One of the important plant protection measure adopted was *kundakoottal* in which seedlings were uprooted and heaped. It was done because it generates heat, which kills eggs and larvae of pests especially of stem borer and case worm. This practice was in confirmation

with the study of Preetha (1997). Another practice of hanging white plastic bags and split pseudo stem of banana in rice fields to ward off rodents. This was done to scare the rodents and it was found to be effective.

Methods to increase yield by some simple indigenous techniques like transplanting in a slanting manner to increase the number of tillers and harvesting of rice before reaching of complete maturity so that the grain fall will be less. Moreover if the seedlings were planted in slanting manner the chance of falling was less. Scientists consider these practices as rational practices.

A single practice, which comes under 'other cultural practices', is sprinkling of common salt in nursery at the rate of 2kg/ $40m^2$ to make the uprooting of seedling easier was considered as a rational practice because salt causes deflocculation and thus loosening of soil takes place, which helps, in easy uprooting of seedlings.

All the items showed positive correlation at five per cent and one per cent level of significance. It can be inferred that the farmers and the extension personnel were in agreement regarding their opinion about various items included in the study. This was in concurrence with the results of Kashem and Islam (1999) who revealed that farmers attitude towards ITK was positively related to their rationality at one per cent level of probability.

HOMESTEAD BASED MIXED FARMING

Cows have been in domestication long enough by mankind ad as a result milk, manure, medicinal properties of cowdung and cow urine could be observed by human beings and use them to its full extent. The existence of large number of ITK practices may be due to the reason that human beings were constantly trying to increase milk yield, quality of milk, increase lactation period, increasing calving and protect the animals from injuring pests and diseases considering its multi purpose use. And in India cow is considered as a sacred animal so much attention is paid to its sanitation and quality of milk. As in case of human beings farmers and rural folk have tried various methods to produce healthy milking cows using

locally available plant materials as feed or antidote for injuries diseases and observation of animal behaviour as a whole

In HMF, practices identified were related to milch animals were methods to increase milk yield, protections against lice and constipation in newborn calves, protection against delayed lactations, against coagulation of rubber milk when taken by milch animals, accidental breaking of horn and for easy coming out of placenta. Farmers could apply these practices to milch animals even in the absence of trained professionals. Most of the ITK to increase milk yield were based on locally available materials like *Palmuthukku (Ipomea paniculata)*, papaya *(Carica papaya)*, gingelly oil, mulberry leaves, jaggery and sugar which could be easily practiced by milch farmers or in homesteads. ITK practices against delayed lactation was supplemented with gingly oil, oil cakes, sprouted cow pea and *Cicer arietenum*, egg and moringa leaves which were all locally available which was cost effective and produces the desired results. The over all ITK practices in HMF was that the practices were of locally available material, cost effective, practicable and easy to administer.

Various indigenous practices, which were followed by farmers in homestead-based mixed farming were collected and studied. It includes the practices followed to increase milk yield in cattle. Many of the practices like feeding oil to increase fat content, keeping fixed time for milking, adding sweet substance to cattle feed and feeding of mulberry leaves was found to be effective and the methods followed was easy to administer and the materials involved were locally available. These was in confirmation with the studies of Mandal and Chauhan,(2001).

Animal protection was the most important part of HMF system. Indigenous techniques play a major role in animal protection and were given in table 33. Use of turmeric and charcoal in case of accidental breaking of horn was practices even now turmeric was well known for its antiseptic properties and charcoal absorbs moisture thus making healing faster. Then application of pig fat in case of drying of teat was also followed now. But scientists were of the opinion that the fat of domestic pig was not that good. In olden days peoples were using the fat of wild

boar, which has got some medicinal properties. In case if placenta was not coming out leaves of bamboo were fed to cattle, which cause an irritation and thus causing expulsion of placenta. If the cattle drink rubber milk, coconut oil was given immediately, which results in globule formation, which was easily excreted by cattle. For constipation, castor oil was given which was also applicable in case of human beings. To protect the cattle from lice, neem oil was applied over the body. Repellent action of neem oil was studied and reported by Saxena *et al.* (1980).

Various methods to prevent delayed lactation was given. Giving of sprouted seeds of cowpea or *Cicer wereitinum* will result in fertility because the sprouted seeds contain high concentration of vitamin E, which was anti sterility vitamin. The moringa leaves also contain vitamin E, which makes the cattle fertile. Gingelly oil was fed to cattle, for getting fertilized. Gingelly may be having meat tenderizing effect. All the muscles get softened including the vaginal muscles, which may result in easy fertilization.

All the items showed high positive correlation at one per cent level of significance. It can be inferred that the farmers and the extension personnel were in agreement regarding their opinion about various items included in the study. This was in concurrence with the results of Kashem and Islam (1999) who revealed that farmers attitude towards ITK was positively related to their rationality at one per cent level of probability.

ANNUAL CROPS

Practices collected were in the crops of tapioca and banana, which was cultivated and consumed, in large scale in the state. The farmers have attempted to enhance the yields of these crops and they were remunerative and so have taken a lot of efforts to protect the growing plants by applying locally available plant protection methods. Considering the importance of banana in the state, farmers have also used innovative ideas to enhance the banana color, shape and enhance ripening. Methods to increase yield in tapioca using starch water and fermented groundnut cake in banana were effective ITK in practices. Most of the ITK practices in banana were promoted by VFPCK.

A. Banana

Banana is the fourth important food crop after paddy, wheat and milk products and is well woven in the cultural heritage of India. The ITK practices observed in banana particularly use of *Mullanpayal* to ward of birds and to improve shape and look of the bunch and use of *Cassia fistula* for speedy ripening were probably just accidental discoveries by farmers.

A practice in which adjustment to season was given. This was in relation to the duration of the crop. Methods to increase yield were given which includes applying of fermented groundnut cake to banana to improve yield and destroying of suckers till emergence of bunch and these practices had scientific validity and were followed now.

Other cultural operations followed to improve market value and to make ripening faster in banana were covering of banana with *Mullan payal* was found to improve shape and look of bunch and it protects the bunch from attack of birds. Another practice of keeping the leaves of *Kanikonna* (*Cassia fistula)* with bunches to enhance ripening. This was done even now and farmers were confident about the result.

All the items showed high positive correlation at one per cent level of significance. It can be inferred that the farmers and the extension personnel were in agreement regarding their opinion about various items included in the study. This was in concurrence with the results of Kashem and Islam (1999) who revealed that farmers attitude towards ITK was positively related to their rationality at one per cent level of probability.

B. Tapioca

Tapioca is considered as the second staple food crop of Kerala and is well grown in the sandy soils of Kerala without irrigation and the yields are considerable when compared to the limited use of manuring or plant protection practices. This could be the reason for limited number of ITK practices in the crop.

The rodents are the main cause of injury to the crop are warded off by planting turmeric or Chettikoduveli both which acts as repellants to rodents. This is the area where farming community had tried to develop a preventive measure through trials.

Various plant protection practices in tapioca against rodents were collected It includes planting of turmeric an *Chettikkoduveli (Plumbago rosea)* along with tapioca. Turmeric had got repellant action. In the roots of *Chettikkduveli* Plumbagin was present which causes irritation to the rodents. To avoid attack of rodents pineapple gardens tapioca was planted in the border. This practice was based on simple logic that rodents would eat tapioca and would go back with out doing any harm to the main crop pineapple. This practice was found to be effective in many areas.

All the items showed high positive correlation at one per cent level of significance. It can be inferred that the farmers and the extension personnel were in agreement regarding their opinion about various items included in the study. This was in concurrence with the results of Kashem and Islam (1999) who revealed that farmers attitude towards ITK was positively related to their rationality at one per cent level of probability.


SUMMARY

SUMMARY

Traditional technologies were very much in tune with the cultural ethos and environmental conditions of the country. For a developing country like India with an outstanding record of science and technology, traditional technologies were certainly worth upgradations and modernization, and they can meet a considerable portion of the demands in agriculture and animal husbandry, health science, housing and clothing. Indigenous knowledge and traditional practices were to be revived and modernized of production and productivity was to be sustained. Indigenous technical knowledge, as the name denotes, was the knowledge acquired by the farmers through practice. This knowledge has been passed on from generation to generation over centuries. The importance of this traditional knowledge about agriculture and natural resource management holds a better prospect for present and future generations.

The present system of agriculture using modern concepts of science and technology was now at a crossroad. The extensive use of chemicals to increase production has resulted in the degradation of natural resources to a great extent. But the importance of organic farming over the use of chemicals was now finding more takers. Moreover the present day farming methods increase cost of agricultural production where as ITK reduces the cost substantially. ITK safely avoids health hazards and promotes ecofreindly agriculture. Under the present condition the study was under taken with the following objectives:

1. To collect ITK of farmers in production management in various farm production systems in Palakkad district.
2. To rationalize the collected ITK in production management in various farm production systems in Palakkad district.
3. To evaluate the collected ITK in production management and in various farm production systems in Palakkad district.
4. To document the collected ITK in production management in various farm production systems in Palakkad district.

The study was conducted in Palakkad district. A multistage sampling procedure was followed for selection of samples for the study. Out of the 13

developmental blocks five were selected based on the criteria of highest agricultural predominance and presence of at least three production systems out of five envisaged in the study namely rice based, homestead based mixed farming system, plantation including spices, seasonal crops and annual crops. One of the blocks was selected to represent one agro eco zone. Four panchayats were selected within each block based on the same criteria of highest agricultural predominance and presence of at least three production systems out of five. Thus 20 panchayats were included for the study.

The study being a participatory analysis, the respondent groups included Farmer Sub System (FSS), Extension Sub System (ESS) and the Research Sub System (RSS). From each panchayat five Key Informant Farmers (KIF) were selected. The selection was done with the help of extension workers of respective panchayats through judgment sampling. Thus a total of 100 KIFs were selected and ITK items were compiled with their help. The ESS consisted of a total of 40 respondents selected from 20 panchayats, which included Agricultural Officer and an Agricultural Assistant from each panchayat. Besides these 30 veterinary doctors were also included in the respondent group to evaluate the PE and SR of ITK practices in HMFS. A multidisciplinary team of 20 agricultural researchers drawn from research stations and KVK of the district/zone comprised the RSS. They did the final rationality testing of the items giving scientific reasoning of the ITK practice.

First the ITK items were evaluated by the FSS during the KIW and then the same items were evaluated for PE and SR by the ESS. Then these items were given to the RSS for rationalization. Those items, which were scored high by FSS, ESS and supported by RSS with scientific rationality, were considered as good practice. Mean score was calculated for each ITK item for farmer's perception, PE and SR. Correlation analysis was conducted to know the degree of association between the scores given by farmers and extension workers. Then paired t test was done whether the means differ significantly. Percentage analysis was done to categorize the ITK items into high, medium and low categories. The findings of the study were given below.

1. There were 34 ITK practices in coconut, which were agreed as good practices by FSS and ESS and supported by RSS with rationalization. These practices were documented.

2. In ginger six ITK practices were documented after evaluation by FSS and ESS and rationalization by scientists.

3. In pepper five ITK practices were documented after evaluation by farmers and extension personnel and rationalization by scientists.

4. In case of vegetable cowpea seasonal crops 19 ITK items were rated as good by FSS, ESS and RSS.

5. In ashgourd eight ITK items were finally documented after scrutinizing by FSS, ESS and RSS.

6. In bittergourd nine ITK items were filtered out after evaluation by FSS and ESS and rationalization by RSS.

7. In chilly only two ITK items were documented.

8. In pumpkin only single practice was documented.

9. In rice crop 26 ITK practices were documented after evaluation by farmers and extension personnel and rationalization by scientists.

10. In homestead based mixed farming which mainly stressed on milch animals 17 practices were documented.

11. In banana which a major crop of Kerala only five ITK practices were documented.

12. In tapioca four ITK practices were documented after evaluation by FSS and ESS and rationalization by RSS.

Implications of the study

1. The study collected, rationalized, evaluated and documented traditional farmers knowledge that were in the verge of extinction.

2. The study had documented many indigenous knowledge items in production management which includes Indigenous land preparation and cultural practices, water management, seeds/seedlings selection methods, sowing, manuring, adjustment to season, time and method of planting, weed management, weather forecasting, harvesting some special practices.

3. Most of the ITKs collected were supported by scientific rationality though some lacked it. The most important disadvantage was the many of them lacked correct dosages of various organic manures and other plant parts, which were used as repellants.

4. One major implication of the study was that these collected ITK after evaluation and rationalization can be blended with modern technologies and can be used more efficiently.

5. The study has provided a list of ITK that was evaluated by FSS and ESS and rationalized RSS and so these ITKs can be recommended to the farmers with confidence.

Suggestions for future research

1. Similar work can be done in other districts of Kerala so that a comprehensive ITK package can be developed. It was a must because almost all ITKs were location specific.

2. Those ITKs, which were rated as good by the FSS, ESS and RSS, can be blended with modern technology and can be fed back to the farmers.

3. The ITKs, which were not rationalized by the scientists but considered as good by the farmers, can be selected for further study.

4. The correct dosage and other details like time of application and method of application can be developed for each ITK so that it will become more specific.

5. Those ITKs, which were fool proof, can be included in the package of practices for the corresponding production systems.

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APPENDIX - I

നെല്ല്

1) ഇനങ്ങൾ
2) വിത്തുൽപ്പാദനം
3) വിത്ത് സൂക്ഷിക്കൽ
4) വിത്തിന്റെ അളവ്
5) ഞാറിന്റെ മൂപ്പ്
6) നടുന്ന/പാകുന്ന സമയം
7) ഞാറ്റുവേല, മഴ സമയക്രമീകരണം
8) വിത്തുസംസ്കരണം
9) വിത്തുമുക്കൽ
10) വിത്തു മുളപ്പിക്കൽ
11) മുളനോക്കൽ
12) മണ്ണ് തയ്യാറാക്കൽ
13) പറിച്ചുനടൽ
14) ജലസേചനം
15) വളപ്രയോഗം
16) കളനിയന്ത്രണം
17) വേറെ കൃഷികൾ
18) കൊയ്ത്ത് - സമയം, പ്രായം കണക്കാക്കൽ, ജലക്രമീകരണം
19) കാലാവസ്ഥാ പ്രവചനം
20) കാലാവസ്ഥ വിളയെ എങ്ങനെ ബാധിക്കുന്നു
21) ബന്ധപ്പെട്ട ആചാരങ്ങൾ
22) മേനി വിളവ്
23) പഠക്കണക്ക്, നാരായം, നാഴി
24) ഞാർ, - മുടി, തൂക്ക്
25) മെതി - പതം
26) പ്രത്യേക സമ്പ്രദായങ്ങൾ
    കൂട്ടുമുണ്ടകൻ, കരിങ്കര, മോടൻ
27) വിത - പൊടിവിത, ചേറ്റുവിത, നുരി വിത്തിടൽ
28) വിത്തുമുക്കുന്ന വിധം, വിത്തു കൂട്ടിവെക്കുന്ന വിധം
29) നല്ല വിത്തു തിരഞ്ഞെടുക്കുന്ന രീതി
30) വിത്തിന്റെ അളവ്
31) നടീൽ അകലം
32) ഞാർ മൂപ്പ് - ഇനങ്ങൾ തമ്മിലുള്ള വ്യത്യാസം

തെങ്ങ്

1) വിത്ത് തേങ്ങ സംഭരണം, സമയം, സൂക്ഷിക്കൽ
2) തെങ്ങ് + ഇടവിള
3) വിത്തിനുള്ള തെങ്ങ് തിരഞ്ഞെടുക്കുന്ന വിധം - ലക്ഷണങ്ങൾ
4) വിത്ത് തേങ്ങയുടെ ലക്ഷണങ്ങൾ
5) നല്ല തയ്യിന്റെ ലക്ഷണങ്ങൾ - നടുവാൻ പറ്റിയ പ്രായം, സംരക്ഷണം
6) കുലയിറക്കുന്ന വിധം
7) തേങ്ങയുടെ മൂപ്പ് കണക്കാക്കൽ, പൊതിച്ച തേങ്ങയുടെ മൂപ്പ്
8) ജലസേചനം എങ്ങനെ
9) വിളവെടുപ്പും, സംസ്കരണവും
10) കള്ള് ചെത്ത്
11) തെങ്ങു കയറ്റം
12) പുതയിടൽ

കുരുമുളക്

1) ഇനങ്ങൾ - പ്രത്യേകതകൾ
2) മാതൃസസ്യം തെരഞ്ഞെടുക്കൽ
3) വള്ളികൾ വേരുപിടിപ്പിക്കൽ
4) മിശ്രിതം ഉണ്ടാക്കൽ
5) തൈകൾ നടൽ
6) തണൽ ക്രമീകരണം
7) വിള പരിപാലനം
8) താങ്ങുകാലുകൾ, താങ്ങുമരങ്ങൾ - പ്രത്യേകതകൾ
9) നടാൻ പറ്റിയ സ്ഥലം, സമയം
10) നടുന്ന വിധം
11) വളപ്രയോഗം
12) ജലസേചനം
13) വള്ളിത്തല കെട്ടൽ
14) തൈകൾ പൊതിഞ്ഞു കെട്ടൽ
15) ഇടയിളക്കൽ
16) രോഗങ്ങൾ, കീടങ്ങൾ
17) സംസ്കരണം, ശുചീകരണം, സംഭരണം

മുളക്, മത്തൻ, കുമ്പളം, പാവൽ

1) ഇനങ്ങൾ
2) വിത്തു സംസ്കരണം, സൂക്ഷിപ്പ്
3) നല്ല വിത്തിന്റെ ലക്ഷണം
4) വിത്ത് മുള നോക്കൽ
5) ശത്രുചെടികൾ - നിയന്ത്രണം
6) വിവിധപന്തൽ രീതികൾ - ഉപയോഗിക്കുന്ന സാധനങ്ങൾ
7) വെള്ളം തേകാൻ ഉപയോഗിക്കുന്ന യന്ത്രങ്ങൾ
8) ഏത്തം, തേക്കുകൊട്ട
9) പക്ഷികളേയും മൃഗങ്ങളേയും ഓടിക്കാൻ ഉപയോഗിക്കുന്ന മാർഗ്ഗങ്ങളും സാധനങ്ങളും
10) വിത്തുകളും, ഭക്ഷ്യവിളകളും സൂക്ഷിക്കാനുപയോഗിക്കുന്ന സാധനങ്ങൾ പത്തായം
11) തോല് - നല്ലതും ചീത്തയും
12) ചിതൽ നിയന്ത്രണം
13) വീടിനോട് ചേർന്നുള്ള പാമ്പ് - നിയമങ്ങൾ

മരച്ചീനി, പയർ വർഗ്ഗങ്ങൾ

1) ഇനങ്ങൾ
2) നടുന്ന രീതികൾ
3) വെള്ളം വാർത്തു കളയുന്ന രീതികൾ
4) മണ്ണ് സംരക്ഷണം
5) വെള്ളം സംരക്ഷണം

വാഴ

1) കന്ന് തിരഞ്ഞെടുക്കൽ
2) ചേറുവാഴ, പൊടിവാഴ
3) ഊന്നുകൾ
4) കായ് വലുപ്പം കൂട്ടാൻ
5) കായ് ഗുണം കൂട്ടാൻ
6) കാഴ്ച്ചക്കുലകൾ
7) ഇനങ്ങൾ

കന്നു കുട്ടി പരിപാലനം
ആഹാരം, സംരക്ഷണം, പ്രസവം, പ്രസവ ശുശ്രൂഷ
വളർത്തു മൃഗങ്ങൾ, പണികൾക്കുപയോഗിക്കുന്ന മൃഗങ്ങൾ - പരിപാലനം

APPENDIX- 1

RICE

01. Varieties
02. Production of seeds
03. Storage of seeds
04. Quantity of seed
05. Maturity of seedlings
06. Time of sowing
07. Njattuvela, adjustment with rains
08. Treatment of seeds
09. Seed dipping
10. Sprouting of seeds
11. Test for sprouts
12. Land preparation
13. Transplanting
14. Irrigation
15. Weed control
16. Other crops
17. Manuring
18. Harvesting- time, age, water management
19. Weather forecasting
20. Impact of weather on crop
21. Related cultural practices
22. Other counts of yield
23. Para and other calculations
24. Seedlings and other related calculations
25. Threshing and wage rates
26. Special cultivation practices- Koottumundakan, karinkora and modan
27. Sowing- water less cultivation and cultivation in water
28. Selection of good seed material
29. Quantity of seed used
30. Methods of seed dipping and storing
31. Distance between seedlings while transplanting
32. Age of seedling- difference in varieties

COCONUT

01. Varieties- peculiarities
02. Coconut- intercrop
03. Selection of seed nut
04. Characteristics of good seed nut
05. Characteristics of good seedling
06. Bunch landing
07. Identifying the maturity of seed
08. Irrigation
09. Harvesting and curing

10. Toddy tapping
11. Coconut climbing
12. Mulching

PEPPER

01. Varieties- peculiarities
02. Mother plant selection
03. Rooting of seedlings
04. Making of rooting solution
05. Planting of seedling
06. Shade regulation
07. Crop protection
08. Plants used as support
09. Time of planting and location
10. Planting method
11. Manuring
12. Irrigation practices
13. Tying of tips of the plant
14. Protection of seedling from sunlight
15. Cultivation practices
16. Diseases, pests
17. Curing of seeds, cleaning and storage

CHILLY, PUMPKIN, ASHGOURD, BITTERGOURD

01. Varieties
02. Seed treatment, storage
03. Characteristics of good seed
04. Sprout examination
05. Biocontrol
06. Bird control
06. Animal control
06. Weed management
07. Green manures
08. Control of termites
09. Irrigation methods and indigenous devices used
10. Storage structures used

TAPIOCA, PULSES

01. Varieties
02. Methods of planting
03. Methods of water draining
04. Soil conservation
05. Water conservation

BANANA

1. Selection of suckers
2. Planting with/ with out water
3. Props used
4. Methods to increase size of fingers
5. Methods to increase quality of bunch
6. Varieties
7. Other age old practices

ANIMAL PROTECTION

1. Food
2. Protection of calves
3. Pregnancy and related food
4. Animals used for food purpose
5. Animals used for farm operations

APPENDIX - II

നാട്ടറിവുകൾ

നമ്പർ	വിശ്വാസ്യത			ചെയ്തിട്ടുണ്ടോ		ചെയ്യുമോ		പത്തിൽ മാർക്ക്
	തികച്ചും വിശ്വസിക്കുന്നു	കുറച്ചൊക്കെ വിശ്വസിക്കുന്നു	തീരെ വിശ്വസിക്കുന്നില്ല	ഉവ്വ്	ഇല്ല	ഉവ്വ്	ഇല്ല	
1								
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APPENDIX- II

INDIGENOUS PRACTICES

No	Degree of belief			Whether done the practice		Whether do the practice		Mark out of 10
	High belief	Moderate belief	No belief	Yes	No	Yes	No	
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APPENDIX - III

List of ITK items given to scientists and extension workers

RICE Min score 1 max score5

Sl no	ITK ITEMS	Perceived Effect					Scientific Rationality				
1	Put an egg in water and add common salt till the egg floats. Dip seeds in this water for some time. This will increase sprouting.	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									
2	In preparation of nursery expose to sunlight for 12 hrs after draining water. Then sow sprouted seeds. This will prevent deep placement (**Cheeruthinnal**) of seeds.	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									
3	One week before sowing give a heat treatment to seeds by spreading in sunlight. This will increase germination percentage.	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									
4	Application of ash (Potassium) increases grain yield and application of cow dung (Nitrogen) increases straw yield.	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									
5	Rice for seed purpose is threshed soon after harvest.	1	2	3	4	5	1	2	3	4	
		Probable reason for your judgement:									
6	Seeds are collected from areas of good soil depth.	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									
7	For testing viability of seeds it is just broken into two pieces . There must be white powder inside in the size of a needle. The seed should not get broken into small pieces.	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									

8	"Mampoo kaanikkuka" – helps to retain viability in the store. This involves spreading seeds in courtyard exposing it to wind, sun and snow for three days in the month of 'Kumbam' (Feb-March). Seeds are taken in the morning hours along with straw and stored. It is not turned over for three days. This is believed to ensure quick germination.	1	2	3	4	5	1	2	3	4	5	
		Probable reason for your judgement:										
9	Dipping rice seeds in salt water before sowing.	1	2	3	4	5	1	2	3	4	5	
		Probable reason for your judgement:										
10	Seed treatment- seeds are dipped in water mixed cow dung for 6 hrs. Then water is drained and seeds are heaped in baskets. Small twigs with leaves of gooseberry are placed over and covered with gunny bags. A weight is placed over this and watered to hasten germination. Gooseberry leaves are believed to generate heat thus helping in emergence of vigorous buds	1	2	3	4	5	1	2	3	4	5	
		Probable reason for your judgement:										

11	Seeds in store are mixed with fruits of ' Karim cheru' (*Holigarna nigra*) to ward off storage pests.	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									
12	Seeds are stored in Vallam and mixed with leaves of Neem *(Azadiracta indica)* to control pests.	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									
13	Neem leaves are burned in the store for smoking seeds.	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									
14	Mixing fruits of 'Cheru' (*Holigarna arnottiana*) with rice seeds is also found to control pests.	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									
15.	Before transplanting the seedlings are harvested and then heaped. This heaping generates heat. This reduces pest incidence. This practice is called 'Kunda koottal'.	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									

16	Hang bougainvillaea twigs with leaves in store where seeds are stored. This is found to reduce pest incidence.	1	2	3	4	5	1	2		3	4	5
		Probable reason for your judgement:										
17	Avoid seeds at the bottom of the heap for sowing. It is found to have less sprouting capacity	1	2	3	4	5	1	2		3	4	5
		Probable reason for your judgement:										
18	Sowing seeds in 'Karutta Pakasham' decrease incidence of Chazhi , *.(Leptocorisa acuta)*	1	2	3	4	5	1	2		3	4	5
		Probable reason for your judgement:										
19	To decrease *Striga lutea* in paddy fields sow some mustard along with paddy.	1	2	3	4	5	1	2		3	4	5
		Probable reason for your judgement:										
20	Dip seed in water of temperature 50^0C for 10 minutes. Then dip in cold water for 24 hrs. Then tie it in sacks and keep for another 24 hrs. This will increase germination percentage	1	2	3	4	5	1	2		3	4	5
		Probable reason for your judgement:										

21	Add cowpea seeds along with rice seeds when sowing in water less condition (Podivitha) at the rate 12.5 kg/ ha. It increases the availability of green manure and overall yield increase	1	2	3	4	5	1	2	3	4	5	
		Probable reason for your judgement:										
22	Sprinkling of common salt in nursery beds @ 2kg/cent makes the plucking of seedlings easier	1	2	3	4	5	1	2	3	4	5	
		Probable reason for your judgement:										
23	During transplanting if seedlings are transplanted in a slanting manner it increases the number of tillers.	1	2	3	4	5	1	2	3	4	5	
		Probable reason for your judgements										
24	If cashew leaves are used as green manure especially in Poonthal Padangal it improves soil structure.	1	2	3	4	5	1	2	3	4	5	
		Probable reason for your judgement:										
25	To decrease damage due to rodents hang white plastic bags, split pseudo stem of banana etc. in rice fields.	1	2	3	4	5	1	2	3	4	5	
		Probable reason for your judgement:										

26	In areas of Iron toxicity add mango leaves and twigs as green manure.	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									
27	Add calotropis, Kongini (arippoo) as green manure. It can decrease incidence of pests and diseases.	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									
28	Sprinkle common salt in hay heaps to decrease attack of rodents.	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									
29	Use grains at the tip of inflorescence for seed purpose. Cut the tip and thresh it separately. It is found to increase yield up to 20%.	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									
30	Seeds falling in first and second beat during threshing will be those at the end of the inflorescence. These are best for using as seeds.	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									
31	Avoid planting during Pooyam Njattuvela (July 18- August 2) to decrease the incidence of gall fly and shoot borer.	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									
32	Harvesting of rice before reaching complete maturity will decrease grain fall.	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									

33	Along with stored paddy seeds put neem leaves/ Karinochi *(Vitex negudo)* to decrease storage pests.	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									

VEGETABLES
Min score 1 max score5

Sl no	ITK ITEMS	Perceived Effect					Scientific Rationality				
1	Preservation of bitter gourd seeds by covering with a paste of cow dung or poultry manure and then fixed on the wall of kitchen or over hearth. This is done for protecting seeds from insect attack and to improve viability.	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									
2	Land kept for three days after preparation. If done in summer it will help in soil conservation, weed growth eliminated, resting stages of insects and pathogens destroyed when exposed to sunlight, pulverize soil and increases soil depth.	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									
3	Liming at first digging act as soil ameliorant and resist fungal diseases.	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									
4	Neem cake application has both fertilizer effect and plant protecting effect. 'Azadiractin' repels pests. It increases desirable micro organisms and nematodes causing diseases	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									
5	Green leaf manuring with thick leaves of mango, jack, cashew etc. more preferred because the residual effect lasts for longer.	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									

6	Smoking under Pandal enhances fruit set, reduces pest attack and adds fertility to soil.	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									
7	After rubbing with wood ash, the seeds are stored over smoke in kitchen.	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									
8	Covering bitter gourd fruits (for seed purpose) with teak leaves. Oily nature of teak leaves repels the raindrops falling and prevents the fruit from rotting.	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									
9	Placing wet bundle of straw over bitter gourd seeds. This is to enhance germination.	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									
10	For easy germination of seeds dip the seeds for about 2 hours in garlic decoction and then cover with a gunny bag.	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									
11	Intercropping of bitter gourd with elephant foot yam will decrease stunting of bitter gourd.	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									

12	Raising seedlings of cucurbitaceous vegetables in jack leaf cones. This helps in proper establishment of crops after transplanting.	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									
13	Pinching tip of vines. It is believed to enhance branching.	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									
14	Restricted irrigation.	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									
15	Wet soil after mixing with wood ash and cow dung is taken in a banana sheath and seeds are sown in it. This provides nutrients and maintains moisture for germinating seeds.	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									
16	Keeping seeds with bird pepper (Kanthari) fruits to avoid pest attack during storage.	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									
17	Keeping seeds in unopened fruits. Fruits are hanged using ropes.	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									
18	Treating seeds of ash gourd with cow dung decoction. This will induce good germination and increase vigorous seedlings.	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									

19	Drying pods for 4-6 days.	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									
20	Subjecting pods under storage to sunshine to protect from attack of storage pests.	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									
21	Smoking seeds by hanging above 'Aduppu'.	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									
22	Storing seeds with split seed coat pieces of cashew. The oil has heat conservation and pungent effect which repels storage pests.	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									
23	Mixing moringa leaves with stored seeds.	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									
24	Mixing neem leaves with stored seeds.	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									
25	Mixing seeds with pepper seeds.	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									

26	Keeping some mango leaves with seeds.	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									
27	Burning basins before sowing.	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement									
28	Add fresh cow dung at the time of flowering in cow pea.	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									
29	Manuring with a mixture of fresh cow dung and green leaves. Green leaf manuring reduces pests and diseases.	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									
30	Removal of excess leaves in cowpea induces early flowering.	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									

31	Dusting of wood ash over cowpea to ward of pests.	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									

32	Dusting of fine sand over cowpea.	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									
33	Storing seeds in hollow bamboo stem or empty coconut shell.	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									
34	Mixing cowpea seeds with ash obtained by burning husk of cowpea.	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									
35	Subjecting seeds to natural cold treatment during **Makaram.**	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									
36	Gingely oil application to cowpea seeds.	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									
37	Storing seeds in pods itself.	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									
38	Removal of excess leaves to induce early flowering. Middle leaves retained.	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									

39	Cowpea seeds are stored with powdered seeds of Kadalavanakku (Castor) to prevent insect attack.	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									
40	During storage of seeds put some garlic in the container. It will prevent insect attack.	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									
41	Storing of cowpea seeds in clay pots along with sand will prevent insect attack.	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									
42	Application of salt at the base of the tree increases flowering in mango.	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									
43	To avoid cowpea seeds from attack of storage pests keep it mixed with ground castor seeds.	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									
44	Storing seeds with neem leaves and red chilly will prevent insect attack.	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									
45	Applying rice gruel (Kanjivellam) to basin of Dolichos *(Dolichos lablab)* will improve yield	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									

46	To prevent the flower and fruit fall in chillies apply a mixture of tender coconut water and *cows milk.*	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									
47	During planting of pumpkin if fresh cow dung is applied to internodes it will increase the growth rate and flowering increases	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									
48	Mixing cowpea seeds and cereal seeds with turmeric powder if found to check storage pests	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									
49	Chilly seeds if soaked in starch water will increase germination	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									
50	Growing Marigold in vegetable plots reduce nematode resistance	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									
51	To decrease flower fall in bitter gourd, snake gourd, bottle gourd and sponge gourd sprinkle water mixed with asfoetida	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									

52	Growing red gram with pumpkin, snake gourd etc. will prevent beetle attack	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									

PLANTATION CROPS & SPICES
Min score 1 max score5

Sl no	ITK ITEMS	Perceived Effect	Scientific Rationality
1	Nuts brought down with the help of ropes.	1 2 3 4 5	1 2 3 4 5
		Probable reason for your judgement:	
2	Soaking seed nuts in water for more than one month after drying in shade.	1 2 3 4 5	1 2 3 4 5
		Probable reason for your judgement:	
3	Detecting functional eye by floating nut in water.	1 2 3 4 5	1 2 3 4 5
		Probable reason for your judgement:	
4	Detecting functional eye by position of smaller stalk.	1 2 3 4 5	1 2 3 4 5
		Probable reason for your judgement:	
5	Sowing in slanting position.	1 2 3 4 5	1 2 3 4 5
		Probable reason for your judgement:	
6	Transplanting at *'Katti koombu'* stage.	1 2 3 4 5	1 2 3 4 5
		Probable reason for your judgement:	

7	Transplanting at *Karkidakavaarcha.*	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									
8	Transplanting in *Kumba Bharani*	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									
9	Drip irrigation using clay pot and thread. *(Thiriyittu nanakkal)*	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									
10	Burial of Pseudo stem of Banana in the basin of the palm	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									
11	Those nuts which float in water with stalk portion up will sprout earlier	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									
12	Removal of some husk at the eye portion of coconut will enhance sprouting and the seedling will be more vigorous	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									

13	Planting seed nuts in poly bags or medium sized pots. It will decrease damage during transplanting.	1	2 3 4 5 1 2 3 4 5
		Probable reason for your judgement:	
14	Planting chilly seedling along with coconut seeds planted for sprouting. It will decrease incidence of weeds	1	2 3 4 5 1 2 3 4 5
		Probable reason for your judgement:	
15	Burning of waste from coconut tree in the basins improves seed set, gives potash and decrease incidence of pests and diseases.	1	2 3 4 5 1 2 3 4 5
		Probable reason for your judgement:	
16	Toddy tapping increases yield of coconut	1	2 3 4 5 1 2 3 4 5
		Probable reason for your judgement:	
17	Cultivation of betel vine in coconut gardens increases yield of coconut	1	2 3 4 5 1 2 3 4 5
		Probable reason for your judgement:	
18	Dig the coconut basin to a depth of 1feet and I mt.diameter and fill the pit with chaff rice grains @ 10 basket /plant. Repeat it every year. This increases productivity as water scarcity during summer months is prevented	1	2 3 4 5 1 2 3 4 5
		Probable reason for your judgement:	

19	Plant banana around coconut seedling. It will prevent direct sunlight and give moist atmosphere and gives enough water to the seedling	1	2 3 4 5 1 2 3 4 5
		Probable reason for your judgement:	
20	Fixing of bee hives in coconut gardens increase the pollination and thus increases yield.	1	2 3 4 5 1 2 3 4 5
		Probable reason for your judgement:	
21	Application of decomposed hay in the basin increases yield of coconut palm and increases water holding capacity of soil	1	2 3 4 5 1 2 3 4 5
		Probable reason for your judgement:	
22	Bottom clay of ponds is a best manure	1	2 3 4 5 1 2 3 4 5
		Probable reason for your judgement:	
23	Select nuts with bottom portion round in shape as seed nuts	1	2 3 4 5 1 2 3 4 5
		Probable reason for your judgement:	
24	Nuts from the middle of the bunch are selected	1	2 3 4 5 1 2 3 4 5
		Probable reason for your judgement:	
25	Select seedling with higher collar girth.	1	2 3 4 5 1 2 3 4 5
		Probable reason for your judgement:	

26	Those seedlings with Narola are healthy and early bearers. Narola refers to the leaf having a fibre connecting the leaflets along the margin	1	2 3 4 5 1 2 3 4 5
		Probable reason for your judgement:	
27	Application of common salt in the planting pit	1	2 3 4 5 1 2 3 4 5
		Probable reason for your judgement:	
28	Application of a mixture of sand, salt and ash in the pit before transplanting.	1	2 3 4 5 1 2 3 4 5
		Probable reason for your judgement:	
29	Arranging coconut husk inside planting pit	1	2 3 4 5 1 2 3 4 5
		Probable reason for your judgement:	
30	Planting turmeric and arrowroot *(Maranda arundinaceae)* etc in coconut nursery decrease incidence of termite.	1	2 3 4 5 1 2 3 4 5
		Probable reason for your judgement:	
		Probable reason for your judgement:	
31	Dipping pepper for one minute in boiled water increases the colour and thus market value	1	2 3 4 5 1 2 3 4 5
		Probable reason for your judgement:	
32	Planting of ginger, turmeric, kacholam etc. in pepper gardens increases yield of pepper	1	2 3 4 5 1 2 3 4 5
		Probable reason for your judgement:	

33	Mulch ginger plants with leaves of banana and neem. This increases corm size	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									
34	For storage of dried ginger fill lemon grass and ginger layer by layer	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									
35	Storing ginger seeds in the leaves of Panal for safe storage	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									
36	Smoking ginger seeds spread in panal leaf for some days will enhance sprouting. This is done in Medam.	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									
37	The juice obtained during fermentation of cocoa can be used for coagulating rubber	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									
38	Apply thulasi as green leaf manure under betel vine then betal vine will get the smell of thulasi	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									
39	For getting maximum sprouting in Teak seed put the seeds in water during night then dry in sunlight during daytime. Repeat this for 7 days	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									

40	Planting turmeric and arrowroot *(Maranda arundinaceae)* etc in coconut nursery decrease incidence of termite.	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									
41	To prevent drop of buttons (Achinga) apply cows urine + 10 times water.	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									
42	Smoking in coconut gardens increases yield.	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									
43	Remove old roots of coconut tree to improve yield.	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									
44	Allow pepper plants to climb on other plants with out separating it from mother plants. After 2-3 years only separate it from mother plants. This will increase tolerance.	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									
45	Put plucked pepper in sunlight for a day . it will make threshing easier.	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									
46	For safe storage of dried ginger put ground seeds of Castor or put leaves of neem along with dried ginger.	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									
47	Store ginger seeds in panal leaves after dipping in cowdung slurry it will increase sprouting.	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									
48	Application of common salt in basin of mango tree increases flower set	1	2	3	4	5	1	2	3	4	5

	mango tree increases flower set.	Probable reason for your judgement:
49	For fruit set in moringa apply water mixed with asafoetida in the basin	1 2 3 4 5 1 2 3 4 5 Probable reason for your judgement:
50	To decrease the attack of rats in pine apple gardens plant tapioca at the boundaries.	1 2 3 4 5 1 2 3 4 5 Probable reason for your judgement:
51	Apply rice gruel in the basin of mango tree to improve fruit set.	1 2 3 4 5 1 2 3 4 5 Probable reason for your judgement:
52	In case of coconut those seedlings which emerge first will give good yield	1 2 3 4 5 1 2 3 4 5 Probable reason for your judgement:
53	Seed nuts are taken from the bunches in the northern side	1 2 3 4 5 1 2 3 4 5 Probable reason for your judgement:
54	Plant coconut with eyes under soil. After 2 weeks put in normal position. This will increase strength of seedlings.	1 2 3 4 5 1 2 3 4 5 Probable reason for your judgement:
55	December to April (Vrischikam to Meenam) is the best time for collecting seed nuts.	1 2 3 4 5 1 2 3 4 5 Probable reason for your judgement:

ANIMAL HUSBANDRY Min score 1 max score5											
Sl no	ITK ITEMS	Perceived Effect					Scientific Rationality				
1	To increase milk yield give grounded yam of Palmutukku *(Ipomea paiculata)*.	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									
2	For increased milk production give ripe papaya or boiled unripe papaya.	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									
3	In case of breaking of horn apply turmeric along with attakkari	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									
4	To avoid drying of teats apply pig fat.	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									
5	For coming out of placenta in cows give leaves of *Bamboosa bambos*	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									
6	For easy coming out of placenta give leaves and flowers of Shoeflower *(Hibiscus rosasinensis)*	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									

7	In case if cows drink rubber milk to avoid coagulation give coconut oil.	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									
8	In case of constipation in new born calves give a teaspoon of castor oil.	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									
9	In case of delayed lactation give two ounces of gingely oil and feeding of gingili cakes during milking is also good.	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									
10	Feeding calves with oil cakes results in delayed maturity.	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									
11	In case of delayed maturity give sprouted cowpea or *Cicer arietinum* or egg.	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									
12	To increase fat content in milk give half ounce Nallenna/ day	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									

13	For coming out of placenta give unripe pine apple, mango leaves or Thondiyila	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									
14	In case if cows are not showing heat symptoms give one handful of moringa leaves for one week. Then give one egg mixed with food	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									
15	For cows which are not lactating cover their back with wet gunny bags	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									
16	Keep the time of milking fixed for getting good milk yield.	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									
17	Add some sweet substance to cattle feed to increase milk availability	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									
18	When navel point of cow reaches the udder part then it is time for delivery	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									

19	Give 200 ml mustard oil mixed with 2 eggs three times in 4 days interval between each dose for those cows which are not getting fertilized	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									
20	For cows those are not conceiving give 200ml gingili oil in 4 days interval along with 2 eggs.	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									
21	To increase milk production give mulberry leaves to cows.	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									
22	Some cows stop feeding when shed is changed. In this case give them toddy mixed with some pepper powder.	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									
23	For constipation of calves give ripe fruits of Koovalam.	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									

ANNUALS Min score 1 max score5											
Sl no	ITK ITEMS	Perceived Effect					Scientific Rationality				
1	For speedy ripening of bunches put leaves of *Cassia fistula* along with bunches	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									
2	Do not allow growth of suckers till bunch emergence in Nendran. This will decrease the number of fingers and hands	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									
3	Put leaves of (*Avarrhoea bilimbi*) Irumban puli with bunches of coconut to make ripening faster	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									
4	Applying fermented groundnut cake to *banana improves the yield.*	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									
5	If onam is in the first half of Chingam plant banana in the starting of Attam Njattkuvela and if onam is in the second half of Chingam plant banana in the starting of Chothi Njattuvela.	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									
6	Taking rhizomes just under the bunch and those on the opposite sides of the bunch gives good bunch.	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									

7	In tapioca application of fresh cow dung to the cut ends prevents drying up of setts.	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									
8	Planting tapioca setts after dipping in rice water (Starch water) is said to increase sprouting and establishment	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									
9	To prevent attack of rats in tapioca field, plant turmeric between tapioca	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									
10	Planting Chettikkoduveli between tapioca will prevent rat attack	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									
11	Spreading cut hairs near base of tapioca will prevent rats.	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									
12	For getting good colour for bunches apply rice gruel mixed with water on the bunches.	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									

13	For preventing cracking of fruits in banana apply neem oil along with irrigation water.	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									
14	Covering of banana bunches with mullan payal will help in quality improvement and prevent birds from attacking the bunches.	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									
15	Planting of Thakara between banana prevent attack of banana by nematodes.	1	2	3	4	5	1	2	3	4	5
		Probable reason for your judgement:									

APPENDIX - IV

Coconut

1. Those nuts, which sprout earlier, will have high productivity.
2. To avoid tender seed fall in coconut add cows urine + 10 times water and apply it to the basin

Cowpea

1. For easy germination of seeds dip the seeds for about 2 hours in garlic decoction and then cover with a gunny bag.
2. Mixing moringa leaves with stored seeds.
3. Storing seeds in hollow bamboo stem or empty coconut shell.

Bittergourd

1. To decrease flower fall in bitter gourd, snake gourd, bottle gourd and sponge gourd sprinkle water mixed with asafetida.
2. Growing red gram with bitter gourd will prevent beetle attack

Chilly

1. For easy germination of seeds dip the seeds for about 2 hours in garlic decoction and then cover with a gunny bag.
2. To prevent the flower and fruit fall in chillies apply a mixture of tender coconut water and cows milk

Rice

1. Use grains at the tip of inflorescence for seed purpose. Cut the tip and thresh it separately. It is found to increase yield.
2. Grains falling in first and second beat during threshing will be those at the end of the inflorescence. These are best for using as seeds
3. Mixing fruits of *'Cheru'* (*Holigarna arnottiana*) with rice seeds is also found to control pests
4. Hang bougainvillea twigs with leaves in store where seeds are stored. This is found to reduce pest incidence

5. To decrease *Striga lutea* in paddy fields sow some mustard along with paddy.

6. Sprinkle common salt in hay heaps to decrease attack of rodents.

Homestead based mixed farming

1. To increase milk yield give grounded yam of *Palmutukku (Ipomea paiculata)*
2. For increased milk production give ripe papaya or boiled unripe papaya.
3. Apply *Biophytum sensitivum* grinded on the broken area and cover with cloth.
4. For easy coming out of placenta give leaves and flowers of Shoeflower *(Hibiscus rosasinensis)*
5. In case of constipation give ripe fruits of *Koovalam*
6. In case of delayed lactation give two ounces of gingely oil and feeding of gingely cakes during milking is also good.

Banana

1. For getting good colour for banana bunch spray rice gruel mixed with water on the bunch.
2. Put leaves of Irumban puli with bunches of coconut to make ripening faster.

Tapioca

1. Spreading cut hairs near base of tapioca will prevent rats.
2. Planting tapioca setts after dipping in rice water (Starch water) is said to increase sprouting and establishment.

RATIONALISATION OF INDIGENOUS TECHNICAL KNOWLEDGE ON PRODUCTION MANAGEMENT IN THE FARM PRODUCTION SYSTEMS OF PALAKKAD DISTRICT

By

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ABSTRACT OF THE THESIS

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ABSTRACT

Indigenous Technical Knowledge (ITK) was recognized as a possible key to low external input sustainable agriculture that contributes both to sustainable agricultural production for the farmers, as well as a source of knowledge that can add on to the existing science based knowledge of the researchers. Identifying, documenting and incorporating indigenous knowledge systems into agricultural extension organizations were essential to achieve sustainable agricultural development.

Keeping in view the objectives of the study and the perusal of available literature shows that most of the attributes included in the study were *expost facto* in nature and in *expost facto* studies the chance for manipulation by the researcher is very less. The study was conducted in Palakkad district. A multistage sampling procedure was followed for selection of samples for the study. Out of the 13 developmental blocks five were selected based on the criteria of highest agricultural predominance and presence of at least three production systems out of five envisaged in the study namely rice based, homestead based mixed farming system, plantation including spices, seasonal crops and annual crops. One of the blocks was selected to represent one agro eco zone. Four panchayats were selected within each block based on the same criteria of highest agricultural predominance and presence of at least three production systems out of five. Thus 20 panchayats were included for the study.

The objectives of the study necessitated the involvement of three types of respondents viz.,farmers, extension personnel and scientists. These three groups were referred as Farmers Sub System (FSS), Extension Sub System (ESS) and Research Sub System (RSS) respectively.

There were 34 ITK practices in coconut, which were agreed as good practices by FSS and ESS and supported by RSS with rationalization. These practices were documented. In ginger six ITK practices were documented after evaluation by FSS and ESS and rationalization by scientists. In pepper five ITK practices were documented after evaluation by farmers and extension personnel and rationalization by scientists.

Similar work can be done in other districts of Kerala so that a comprehensive ITK package can be developed. It was a must because almost all ITKs were location specific.

Those ITKs, which were rated as good by the FSS, ESS and RSS, can be blended with modern technology and can be fed back to the farmers. The ITKs, which were not rationalized by the scientists but considered as good by the farmers, can be selected for further study.The correct dosage and other details like time of application and method of application can be developed for each ITK so that it will become more specific. Those ITKs, which were fool proof, can be included in the package of practices for the corresponding production systems.